



Indonesian Society of Hypertension
Perhimpunan Dokter Hipertensi Indonesia

19th InaSH

SCIENTIFIC MEETING

**Hypertension Control and Prevention of
Cerebro-Cardio-Renovascular Disease
through Multidisciplinary Collaboration**

F E B
21-23
2025

**SHERATON GRAND GANDARIA CITY
JAKARTA**

Jl. Sultan Iskandar Muda, Kebayoran Lama Utara
Kebayoran Lama, Jakarta Selatan

Program Book



+62 21 573 4978



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www.inash.or.id

WELCOME MESSAGE

Indonesian Society of Hypertension is an organization committed to continuously promote scientific exchange on every aspects of hypertension and its related complications, as the world's largest burden of non communicable diseases. It is through our annual scientific meeting, the stakeholders of hypertension in Indonesia meet to showcase current innovations on clinical, population and basic science research in this field. The meeting provide a dynamic forum for researchers, clinicians, academics, health practitioners and also the industry to discuss current challenges and also forge collaboration with a shared goal of making progress in the subject of blood pressure control. Our annual conference is historically met with enthusiasm of all parties involved, with over 1500 attendees and more than 100 faculty members and research presenters each year.

This year in our 19th of Annual Scientific Meeting, we plan to continue our tradition as the leading scientific event on hypertension in Indonesia, but with a twist. We will transform our platform to a full offline conference.

By engaging with our audience through multiple online platforms, we are confident that The 19th Annual Meeting of Indonesian Society on Hypertension will be able to reach a wider attendance, even in remote corners of Indonesia. We look forward to welcome our industry partners to once again, set up a world class scientific meeting on hypertension in Indonesia together. Join us in this opportunity to become a part of the first offline conference of Indonesian Society of Hypertension.

Regards,



Ni Made Hustrini, MD
Chairperson - Organizing Committee
The 19th InaSH Scientific Meeting 2025



Afiatin, MD
Chairperson - Scientific Committee
The 19th InaSH Scientific Meeting 2025

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ORGANIZING COMMITTEE

Chairman	: Ni Made Hustrini, MD
Co - chairman	: Aryatama, MD
Secretary	: Anandhara Indriani, MD
Organizing Committee	
Treasurer	: Ekawati Dani Yulianti, MD

Scientific committee

Chairman	: Afiatin, MD, PhD
Members	: Arieska Ann Soenarta, MD Pranawa Martosuwignyo, MD Tunggul D. Situmorang, MD Prof Yuda Turana, MD, PhD Erwinanto, MD Eka Harmeiwaty, MD Antonia Anna Lukito, MD, PhD Djoko Wibisono, MD A. Sari S. Mumpuni, MD Artaria Tjempakasari, MD, PhD Amanda Tiksnadi, MD, PhD Siska Suridanda Danny, MD

Workshops	: Celly Anantaria Atmadikoesoemah, MD Aryatama, MD Paskariatne Probo Dewi Yamin, MD Dimas Septiar, MD
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Young Investigator Award	: Prof Saifur Rohman, MD, PhD Prof Syahrul Gazali, MD, PhD Maruhum Bonar Marbun, MD, PhD Bambang Widyantoro, MD
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Poster	: Artaria Tjempakasari, MD, PhD Rakhmat Hidayat, MD, PhD BRM. Ario Soeryo Kuncoro, MD Oryza Gyragus Prabu, MD
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Trigger Quiz	: I Made Putra Swi Antara, MD Tities Anggraeni Indra, MD Abdul Wahid Indrajaya, MD
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ORGANIZING COMMITTEE

Publication	: Badai Bhatara Tiksnadi, MD Adrianus Kosasih, MD Dinda Diafiri, MD Tities Anggraeni Indra, MD
Exhibition	: Frits RW Suling, MD Oryza Gyragus Prabu, MD
Registration & Web / IT	: Estu Rudiktyo, MD I Made Putra Swi Antara, MD David, MD
Venue & Accomodation	: Rarsari Soerarso Pratikto, MD
Dinner/Industrial Meeting	: Afiatin, MD, PhD Anandhara Indriani, MD

ACKNOWLEDGEMENT

The 19th Scientific Meeting on Hypertension of Indonesian Society of Hypertension Organizing Committee expresses sincere gratitude to the following companies for their support of the meeting:



Mitsubishi Tanabe Pharma Indonesia



KALBE

ACKNOWLEDGEMENT

Sponsors :

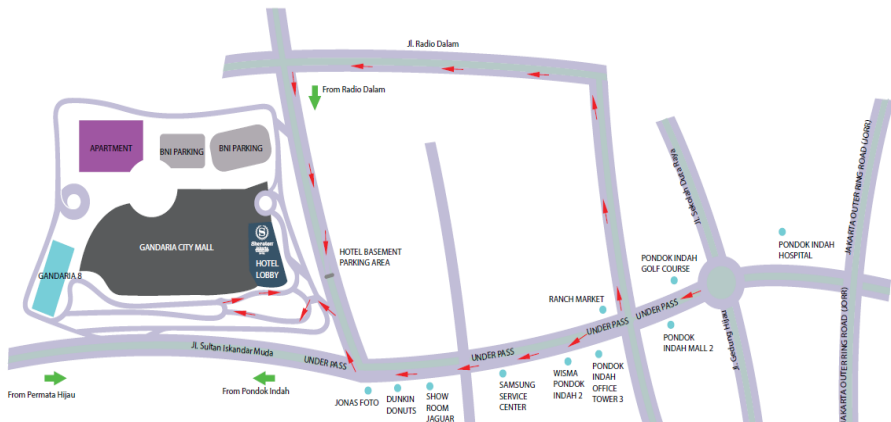
PT. Omron Healthcare Indonesia
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PT. Dixa Medica Indonesia
PT. Ferron Pharmaceuticals
PT. Fahrenheit Indonesia

GENERAL INFORMATION

Name of event : 19th Scientific Meeting of the Indonesian Society of Hypertension

Date : February 21st – 23rd, 2025

Venue : Sheraton Grand Jakarta Gandaria City Hotel
Jl. Sultan Iskandar Muda, Kebayoran
Jakarta, 12240, Indonesia
Phone: +62 21 806 30888



GENERAL INFORMATION

IMPORTANT DATES & VENUE

19 th InaSH Workshop	February 21 st , 2025
19 th Scientific Meeting of InaSH	February 22 nd – 23 rd , 2025

InaSH Business Meeting	February 21 st , 2025 Meeting Room VI	19.00 hrs
Opening Ceremony	February 22 nd , 2025 Ballroom 2	09.30 hrs
InaSH Consensus Launching	February 23 rd , 2025 Ballroom 2	14.30 hrs
Young Investigator Award	February 22 nd , 2025 Meeting Room III	10.30 hrs
Trigger Quiz Competition	February 22 nd , 2025 Meeting Room VI	10.30 hrs

Workshop of InaSH (WS):

Targeted Hypertension Care : Tailoring Treatment Across Multiple Conditions

February 21 st , 2025	Ruby Ballroom	08.00 hrs
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Challenges in Hypertension : How to Session

February 21 st , 2025	Sapphire Ballroom	08.00 hrs
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Workshop of Hypertension by OMRON Academy

February 21 st , 2025	Emerald Ballroom	08.00 hrs
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GENERAL INFORMATION

DAILY VENUE

Registration	LOVE Lobby – Main Lobby Hotel, G Floor
Plenary Session	Ballroom 2,
Symposium	Ballroom 1, Ballroom 2, Ballroom 3
Slide Counter	Ruby Foyer
Moderated Poster Section	Ballroom 1 Foyer
Poster Section	Emerald - Sapphire Foyer
Secretariat	Meeting Room 1
Faculty Lounge	Meeting Room 2
Musholla	3 rd Floor

Language

The official language of meeting is Bahasa Indonesia or English.
Translation is not provided.

Congress Badge

Congress badge should be worn during all congress. No Badge, No Entry.

Certificate

Certificate of Attendance can be downloaded through www.inash2025.id after the participant complete the congress questionnaire.

Certificate with Ministry of Health Accreditation can be downloaded through SATU SEHAT application. This certificate can only be downloaded if the participant complete the whole congress attendance and submit the quiz.

CHAIRPERSON GUIDELINES

- Kindly be in the room at least 10 minutes before the session begins
- Respect the timing allowed to the session and to each presentation
- Language for all presentations, discussions and questions as follows:
19th InaSH Meeting & Workshop : Bahasa Indonesia or English

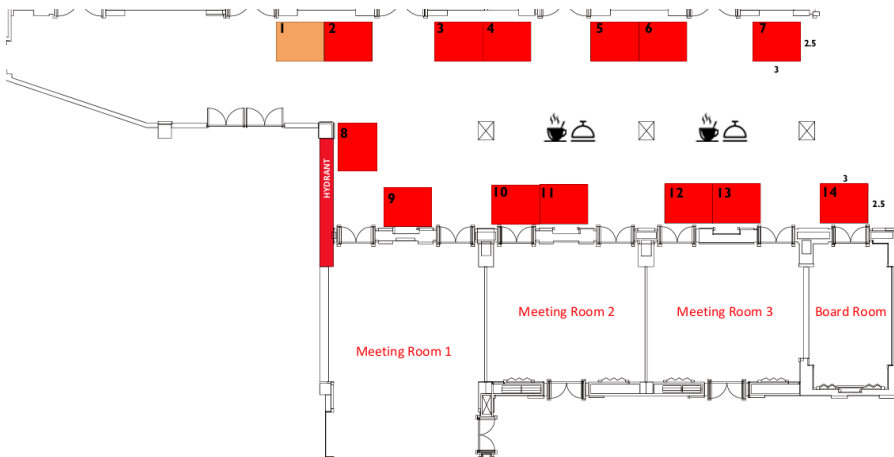
GENERAL INFORMATION

SPEAKER GUIDELINES

- All presentation slides should be submitted in the Slide Counter (Ruby Foyer) at least 3 hours before the presentation
- Speakers can check their slides in the Slide Counter by asking assistance from the audio visual operators
- Personal computers cannot be connected directly on the computer of in the room of each session
- All presentation slides should be presented in the 19th Scientific Meeting of InaSH basic slide template
- We kindly request speakers to provide the slides in a Windows compatible format
- Kindly be in the room at least 10 minutes before the session begins and respect the timing allowed for your presentation
- Language for all presentations, discussions and questions as follows:
19th InaSH Meeting & Workshop : Bahasa Indonesia or English

GENERAL INFORMATION

LIST OF EXHIBITORS



COMPANY	BOOTH
Tanabe Mitsubishi	3
Servier Indonesia	3
Abbott Indonesia	3
Omron Healthcare Indonesia	3
Astra Zeneca	3
Novonordisk Indonesia	3
Hetero	3
Fahrenheit Indonesia	3
Otto Indonesia	3
Dexa Medica	3
Aurogen Indonesia	3
Ferron Pharmaceuticals Indonesia	3
Kalbe Farma	3

GENERAL INFORMATION

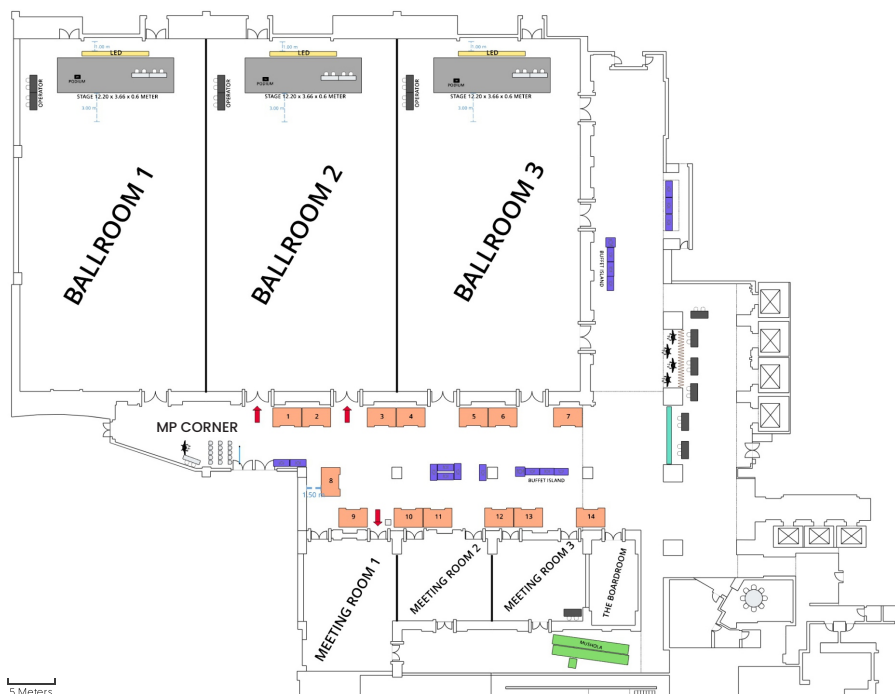
EXHIBITION MAP



19th SCIENTIFIC MEETING OF INDONESIAN SOCIETY OF HYPERTENSION 2025

Hypertension Control and Prevention of Cerebro-Cardio-Renovascular Disease through Multidisciplinary Collaboration

Sheraton Grand Gandaria City Hotel Jakarta, Indonesia
February 21st - 23rd, 2019



PROGRAM AT GLANCE

THE 19th SCIENTIFIC MEETING ON HYPERTENSION Hypertension Control and Prevention of Cerebro-Cardio-Renovascular Disease through Multidisciplinary Collaboration

Workshop

Friday, February 21st, 2025

Scientific Session

Saturday, February 22nd, 2025

Sunday, February 23rd, 2025

Workshop

Friday, February 23rd, 2024

08.00 - 14.30

Workshop 1

Targeted Hypertension
Care : Tailoring Treatment
Across Multiple
Conditions

Interactive Case Discussion

08.00 - 14.30

Workshop 2

Challenges in
hypertension :
How to session

Interactive Case Discussion

08.00 - 14.30

Workshop 3

WORKSHOP OF
HYPERTENSION BY
OMRON ACADEMY

Interactive Case Discussion

19.00

Business Meeting - InaSH

PROGRAM AT GLANCE

Scientific Program

Saturday, February 22nd, 2025

	BALLROOM 1	BALLROOM 2	BALLROOM 3			
07.50 - 08.00	Ethical Issues in Managing Hypertension					
08.00 - 08.40	MORNING TALKS ON HYPERTENSION Resistant Hypertension: A Practical Clinical Approach for Diagnosis and Treatment					
08.40 - 09.30		PLENARY SESSION 1				
09.30 - 10.00		OPENING CEREMONY				
10.00 - 10.30	COFFEE BREAK					
10.30 - 11.30	Symposium 1 Consequences of Hypertension to the Brain, Heart and Kidney: Strategies to Improve Outcomes	Symposium 2 Hypertension and Dyslipidemia as a Double Burden of Cerebro Vascular Disease	Symposium 3 Navigating the Complex Relationship: Heart Failure and Cardiorenal Syndrome			
11.30 - 12.30	Lunch Symposium 1 JOINT SESSION InaSH - ISH and HOPE ASIA NETWORK	Lunch Symposium 2 Mastering Hypertension: Innovations and Strategies for Optimal Blood Pressure Control	Lunch Symposium 3 Pioneering Cerebrocardiorenal Complications in Hypertension			
12.30 - 13.30	LUNCH					
13.30 - 14.30	Symposium 4 ACE Inhibitor and Beta Blocker in the Management of Hypertension	Symposium 5 EXPLORING GUT HYPERTENSION AXIS: INTEGRATING SINGLE PILL COMBINATIONS FOR OPTIMIZED CV MANAGEMENT	Symposium 6 Burden of Hypertension to Brain, Heart and Kidney			
14.30 - 15.30	Symposium 7 THE INNOVATIONS IN HYPERTENSION MONITORING	Symposium 8 Evidence to Practice: Renal Denervation as a treatment for Hypertension	Symposium 9 Management of ASCVD and Type 2 Diabetes			
15.30 - 15.45	WRAP UP					

REGISTRATION

MODERATED POSTER (MP Corner / In front Ballroom 1)
YOUNG INVESTIGATOR AWARD (Mutiatara 3)

TRIGGER QUIZ (Mutiatara 8)

PROGRAM AT GLANCE

Scientific Program

Sunday, February 23rd, 2025

		BALLROOM 1	BALLROOM 2	BALLROOM 3		
08.00 - 09.00	REGISTRATION		PLENARY SESSION 2		MODERATED POSTER (MP Corner / In front Ballroom 1)	TRIGGER QUIZ (Mutihara 3)
09.00 - 9.30			InaSH AWARD			
09.30 - 10.30		Symposium 10 HYPERTENSION IN THE EARLY AGE AND PREGNANCY	Symposium 11 JOINT SESSION InaSH APSH KSH OBESITY, METABOLIC SYNDROME AND HYPERTENSION	Symposium 12 HYPERTENSION IN CENTRAL AND PERIPHERAL VASCULAR DISEASE		
10.30 - 11.00		COFFEE BREAK				
11.00 - 12.00		Symposium 13 Secondary Prevention on ASCVD	Symposium 14 State of the Art Anti Hypertensive Combination	Symposium 15 CCB: Beyond Blood Pressure Lowering Effect to Atherogenesis		
12.00 - 13.00		LUNCH				
13.00 - 14.00		Lunch Symposium 4 ESC 2024 HYPERTENSION GUIDELINES	Lunch Symposium 5 HYERTENSION IN ELDERLY	Lunch Symposium 6 HYPERTENSION AND CHRONIC KIDNEY DISEASE		
14.00 - 14.30		WRAP UP				
14.30 - 15.00			LAUNCHING InaSH PRACTICAL GUIDE BOOK			
15.00 - 15.30			CLOSING REMARK			

FACULTY MEMBERS

OVERSEAS FACULTY MEMBERS



**International
Society of
Hypertension**



Prof George S. Stergiou, MD, PhD

President, International Society of Hypertension (ISH)

Chairman, STRIDE BP International Organization on Blood Pressure Measurement Methodology and Technology



Prof Hae-Young Lee, MD, PhD

Director of International Relations Committee, Korean Society of Hypertension

Department of Internal Medicine, Seoul National University College of Medicine



Prof Ji-Guang WANG, MD, PhD

Deputy President, HOPE Asia Network

President, Chinese Hypertension League



Prof Claudio Borghi, MD, PhD

Chairman of the Research, Science and Educational Committee, International Society of Hypertension (ISH)

Council Member, European Society of Hypertension

FACULTY MEMBERS



Prof Teo Boon Wee, MD

Secretary General, Asia Pacific Society of Hypertension

Secretary, Singapore Society of Hypertension

SCIENTIFIC PROGRAM

WORKSHOP

Friday, February 21st, 2025

Ruby Ballroom, Sheraton Grand Gandaria City, Jakarta

WORKSHOP 1

Targeted Hypertension Care: Tailoring Treatment Across Multiple Conditions

Chair: Tities Anggraeni Indra, MD

TIME	TOPIC	SPEAKER
08.00 - 08.30	Registration	
08.30 - 08.40	Pre Test	
08.40 - 09.00	Hypertension in High Risk Occupation	Made Junior Rina Artha, MD
09.00 - 09.30	Hypertension and Sport : Balancing Fitness and Safety	Ade Median Ambari, MD
09.30 - 10.00	Comprehensive Strategies in Managing Obesity Related Hypertension	Yulia Sofiatin, MD
10.00 - 10.15	Coffee Break	
10.15 - 10.45	Managing Hypertension in the Elderly : Promoting Healthy Aging	Abdul Wahid, MD
10.45 - 11.15	Treatment of Hypertension in Coronary Artery Disease	Sari Mumpuni, MD
11.15 - 11.30	Q&A	
11:30 - 13:00	FRIDAY PRAYING & LUNCH	
13.00 - 14.30	Interactive Case Discussion	All Speakers Dimas Septiar, MD (Case Presenter)

SCIENTIFIC PROGRAM

WORKSHOP

Friday, February 21st, 2025

Sapphire Ballroom, Sheraton Grand Gandaria City, Jakarta

WORKSHOP 2

Challenges in Hypertension: How to Session

Chair: Cep Juli, MD

TIME	TOPIC	SPEAKER
08.00 - 08.30	Registration	
08.30 - 08.40	Pre Test	
08.40 - 09.00	How to Optimize Hypertension Outcomes with Home Blood Pressure Monitoring	Triwedya Indradewi, MD
09.00 - 09.30	How to Identify and Diagnose Secondary Hypertension in Young Adults	Widodo, MD
09.30 - 10.00	Hypertension - Induced Cerebral Small Vessel Disease: How to Manage?	Paulus Anam Ong, MD
10.00 - 10.15	Coffee Break	
10.15 - 10.45	How to Manage Masked Hypertension : A Comprehensive Approach	Chandra Irwanadi Mohani, MD
10.45 - 11.15	Hypertension Mediated Organ Damage : How to Assess and Intervene	Marihot Tambunan, MD
11.15 - 11.30	Q&A	
11:30 - 13:00	FRIDAY PRAYING & LUNCH	
13.00 - 14.30	Interactive Case Discussion	Oryza Gryagus, MD (Case Presenter)

SCIENTIFIC PROGRAM

WORKSHOP

Friday, February 21st, 2025

Emerald Ballroom, Sheraton Grand Gandaria City, Jakarta

WORKSHOP 3

Workshop of Hypertension by OMRON ACADEMY

Chair: Rarsari Soearso, MD

TIME	TOPIC	SPEAKER
08.00 - 08.30	Registration	
08.30 - 09.00	Pre Test	
09.00 - 09.30	How to Assess Blood Pressure Variability	Rarsari Soearso, MD
09.30 - 10.00	The Impact of Morning Blood Pressure Surge in Cerebrovascular Disease	Eka Harmeiwaty, MD
10.00 - 10.15	Coffee Break	
10.15 - 10.45	Home Blood Pressure Variability: Risk Prediction for Cardiovascular Disease	Badai Tiksnadi, MD
10.45 - 11.15	How to Manage Blood Pressure in Chronic Kidney Disease	Nyoman Paramita Ayu, MD
11:30 - 13:00	FRIDAY PRAYING & LUNCH	
13.00 - 13.30	Hands On by OMRON	Eka Harmeiwaty, MD
13.30 - 14.30	Interactive Case Discussion : Management of Hypertension in Multiple Organ Damage	Rarsari Soearso, MD (Case Presenter)

SCIENTIFIC PROGRAM

Scientific Program

Saturday, February 22nd, 2025

Sheraton Grand Gandaria City, Jakarta

07.00 - 07.50 REGISTRATION

07.50 - 08.00 Ethical Issues in Managing Hypertension
Pukovisa Prawirohardjo, MD

MORNING TALKS

BALLROOM 2

Resistant Hypertension: A Practical Clinical Approach for Diagnosis and Treatment

Chair: Zulkhair Ali, MD

08.00 - 08.10 Interactive Case Study
Anandhara Indriani K., MD

08.10 - 08.40 Discussion
Panelists: Sari Mumpuni, MD
Chandra Irwanady Mohtani, MD
Prof Yuda Turana, MD

PLENARY SESSION 1

BALLROOM 2

Chair: Prof Wiguno Prodjosudjadi, MD

08.40 - 09.05 How to Manage Hypertension in 2025: International Consensus?
Prof George Stergiou, MD
(President - International Society of Hypertension)

09.05 - 09.30 Primordial Hypertension: Shaping National Health Strategies for Prevention and Management
Prof Teguh A. S. Ranakusuma, MD

09.30 - 10.00 **OPENING CEREMONY**

BALLROOM 2

10.00 - 10.30 **COFFEE BREAK**

SYMPOSIUM 1

BALLROOM 1

Consequences of Hypertension to the Brain, Heart and Kidney: Strategies to Improve Outcomes

Chair: Lisda Amalia, MD

10.30 - 10.45 Stroke Prevention in Heart Failure Patients

Rahmat Hidayat, MD

10.45 - 11.00 Tackling HFrEF: Tactics for Superior Long-Term Outcomes

Rossana Barack, MD

11.00 - 11.15 ARNI in Patients with HFrEF and Renal Impairment: Where Do We Stand?

Sally Nasution, MD

11.15 - 11.30 Discussion

SYMPOSIUM 2

BALLROOM 2

Hypertension and Dyslipidemia as a Double Burden of Cerebro Vascular Disease

Chair: Prof Jose Roesma, MD

10.30 - 10.45 Genetic Analyses of Lipid Risk Factors for Atherosclerosis

Prof Bambang Purwanto, MD

10.45 - 11.00 Updated Pharmacological Approaches to Hypertension Management

Yenny Kandarini, MD

11.00 - 11.15 Comprehensive Treatment of Stroke related to Hypertension and Dyslipidemia

Mursyid Bustami, MD

11.15 - 11.30 Discussion

SYMPOSIUM 3

BALLROOM 3

Navigating the Complex Relationship: Heart Failure and Cardiorenal Syndrome

Chair: Erwinanto, MD

10.30 - 10.45 Updates on Cardiorenal Continuum

Ria Bandiara, MD

10.45 - 11.00 Unlocking Hope Across Heart Failure's Ejection Fractions: Dapagliflozin's Position on Latest Guideline Therapy

Badai Tiksnadi, MD

11.00 - 11.15 Advancements in Hyperkalemia Management for Cardiorenal Syndrome: New Therapeutic Strategies

Ginnova Nainggolan, MD

11.15 - 11.30 Discussion

LUNCH SYMPOSIUM 1

BALLROOM 1

JOINT SYMPOSIUM InaSH - ISH - HOPE ASIA NETWORK

Advances in the Treatment Strategies in Hypertension: Present and Future

Chair: *Anwar Santoso, MD*

11.30 - 11.50 Current Issues and Future Perspectives in Blood Pressure Measurement and Hypertension Diagnosis

Prof George Stergiou, MD

(President - International Society of Hypertension)

11.50 - 12.10 Use of Angiotensin-Receptor Neprilysin Inhibitor for the Management of Hypertension

Prof Jiguang Wang, MD

(Deputy President - HOPE Asia Network)

12.10 - 12.30 Discussion

LUNCH SYMPOSIUM 2

BALLROOM 2

Mastering Hypertension: Innovations and Strategies for Optimal Blood Pressure Control

Chair: *Prof Yuda Turana, MD*

11.30 - 11.50 Navigating Hypertension - Integrative Strategies from the ESH 2024 MASTERplan

Prof Claudio Borghi, MD

(European Society of Hypertension / International Society of Hypertension)

11.50 - 12.10 Prevent Cardio Renal Disease in Its Tracks - Power to Control Blood Pressure

Djoko Wibisono, MD

12.10 - 12.30 Discussion

LUNCH SYMPOSIUM 3

BALLROOM 3

Pioneering Cerebrocardiorenal Complications in Hypertension

Chair: *Ekawati Dani Yulianti, MD*

11.30 - 11.45 Guardian of the heart - our superpower in managing all spectrum HF

Siska Suridanda Dany, MD

11.45 - 12.00 Protector of the Kidney - Easing Our CKD Patients

Pranawa Martosuwignyo, MD

12.00 - 12.15 Tackling the Scourge of CVD and CKD with the Duo Force Yan Herry, MD

12.15 - 12.30 Discussion

12.30 - 13.30 LUNCH

SYMPOSIUM 4

BALLROOM 1

ACE Inhibitor and Beta Blocker in the Management of Hypertension

Chair: Ni Made Hustrini, MD

13.30 - 13.45 Interaction Between the Sympathetic Nervous System and Renin Angiotensin Aldosterone in Hypertension
Zulkhair Ali, MD

13.45 - 14.00 Upstream and Downstream Pathway Intervention in controlling Hypertension and Preventing the complication: The Power of ACE-i
Prof Saifur Rohman, MD

14.00 - 14.15 The Role of Vasodilator Beta Blocker as Anti Hypertensive Agents in Specific Population
Paskariatne Probodewi, MD

14.15 - 14.30 Discussion

SYMPOSIUM 5

BALLROOM 2

Exploring Gut Hypertension Axis: Integrating Single Pill Combinations for Optimized CV Management

Chair: Nyoman Paramita Ayu, MD

13.30 - 13.45 Exploring New Therapeutic Options of Microbiota - Derived Metabolites in Blood Pressure Regulation
Afiatin, MD

13.45 - 14.00 Understanding the Link Between TMAO and Cardiovascular Disease: From Pathophysiology to Therapeutic Strategies
Bambang Widyantoro, MD, PhD

14.00 - 14.15 Improving Hypertension Treatment and Control: The Challenge and How to Overcome it with Single Pill Combination
Prof Haerani Rasyid, MD

14.15 - 14.30 Discussion

SCIENTIFIC PROGRAM

SYMPOSIUM 6

BALLROOM 3

Burden of Hypertension to Brain, Heart and Kidney

Chair: Santoso Karo Karo, MD

Co-Chair: Dinda Diafiri, MD

13.30 - 13.45 New Insight into Cerebrovascular Pathophysiology in Hypertension

Cep Juli, MD

13.45 - 14.00 Optimizing Telmisartan in Managing Hypertension: Beyond Blood Pressure Lowering Effect

Pringgodigdo Nugroho, MD

14.00 - 14.15 How to Improve Management of Hypertension Related Proteinuria

Tunggul D. Situmorang, MD

14.15 - 14.30 Discussion

SYMPOSIUM 7

BALLROOM 1

The Innovations in Hypertension Monitoring

Chair: Tunggul D. Situmorang, MD

14.30 - 14.45 Machine Learning Models for Early Detection and Diagnosis in Hypertension

I Made Putra Swi Antara, MD

14.45 - 15.00 Cuffless Blood Pressure Monitoring Device for Better Hypertension Control

Prof Hae Young Lee, MD

(Korean Society of Hypertension)

15.00 - 15.15 The Early Echocardiographic Signs in Hypertensive Heart Disease

BRM Ario Soeryo Kuncoro, MD

15.15 - 15.30 Discussion

SYMPOSIUM 8

BALLROOM 2

Evidence to Practice: Renal Denervation as a Treatment for Hypertension

Chair: Amanda Tiksnadi, MD

14.30 - 14.45 Recent Update on Resistant Hypertension

Bagus Andi Pramono, MD

14.45 - 15.00 The Evidence: The Spyral HTN Clinical program

Faris Basalamah, MD

15.00 - 15.15 Selecting the Right Patients for Renal Denervation

Maruhum Bonar Marbun, MD

15.15 - 15.30 Discussion

SCIENTIFIC PROGRAM

SYMPOSIUM 9

BALLROOM 3

Management of ASCVD and Type 2 Diabetes

Chair: Yulia Sofiatin, MD

14.30 - 14.45 Managing Hypertension in Diabetes: Strategies for Integrated Care and Optimal Outcomes

Prof Rudi Supriadi, MD, PhD

14.45 - 15.00 Managing People with ASCVD and Type 2 Diabetes: What Do Recent Guidelines Say

Antonia Anna Lukito, MD, PhD

15.00 - 15.15 GLP-1 RA Semaglutide Once-Weekly: A Novel Treatment Choice for People with ASCVD and T2D

Dicky Tahapary, MD, PhD

15.15 - 15.30 Discussion

15.30 - 15.45 **WRAP UP**

BALLROOM 2

15.45 - 16.00 **CLOSING**

BALLROOM 2

SCIENTIFIC PROGRAM

Scientific Program

Sunday, February 23rd, 2025

Sheraton Grand Gandaria City, Jakarta

PLENARY SESSION 2

BALLROOM 2

- Chair: Pringgodigdo Nugroho, MD*
- 08.00 - 08.30 Environmental Challenges in Managing Hypertension in Indonesia: Perspective from the Policy Maker
Siti Nadia Tarmizi, MD
(Director for Prevention and Control of Direct Communicable Diseases - Ministry of Health)
- 09.30 - 09.00 Perspective of Hypertension Management in Asia
Prof Jiguang Wang, MD
(Deputy President - HOPE Asia Network)

09.00 - 09.30 InaSH AWARD

BALLROOM 2

SYMPOSIUM 10

BALLROOM 1

Hypertension in the Early Age and Pregnancy

- Chair: Frits R W. Suling, MD*
- 09.30 - 09.45 Hypertension in Pediatric Populations: Causes, Consequences and Prevention Strategies
Prof Dany Hilmanto, MD
- 09.45 - 10.00 Hypertension in Adolescent Populations: Strategies for Effective Management
Radityo Prakoso, MD
- 10.00 - 10.15 Management of Hypertension in Pregnancy: Optimizing Maternal and Fetal Outcomes
Windi Nurdyawan, MD
- 10.15 - 10.30 Discussion

SYMPOSIUM 11

BALLROOM 2

JOINT SYMPOSIUM InaSH - APSH - KSH

Obesity, Metabolic Syndrome and Hypertension

Chair: *Arieska Ann Soenarta, MD*

09.30 - 09.45 Improving Hypertension Control Using Impedance
Cardiography

Prof Teo Boon Wee, MD

(Asia Pacific Society of Hypertension)

09.45 - 10.00 Long Term Impact of New-Onset Diabetes Mellitus in
Hypertensive Patients

Prof Hae Young Lee, MD

(Korean Society of Hypertension)

10.00 - 10.15 Obesity and Hypertension: Where do Indonesia stand?

Anwar Santoso, MD, PhD

10.15 - 10.30 Discussion

SYMPOSIUM 12

BALLROOM 3

Hypertension in Central and Peripheral Vascular Disease

Chair: *Afiatin, MD*

09.30 - 09.45 The Effects of Hypertension on Cerebral Autoregulation
and Brain Health

Ekawati Dani Yulianti, MD

09.45 - 10.00 Managing Hypertension to Mitigate Dementia Risk and
Treatment Strategies

Prof Syahrul Gazali, MD

10.00 - 10.15 Hypertension and Peripheral Arterial Disease

Hananto Andriantoro, MD

10.15 - 10.30 Discussion

10.30 - 11.00 **COFFEE BREAK**

SCIENTIFIC PROGRAM

SYMPOSIUM 13

BALLROOM 1

Secondary Prevention on ASCVD

Chair: Yenny Kandarini, MD

11.00 - 11.15 Lipid-Lowering Combination Therapy: What The Guidelines Say?

Prof Bambang Budi Siswanto, MD

11.15 - 11.30 Lipid Management in Stroke Therapy : Current Strategies, Challenger and Future Directions

Valentinus Besin, MD

11.30 - 11.45 The Role of Lipid-Lowering Combination Therapy in Managing Complex Cardiovascular Conditions

Adrianus Kosasih, MD

11.45 - 12.00 Discussion

SYMPOSIUM 14

BALLROOM 2

State of the Art Anti Hypertensive Combination

Chair: Rossana Barack, MD

11.00 - 11.15 Rationale of Anti Hypertensive Combination

Eka Harmeiwaty, MD

11.15 - 11.30 How Can We Do Better in Hypertension Management with FixedDose Combination

Syafrizal Nasution, MD

11.30 - 11.45 Targeting Cardiovascular Risk in Hypertension : A Pathway to Better Outcomes

Celly Anantaria, MD

11.45 - 12.00 Discussion

SYMPOSIUM 15

BALLROOM 3

CCB: Beyond Blood Pressure Lowering Effect to Atherogenesis

Chair: Eka Musridharta, MD

11.00 - 11.15 Vascular Calcium Channel and High Blood Pressure

Erwinanto, MD

11.15 - 11.30 The Evolution of CCB as Anti Hypertensive Agent

Aryatama, MD

11.30 - 11.45 The Role of Amlodipine in Blood Pressure Control Triage: Achieving Cardiovascular Protection

Ria Bandiara, MD

11.45 - 12.00 Discussion

12.00 - 13.00 **LUNCH**

SCIENTIFIC PROGRAM

LUNCH SYMPOSIUM 4

BALLROOM 1

ESC 2024 Hypertension Guidelines

- Chair: *Antonia Anna Lukito, MD, PhD*
- 13.00 - 13.20 What's New on ESC 2024 Guidelines: Introducing Elevated Blood Pressure
Estu Rudiktyo, MD
- 13.20 - 13.40 Pathophysiology and Clinical Consequences of Elevated Blood Pressure
Lestariningsih, MD
- 13.40 - 14.00 Discussion

LUNCH SYMPOSIUM 5

BALLROOM 2

Hypertension in Elderly

- Chair: *Prof Suhardjono, MD*
- Co-Chair: *Titites Anggraeni Indra, MD*
- 13.00 - 13.20 Hypertension in Elderly: How to Diagnose
Artaria Tjempakasari, MD
- 13.20 - 13.40 Updates on Guidelines for the Management of Hypertension in Older People
Prof Yuda Turana, MD, PhD
- 13.40 - 14.00 Discussion

LUNCH SYMPOSIUM 6

BALLROOM 3

Hypertension and Chronic Kidney Disease

- Chair: *Adre Mayza, MD*
- 13.00 - 13.20 The Effects of Hypertension on Renal Blood Flow
Ni Made Hustrini, MD
- 13.20 - 13.40 Managing Hypertension in Kidney Transplant Recipient
Prof Endang Susalit, MD
- 13.40 - 14.00 Discussion

14.00 - 14.30 WRAP UP

14.30 - 15.00 LAUNCHING InaSH PRACTICAL GUIDE BOOK

BALLROOM 2

15.00 - 15.30 CLOSING CEREMONY

BALLROOM 2

PLENARY SESSION 1

How to Manage Hypertension in 2025: International Consensus?**George S. Stergiou, MD, PhD, FRCP***Professor of Medicine & Hypertension**University of Athens, Greece**President International Society of Hypertension*

Hypertension remains a major and growing public health issue, as it is responsible for one out of five deaths globally. It affects about 30% of the population worldwide, of whom almost 50% are undiagnosed and about 20% are controlled. In the last years, several prestigious organizations have published extensive guidelines for the management of hypertension. All of them are important scientific statements providing evidence-based recommendations. Applying any of them in clinical practice will have enormous benefits in preventing cardiovascular disease in individuals with hypertension. There are several differences among these guidelines in their recommendations, which however are mostly technical and there is reasonable agreement among them on the key aspects of management with minor differences which have little impact on clinical practice. Thus, there is a general consensus on the definition of hypertension, on the need for treatment decisions to be confirmed by out-of-office blood pressure measurements, the blood pressure goal of therapy to be less than 130/80 mmHg in most patients, and a stepwise treatment strategy starting with two-drug combination in most cases using primarily RAS blockers with CCBs or diuretics. Despite the huge amount of good quality research and the international consensus on management, the control rate of hypertension in the general population is poor. Thus, although the guidelines era has been very important for disseminating evidence-based recommendations for hypertension, its potential seems to be exhausted. A paradigm shift focusing on novel ways for disseminating information and novel implementation strategies need to be developed aiming at improving the control of hypertension globally.

PLENARY SESSION 1

**PRIMORDIAL HYPERTENSION:
Shaping National Health for Prevention and Strategies
Management****Teguh A.S. Ranakusuma***Jakarta - Indonesia***Abstract**

Indonesia is the fourth most populous country in the world, with a population of more than 270 million across 17,000 islands. It is one of the emerging market economies in the world and the largest in Southeast Asia. As an upper-middle income country and member of the G20, Indonesia is classified as a newly industrialized country. Hypertension affected around 34% of Indonesian adults, approximately 63.3 million people and led to about 427,000 deaths in 2018 and the prevalence remains high at 29.2% in 2023. In this time are 290.150.016 current population in Indonesia (countrysmeters.info, 2025). The heart, kidney, brain, and arterial blood vessels are prime targets of hypertensive damage. Uncontrolled hypertension accelerates the damage to these organs and results in eventual organ failure and cardiovascular death and disability, and cost. The best solution in Indonesia is preventive public health program in early phase of hypertension such as at the phase of primordial hypertension, which requires public political effort.

SYMPOSIUM 1

Stroke Prevention in Heart Failure Patients**Rakhmad Hidayat****Abstract**

Stroke is the leading cause of disability, and the second leading cause of death in population age above 60 globally. Recent studies found that heart failure (HF) contributes to approximately 9% of all stroke cases. Moreover, HF patients are two to three times more likely to develop stroke, while 10-24% patients with stroke also have HF. The relationship between HF and stroke is influenced by shared risk factors and three primary mechanisms: thromboembolism, cerebral hypoperfusion, and atherosclerosis, following Virchow's triad. Some studies suggest that the CHA₂DS₂-VASc score, originally designed for atrial fibrillation (AF), may also be useful for stroke risk stratification in HF patients without AF and even in the general population. Pharmacological strategies for stroke prevention in HF include anticoagulation (warfarin, non-vitamin K oral anticoagulants [NOACs]), cholesterol management (statins), and blood pressure control (ACE inhibitors, beta-blockers). A meta-analysis of four clinical trials evaluating NOACs (dabigatran, rivaroxaban, apixaban, edoxaban) suggests that these agents may be superior to warfarin in both efficacy and safety. High-dose NOACs in AF and HF patients reduced stroke or systemic embolic events by 14% (OR: 0.86; 95% CI: 0.76–0.98) and major bleeding events by 24% (OR: 0.76; 95% CI: 0.67–0.86) compared to warfarin. The use of NOACs shows potential as an effective stroke prevention strategy in HF patients, particularly those at high risk. However, further research is needed to validate these findings and optimize prevention strategies in this population.

SYMPOSIUM 1

**ARNI in Patients with HFrEF and Renal Impairment:
Where do we stand?****Dr. dr. Sally Aman Nasution, SpPD-KKV, FINASIM, FACP**

Heart failure with reduced ejection fraction (HFrEF) remains a significant challenge, particularly in patients with concurrent renal impairment. Traditional therapies, such as ACE inhibitors and angiotensin receptor blockers (ARBs), have long been the cornerstone of HFrEF management. However, new ESC guideline mention the use of angiotensin receptor-neprilysin inhibitors (ARNI). Sacubitril/valsartan, the primary ARNI therapy, has demonstrated superior efficacy compared to ACE inhibitors in reducing cardiovascular mortality and hospitalizations in patients with HFrEF. However, concerns remain regarding its use in patients with renal dysfunction, particularly in relation to nephrotoxicity, hyperkalemia risk, and potential worsening of renal function.

This presentation explore the role of ARNI and its clinical implementation in managing patients with heart failure with reduced ejection fraction (HFrEF) and renal impairment. Multiple clinical trials highlight ARNI's superiority over ACE inhibitors, reducing cardiovascular mortality, heart failure hospitalizations, and renal decline, even in patients with chronic kidney disease. Guidelines recommend their use with tailored dosing and monitoring to optimize safety and efficacy.

SYMPOSIUM 2

Genetic Analysis of Lipid Risk Factors for Atherosclerosis**Prof.Dr. dr. HM. Bambang Purwanto, SpPD KGH FINASIM****Abstract**

The incidence of atherosclerosis leading to complications: Chronic kidney disease, coronary heart disease, and infarction stroke incidence is increasing. Genetic factors associated with metabolic syndrome, especially hyperlipidemia have been proven. If one parent (genetically) suffers from metabolic syndrome including hyperlipidemia there will be a 30-50% risk of passing it on to their offspring, but if both parents suffer from the disease the risk of passing it on to the child increases to 90%. The genetics of each race (Caucasian, Negro, Asian, etc.) differ by 1%, genetics are related to chromosomes, DNA, and RNA. RNA will express protein, which will be the material for forming receptors, intracellular enzymes, and others. Receptors on the intestinal epithelial membrane and intrahepatic enzymes will affect lipid absorption and metabolism, resulting in the possibility of hyperlipidemia.

Some of the mechanisms of Atherosclerosis include genetic, inflammatory, endothelial dysfunction, hypercoagulation, plaque formation, collagen accumulation, vascular remodeling, and deposition of calcium phosphate salts in the subendothelium. Hyperlipidemia is directly related to plaque formation and hypercoagulation. Some of these mechanisms are interconnected.

Keywords: Genetic, Hyperlipidemia, Atherosclerosis, renal, cardiac, cerebrovascular.

SYMPOSIUM 2

Updated Pharmacological Approach to Hypertension Management

Yenny Kandarini

Division of Nephrology and Hypertension

Department of Internal Medicine. Faculty of Medicine Udayana

University / Ngoerah Hospital Denpasar

Abstract

Hypertension remains the leading global risk factor for death, increasing the CVD risk and leading to heart failure mortality. Due to the widespread use of antihypertensive drugs, global mean blood pressure (BP) has remained constant or slightly decreased over the past four decades. In contrast, the prevalence of hypertension has increased, especially in low- and middle-ranking countries (LMICs).

Early detection and management of hypertension are important to reduce cardiovascular risk and mortality, minimize/ prevent irreversible changes in the systemic vasculature. Current guidelines describe the diagnosis of hypertension levels and the target blood pressures to be achieved. In general, the target blood pressure for adults in the general population is 120–140 mmHg for systolic blood pressure and 70–80 mmHg for diastolic blood pressure. Management of hypertension can be done with combination of non-pharmacological and pharmacological approach.

Pharmacologic lowering of BP was effective in preventing major cardiovascular disease events both in people with or without previous cardiovascular disease. Most patients require at least two antihypertensive agents, either initially as combination therapy or as adjunctive therapy if monotherapy and lifestyle changes do not achieve adequate blood pressure control. Four major classes of drugs are used in combination therapy for the treatment of hypertension: thiazide diuretics, calcium channel blockers, angiotensin-converting enzyme inhibitors (ACEIs), and angiotensin receptor blockers (ARBs). ACEIs and ARBs should not

be used together. Treatment for patients with chronic kidney disease and proteinuria should include an ACEI or ARB plus a thiazide diuretic or calcium channel blocker. Patients with diabetes mellitus should be treated similarly to those without diabetes unless proteinuria is present, in which case combination therapy should include an ACEI or ARB. The BP lowering significantly reduces the risk of MACE, coronary heart disease, stroke, heart failure, and all-cause mortality. Telmisartan, as an evidence-based medicine, reduce CV risk, improve patient adherence with once daily treatment and provides BP control over 24 hours.

Compliance with antihypertensive medication by patients should also be an important point for all clinicians, collaboration between all stakeholders including clinicians, pharmacists, patients and families is very important in increasing the success rate of hypertension control.

Keywords: Hypertension, Target blood pressure, Antihypertensive drugs.

SYMPOSIUM 3

Updates on Cardiorenal Continuum

Ria Bandiara

The incidence of cardiovascular disease (CVD), metabolic diseases, and renal disease have become a health challenge related to high morbidity and mortality rates worldwide. The cardiorenal continuum has been updated to become cardiovascular-kidney-metabolic (CKM) syndrome as a systemic condition arising from the pathophysiological interaction between metabolic risk factors such as obesity and diabetes mellitus (DM), chronic kidney disease (CKD) and CVD. This condition can cause multi-organ dysfunction and cardiovascular mortality. Basically, the conditions of obesity, DM, and hypertension separately and individually make patients have a risk of CVD, but if these conditions are compounded by the presence of renal disease, the risk doubles significantly. More clarity on the definition of CKM syndrome, an approach to CKM staging that

encourages prevention throughout the life course, prediction algorithms that incorporate the exposures and outcomes most pertinent to cardiovascular-kidney-metabolic health, and strategies for the prevention and management of cardiovascular disease in relation to cardiovascular-kidney-metabolic health that takes into account harmonization across major subspecialty guidelines and emerging scientific evidence are all vital for improving cardiovascular-kidney-metabolic health and associated outcomes in the population. As one of the components of comprehensive CKM management, pharmacotherapy using the co-utilization of sodium-glucose cotransporter-2 (SGLT-2) inhibitors and glucagon-like peptide-1 receptor agonists (GLP-1RA) plays a role at all stages of CKM to improve CKM syndrome outcomes. Incorporating socioeconomic determinants of health into cardiovascular-kidney-metabolic syndrome care models is also essential, as is promoting patient-centered interdisciplinary care strategies to lessen care fragmentation and reach better outcomes.

Keywords: cardiovascular-kidney-metabolic syndrome, cardiorenal syndrome, metabolic syndrome.

SYMPOSIUM 3

Advancements in Hyperkalemia Management for Cardiorenal Syndrome: New Therapeutic Strategies

DR. dr. Ginova Nainggolan

Abstract

Hyperkalemia is a condition where potassium blood levels are above 5 meq/L. This condition is common in Chronic Kidney Disease and congestive heart failure (CHF) patients. The other cause of hyperkalemia is patients who use renin angiotensin aldosterone inhibitor (RAASi) drugs due to lower excretion of potassium from urine by the drugs.

RAASi is an important treatment of CHF patients. It is reported that this drug can reduce mortality and hospitalization rate.

In the past, if there was hyperkalemia, the RAASi drugs would be stopped or reduced the dose. There are reports that in CHF patients who reduce or stop taking RAASi drugs the death and hospitalization rate are higher compared to patients who continue taking the drug. So, we hope to find drugs that can lower potassium blood level and RAASi can be given although we continue RAASi. Potassium binders are drug that can reduce potassium level.

The sodium zirconium cyclosilicate, which is a new potassium binder drug, can reduce potassium levels within the first hour and this is different from old potassium binder drug. It was also reported that sodium zirconium cyclosilicate could be used safely during a year and there were no reported side effects.

There are reports that when sodium zirconium cyclosilicate gave to patients who use RAASi the potassium level will return to normal although the renin angiotensin aldosterone inhibitor drug is continued. With the presence of sodium zirconium cyclosilicate, patients can avoid reducing or stopping RAASi and death and hospitalization rates can be reduced.

In previous hyperkalemia treatment guidelines, if there was hyperkalemia as a complication of RAASi treatment, the first thing to do was to reduce or stop the RAASi drug. In the new guidelines, if hyperkalemia occurs in CHF due to consumption of RAASi, administering potassium binder is the first choice of treatment.

LUNCH SYMPOSIUM 1

Current Issues and Future Perspectives in Blood Pressure Measurement and Hypertension Diagnosis**George S. Stergiou, MD, PhD, FRCP***Professor of Medicine & Hypertension**University of Athens, Greece**President International Society of Hypertension*

The non-invasive measurement of blood pressure using an upper-arm cuff device has been the cornerstone of clinical hypertension, as it provides the primary measure for diagnosis and treatment. Automated electronic (oscillometric) upper-arm cuff devices which are properly validated using an established protocol are currently recommended for office, home, and ambulatory blood pressure measurements. The STRIDE BP website (www.stridebp.org) which is endorsed by the International Society of Hypertension, the European Society of Hypertension and the World Hypertension League provides updated lists of properly validated devices for clinical use in the office, at home, and for ambulatory monitoring, for adults, and separate lists for children and for pregnant women in whom the electronic devices may have different accuracy than in the adult general population. However, there are still issues with accurate blood pressure measurement in people with very large arm size (mid arm circumference >42 cm) and in patients with atrial fibrillation, and more research is needed to define validation requirements for blood pressure monitors in these cases. An interesting technological development is the availability of low-cost home blood pressure monitors which can take automated measurements during nighttime sleep, providing a practical alternative to 24-hour ambulatory monitoring which is not widely available. Thus, nighttime blood pressure, which has independent and important prognostic value, will be feasible to assess in more patients with hypertension. Recently, wrist wearable devices which use the classic oscillometric principle with sophisticated technology and a thin inflatable wrist cuff have been developed and might offer additional benefits in improving the assessment of out-of-office and nocturnal blood pressure,

but require further investigation. Lastly, novel cuffless blood pressure measuring technologies implemented in smartwatches, wristbands, or smartphones have considerable potential to improve the screening, management, and long-term monitoring of hypertension. However, they have considerable accuracy issues, particularly in their ability to track blood pressure changes and at present they are not recommended by hypertension societies for clinical use and decision making in people with hypertension.

LUNCH SYMPOSIUM 2

Integrative Strategies from the ESH 2024 MASTERplan

Claudio Borghi

*Department of Cardiovascular Medicine
University of Bologna
Bologna, Italy*

Hypertension is the most important risk factor affection over 30% of the population worldwide and responsible of about 11 millions of death every year. The management of hypertension is an integrated process that involves an accurate diagnosis and an effective control of blood pressure and additional risk factors with the aim of reducing the cumulative burden of cardiovascular disease. Despite a large number of studies pointing out at the correct strategy to achieve a protective target of treatment, the number of patients reaching the expected goal is far from being satisfactory with a proportion of well controlled patients that usually does not exceed the 40% patients according to the most recent international surveys.

The practical principles of the overall approach to hypertensive patients have been recently summarized in a comprehensive document released by the European Society of hypertension (ESH) that propose a four-step based on blood pressure measurement, patient assessment, identification of effective therapy and evaluation of treatment clinical impact. The

clinical application of the MasterPlan approach is aimed at improving the current proportion of patients achieving a satisfactory blood pressure control by acting through an extensive use of combinations of effective and well tolerated drugs leading to a persistent blood pressure control and a high adherence to antihypertensive treatment. Double or triple fixed-dose, single pill combinations of antihypertensive drugs with a synergistic mechanism of action have been reported to improve blood pressure control in different phenotypes of patients with hypertension with a favorable impact on clinical outcome that has been demonstrated in both randomized clinical trials and real-world data. MasterPlan approach support the primary role of RAAS inhibitors, calcium-channel blockers and diuretics with longer duration of action that can be easily combined in the same pill in most of the patients with a remarkable flexibility that is a key point in the achievement of a protective coverage. Among such a classes of first line drugs, a priority use should be recognized to perindopril, amlodipine and indapamide that have been largely tested in seminal clinical trials (e.g. ASCOT, ADVANCE) and real world surveys both in the selected (e.g. PIANIST, PAINT, PETRA) and general populations (e.g. Brisighella Heart Study). The proven clinical efficacy of such drug combinations involve blood pressure control, drug adherence, rate of major cardiovascular disease and economic burden with a dramatic improvement in the overall management of hypertension and cardiovascular burden.

In conclusion, the extensive application of the essential MasterPlan principles will re-define the future of the daily treatment of hypertension moving from theory to clinical practice and integrating the general strategy with the best evidence from trials and real world practice.

SYMPOSIUM 4

Interaction Between the Sympathetic Nervous System and Renin Angiotensin Aldosterone in Hypertension**Zulkhair Ali, MD**

*Nephrology & Hypertension Div., Internal Medicine Dept.
Mohammad Hoesin Hospital, Sriwijaya Medical Faculty
Palembang, Indonesia*

The Sympathetic Nervous System (SNS) and the renin-angiotensin-aldosterone system (RAAS) are pivotal in regulating blood pressure. Dysregulation in these systems significantly contributes to the development and progression of hypertension.

The SNS influences vascular tone, cardiac output, and blood pressure via alpha-adrenergic and beta-adrenergic receptors. Overactivation of SNS leads to increased heart rate and cardiac contractility through β_1 -adrenergic receptors, vasoconstriction through α_1 -adrenergic receptors, sodium retention, and reduced renal blood flow, all of which contribute to volume overload.

On the other hand, RAAS regulates blood pressure and fluid balance by releasing renin from the kidneys, which initiates the production of angiotensin II. Angiotensin II is a potent vasoconstrictor that increases systemic vascular resistance. Additionally, aldosterone promotes sodium and water retention, leading to increased blood volume.

The interaction between SNS and RAAS is critical. SNS activation stimulates RAAS as adrenergic signals via β_1 receptors in the kidney enhance renin release, increasing levels of angiotensin II and aldosterone. Angiotensin II, in turn, amplifies SNS activity by enhancing norepinephrine release from sympathetic nerve terminals and inhibiting norepinephrine reuptake. This bidirectional relationship creates a vicious cycle of vasoconstriction, sodium retention, and increased blood pressure. The interplay between

these systems contributes to resistant hypertension and target organ damage (e.g., heart, kidneys, and vasculature).

The combination therapy of beta-blockers (BB) and RAAS inhibitors, such as ACE inhibitors or ARBs (angiotensin receptor blockers), is a common approach for managing hypertension, particularly in specific clinical settings. By targeting two different pathways, this combination provides a more comprehensive control of blood pressure compared to monotherapy. Combination therapy has synergistic effects, beta-blockers reduce heart rate and cardiac output, leading to decreased blood pressure, while RAAS inhibitors reduce vasoconstriction and fluid retention by inhibiting angiotensin II and aldosterone, addressing a different mechanism of hypertension.

Clinical indications for this combination therapy are especially relevant in hypertension with specific comorbidities such as heart failure, where both beta-blockers and RAAS inhibitors are foundational therapies in heart failure with reduced ejection fraction (HFrEF). In coronary artery disease (CAD), beta-blockers reduce myocardial oxygen demand, while RAAS inhibitors improve endothelial function and reduce vascular remodeling. This therapy is also crucial post-myocardial infarction, in resistant hypertension, and in young patients with high renin hypertension.

Keywords: Hypertension; Sympathetic Nervous System; Renin-Angiotensin-Aldosterone System.

SYMPOSIUM 4

Upstream and Downstream Pathway Intervention in Controlling Hypertension and Preventing the complication: The Power of ACE-i**Mohammad Saifur Rohman***Department of Cardiology and Vascular Medicine, faculty of Medicine, Universitas Brawijaya/ dr. Saiful Anwar Hospital, Jawa Timur*

Angiotensin-converting enzyme inhibitors (ACE-i) are medications used to treat and manage hypertension. Most guidelines recommend ACE-i as first-choice therapy for the treatment cardiovascular patients, whereas angiotensin receptor blockers (ARBs) are merely alternative for ACE-i-intolerant patients.

At the upstream site, ACE-i inhibit the formation of angiotensin II and consequently the downstream effects through the angiotensin II type 1 (AT1) receptor (vasoconstriction, cell growth, sodium and water retention, sympathetic activation) and the angiotensin II type 2 (AT2) receptor. ACE-i inhibitors also acts on non-ACE pathways results in continued low-level production of angiotensin II despite the inhibition of ACE. The nonselective inhibition of angiotensin receptors has been shown to be beneficial because the effect of angiotensin II through the AT2 receptor as result in incremental vasodilation and antiproliferative activity, at the downstream site.

Other investigators maintained that the purported beneficial effects of ACE-i over ARBs are caused by their action to inhibit the breakdown of bradykinin and thereby increase circulating bradykinin levels. Bradykinin levels release nitric oxide as well as increase synthesis of vasoactive prostaglandins.

In a meta-analysis of 80 trials with 146 active treatment arms and 17 placebo arms, adjusted for treatment duration and change in diastolic BP, there was a numerically better decrease in left ventricular mass index with

ACE-i. Urinary protein excretion was also reduced by ACE-i another meta-analysis of 17 randomized controlled trials including 17,951 patients. ACE inhibitors also reduced a composite of CV mortality, nonfatal myocardial infarction (MI), nonfatal stroke, or hospitalization for CV reasons during the 4-year follow-up.

Moreover, in meta-analysis of 106 randomized trials with 254,301 patients without heart failure, active controlled trials, and head-to-head randomized trials suggested that ACE-i were as efficacious and safe as ARB. ACE-i were also similar to ARBs in preventing the composite endpoint of CV death, MI, stroke, new-onset diabetes mellitus, and new-onset heart failure. Thus, the data in aggregate attest to equal efficacy of ACE-i and ARBs in reducing outcomes in patients with hypertension or in patients at high risk of CV events.

In heart failure, ACE-i contribute to the heightened efficacy to endogenous compensatory vasoactive peptides that are operative in ACE inhibitors but not in ARBs., so called “broadening the benefits of inhibitors of the renin-angiotensin system in patients with heart failure by potentiation of endogenous vasoactive peptides”. In the setting of hypertension with other compelling indications, ACE-i showed significant result with regard to the surrogate endpoint of BP and the outcomes of all-cause mortality, CV mortality, MI, heart failure, stroke, and end-stage renal disease.

In conclusion, the accumulating evidences suggested the power of ACE-i on controlling hypertension and the complication not only through upstream pathways but also potentiate endogenous vasoactive peptide result in effective downstream targets.

Keywords: Angiotensin converting enzymes inhibitor, upstream, downstream, nhypertension control, complication.

SYMPOSIUM 4

The Role of Vasodilator Beta Blocker as Antihypertensive Agents in Specific Population**Paskariatne Probo Dewi***Gatot Soebroto Central Army Hospital**paskariatne@gmail.com***Abstract**

Beta-blockers (β -blockers) remain underutilized in hypertensive patients despite their well-documented benefits in reducing cardiovascular morbidity and mortality. Concerns regarding tolerability, particularly with traditional β -blockers, contribute to their discontinuation. Vasodilator β -blockers, such as nebivolol and carvedilol exhibit distinct pharmacological properties that enhance their tolerability and metabolic profile, making them preferable for specific populations, including the elderly, patients with obstructive pulmonary disease (OPD), and individuals with metabolic disorders.

Unlike conventional β -blockers, vasodilator β -blockers provide additional hemodynamic benefits through mechanisms such as nitric oxide (NO) release (nebivolol) or α 1-adrenergic receptor blockade (carvedilol), reducing peripheral vascular resistance without significantly affecting cardiac output. In elderly hypertensive patients, arterial stiffness and endothelial dysfunction contribute to increased systolic blood pressure. The vasodilatory action of nebivolol, in particular, improves endothelial function and central hemodynamics, reducing pulse pressure and enhancing tolerability.

For patients with OPD, concerns about β -blocker-induced bronchospasm have historically limited their use. However, cardio-selective agents such as nebivolol and bisoprolol, with minimal β 2-receptor blockade, demonstrate safety and efficacy in hypertensive individuals with coexisting OPD. Additionally, nebivolol's NO-mediated vasodilation has

shown protective pulmonary effects, further supporting its use in this group.

Metabolic complications associated with non-selective β -blockers, such as glucose intolerance and an increased risk of new-onset diabetes, have been reported in hypertensive patients with metabolic syndrome. However, third-generation β -blockers like nebivolol demonstrate a neutral or even beneficial effect on glucose and lipid metabolism, preserving insulin sensitivity and reducing cardiovascular risk. Recent evidence suggests no significant difference in the incidence of new-onset diabetes between highly selective β 1-blockers, such as bisoprolol and nebivolol, and other antihypertensive classes.

Given their improved safety, metabolic neutrality, and vasodilatory properties, third-generation β -blockers present an optimal choice for managing hypertension in elderly patients, those with OPD, and individuals with metabolic disorders. Their inclusion in clinical guidelines highlights their role as an effective and well-tolerated therapeutic option in tailored hypertension management strategies.

Keywords: vasodilator β -blockers, nebivolol, hypertension, elderly, obstructive pulmonary disease, metabolic syndrome, endothelial function.

SYMPOSIUM 5

Exploring New Therapeutic Options of Microbiota - Derived Metabolites in Blood Pressure Regulation

Afiatin

Hypertension is a prevalent and complex disease that is increasingly recognized to be influenced by the gut microbiome and its metabolites. Understanding the relationship between gut microbial metabolites and blood pressure regulation could provide new therapeutic avenues. This review examines the role of key microbial metabolites—short-chain fatty

acids, trimethylamine N-oxide, tryptophan derivatives, polyamines, bile acids, and phenylacetylglutamine in blood pressure regulation. Short-chain fatty acids, produced through dietary fiber fermentation, can lower blood pressure by modulating immune responses and reducing inflammation. Elevated trimethylamine N-oxide levels are associated with increased cardiovascular risk and hypertension, influencing cholesterol metabolism and promoting atherosclerosis. Tryptophan derivatives interact with vascular and renal functions to modulate blood pressure. Polyamines affect blood pressure regulation through their impact on nitric oxide synthesis and vascular tone. Bile acids influence blood pressure via gut microbiota modulation and activation of metabolic receptors. Phenylacetylglutamine has been linked to hypertension through its effects on platelet hyperactivity and thrombosis.

Therapeutic approaches targeting these metabolites, including probiotics, prebiotics, fecal microbiota transplantation, dietary interventions, and polyphenols, have shown varying degrees of success. Probiotics and prebiotics promote the growth of beneficial gut bacteria and may lower blood pressure. Dietary interventions, such as the Mediterranean diet, positively affect blood pressure and cardiovascular health by modulating the gut microbiota. Polyphenols, known for their antioxidant properties, are associated with blood pressure reductions and improved vascular function. Fecal microbiota transplantation shows promise in restoring gut microbial balance and improving metabolic health, potentially influencing blood pressure regulation.

The significant role of gut microbial metabolites in regulating blood pressure, offering new avenues for hypertension management. Key metabolites, including short-chain fatty acids, trimethylamine N-oxide, and bile acids, play critical roles in blood pressure modulation. Therapeutic strategies targeting these metabolites, such as probiotics, prebiotics, and dietary interventions, hold promise, though further research is needed to fully understand their mechanisms and optimize their use. Advancing microbiota-based interventions through large-scale studies and exploring personalized therapies will be essential for developing effective treatments in hypertension management.

Keywords: hypertension, gut microbial metabolite

SYMPOSIUM 5

Improving Hypertension Treatment and Control: The Challenge and How to Overcome it with Single Pill Combination

Haerani Rasyid

Internal Medicine Department

Faculty of Medicine, Hasanuddin University

Hypertension (HTN) is a major modifiable cardiovascular risk factor. Despite availability of effective blood pressure lowering medications, HTN remains poorly controlled. Causes of suboptimal HTN control include the asymptomatic nature of HTN, low patient compliance, inadequate knowledge regarding the sequelae of HTN, and often complex therapeutic regimen. In the current guidelines, combination therapy using single pill combinations (SPC) has been widely recommended for the treatment of HTN.

Use of SPC based on long-acting medications not only reduces the number of tablets taken by the patient but also allows single-pill once-daily treatment. SPC based on drugs that do not provide 24-hour coverage may not allow adequate blood pressure lowering at trough and may not reduce blood pressure variability similarly to long-acting medications. Clinical studies showed that Candesartan based combination are characterized a long, 24-hour duration of action which is an element of "qualitative" blood pressure control.

Single-pill combination therapy for hypertension is recognized to improve adherence to treatment. However, less is known about the benefits of triple single-pill combinations.

Among the many SPC drugs, the combination of calcium channel blockers (Amlodipine) and angiotensin receptor blockers (Candesartan) has been shown to be effective and safe in the treatment of patients with hypertension.

SYMPOSIUM 6**New Insight Into Cerebrovascular Pathophysiology in Hypertension**

Dr. dr. Cep Juli, Sp.N, Subsp. NIOO(K), CMC

ABSTRACT

Hypertension is associated with a risk of ischemic stroke in 50% to 60% of the population, more than 70% of hemorrhagic stroke, and a 20 mmHg increase in SBP doubles the risk of stroke between the ages of 40 and 69 years. Chronic hypertension damages small cerebral blood vessels, leading to SVD, which contributes significantly to ischemic stroke, intracerebral hemorrhage, and dementia. Insight into the pathophysiology of hypertension-related cerebrovascular problems may offer targets for preventing chronic disease, acute events, and cognitive decline. Early in life, hypertensive disease is driven by sympathetically driven high blood pressure, whereas later in life it involves high systolic pressure with increased arterial stiffness. Early life trajectories may explain the increased rates of stroke in younger adults and later in life cerebrovascular injury. Increased arterial stiffness and autonomic dysfunction increase blood pressure variability, which predicts the risk of ischemic and hemorrhagic stroke. Although systolic blood pressure increases linearly with age, diastolic blood pressure begins to decline at approximately 55 years of age, with a shift from mixed or diastolic hypertension to an increasing frequency of isolated systolic hypertension. This reflects increased aortic stiffness and the cerebrovascular effects of long-standing hypertension. In addition, small vessel brain disease is associated with increased pulsatility and reduced CO₂ reactivity in large cerebral vessels. Endothelium-derived

nitric oxide is a major driver of vasodilation, with reduced functional hyperemia in older hypertensive patients, reduced vascular reactivity in cSVD, and increased circulating markers of endothelial cell dysfunction in patients with cSVD and hypertension.

Keywords: Arterial stiffness, Autonomic dysfunction, Cerebrovascular disease pathophysiology, Hypertension, Stroke, Small Vessel brain disease

SYMPOSIUM 6

How To Improve Management of Hypertension Related to Proteinuria

The role of the 3rd (latest) generation of CCB and benefits for the kidney

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Abstrak

Hipertensi merupakan masalah besar dalam Kesehatan Masyarakat. Diperkirakan 1.28 billion usia dewasa (30-79 tahun) diseluruh dunia penyintas hipertensi.,dan 2/3 nya terdapat dinegara penghasilan rendah-sedang.46 % dari penyintas hipertensi tidak menyadari bahwa dia hipertensi dan hanya kurang dari 42 % yang terdiagnosis dan diobati dan yang terkontrol hanya 1 dari 5 pasien (21%). Hipertensi merupakan penyebab utama kematian di seluruh dunia.Salah satu tujuan target secara global adalah menurunkan hipertensi kurang dari 33% pada tahun 2010 – 2030. Penatalaksanaan hipertensi selalu makin sempurna seiring meningkatnya penelitian² yang menjadi dasar penyempurnaan guideline penatalaksanaan hipertensi yang selalu”up to date”.Calcium channel blockers(CCB) merupakan salah satu golongan anti hipertensi yang menempati penggunaan terbanyak baik secara sendiri(monotherapy) maupun dalam kombinasi.Lercanidipine,sebagai CCB generasi ke 3

(terbaru) mempunyai keunggulan tersendiri karena mekanisme kerjanya yang berbeda dan unik dibandingkan CCB generasi sebelumnya. Lercanidipine sangat selektif terhadap vascular, *high lipophilicity* berikatan erat dengan cell membrane dan menghambat Calcium secara progressif dan terus menerus (long acting). Efek sampingnya a.l sakit kepala, flushing, skin rash, palpitasi sangat minimal dibandingkan dgn CCB sebelumnya. Lercanidipine tidak menimbulkan edema tungkai. Pada penelitian ZAFRA (Zanidip en Function Renal Alterada), lercanidipine menunjukkan penurunan proteinuria 25 % dan meningkatkan kliren kreatinin sebesar 10 % bila dikombinasi dengan ACEi/ARB.

Disimpulkan bahwa Lercanidipine patut direkomendasikan pada pengobatan hipertensi nefropati dengan proteinuria.

SYMPOSIUM 7

Cuffless blood pressure monitoring device for better hypertension control

Hae Young Lee

Hypertension management is undergoing a transformative shift towards comprehensive 24-hour blood pressure (BP) control, including nighttime monitoring. This shift opens avenues for personalized interventions and improved patient care. Integrating nighttime BP monitoring with innovative wearable technology promises a transformative era in hypertension care, lowering risks and enhancing patient outcomes. Recent global hypertension guidelines emphasize the importance of home BP monitoring and 24-hour ambulatory BP measurement for accurate diagnoses and treatment plans. However, the patient's discomfort during ambulatory BP measurement and the technical issue in automatic measurement in nighttime in case of home BP monitoring limit widespread adoption. Despite these challenges, integrating BP measurement into mobile devices offers a promising avenue for monitoring BP outside clinical settings. Innovations include smartwatches

utilizing photoplethysmography (PPG) sensors and machine learning algorithms. Although promising, these devices face concerns regarding accuracy and the need for periodic calibration. And other challenges such as verifying device accuracy, interpreting vast amounts of data, and ensuring reliable calibration need to be addressed.

Despite all these current limitation, mobile device BP monitoring represents a significant advancement in hypertension management, offering the potential for continuous, convenient, and less intrusive BP monitoring. The integration of BP measurements using smartwatches and other wearables might open a new field of dynamic evaluation of BP. Conventional BP measurement methods, including ABPM, mainly focus on static BP measurements in a resting state. However, wearable technology allows for the continuous monitoring of BP changes in daily living and during physical or emotional stress. This dynamic BP monitoring could provide a more comprehensive understanding of BP patterns and their impact on cardiovascular health.

In conclusion, mobile device BP monitoring holds the potential to revolutionize hypertension management. Despite the potential benefits, challenges such as verifying device accuracy, interpreting data, and ensuring calibration need to be addressed. The future of hypertension management will likely rely on these technologies, alongside traditional methods, to offer a more comprehensive understanding of an individual's BP profile. This integration promises to improve hypertension diagnosis, management, and patient outcomes, though further research and development are necessary to overcome current limitations. Innovations in wearable BP monitoring technology offer exciting possibilities for more personalized and effective hypertension care. As these technologies evolve, they will likely play a crucial role in reducing the burden of hypertension-related cardiovascular diseases and improving patient outcomes globally.

SYMPOSIUM 8

Recent Update on Resistant Hypertension**Bagus Andi Pramono****Abstract**

Systolic blood pressure (SBP) or diastolic blood pressure (DBP) that stays at or above 140 mmHg or 90 mmHg, respectively, in spite of leading a suitable lifestyle and taking a three-drug combination that includes a diuretic at optimal or maximum tolerated dosages is known as resistant hypertension (RH). This definition includes both refractory hypertension, also known as uncontrolled BP despite five or more medications of different classes, including a diuretic, and controlled RH, which is defined as the presence of blood pressure (BP) effectively controlled by four or more antihypertensive agents. It is necessary to rule out a number of reasons of secondary hypertension and pseudo-resistant hypertension, including incorrect blood pressure measuring methods and poor medication adherence, in order to confirm the presence of RH. An out-of-office blood pressure measurement should be used to confirm inadequate blood pressure control. About 5% of people with hypertension have RH, which is linked to higher rates of cardiovascular morbidity and death. Following confirmation of RH existence, patient evaluation entails determining contributory factors, such as lifestyle choices or interfering medications, as well as evaluating for organ damage caused by hypertension. The management of RH includes optimizing the present pharmaceutical regimen and implementing lifestyle changes. If blood pressure is still out of control, further medications should be added one after the other, and renal denervation may be an extra course of treatment. Achieving ideal blood pressure regulation in this situation is still difficult, though.

Keywords: *resistant hypertension – lifestyle changes – pharmaceutical regimen optimization – renal denervation*

SYMPOSIUM 8

Selecting the Right Patients for Renal Denervation

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Introduction

High blood pressure (BP) is amongst the most prevalent modifiable cardiovascular (CV) risk factors and remains a leading cause of death. Lowering BP through the use of antihypertensive drugs has been shown to reduce the risk for CV morbidity and all-cause mortality. However, disease awareness and BP control rates remain poor worldwide.¹

Renal denervation (RDN) has been developed as a neuromodulation therapy for patients with hypertension. Antihypertensive effects of RDN are plausibly based on inhibition of both renal efferent and afferent pathways. Catheter-based RDN techniques include radiofrequency ablation, ultrasound ablation, and chemical ablation using alcohol. The 2023 European Society of Hypertension (ESH) guidelines make a class II recommendation for the use of RDN in patients with resistant hypertension (RH) and uncontrolled hypertension despite the use of antihypertensive drug combination therapy, or if drug treatment elicits serious side effects and poor quality of life.²

The Efficacy of RDN

The efficacy of RDN is not uniform among all patients. A meaningful reduction in office Systolic BP (SBP) or daytime ambulatory SBP of at least 5 mm Hg was observed in 60% to 70% of patients during 2 to 3 months of follow-up among patients undergoing ultrasound RDN. Although 24% of patients undergoing RDN achieved the target of daytime or home BP <135/85 mm Hg compared with 12% in the sham group, participants in the RDN arm received less medication. RDN is a promising new therapeutic approach for some patients with uncontrolled hypertension, particularly patients with RH or who have multiple medication intolerances. Ideally,

individual characteristics that predict response will be identified to enhance the success of the procedure.³

Safety and Durability

RDN has shown an excellent safety profile, although larger studies are required to confirm the safety margins of these procedures. Anticipated periprocedural and immediate postprocedural complications and adverse effects include vascular access and bleeding complications, renal artery dissection or perforation, and other well-characterized complications of percutaneous arterial procedures.¹

In the trials to date, the incidence of these complications has been remarkably low, especially given that most operators had limited experience with RDN or renal interventional procedures. Over the intermediate to longer term, potential complications include renal artery stenosis and worsening of renal function. Nevertheless, across the trials of RDN devices, excellent safety has been demonstrated, with minimal rates of adverse events and a strong safety profile for up to 3 years in sham-controlled trials and for longer in observational cohorts.^{1,4}

Long-term follow-up data from the Global SYMPPLICITY Registry, the SPYRAL HTN-ON MED trial, and the RADIANCE-HTN SOLO trial indicate that the BP-lowering efficacy of RDN in patients with hypertension is sustained for at least up to three years, with a trend for continuous BP reduction over time. The demonstration of durability can be challenging because of dynamic changes in medications, lifestyle interventions, development of coexisting illnesses, ageing, etc.¹

Patient Selection

Resistant hypertension is defined as uncontrolled office BP ($\geq 140/\geq 90$ mmHg), which is confirmed by out-of-office BP measurements, despite appropriate lifestyle changes and the intake of a triple-drug combination, including a diuretic at maximally tolerated doses. RDN was shown to reduce BP in adult patients with uncontrolled hypertension in addition to antihypertensive drugs, including RH. RDN may be used in adult patients with uncontrolled RH (office BP $\geq 140/\geq 90$ mmHg confirmed by 24-hour

ambulatory systolic BP ≥ 130 mmHg or daytime systolic BP ≥ 135 mmHg) treated with ≥ 3 antihypertensive drugs and an eGFR ≥ 40 ml/min/1.73 m².¹

Patients who are non-adherent or intolerant to multiple antihypertensive drugs, particularly firstline agents and spironolactone, may also be candidates for RDN. These patients may, therefore, be on fewer than 3 drugs at the time of their selection for RDN due to their prior drug intolerance.¹

Clinical Guidelines

RDN is now recommended for the adjunctive treatment of hypertension in several clinical statements and guidelines from Asia, Europe and the USA. The 2023 European Society of Hypertension guidelines for the management of arterial hypertension, endorsed by the International Society of Hypertension, recommend RDN as a treatment option in patients with uncontrolled BP despite the use of antihypertensive drug combination therapy or if drug treatment elicits serious adverse effects and poor quality of life. The guidelines also recommend that RDN be considered in patients with resistant hypertension, namely those with BP above target levels despite three antihypertensive medications at optimal doses, including a diuretic, or anyone requir-

ing four or more medications. An estimated glomerular filtration rate of >40 ml/min/1.73 m² is advised because this cut-off was used in clinical trials.

The 2024 European Society of Cardiology guidelines for the management of elevated blood pressure and hypertension give a class IIb recommendation for the use of RDN in patients with truly resistant hypertension and a class IIa recommendation for the use of RDN in patients with increased risk of cardiovascular disease and uncontrolled hypertension who are receiving fewer than three drugs. The guideline authors emphasize that RDN is not recommended as a first-line BP-lowering intervention for hypertension and urge caution with the use of RDN in patients with moderately-to-severely impaired renal function.⁴

Conclusions

- Renal denervation (RDN) is a catheter-based therapy for hypertension that reduces sympathetic nervous system activity
- RDN has been carefully studied in patients with mild, moderate or resistant hypertension; on average, RDN lowers blood pressure to a similar degree as an effective antihypertensive medication
- Ultrasound and radiofrequency RDN devices can be used as an adjunctive treatment when lifestyle modifications and medications are not sufficient to control blood pressure
- Appropriate patient selection for RDN is crucial, with a comprehensive evaluation ensuring that patients have sustained, uncontrolled hypertension and that secondary causes are appropriately investigated
- Safe and appropriate implementation of RDN requires multidisciplinary teams, including hypertension specialists and well-trained interventionalists, to ensure proper evaluation, treatment and follow-up

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SYMPOSIUM 9

Management of Hypertension with Diabetes: Strategy for integrated care and optimal outcomes

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RS. Dr. Hasan Sadikin Bandung

Abstract

Hypertension and diabetes are global disease problems whose prevalence is increasing. Hypertension and diabetes are the main causes of damage to important organs, namely kidney damage, cardiovascular, stroke and blindness. The basic health research of the Ministry of Health of the Republic of Indonesia states that there are around 34.1% of Indonesian adults with hypertension. This disease does not show any real symptoms so it often escapes the patient's consciousness so it is called a silent killer. More than half of hypertensive patients also suffer from diabetes and also more than 60% of diabetics also suffer from hypertension. Both when present together are a combination of very high risk factors for comorbidity and mortality due to cardiovascular complications, kidney and stroke.

Complications of hypertension accompanied by diabetes must be immediately recognized by various risks. Testing for hypertensive patients in the community as well as the prevention of patients who have hypertension and diabetes factors is an important action. Risk factors such as family history, obesity, smoking, alcoholism, which can be changed can be given education with diet and activity patterns as well as lifestyle changes which are the two main things in hypertension and diabetes therapy before giving pharmacological therapy. Without these two factors, the blood pressure and blood sugar targets will be difficult to achieve before the doctors express their resistance to therapy.

Various new guide lines in the world have revealed some of the best therapies for hypertension drugs accompanied by diabetes. The RAAS inhibitor group is still the mainstay, while for diabetes drugs accompanied by hypertension, there are many options depending on other accompanying risk facts. The combination of hypertension drugs with diabetes is chosen the best that is as small as causing unwanted effects. The role of diet in determining the epigenetics of hypertension is currently under extensive research.

Treatment of hypertension and diabetes generally requires more than 1 drug so that the target of blood pressure and blood sugar is achieved, therefore various concomitant diseases, complications and risk factors must be handled in an integrated and continuous manner. However, diet and activity as well as weigh loss are the main determinants in the success of therapy.

Keywords: Hypertension, Diabetes, Therapy, Hypertension and Diabetes Guide Line.

SYMPOSIUM 10

Hypertension in Pediatric Populations: Causes, Consequences and Prevention Strategies

Dany Hilmanto

Abstract

The issue of hypertension in children is becoming increasingly prevalent. This rise is attributed to the growing incidence of childhood hypertension, which is linked to the increasing number of overweight and the improved survival rates of neonates born with extremely low birth weights. Hypertension in children is classified as either primary or secondary, depending on its etiology. While secondary hypertension, often caused by kidney disease, is more common in younger children,

primary hypertension is now the most prevalent form, particularly among adolescents, males, and individuals with a history of low birth weight. According to a number of longitudinal cohort studies, hypertension in children has been closely linked to abnormalities of target organs, including altered heart structure and function, arterial stiffness, renal dysfunction, retinal artery damage, and cognitive impairment. Hypertension prevention strategies in children encompass primary, secondary, and tertiary prevention. Primary prevention involves identifying risk factors and minimizing exposure to factors that contribute to hypertension. Secondary prevention focuses on preventing the onset of hypertension in children who are already at risk. Tertiary prevention aims to eliminate or mitigate complications that may arise in children who have already developed hypertension.

Keywords: Childhood hypertension; Complications ; Etiology ; Prevention

SYMPOSIUM 11

Title of talk: Improving hypertension control using impedance cardiography

Toe Boon Wee

Associate Professor TEO Boon Wee Jimmy

Abstract

The World Health Organization (WHO) in 2023 released its "Global report on hypertension: the race against a silent killer." The population age structure of the world is shifting towards a greater proportion of older persons. This coupled with a risk of hypertension increasing with age means that the number of adults with hypertension doubled from 650 million in 1990 to 1.3 billion in 2019. The WHO advised a voluntary target to reduce the prevalence of uncontrolled hypertension (<140/90 mmHg) by 25% in 2025 but we have not been able to achieve this.

We and many investigators have shown that despite access to medical care and medications in academic medical centers, the percentage of patients achieving full control of hypertension remains dismally low. There are many causes of uncontrolled hypertension despite treatment including, inappropriate or inadequate diagnosis, inadequate or inappropriate treatment, non-adherence to treatment, inadequate management of other factors such as obesity, sodium salt reduction, adequate potassium intake, adequate sleep, and exercise.

Inadequate diagnosis may include not detecting intravascular volume expansion or increase in extra-cellular fluid volume, high sympathetic activity, or inadequate vascular relaxation. Medications are often adjusted on trial and review basis, and titrated for effect. These methods require time and increases the burden of care adherence for patients. We discuss impedance cardiography as an outpatient accessible technology to expedite correct diagnosis of the drivers of hypertension, and thus, initiate and also titrate medications to achieve treatment goals in patients.

Practitioners should embrace technology to improve the diagnosis and management of hypertension as the incidence and prevalence of hypertension has reached epidemic proportions. While strong public health measures are needed, the patients who already have hypertension need to be adequately treated by their doctors.

SYMPOSIUM 11

Long term impact of new-onset diabetes mellitus in hypertensive patients**Hae Young Lee**

Many patients with HT have obesity and metabolic syndrome with alterations of lipid and glucose metabolism, which is major risk factor of new onset DM (NODM). The prevalence of metabolic syndrome has been increased over the last 10 years worldwide including Korea, reaching 30% among general population. As expected, the prevalence of metabolic syndrome is twice as high among patients with HT. In addition to metabolic syndrome, HT is associated with twice higher risk of NODM. A meta-analysis of 30 prospective clinical studies reported that each 20 mmHg increment of systolic blood pressure (SBP) increased the risk of NODM by 77%. Even prehypertensive range of SBP and diastolic blood pressure (DBP) of $\geq 130/80$ mmHg, the risk of NODM was increased by 20-30% compared with normal SBP/DBP of $< 120/80$ mmHg.

In the last 30 years, the prevalence of HT has decreased to one-fourth of worldwide population, whereas the prevalence of DM has continued to increase. Insulin resistance, hyperinsulinemia, increased oxidative stress, subclinical chronic inflammation are the most studied pathophysiological mechanisms linking HT and DM. Remarkably, endothelial dysfunction associated with HT was suggested to play a primary role in NODM and cardiovascular events. The coexistence of DM and HT multiplies the risk of cardiovascular events and deaths. And current concept is that NODM associated with HT management was not different in the risk of cardiovascular event from those who have already DM and HT. However, this increased risk was not appreciated for at least 6 or more years after NODM development.

If HT increases the risk of NODM by hemodynamic disturbance, it might be logical that the population with controlled HT within the normal BP range has the incidence rate of NODM similar to that of the general

population. In addition, if the endothelial dysfunction by high BP is the main pathophysiology of increased risk of cardiovascular events with the coexistence of HT and DM, the population of population with controlled HT within the normal range might have similar risk compared non-hypertensive controls. Indeed, the meta-analysis suggested that SBP reduction by 5 mmHg reduced the risk of NODM by 11%. However, the long term results of controlled HT compared with non-hypertensive population is limited, yet.

Therefore, we designed this study using the Korean HT Cohort (KHC) data. The KHC followed up > 10,000 patients with HT and ten-fold larger age-sex matched non-hypertensive controls for more than 10 years by combining hospital data and the national health insurance system-health screening (NHIS-HEALS) system. We primarily aimed to evaluate the incidence rate of NODM, the risk of cardiovascular events with or without NODM, and residual risk of patients with HT controlled within normal range compared with non-hypertensive controls.

SYMPOSIUM 12

The Effect of Hypertension on Cerebral Autoregulation and Brain Health

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Abstract

Cerebral autoregulation, a mechanism that stabilizes cerebral blood flow (CBF) despite fluctuations in cerebral perfusion pressure (CPP), depends on the reflex response of cerebrovascular resistance (CRV) and is crucial for ensuring adequate brain oxygen and nutrient supply. Hypertension

could disrupt this delicate balance, leading to various neurological consequences.¹

Chronic systemic arterial hypertension could lead to an increase in CRV and disturbs autoregulatory control, narrowing the safe range of blood pressure for the brain.² In malignant hypertension, dynamic cerebral autoregulation is impaired, potentially leading to further complications.³ Altered brain's blood vessels, caused by chronic hypertension consists of vascular remodeling, atherosclerosis, small vessel disease and neurovascular uncoupling, damaging brain structures, could lead to the deterioration of the brain health, manifesting as cognitive decline, stroke, and brain atrophy.^{4,5,6}

Some studies showed that earlier careful blood pressure management using antihypertensive agents is crucial for hypertensive patient to prevent brain's hypertensive complication especially the cognitive decline.^{4,7,8,9}

Keywords: cerebral autoregulation, hypertension, brain health

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SYMPOSIUM 12

Hypertension and Peripheral Arterial Disease

Hananto Andriantoro

Hypertension (high blood pressure) can lead to serious health complications like heart attacks, strokes, kidney damage, peripherals artery disease, heart failure and even sudden death, as the constant high pressure damages arteries and restricts blood flow to vital organs like the brain and heart.

hypertension is considered a major cause of endothelial dysfunction, meaning that high blood pressure can damage the lining of blood vessels, leading to impaired vascular function, which further contributes to the development and progression of hypertension itself, this dysfunction is characterized by reduced nitric oxide production and increased vasoconstriction, leading to narrowed blood vessels and elevated blood pressure.

Endothelial dysfunction can be detected using a Flow Mediated Dilatation (FMD) test, which is a non-invasive method that measures the dilation of an artery in response to increased blood flow, essentially assessing how well the endothelium is functioning, a reduced FMD value indicates potential endothelial dysfunction.

Endothelial dysfunction can be detected using a test called “reactive hyperemia,” which measures the dilation of blood vessels in response to a temporary restriction of blood flow, essentially acting as a marker of how well the endothelium (the lining of blood vessels) is functioning; a reduced reactive hyperemic response indicates potential endothelial dysfunction.

Endothelial dysfunction (ED) can lead to atherosclerosis by damaging the arterial wall and causing inflammation. Endothelial dysfunction is an early marker of atherosclerosis, occurring before the development of atherosclerotic plaque.

Endothelial dysfunction can cause peripheral arterial disease (PAD). Endothelial dysfunction is a condition that damages the lining of blood vessels, which can lead to a number of vascular diseases.

Hypertension and Endothelial dysfunction can cause aortic disease and aortic aneurysms. High blood pressure can damage the aorta's walls and increase the risk of aortic disease or dissection and aneurysms.

Conclusion:

Hypertension is considered a major cause of endothelial dysfunction, meaning that high blood pressure can damage the lining of blood vessels, leading to impaired vascular function.

Endothelial dysfunction (ED) can cause atherosclerosis, which can lead to peripheral arterial disease (PAD) and aortic disease

SYMPOSIUM 13

**LIPID LOWERING COMBINATION THERAPY:
WHAT THE GUIDELINES SAY?****Bambang Budi Siswanto***Division Clinical Cardiology Dept. Cardiology & Vascular Medicine**University Indonesia**National Cardiovascular Center Harapan Kita Jakarta*

Atherosclerotic cerebro-cardiovascular disease is a leading cause of morbidity and mortality in Indonesia. Lipid theory is one of the etiology of atherosclerotic cerebrocardiovascular disease. Uncontrolled mixed dyslipidaemia had showed recurrent revascularisation procedures. Real world data on dyslipidaemia showed only 4 % in population achieved NTECP target. Guidelines recommended combination therapy to achieved LDL goal to 40 mg/dL. Dietary intake cholesterol only 40 % source of the lipid on the blood. Anabolism of cholesterol play an important role on cholesterol source. LDL receptor on the liver work to regulate the lipid, removing about 70% of LDL from the blood. However, LDL receptor decreased due to ageing and disease.

Enzyme HMGCoA reductase also worked to maintain cholesterol level by converting to mevalonate. Some statin are lipid soluble and some are water soluble penetrate to vessel wall and plaque.

The absorption of dietary intake of cholesterol could be inhibited from intestine by the role of ezetimibe. So the dual treatment using HMGCoA reductase combined with ezetimibe could decrease the cholesterol level in the blood, but only modest to reduce high calcium score CAD.

PCSK9 inhibitor is a new injection drug with new mechanism of action to reduced LDL containing lipoprotein. The combination of injection PCSK9 inhibitor combined with high intensity statin and ezetimibe will reduce LDL cholesterol up to 95 %.

Summary: combination of lipid lowering drug with various mechanism of action would benefit to normalized LDL cholesterol in the blood, the lower the better, early prevention is best.

SYMPOSIUM 13

Lipid Management in Stroke Therapy : Current Strategies, Challenger and Future Directions

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Abstract

Lipid management in stroke cases is currently regulated by a number of guidelines. In adults who qualify for treatment with lipid-lowering therapy, treatment with a statin is recommended to reduce the risk of a first stroke. In patients with ischemic stroke in some conditions, high intensity dose of statin is indicated to reduce risk of stroke recurrence. In patients with ischemic stroke or Transient Ischemic Attack (TIA) and atherosclerotic disease, lipid-lowering therapy with a statin and also ezetimibe combination therapy are given to achieve LDL-Cholesterol <70 mg/dL. A number of challenges from past to present are also encountered in dyslipidemia treatment, such as patient compliance, difference in LDL-C target perception, potential side effects, and patient's concern regarding a number of issues. The current and future challenges of dyslipidemia treatment must also be anticipated, such as lipid- lowering therapy drug response associated with elimination via cytochrome P450 (CYP) pathways and APO gene's genetic variants. The presence of the combination atorvastatin and ezetimibe therapy may help reduce the risk that arise from high-dose statin doses. Ezetimibe is also eliminated primarily by glucuronidation and not by cytochrome P450 (CYP) oxidation. Nevertheless, personalized and precision-based therapy remains the direction of future therapy in lipid management.

Keywords: lipid management, stroke, atorvastatin, ezetimibe, combination therapy.

SYMPOSIUM 14

RATIONALE OF ANTI HYPERTENSIVE COMBINATION

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Despite having various antihypertensive agents that have shown their efficacy and safety, the percentage of patients achieving the recommended therapeutic goals is unacceptably low. When hypertensive patients do not achieve adequate control of their blood pressure, the options to achieve required treatment goals are to increase the dose of monotherapy or to use drug combinations with minimum side effects and ensure the adherence.

Combination therapy provides greater antihypertensive power than the use of high doses of monotherapy, adding several mechanisms of action that block various pathways of increased blood pressure, in addition to providing greater protection to target organs than monotherapy, and reduced potential for side effects.

The major four drug classes (ACE inhibitors, ARBs, dihydropyridine CCBs, and thiazide or thiazide-like diuretics) are recommended as firstline BP-lowering medications, either alone or in combination. An exception is the combination of two RAS blockers, which is not recommended. Avoid combining direct renin inhibitors with ACE inhibitors or ARBs.

The combinations recommended by the most commonly used guidelines include a RAS blockers (ACE inhibitors, ARBs) associated with a calcium antagonist or a natriuretic. Among these combinations, those that include a calcium antagonist have been shown to be more effective in

reducing mortality, cardiovascular events, cerebrovascular events and kidney damage than those using hydrochlorothiazide. Combinations of antihypertensive drugs also have been shown to have beneficial effects unrelated to their antihypertensive effect. These actions are metabolic effect , anti-inflammatory, renal protective, hemodynamic effect and improving vascular structure and function. Patients with chronic kidney disease who have proteinuria should be prescribe ACE inhibitors or ARBs as part of combination therapy.

Antihypertensive drugs can be combined in a number of ways, including single-pill combinations (SPCs), free equivalent combinations, titration and sequential monotherapy. The use SPCs therapy, a combination of two or more active ingredients in the management of hypertension is largely accepted as a safe and efficient. The advantages of SPCs that some combination pills may be more expensive and having less flexibility in medication dosing.

SYMPOSIUM 14

How Can We Do Better in Hypertension Management with Fixed Dose Combination

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Abstract

Hypertension is a common condition associated with substantial morbidity and mortality. Nowadays, over 1 billion people suffer from high blood pressure worldwide , and it is estimated that the prevalence of hypertension will have risen by an additional 27 million people by the year 2030 . Improper management of hypertension can lead to cardiac failure, stroke, end-stage renal disease, and, finally, to death . Although blood

pressure lowering is crucial in hypertension, about half of the patients still have uncontrolled blood pressure .

The initial approach to blood pressure lowering is based on monotherapy, but in many cases, combination therapy is necessary to achieve target blood pressure levels.

Administration of the Fixed Dose Combination (FDC) for antihypertensive treatment is associated with a statistically significant improvement in the cooperation between a doctor and a patient in comparison with Fixed Equivalent Combination (FECs) will increased adherence and persistence to the treatment schedule. It was shown that the use of FDCs of hypertensive agents may have a positive effect on blood pressure and is associated with a lower risk of cardiovascular events compared with the use of FECs .

The introduction of FDC drugs to the standard treatment of hypertension could improve the quality of life and even provide additional benefits such as a reduced risk of cardiovascular events due to elevated adherence and persistence to the treatment .

Keyword: *Uncontrolled Hypertension, monotherapy, Fixed Dose Combination, adherence,persistence*

SYMPOSIUM 15

The Evolution of Calcium Channel Blockers (CCBs) as Antihypertensive Agents

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Abstract

Hypertension is one of the most commonly treated conditions in modern medical practice, but despite its long history, it was largely ignored until the midpoint of the 20th century. Although recognized since 2600 BC in ancient China, hypertension role as the cause of the so much heart, brain, and kidney disease was only firmly appreciated in the decades after World War II.¹

In concurrent with the expanded evidence of hypertension risk for cardiovascular events, the research for finding effective and safe antihypertensive agents evolved. Among those agents, ones of the most prescribed drugs are calcium channel blockers (CCBs), a class of drugs that function by inhibiting the movement of calcium by binding to voltage gated calcium channel receptors.^{1,2,3}

Discovered firstly in 1960's throughout a search for the treatment of angina pectoris, the CCBs were gradually recognized for its benefit as antihypertensive agents. Calcium channel blockers using as antihypertensive agents can be separated into two classes: dihydropyridine and non-dihydropyridine. They differ mainly in tissue selectivity. Non-dihydropyridine CCBs act on voltage-dependent L-type calcium channels of cardiac and smooth muscle to decrease muscle contractility. On the other hand, dihydropyridine CCBs act by mainly vasodilating the peripheral vasculature.^{2,4}

Backing by copious studies showing their benefit for preventing the Hypertension-mediated organ damage (HMOD), dihydropyridine CCBs in particular were developed more thoroughly from the rapid onset, short acting first generation ones to slower onset, longer acting and lesser side effects later generation ones, that made it among the first choice for monotherapy of essential or a part of combination therapy of optimal pharmacological treatment of hypertension in the current guidelines.^{3,4,5}

Keywords: evolution, calcium channel blockers, hypertension

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SYMPOSIUM 15

The Role of Amlodipine in Blood Pressure Control Triage: Achieving Cardiovascular Protection**Ria Bandiara****Abstract**

Hypertension is an important worldwide public-health challenge, often referred to as “the silent killer” owing to it being a major risk for myocardial infarction (MI) and the most important risk factor for stroke. Globally, high systolic blood pressure (SBP) is the leading risk factor accounting for 10.4 million deaths and 218 million disability-adjusted life-years (DALYs). The World Health Organization (WHO) estimates that of 1.13 billion people with hypertension worldwide, two-thirds are in low and middle income countries (LMICs) and this number is expected to increase over 1.56 billion by 2025. A systematic review and meta-analysis of 242 studies reported that in LMICs, one in three persons had hypertension (mean age: 45.9_12.1 years). However, only less than one in five people with hypertension have the blood pressure (BP) under control. An important reason for poor BP control may be late or ineffective treatment that could lead to irreversible or difficult to reverse adaptations of the cardiovascular (CV) system.

It has been long recognized that BP varies as per circadian rhythm, dipping at night during rest, increasing steeply in the morning (known as the “morning surge”), and peaking typically in the late afternoon. Thus, measurement of blood pressure variability (BPV) over a period of 24 hours (outside clinic) is recommended. A substantial number of studies advocated that BPV (ultrashort term, short term and long term) is a causative factor for different CV diseases like left ventricular hypertrophy (LVH) that further leads to organ damage. BPV or the fluctuation in the BP is complex and includes both the short-term (within minutes to hours) and long-term variations (includes days and months); the latter being more reliable than former on the grounds that it is better predictor of the CV outcomes. Accordingly, CV protection by antihypertensive treatment

should aim not only at achieving control of the average BP values, but also at stabilizing BPV. Blood pressure (BP) is characterized by continuous dynamic and spontaneous oscillations occurring over lifetime and defining the so-called blood pressure variability (BPV). BPV has been associated with target organ damage, cardiovascular (CV) risk and death, suggesting the use of BPV as a new target in hypertension management in addition to mean BP values lowering.

The management of “morning hypertension” is the most effective first step to achieve “perfect 24-hour BP control”. The majority of the benefit of antihypertensive treatment is derived from BP control per se. There is robust evidence that indicates BP control throughout 24 hours is essentially important for lowering the risk of organ damage and cardiovascular events. However, not only strict reduction of the 24-hour BP level (amount of 24-hour BP lowering), but also restoring disrupted circadian BP rhythms, and reducing exaggerated BP variability (quality of 24-hour BP lowering), are required to achieve “perfect 24-hour BP control”. All the major hypertensive guidelines recommend calcium channel blockers (CCBs) as one of the first line antihypertensive drugs. Trials like ALLHAT, VALUE, ASCOT, and ACCOMPLISH recommend CCB-based therapy for the management of normal and high CV risk hypertensive patients. Amlodipine is a trusted and well-tested CCB that blocks all the subtypes of calcium channels, effectively controls BP while maintaining circadian rhythm and reduces the risk of CV and cerebrovascular complications. Amlodipine is an excellent first line choice among all the other antihypertensive agents. The efficacy and safety of amlodipine are extensively studied and well established as a monotherapy as well as a combination therapy. Amlodipine with an effective BP control over 24 hours and low BPV reduces the progression of severe complications. Its longer half-life and higher SI lead to a consistent average BP reduction. Amlodipine is a trusted and cost-effective option not only for controlling BP but also effectively reduces BPV, thereby to improve patient outcomes like protecting against stroke and MI.



19th InaSH

SCIENTIFIC MEETING

**Hypertension Control and Prevention of
Cerebro-Cardio-Renovascular Disease
through Multidisciplinary Collaboration**



Free Paper Abstract

**selected abstract will be published
in Journal of Hypertension (Official
international journal of ISH and ESH)**

YOUNG INVESTIGATOR AWARD

YOUNG INVESTIGATOR AWARD

Saturday, Februari 22nd - Venue: Meeting Room 2

YIA NUMBER	TITLE	NAME	INSTITUTION
1	Visit-to-Visit Blood Pressure Variability, Carotid Intima-Media Thickness, and Cardiovascular Hospitalization Risk in Chronic Hemodialysis Patients: A Pilot Prospective Cohort Study	Triza Ahmad Praramadhan	Universitas Sriwijaya, Palembang
2	Association between Characteristics of Hypertension with Left Atrium Volume Index and Left Ventricle Ejection Fraction in Hypertensive Patients of Tertiary Hospital	Pradnyamita Puspawikan	Universitas Padjadjaran, Bandung
3	The Essential Role of Education in Managing Blood Pressure and Follow-Up Adherence among Hypertensive Patients: A Retrospective Cohort Study in Primary Care	Reza Ishak Estiko	RSUD Kota Bandung
4	Prevalence and Risk Factors of Resistant Hypertension Based on Ambulatory Blood Pressure Monitoring (ABPM)	Fawzia Haznah Nurul Imani	Universitas Diponegoro, Semarang
5	Visit-to-Visit Predialytic Blood Pressure Variability and Its Association with Cognitive Impairment in Hemodialysis Patients	Nia Githa Sarry	Universitas Sriwijaya, Palembang
6	Hypertension and the Severity of Symmetrical Diabetic Peripheral Neuropathy: Could the DISINI Score Be a New Game-Changing Tool	Arya Taksya Bagaskara	Universitas Kristen Duta Wacana, Yogyakarta
7	Unmasking Hypertension Effect to Early Cardiac Dysfunction in Breast Cancer Patients Undergoing Chemotherapy with Anthracycline	Firinda Soniya	RSUP Mohammad Hoesin, Palembang

YIA01

Visit-to-Visit Blood Pressure Variability, Carotid Intima-Media Thickness, and Cardiovascular Hospitalization Risk in Chronic Hemodialysis Patients: A Pilot Prospective Cohort Study

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Background: Chronic hemodialysis patients are at high risk for cardiovascular events, with blood pressure variability and carotid intima-media thickness (CIMT) being potential markers of cardiovascular risk. However, their relationship to cardiovascular hospitalization remains contentious.

Objective: To assess the association between visit-to-visit blood pressure variability, carotid intima-media thickness, and cardiovascular hospitalization risk in chronic hemodialysis patients.

Method: A pilot prospective cohort study was conducted at Mohammad Hoesin Hospital, from May 2024 to December 2024. Blood pressure was measured over eight consecutive dialysis sessions using a dialysis machine, and variability was calculated as the coefficient of variation (CV). CIMT was measured via B-mode ultrasound in both carotid arteries. Cardiovascular hospitalization risk was assessed over six months, including stroke, acute coronary syndrome, acute lung edema, peripheral artery disease, and vascular access thrombosis.

Results: The cohort included 77 chronic hemodialysis patients (36 males), with a median age of 62 years (range: 40–85). The median CV for systolic blood pressure (SBP) was 8.24 (2.58–18.66) mmHg, and for diastolic blood pressure (DBP), 7.85 (2.84–40.93) mmHg. Among 28 patients hospitalized for cardiovascular events, non-hemorrhagic stroke and acute lung edema were most common. Higher CV SBP was associated with increased CIMT (OR 7.28, 95%CI 2.17–24.49, $p=0.001$) and hospitalization risk (OR 3.94, 95%CI 1.45–10.74, $p=0.006$). Higher CV SBP remained an independent risk factor for hospitalization after adjustment for age, sex, comorbidities, dialysis adequacy, and medications.

Conclusion: Higher visit-to-visit SBP variability is an independent risk factor for cardiovascular hospitalization in chronic hemodialysis patients.

Keywords: *Chronic hemodialysis, blood pressure variability, carotid intima-media thickness, cardiovascular hospitalization.*

YIA02

Association between Characteristics of Hypertension with Left Atrium Volume Index and Left Ventricle Ejection Fraction in Hypertensive Patients of Tertiary Hospital

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Bandung, Indonesia

Introduction: Chronic hypertension leads to cardiac remodeling. Prior research shows that higher left atrial volume index significantly predict mortality risk. Hypertensive patients in tertiary hospital have other comorbidities, those are still rarely found.

Aim: This study conducted to prove whether chronic hypertension could alter left heart chamber function in hypertensive patients of tertiary hospital.

YOUNG INVESTIGATOR AWARD

Methods: Patients from hypertension registry from August 2022 to April 2024, where patients are consecutively planned for echocardiography. Patients with chronic hypertension, controlled and uncontrolled, enrolled in this study. Echocardiography examination was done using Vivid IQ, blood pressure measurement using Omron digital tensimeter. Left ventricle ejection fraction (LVEF) calculation using biplane method. Statistical analysis was carried out using Spearman analysis for non-normally distributed data.

Result: We include 163 participants, 73 patients are women with 10 of them had history of gestational pregnancy (6.1%), mean of systolic blood pressure 145 ± 23 , mean of diastolic blood pressure 80 ± 14 , mean of body mass index 25.16 ± 4.66 , mean duration of hypertension 8.48 ± 9.57 years, controlled 42.9% and uncontrolled 57.1%. We found that diastolic blood pressure correlates negatively to left atrium volume index (LAVI) significantly ($r = -0.182$ with $p = 0.020$) and systolic blood pressure correlates positively to LVEF significantly ($r = 0.221$ with $p = 0.005$). Duration of hypertension also correlate positively to LAVI significantly ($r = 0.178$ with $p = 0.023$).

Conclusion: Our study proves that chronic hypertension leads to cardiac remodeling. Simple blood pressure measurement can portray heart function such as LAVI and LVEF.

Keywords: blood pressure, cardiac remodeling, chronic hypertension, echocardiography

YIA03

The Essential Role of Education in Managing Blood Pressure and Follow-Up Adherence among Hypertensive Patients: A Retrospective Cohort Study in Primary Care

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Background: Hypertension significantly contributes to cerebro-cardio-renalovascular complications and global mortality, making education at the primary care level pivotal for prevention.

Objective: To evaluate the impact of education on follow-up adherence and blood pressure (BP) changes among hypertensive patients and identify associated factors.

Method: A retrospective cohort study was conducted at Pasirlayung Community Health Center from July to December 2024. Inclusion criteria were age ≥ 18 years, diagnosed hypertension (SBP ≥ 140 or DBP ≥ 90 mmHg), and receiving education and medication by doctors during the study. Patients with complications requiring advanced care were excluded. At the outpatient clinic, patients received verbal education emphasizing medication adherence, non-compliance risks, and the importance of a 20-day follow-up. This study was approved by the UNPAD Research Ethics Committee (No. 1040/UN6.KEP/EC/2024).

Result: Among 172 participants (median age 58 years; 75.6% female), education significantly improved follow-up adherence (59.3%, $p=0.018$). Significant reductions were observed in SBP (155.1 ± 15.7 to 143.0 ± 17.4).

mmHg; $p < 0.001$) and DBP (92.0 ± 12.4 to 86.9 ± 12.3 mmHg; $p < 0.001$). Trends toward increased adherence were observed with age (OR: 1.013, $p = 0.736$) and BPJS insurance coverage (Non-PBI: OR: 2.026, $p = 0.907$; PBI: OR: 1.774, $p = 0.906$). Male sex (OR: 1.558, $p = 0.612$) showed reductions in SBP, while dual antihypertension use (OR: 1.924, $p = 0.184$) is associated with DBP reductions.

Conclusion: Education in primary care improves follow-up adherence and significantly reduces BP, alleviating the global burden of cerebro-cardio-renal complications. Age and BPJS insurance coverage increase adherence, while male sex and dual antihypertension therapy are associated with SBP and DBP reductions, underscoring the need for tailored BP management strategies.

Keywords: Adherence; Blood Pressure Control; Education; Hypertension; Primary Care.

YIA04

Prevalence and Risk Factors of Resistant Hypertension Based on Ambulatory Blood Pressure Monitoring (ABPM)

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Background: Resistant hypertension (RH) is defined as uncontrolled blood pressure despite optimal therapy and is associated with significant cardiovascular risks. Ambulatory Blood Pressure Monitoring (ABPM) is crucial for accurate diagnosis and management, as it provides 24-hour BP data that office measurements may miss.

YOUNG INVESTIGATOR AWARD

Objective: To identify risk factors associated with RH using ABPM reports.

Methods: This cross-sectional study reviewed 149 ABPM reports from hypertensive patients at a cardiovascular hospital (November 2022–November 2023). Data included demographics, lab results, echocardiography, medications, and comorbidities such as chronic kidney disease (CKD), type 2 diabetes (T2DM), heart failure (HF), dyslipidemia, obesity, and coronary artery disease (CAD). Bivariate analysis (Chi-square) and logistic regression identified predictors of RH.

Results: RH was identified in 35.57% of patients. Its prevalence was 31.67% in females (38 out of 120 female patients) and 51.72% in males (15 out of 29 male patients). Bivariate analysis showed significant associations with male gender ($p=0.043$, OR 2.3, CI 1.02 – 5.27), T2DM ($p=0.013$, OR 3.14, CI 1.24 – 7.95), HF ($p=0.04$, OR 2.03, CI 1.02 – 4.04), and CKD ($p < 0.001$, OR 19.43, CI 2.34 – 158). Multivariate analysis confirmed male gender ($p=0.01$, OR 2.99 CI 1.29 – 6.95) and CKD ($p=0.003$, OR 25.14 CI 3.05 – 207) as strong independent predictors.

Conclusion: RH affects over one-third of hypertensive patients, with higher prevalence in males and those with CKD, T2DM, or HF. Male gender and CKD are the strongest independent risk factors. Focused management of these at-risk groups is necessary to reduce cardiovascular events.

Keywords: Hypertension, Resistant hypertension, ABPM, CKD, Male gender.

YIA05

Visit-to-Visit Predialytic Blood Pressure Variability and Its Association with Cognitive Impairment in Hemodialysis Patients

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Background. Cognitive impairment is a prevalent but often underdiagnosed complication in patients undergoing chronic hemodialysis. Potential mechanisms include vascular injury, oxidative stress, and hemodynamic instability, which may be exacerbated by blood pressure variability. Variability in predialytic blood pressure may contribute to this dysfunction, yet its role remains unclear.

Objective. To determine the relationship between predialytic blood pressure variability and cognitive impairment in patients undergoing chronic hemodialysis.

Methods. This cross-sectional study was conducted at Mohammad Hoesin General Hospital between August and September 2024. Predialytic blood pressure variability was assessed across eight dialysis sessions using the coefficient of variation. Cognitive impairment was identified using the Mini-Mental State Examination (MMSE) with a cutoff of ≤ 24 , while depression was excluded using the Beck Depression Inventory. Blood pressure measurements were obtained using calibrated sphygmomanometers integrated into dialysis machines, following the International Society of Hypertension (ISH) guidelines.

Results. A total of 100 patients were included, with 25 exhibiting cognitive impairment. Patients with cognitive impairment demonstrated significantly higher predialytic blood pressure variability. Multivariate logistic regression analysis confirmed that increased blood pressure variability was independently associated with cognitive impairment ($p < 0.05$). Monitoring and minimizing blood pressure variability may play a role in preserving cognitive function in this population. Further studies are warranted to explore potential interventions targeting blood pressure stability.

Conclusion. Higher visit-to-visit predialytic blood pressure variability is significantly associated with cognitive impairment in chronic hemodialysis patients.

Keywords: Predialytic blood pressure variability, cognitive impairment, hemodialysis, Mini-Mental State Examination.

YIA06

Hypertension and the Severity of Symmetrical Diabetic Peripheral Neuropathy: Could the DISINI Score Be a New Game-Changing Tool

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Background: Diabetic peripheral neuropathy (DPN) is a major complication of type 2 diabetes mellitus, characterized by sensory loss and pain in a "stocking-and-glove" distribution. Hypertension may exacerbate DPN by disrupting microvascular blood flow, increasing peripheral nerve damage.

YOUNG INVESTIGATOR AWARD

Objective: To evaluate the association between hypertension and the severity of distal symmetrical DPN and to assess the diagnostic performance of the Distal Simetris Neuropati (DISINIS) score in measuring the severity of distal symmetrical DPN.

Methods: This study is a single-center retrospective cohort study. We include patients diagnosed diabetic neuropathy which never had an amputation, with or without hypertension, through structured history taking and neurological examination. The severity of DPN was assessed using a diabetic neuropathy symptom and examination scoring system; Douleur Neuropathique 4 (DN4) scoring and Distal Simetris Neuropati (DISINI). The DN4 and DISINI scores were compared for diagnostic quality using a diagnostic test evaluation calculator, and the mean and standard deviation of these scores were compared between groups with and without hypertension.

Results: A total of 64 patients were analyzed. Hypertensive patients had significantly higher DISINI scores compared to non-hypertensives (mean $\pm$ SD 4.61 $\pm$ 1.63 vs 3.88 $\pm$ 1.30, $p=0.046$). DISINI demonstrated superior diagnostic performance, with 91.18% sensitivity, 43.33% specificity, 64.58% positive predictive value, and 81.25% negative predictive value.

Conclusions: Patient with hypertension has higher DPN severity. Our studies identifying hypertension as an independent risk factor for the development of DPN. The DISINI score effectively assessed DPN severity, showing superior diagnostic performance over the DN4 score, although further validation is warranted.

Keywords: hypertension, diabetic peripheral neuropathy, DISINI score, DN4 score.

YIA07

Unmasking Hypertension Effect to Early Cardiac Dysfunction in Breast Cancer Patients Undergoing Chemotherapy with Anthracycline

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Background. Cancer therapy-related cardiac dysfunction (CTRCD), marked by a >15% reduction of left ventricle global longitudinal strain (GLS), was found in patient receiving anthracycline chemotherapy. The role of hypertension in increasing cardiotoxicity risk remains unclear.

Objective. To analyze hypertension severity and CTRCD in breast cancer patients receiving anthracycline chemotherapy.

Methods. In 2024, from March until November, 22 breast cancer patients receiving anthracycline chemotherapy detected to have CTRCD, was included in this study. The data of blood pressure was collected and categorized based on ESC guideline. GLS was measured by echocardiography before chemotherapy and after the third cycle of chemotherapy. Multivariate analyses were performed to assess the relationship between hypertension severity and GLS reduction.

Results. The average age of 22 female patients was 48.95 ± 1.83 years, with hypertension was the most common comorbidity (86.3%). Patients in this study have 3 categories of blood pressure; normal, elevated (pre-hypertension) and stage I hypertension. ANOVA showed a significant difference in GLS reduction among hypertension groups ($F = 6.37\%$, $p=0.008$). Significant GLS reduction was found the most in stage I hypertension; 10.445% ([95% CI, 2.64%-18.25%]; $p=0.007$), followed by patient with elevated blood pressure; 7.689% ([95% CI, 0.89%-14.49%]; $p=0.024$). Regression analysis revealed hypertension severity as a significant predictor of GLS reduction ($R^2 = 34.5\%$, $p=0.001$).

Conclusion. Hypertension severity have significant effect to early cardiac dysfunction in breast cancer patients receiving anthracycline chemotherapy. Risk of cardiac dysfunction was already increased in elevated (pre-hypertension) patients. Early blood pressure monitoring and management was essential to reduce the risk of cardiotoxicity.

MODERATED POSTER SCHEDULE

Saturday, February 22 nd , 2025 - Venue: MP CORNER, Time: 10.30 – 11.30		
MP NUMBER	TITLE	NAME
1	Integrated Bioinformatic Analysis on the Correlation between Obesity and Hypertension in Woman	Stephen Dario Syofyan
2	Long-Term Blood Pressure Variability and Its Association with Sarcopenia in Chronic Hemodialysis Patients	Eva Julita
3	Characteristics of Lupus Nephritis Among Hypertension Population and Risk of Kidney Function Decline: A Single Center Retrospective Cohort Study	Ni Made Hustrini
4	Clinical Profile of Visual Loss in Patients with Hypertension at Dr. Cipto Mangunkusumo Hospital, Jakarta, Indonesia from 2021–August 2024	Wafya Melosi Ramschie
5	The Effect of Hypertension Status on Blood Pressure Changes and Walking Distance During Six Minutes Walking Test in Coronary Artery Disease Patient	Rifqi Nahadhol M
26	In-Depth Analysis of Hypertension Medication Adherence and Its Correlation on Laboratory and Echocardiographic Outcomes	Fatih Farabi

MODERATED POSTER

MODERATED POSTER SCHEDULE

Saturday, February 22 nd , 2025 - Venue: MP CORNER, Time: 11.30 – 12.30		
MP NUMBER	TITLE	NAME
11	Mind the Dip: Are Asian Hypertensive Patients More Susceptible? A Network Meta-Regression on Dipping Patterns and Cognitive Outcomes	dr. Surya Sinaga Immanuel
12	Comparative Efficacy of Antihypertensive Drugs for Primary Stroke Prevention – A Network Meta-Analysis of Randomized Controlled Trials	Leo Deddy Pradipta
13	The Role of Blood Pressure Variability as a Risk Factor of Heart Failure Incidence: A Systematic Review and Meta-Analysis	Alvin Frederickh
14	HYPERTENSION AND OBSTRUCTIVE SLEEP APNEA IN THE ADULT: UNDERSTANDING THE TREATMENT STRATEGIES	Jessy Sestomi
15	Opening New Horizon of Novel Pharmacological “Zilebesiran” as siRNA-Based Therapeutics for Hypertension: A Systematic Review	Ghazy Wira Pradipta

MODERATED POSTER SCHEDULE

Saturday, February 22 nd , 2025 - Venue: MP CORNER, Time: 13.30 – 14.30		
MP NUMBER	TITLE	NAME
21	Acute Aortic Dissection (AAD) Misdiagnosed as Acute Coronary Syndrome (ACS): The Crucial Role of Four-Extremity Blood Pressure (BP)	Muhamad Fajri Adda'i
22	Unmasking the Culprit: A Case of Coronary Fistula as a Possible Etiology of Secondday Hypertension in Female Patient	Kevin Wibawa
23	Blood Pressure as a Contributing Factor to Early Neurological Deterioration in Acute Ischemic Stroke: A Case Report	Ivan Jeremia
24	Purple Urine Bag Syndrome: A Rare Manifestation of Underlying End-Stage Organ Damage in Hypertension	dr. R. Mohamad Javier
25	A CASE SERIES: SECONDARY HIPERTENSION DUE TO CONN'S SYNDROME AT DR SARDJITO HOSPITAL	Zumrati Ahmad

MODERATED POSTER SCHEDULE

Sunday, February 23 rd , 2025t - Venue: MP CORNER, Time: 09.30 – 10.30 hrs		
MP NUMBER	TITLE	NAME
6	HYPERTENSION POPULATION GROWTH IN INDONESIA: INSIGHTS FROM BPJS-KESEHATAN BIG DATA	Sarah Shadiqa
7	Bioinformatic Analysis on The Association Between Heart Failure and Left Heart Disease Leading to Hypertension	Stephen Dario Syofyan
8	Clinical Profile of Haemodynamic Orthostatic Vertigo and Dizziness (HODV) in Patients with Hypertension at Dr. Cipto Mangunkusumo Hospital, November 2021–October 2024	Gabriella Juli Lonardy
9	Influence of Left Ventricular Mass Index on Left Atrial Strain in Patients with Stroke and Hypertensive Heart Disease	Indra Fahlevi
10	Validation and Assessment of Novel Morphology-Voltage-P-wave Score for Diagnosing Left Ventricular Diastolic Dysfunction in Patients with Hypertension (VANESSA Trial)	Leo Deddy Pradipta

MODERATED POSTER

MODERATED POSTER SCHEDULE

Sunday, February 23 rd , 2025 ^t - Venue: MP CORNER, Time: 11.00 – 12.00 hrs		
MP NUMBER	TITLE	NAME
16	Targeting Optimal Ablation Sites in Renal Denervation for Resistant Hypertension: A Systematic Review and Meta-Analysis	Rizki Hari Mulia
17	PROGNOSTIC VALUE REGRESSION OF ELECTROCARDIOGRAPHIC LEFT VENTRICULAR HYPERTROPHY ASSOCIATED DECREASING OF ADVERSE CARDIOVASCULAR EVENTS IN HYPERTENSIVE PATIENTS: A META-ANALYSIS	Rio Bayu Nugroho
18	THE RELATIONSHIP BETWEEN POOR GLYCEMIC CONTROL AND HYPERTENSIVE DISORDERS OF PREGNANCY: A SYSTEMATIC REVIEW	Antonia Michelle Wongso
19	Prognostic Value of Blood Pressure Variability in Patients with Heart Failure: A Systematic Review and Meta-Analysis	Apridya Nurhafizah
20	Decoding Exercise Strategies for Coronary Artery Disease: A Network Meta-Analysis of Aerobic, Resistance, and Continuous Training Modalities	Keisha Rochelline

MP-01

Integrated Bioinformatic Analysis on the Correlation between Obesity and Hypertension in Woman

Stephen Dario Syofyan¹, Josia Nathanael Wiradikarta¹,
Joshua Francisco Syofyan², Michael Christianto¹, Kenoah Kovara¹

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²*Faculty of Medicine; Universitas Udayana; Bali; Indonesia*

Background. Hypertension is a disease that is commonly associated with obesity, wherein it is suspected that 65-78% of primary hypertension is caused by obesity. Obesity as a condition has also increased in women from 1975 to 2022, where the obesity rate has tripled from 6.6% to 18.5%. The mechanism of obesity leading to hypertension is an interesting topic because of its applicability in the treatment of hypertension as a complication of obesity. Consequently, this study aims to analyze the mechanisms of Obesity which leads to hypertension.

Methods. Two microarray and RNA-sequencing datasets (GSE217007 and GSE181339) were extracted from the Gene Expression Omnibus (GEO) database. From those databases the GEO2R tool was used to analyze the differentially expressed genes (DEGs) from each dataset. The common DEGs from every datasets were integrated and the Gene ontology (GO) and pathway enrichment analysis was done with the ShinyGo tool.

Results. From these two datasets 2 common DEGs were identified and combined which are the ERAP2 and HBA2 genes. The results of the enrichment analysis of the common DEGS were linked to oxygen transport and antigen processing in the biological process category, haptoglobin-hemoglobin complex and hemoglobin complex in the cellular component category, and haptoglobin binding and oxygen carrier activity in the molecular function category.

Conclusion. The correlation between obesity and hypertension in women can be caused by the genes ERAP2 and HBA2, these genes need to be

studied further as one of the key pathways leading to hypertension caused by obesity.

Keywords. *Bioinformatic, hypertension, obesity.*

MP-02

Long-Term Blood Pressure Variability and Its Association with Sarcopenia in Chronic Hemodialysis Patients

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Background. Sarcopenia is common in chronic hemodialysis patients and correlated with poor outcomes. While long-term blood pressure variability (CV SBP) is associated with sarcopenia in older and diabetic patients, this relationship remains unexplored in hemodialysis populations. This study aims to investigate the association between long-term blood pressure variability and sarcopenia in chronic hemodialysis patients.

Methods. This case-control study was conducted at Mohammad Hoesin General Hospital in Palembang. Sarcopenia was diagnosed according to the Asian Working Group on Sarcopenia (AWGS) 2019 criteria, using handgrip strength, gait speed, and skeletal muscle mass index, all assessed in November 2024. Pre-dialytic blood pressure was measured at each dialysis session, with visit-to-visit variability calculated for November 2024. The coefficient of variation (CV) of systolic (SBP) and diastolic (DBP) blood pressure was analyzed. Logistic regression was used to adjust for confounders.

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Results. The study included 48 chronic hemodialysis patients (12 males and 36 females; median age 61 [30–70] years), divided into 24 sarcopenia and 24 control groups. Patients with sarcopenia had a higher CV of SBP compared to those without sarcopenia (median 10.75% [2.75–21.22] vs 8.66% [4.83–23.51], $p = 0.043$). No significant difference was observed in CV of DBP between the groups ($p = 0.470$). Higher CV of SBP was associated with an increased risk of sarcopenia (OR 5.89, 95% CI 1.70–20.48), and this association remained significant after adjusting for confounders ($p < 0.05$).

Conclusions. Long-term variability in SBP is significantly associated with sarcopenia in chronic hemodialysis patients, even after adjusting for confounders.

Keywords: Sarcopenia, Chronic Hemodialysis, Blood Pressure Variability, Systolic Blood Pressure (SBP).

MP-03

Characteristics of Lupus Nephritis Among Hypertension Population and Risk of Kidney Function Decline: A Single Center Retrospective Cohort Study

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Abstract

Background. The prevalence of hypertension among lupus is high, reaching up to 74%; and is increased with the severity of renal impairment. This study aimed to assess the association of hypertension with degree of clinical and histopathological presentation and kidney function decline over time in lupus nephritis (LN).

Methods. A retrospective-cohort study performed between 1/1/2011 to 31/12/2021 at Dr. Cipto Mangunkusumo Hospital, Jakarta. We included biopsy-proven LN patients according to ISN/RPS 2018 classification and followed until death, initiation of kidney replacement therapy, or end-of study. Association between hypertension and degree of kidney damage was analyzed using Chi-Square, independent T-test or Mann-Whitney; whichever appropriate. A linear mixed-model analysis was used to assess the association of hypertension and kidney function decline overtime.

Results. A total of 268 patients were included with a mean age of 28.7±8.5 years. The prevalence of hypertension was 39.2%. Hypertension

group had a lower baseline eGFR (81.0 ± 39.2 vs 102.6 ± 36.0 ml/minute/1.73 m², $p < 0.001$) with a higher prevalence of CKD (64.2% vs 35.8%, $p < 0.001$) compared to non-hypertensive group. Hypertensive group was found higher among proliferative classes of LN compared to non-hypertensive group (class III 24.8% vs 16%, class IV 41.9% vs 36.2%, class III/IV+V 14.3% vs 11%, $p = 0.009$). Moderate to high chronicity index was greater in hypertension group (61% vs 39%, $p < 0.001$). Higher eGFR decline was observed in those with hypertension (β -33.3, SE 9.7, $p < 0.001$), LN class IV (β -39, SE 13.6, $p = 0.004$) and VI (β -55.5, SE 27.4, $p = 0.044$).

Conclusion. Hypertension was associated with a worse clinico-histopathological presentation and higher eGFR decline at baseline.

MP-04

Clinical Profile of Visual Loss in Patients with Hypertension at Dr. Cipto Mangunkusumo Hospital, 2021–August 2024

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Background. Hypertension can cause damage to various neuro-ophthalmic structures, including the retina, optic nerve, visual pathway, and brain, resulting in visual loss.

Objective. To analyze the clinical profile and characteristics of visual loss in hypertensive patients.

Methods. This cross sectional study included hypertensive patients consulted with visual loss at Neuro- Ophthalmology and Neuro-Otology Diagnostic Clinic, Dr. Cipto Mangunkusumo Hospital, Jakarta, Indonesia from 2021 to August 2024

Results. Total 234 patients was consulted for vision loss to our clinic, 95 had hypertension. After excluding those with structural lesions, 61 patients were included in the study. The mean age was 51.56 years, of whom 70.5% were male. Most visual loss distribution was binocular (73.8%). Most subjects had visual field defects (78.7%), primarily homonymous hemianopsia (41%). Most patients had chronic controlled hypertension, with mean systolic blood pressure of 137.25 ± 16.86 mmHg and median duration of 5 years. Hypertensive retinopathy was observed in 63.9% of subjects, predominantly mild (49.2%). Patients without retinopathy had a shorter hypertension duration (median 2 years, $p = 0.006$). Most frequent etiology of visual loss was stroke (62.3%), followed by ischemic optic neuropathy. Hypertension duration showed a significant association with the etiology of visual loss ($p = 0.034$). Subjects who had hypertension >5 years exhibited more cases of stroke.

Conclusion. The most frequent visual loss in hypertensive patients was homonymous hemianopia caused by stroke, showing damage of intracranial visual pathway. Longer hypertension duration was associated with stroke. Early hypertension control and regular visual examinations are crucial in preventing visual loss.

Table 1. Characteristics of Subjects

Characteristics	Total n (%)
Age (year)	51.56 $\pm$ 11.88
Sex	
• Male	43 (70.5%)
• Female	18 (29.5%)
Duration of hypertension (years)	5.0 (0 - 34)
Systolic blood pressure (mmHg)	137.25 $\pm$ 16.86
Diastolic blood pressure	84.75 $\pm$ 14.61
Visual Loss Distribution	
• Binocular	45 (73.8)
• Monocular	16 (26.2)

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	4 (6.5)
Visual Loss Type Transient Permanent	
• Visual field defect only	36 (59.0)
• Visual acuity impairment only	9 (14.8)
• Both	12 (19,7)
Visual Field Defect Type	
• Homonymous hemianopsia	25 (41)
• Homonymous quadrinopsia	8 (13.1)
• Quadrinopsia	2 (3.3)
• Scotoma	1 (1.6)
• Altitudinal hemianopsia	6 (9.8)
• Constrictive	1 (1.6)
• Cortical blindness	4 (6.6)
• None	14 (23)
Hypertensive Retinopathy	
• No	22 (36.1)
• Mild	30 (49.2)
• Moderate	9 (14.8)
Etiology	
• Stroke	38 (62.3)
• Posterior TIA	3 (4.9)
• Amaurosis Fugax	2 (3.3)
• Ischemic Optic Neuropathy	12 (19.7)
• Retinal Vascular Occlusion	4 (6.6)
• Other	2 (3.3)
Antihypertensive Medication	
• Single antihypertensive medication	33 (54.1)
• > 1 antihypertensive medication	28 (45.9)

MP-05

The Effect of Hypertension Status on Blood Pressure Changes and Walking Distance During Six Minutes Walking Test in Coronary Artery Disease Patient

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Background. It remains unclear whether systolic (SBP) and diastolic (DBP) pressure and BP response in submaximal test including six-minute walk test (6MWT) are associated with hypertension status.

Objective. To asses BP response during 6MWT between hypertensive and non-hypertensive CAD patient in Hasan Sadikin General Hospital

Methods. The data was derived from 6MWT in CAD population registry. Normality test was performed for continuous variable. Independent T-test or Mann-Whitney U Test was performed to analyze continuous variable. Chi-square or Fisher-exact Test was performed to analyze dichotomous variables. Hypertension group defined as group of patients with history of hypertension.

Results. A total of 344 patients was included, male with normotensive group was higher than hypertension group (84 % vs 77%). The mean LVEF between two group is 47,5 %. The mean systolic BP before 6MWT was 120(110-132) and after 6MWT 133(120-140) mmHg in hypertensive patient. In normotensive patient, mean systolic BP before 6MWT was 113 (105-124) and post 6MWT was 125 (111-135). The mean borg scale after 6MWT was 12. The blood pressure response during 6MWT was compared but not statistically significant. The distance walked in 6 min was compared and the normotensive group was higher (358 ± 113 vs 351 ± 96 , $p=0.545$).

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Conclusion. Among population with CAD, hypertensive group was older compared to normotensive group. There are no difference of blood pressure changes and walking distance during 6MWT between CAD patients with and without hypertension. The distance walked in 6 min was higher in normotensive group but not statistically significant.

Table 1. Comparison between hypertensive and non-hypertensive CAD patient who underwent 6MWT.

Variable	Hypertension (n = 171)	Normotensive Blood pressure (n = 173)	P-value
Age	58.9 ± 9.5	56.1 ± 10.1	0.007
Gender (Male)	132	147	0.065
Diabetes	47	35	0.114
Family History	8	13	0.368
Smoking	102	126	0.010
Dislipidemia	44	42	0.272
SBP pre 6MWT	120 (110-132)	113 (105-124)	<0.001
SBP post 6MWT	133 (120-140)	125 (111-135)	<0.001
Elevated blood pressure >20 mmHg after 6MWT	17	23	0.332
DBP pre 6MWT	78 (10-83)	70 (68-80)	0.006
DBP post 6MWT	80 (71-90)	78 (70-83)	0.001
Delta SBP	10 (3-14)	10 (2-15)	0.946
Delta DBP	0 (0-9)	1 (0-8)	0.869
Distance 6MWT (meter)	351 ± 96	358 ± 113	0.545

SBP = systolic blood pressure; DBP = diastolic blood pressure; 6MWT = 6 minutes walking test.

MP-06

HYPERTENSION POPULATION GROWTH IN INDONESIA: INSIGHTS FROM BPJS-KESEHATAN BIG DATA

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Background. Hypertension is a significant risk factor for cardiovascular diseases and contributes heavily to the health burden in Indonesia. Survey Kesehatan Indonesia 2023 reported a decline in the prevalence of hypertension from 34.1% in 2018 to 30.8% in 2023.

Objective. To analyze the trends in the hypertension population in Indonesia between 2019 and 2023.

Method. This study utilized big data samples of BPJS-Kesehatan, processed through stratified random sampling to ensure regional representation and longitudinal consistency. Data from outpatient visits to primary healthcare facilities between 2019 and 2023 were analyzed, focusing on cases identified by ICD-10 codes I10 (essential hypertension) and I11 (hypertensive heart disease).

Result. A total of 229,484 hypertension cases were recorded across 34 provinces from 2019 to 2023. Annual growth rates of the hypertension population were -10% (2019–2020), 9% (2020–2021), 12% (2021–2022), and 17% (2022–2023), resulting in an overall growth rate of 29% over four years. When analyzed by region, the highest growth was observed in Sumatra (69%), followed by Bali-NTB-NTT (40%), Kalimantan (25%), Sulawesi (22%), Maluku-Papua (20%), and Java (15%). Notably, only 5% of hypertension patients made regular visits to primary healthcare facilities.

Conclusion. Despite reported decline in hypertension prevalence, this study highlights a substantial growth in the hypertension population in Indonesia across all regions.

MP-07

Bioinformatic Analysis on The Association Between Heart Failure and Left Heart Disease Leading to Hypertension

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Background. Hypertension is a common complication of various serious diseases, such as heart failure and left heart disease. Heart failure affects 64 million people all over the world and 17.2% left heart disease patients have been diagnosed with pulmonary hypertension. This study aims to identify similar molecular mechanisms causing pulmonary hypertension in heart failure and left heart disease.

Methods. Two microarray datasets (GSE196656 and GSE236251) were picked from the Gene Expression Omnibus (GEO) database. The differentially expressed genes expressed in both datasets were analyzed using the Geo2R tool. The DEGs commonly expressed were analyzed with the Gene Ontology and pathway enrichment analysis with the ShinyGo tool. Protein-protein interaction network was constructed of common DEGs with the STRING A network of protein-protein interaction (PPI) of DEGs was fabricated using STRING and Cytoscape, then the top 10 hub genes were identified.

Results. 80 common DEGs were linked from the two datasets. Following that an enrichment analysis was conducted on the DEGs, the DEGs were mostly associated with negative regulation of gene expression, nucleosome, DNA packing complex, protein heterodimerization, and haptoglobin binding. The top 10 hub genes ranked by the degree were TLR1, FCGR2A, VSIG4, LYVE1, FCGR1A, TLR8, MS4A6A, CD163, CCR2, and C3AR1.

Conclusion. The bioinformatics study done reveals that there is an association between heart failure and left heart disease in causing hypertension.

Keywords. Bioinformatic; Heart Failure; left heart disease

MP-08

Clinical Profile of Haemodynamic Orthostatic Vertigo and Dizziness (HODV) in Patients with Hypertension at Dr. Cipto Mangunkusumo Hospital, November 2021–October 2024

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Background. Haemodynamic Orthostatic Vertigo and Dizziness (HODV) is a common yet underdiagnosed condition characterized by dizziness or vertigo due to haemodynamic changes on arising to sitting or standing. The key mechanism of HODV is autonomic dysfunction, however the association with hypertension remains significant but not well studied.

Objective. To analyze the clinical profile and characteristics of HODV in hypertensive patients

Methods. A cross sectional study was conducted at Neuro-Ophthalmology and Neuro-Otology Diagnostic Clinic, Dr. Cipto Mangunkusumo Hospital, Jakarta, Indonesia from November 2021 to October 2024

Results. This study involved 54 subjects with a mean age of 55.2 years, most subjects (57.4%) had hypertension. Definite HODV was more

prevalent in the hypertensive group (70.0% vs. 30.0%, $p=0.036$). The most common vestibular symptom in both groups was vertigo (77.8%). Hypertensive subjects exhibited higher mean difference of systolic blood pressure (SBP) from supine to 1 minute standing (9.03 ± 17.5 mmHg vs -5.5 ± 18.4 mmHg, $p=0.005$) and from supine to 3 minute standing (12.7 ± 22.8 mmHg vs -5.3 ± 20.7 mmHg, $p=0.004$) compared to nonhypertensive subjects. Hypertensive patients also exhibited significantly lower mean difference of heart rate from supine to 1 minute standing (5.1 ± 7.7 bpm vs 11.3 ± 9.3 , $p = 0.01$) and from supine to 3 minute standing (4.2 ± 7.0 bpm vs 11.8 ± 10.1 bpm, $p=0.002$) compared to nonhypertensive patients.

Conclusion. HODV patients are more likely to be hypertensive. Systolic blood pressure mean differences within 1 and 3 minutes of standing is higher in hypertensive patients

Table 1. Characteristic of Patients

Characteristics	Total n (%) n=54
Age (year)	55.2 $\pm$ 17.1
Sex	
• Male	19 (35.2)
• Female	35 (64.8)
Hypertension	
• Yes	31 (57.4)
• No	23 (42.6)
ICVD Diagnosis	
• <i>Definite</i> HODV	30 (55.6)
• <i>Probable</i> HODV	24 (44.4)
Symptoms	
• Vertigo	24 (44.4)
• Dizziness	0 (0)
• Vestibulo-visual symptoms	0 (0)
• Postural symptoms	12 (22.2)
• More than 1 symptoms	18 (33.3)

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Orthostatic Disorder	
• Orthostatic hypotension	10 (18.5)
• Orthostatic hypertension	19 (35.2)
• POTS	0 (0)
• Orthostatic hypertension + POTS	2 (3.7)
• No orthostatic disorder	25 (46.3)
Pupil Abnormality	
• Yes	15 (27.8)
• No	39 (72.2)
Systolic blood pressure (mmHg)	
• Supine for 10 minutes	131.5 ± 21.5
• Immediate standing	129.2 ± 25.6
• Standing for 1 minute	134.3 ± 22.4
• Standing for 3 minutes	136.5 ± 25.7
Diastolic blood pressure (mmHg)	
• Supine for 10 minutes	80.2 ± 14.7
• Immediate standing	82.8 ± 21.4
• Standing for 1 minute	86.0 ± 20.3
• Standing for 3 minutes	87.3 ± 20.2
Heart rate (bpm)	
• Supine for 10 minutes	74.4 ± 12.4
• Immediate standing	80.6 ± 14.8
• Standing for 1 minute	82.7 ± 15.1
• Standing for 3 minutes	82.9 ± 15.7
Systolic blood pressure differences : (mmHg)	
• Supine to immediate standing	-2.3 ± 18.8
• Supine to 1 minute standing	2.8 ± 19.1
• Supine to 3 minutes standing	5.0 ± 23.5
Diastolic blood pressure differences : (mmHg)	
• Supine to immediate standing	2.6 ± 13.4
• Supine to 1 minute standing	5.9 ± 13.3
• Supine to 3 minutes standing	6.6 ± 14.7
Heart rate differences (bpm)	
• Supine to immediate standing	6.3 ± 8.2
• Supine to 1 minute standing	7.7 ± 8.9
• Supine to 3 minutes standing	7.4 ± 9.2

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Antihypertensive drugs	
• ≤2 types	24 (44.4)
• >2 types	6 (11.1)
Cardiac Disease	
• Atrial Fibrillation	2 (3.7)
• Ischemic Heart Disease	9 (20.4)
• Congestive Heart Failure	1 (5.6)
• More than 1 disease	2 (3.7)
• Absent	40 (74.1)

Tabel 2. Differences in Characteristics of HODV Patients With and Without Hypertension

Characteristics	Hypertension n=31	Without Hypertension n=23	p
Age	60.5 ± 14.6	48.0 ± 17.9	0.07 ^c
Sex			
• Male	14 (73.7)	5 (26.3)	0.075 ^a
• Female	17 (48.6)	18 (51.4)	
ICVD HODV Diagnosis			
• Definite HODV	21 (70.0)	9 (30.0)	0.036 ^{a*}
• Probable HODV	10 (41.7)	14 (58.3)	
Vertigo			
• Present	24 (57.1)	18 (42.9)	0.941 ^a
• Absent	7 (58.3)	5 (41.7)	
Postural Symptoms			
• Present	19 (63.3)	11 (36.7)	0.325 ^a
• Absent	12 (50.0)	12 (50.0)	
Orthostatic Hypotension			
• Present	5 (50.0)	5 (50.0)	0.728 ^b
• Absent	26 (59.1)	18 (40.9)	
Orthostatic Hypertension			
• Present	16 (84.2)	3 (15.8)	0.03 ^{a*}
• Absent	15 (42.9)	20 (57.1)	

Diastolic blood pressure differences :
(mmHg)

• Supine to immediate standing	4.0 ± 12.8	0.7 ± 14.3	0.372
• Supine to 1 minute standing	8.6 ± 12.9	2.2 ± 13.1	0.082
• Supine to 3 minutes standing	9.8 ± 14.2	2.3 ± 14.6	0.058

Systolic blood pressure differences :
(mmHg)

• Supine to immediate standing	0.6 ± 18.7	-6.2 ± 18.8	0.191
• Supine to 1 minute standing	9.0 ± 17.5	-5.5 ± 18.4	0.005*
• Supine to 3 minutes standing	12.7 ± 22.8	-5.3 ± 20.7	0.004*

Heart rate differences

• Supine to immediate standing	4.4 ± 7.1	8.8 ± 9.0	0.046
• Supine to 1 minute standing	5.1 ± 7.7	11.3 ± 9.3	0.010*
• Supine to 3 minutes standing	4.2 ± 7.0	11.8 ± 10.1	0.002*

a: chi square

b: fisher test

c : independent t test

MP-09

Influence of Left Ventricular Mass Index on Left Atrial Strain in Patients with Stroke and Hypertensive Heart Disease

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Abstract

Background: Left ventricular mass index (LVMI) is a key marker of cardiac remodelling in hypertensive heart disease (HHD) and is linked to diastolic

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dysfunction. Its relationship with left atrial (LA) strain, a measure of LA function, in stroke patients remains unclear.

Objective: To evaluate the effect of increased LVMI on LA strain in patients with stroke and HHD.

Methods: A cross-sectional study was conducted on stroke patients with HHD, divided into elevated LVMI ($>115 \text{ g/m}^2$ for males, $>95 \text{ g/m}^2$ for females) and normal LVMI ($\leq 115 \text{ g/m}^2$ for males, $\leq 95 \text{ g/m}^2$ for females). Demographic, echocardiographic, and LA strain parameters were analysed.

Results: Patients with elevated LVMI ($n=25$) were older (58.6 ± 12.5 vs. 46.6 ± 17.7 years, $p=0.009$), had higher LAVI (27.22 ± 9.65 vs. $22.36 \pm 10.27 \text{ mL/m}^2$, $p=0.026$), and more frequent diastolic dysfunction (60% vs. 4%, $p<0.001$). LA strain parameters, including conduit strain (LAScd: 12.4 ± 4.1 vs. 13.84 ± 6.31 , $p=0.373$), contractile strain (LASct: 9.24 ± 4.96 vs. 10.48 ± 6.64 , $p=0.458$), and reservoir strain (LASr: 21.7 ± 5.7 vs. 24.52 ± 9.11 , $p=0.206$), were reduced in two groups although there were not statistically significant differences.

Conclusion: Elevated LVMI is associated with LA structural remodelling and decreased diastolic function. Although there were no significant differences were observed between groups, LA strain parameters were reduced and below normal in all patients. These findings highlight the need for further exploration of LVMI's impact on LA function.

Keywords: *Left ventricular mass index, Left atrial strain, Hypertensive heart disease, Stroke, Diastolic dysfunction.*

MP-10

Validation and Assessment of Novel Morphology-Voltage-P-wave Score for Diagnosing Left Ventricular Diastolic Dysfunction in Patients with Hypertension (VANESSA Trial)

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Background. Hypertension is a major risk factor for cardiovascular disease, often associated with left ventricular diastolic dysfunction (LVDD). Electrocardiogram (ECG) parameters, including P-wave duration and voltage, may provide valuable insights into the detection of LVDD.

Objective. This study aimed to validate and assess the diagnostic utility of novel Morphology-Voltage-P-wave Score (MVP Score) in identifying LVDD among patients with hypertension.

Method. This study was a single centre, prospective study, included 50 consecutive patients with hypertension between January – June 2024. The novel MVP score consists of three components: P wave dispersion, P wave morphology, and P wave voltage (Table 2). Based on echocardiography results, patients were categorized as LVDD and no LVDD group. Patients with LVEF<55%, congenital heart disease, infiltrative cardiomyopathy, coronary artery disease, chronic kidney disease, valvular heart disease, bundle branch block, and arrhythmia were excluded.

Result: The patients were categorized into two groups based on the presence of LVDD. The mean age of the study was 57 ± 11 years, with 14 patients of the participants being male. LVDD group had lower mean P wave voltage in lead I and longer mean P wave duration than no LVDD group. The MVP score of the LVDD group exhibited a significantly higher

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than no LVDD group ($p = 0.01$). MVP score more than 2 could assist in diagnosing LVDD with 78.35% sensitivity, 75.1% specificity, and AUC 0.743 (95%CI 0.601 – 0.885).

Conclusion: MVP score could be assessment tool for diagnosing LVDD in patients with hypertension due to its cost-effectiveness, availability, and easy-to-use formula.

[VANESSA Trial; ClinicalTrials.gov Identifier: NCT06779513]

Keywords: morphology voltage p-wave score; diastolic dysfunction; hypertension.

Table 1. Baseline characteristics

	Total (n = 50)	Patients		p
		LVDD (n = 29)	No LVDD (n = 21)	
Characteristics				
Age, years	57 ± 10.7	58.8 ± 9.3	53.2 ± 12.8	0.25
Gender				0.74
Male, n (%)	14 (28%)	10	4	
Female, n (%)	36 (72%)	19	17	
Body Mass Index (kg/m ²)	19.92 ± 3.4	19.54 ± 3.4	20.72 ± 3.4	0.44
Echocardiography Parameters				
LA diameter, mm	34.4 ± 5.5	34.9 ± 5.6	33.4 ± 5.5	0.27
IVSd, mm	11.7 ± 2.5	11.8 ± 2.5	11.4 ± 2.8	0.51
LVIDd, mm	43.8 ± 6.5	43.9 ± 6.5	43.5 ± 6.9	0.45
PWTd, mm	11 ± 2.7	11.1 ± 3	10.9 ± 1.9	0.68
IVSs, mm	14.7 ± 3.1	14.6 ± 2.9	14.9 ± 3.5	0.12
LVIDs, mm	27.2 ± 6.7	27.9 ± 7.1	25.8 ± 5.6	0.41
PWTs, mm	15.8 ± 2.8	15.7 ± 3.1	15.9 ± 2.3	0.28
LVEF, %	69.9 ± 8.1	69.9 ± 7.5	70.1 ± 9.4	0.07
LVMI	113.9 ± 34.9	118.5 ± 39.3	104.1 ± 20.6	0.59
RWT	0.5 ± 0.1	0.53 ± 0.15	0.53 ± 0.14	0.32

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TAPSE, mm	22.4 ± 3.1	22.4 ± 2.9	22.4 ± 3.6	0.63
E/A ratio	0.95 ± 0.37	0.84 ± 0.42	1.3 ± 0.22	0.03
EDT, ms	215 ± 49	188.9 ± 52.8	228 ± 38.8	0.04
E/e'	9.9 ± 3.9	12.7 ± 4.4	8.2 ± 2.1	0.02
Electrocardiography Parameters				
P wave voltage in lead I, mV	0.08 ± 0.03	0.07 ± 0.03	0.09 ± 0.02	0.03
P wave dispersion	45.8 ± 24.9	52.7 ± 26.9	31.3 ± 10.3	0.02
IAB				0.13
No IAB	36	17	19	
Partial IAB	10	8	2	
Advanced IAB	4	4	0	
MVP Score	3 ± 2	3 ± 1	2 ± 1	0.01

LA: Left atrium

EDT:

E-wave Deceleration Time

IVSd: Interventricular Septal diastolic

LVIDd: Left Ventricular Internal Diameter diastolic

PWTd: Posterior Wall Thickness diastolic

IVSs: Interventricular Septal systolic

LVIDs: Left Ventricular Internal Diameter systolic

PWTs: Posterior Wall Thickness systolic

LVEF: Left ventricle ejection fraction

LVMI: Left ventricle mass index

RWT: Regional Wall Thickness

TAPSE: Tricuspid annular plane systolic excursion

IAB: Interatrial Block

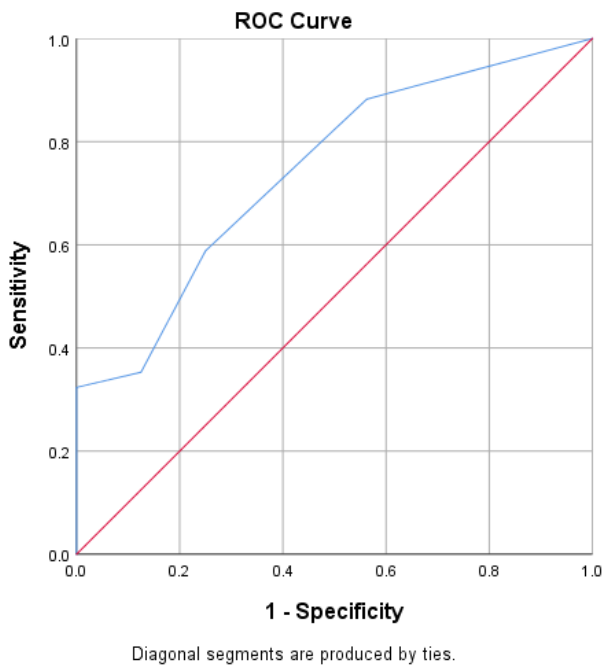
MVP: Morphology-Voltage-P-wave Score

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Table 2. Novel MVP score components and the assigned points

Variable	Value	Score
P wave dispersion	<40 ms	0
	40 – 60 ms	1
	>60 ms	2
P wave morphology in inferior leads	No IAB	0
	Partial IAB	1
	Advanced IAB	2
P wave voltage in lead I	>0.2 mV	0
	0.1 – 0.2 mV	1
	<0.1 mV	2

IAB: Interatrial block (no IAB if P wave duration <120 ms; partial IAB if P wave duration >120 ms without biphasic morphology in the inferior leads; and advanced IAB if P wave duration >120 ms with biphasic morphology in the inferior leads)



MVP score in diagnosing LVDD: AUC 0.743 (95%CI 0.601 – 0.885)

Figure 1. ROC curve analysis of MVP score in diagnosing LVDD

MP-11

Mind the Dip: Are Asian Hypertensive Patients More Susceptible? A Network Meta-Regression on Dipping Patterns and Cognitive Outcomes

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Background. Nighttime blood pressure (BP) dipping abnormalities, more prevalent in Asia than in Western countries, may pose risks to adverse cognitive outcomes. Investigating whether these patterns are modifiable risk factors for long-term cognitive outcomes is crucial.

Objective. To evaluate cognitive impairment (CI) and dementia incidence, alongside cognitive assessment value across hypertension dipping patterns, and assess age and sex influences.

Method. Following PRISMA guidelines (PROSPERO CRD42024627841), nine databases were searched through December 2024 for studies reporting CI or dementia incidence or Mini-Mental State Examination (MMSE) among extreme dipper (ED), dipper, non-dipper (ND), and reverse dipper (RD) hypertensive patients. The risk of bias was assessed using the ROBINS-E tool. A Bayesian network meta-analysis calculated odds ratios (OR) or mean differences (MD) with 95% credible intervals. Asia-based subgroup analysis and meta-regression (age, sex) were performed, followed by surface under the cumulative ranking (SUCRA).

Result. We included twenty-five observational studies (N=5,839, mean age 72.30±9.38; 15 Asia-based). RD showed the highest odds for CI (OR 3.61 overall; 3.82 Asia-based) and dementia (OR 5.65 overall; 6.56 Asia-based), followed by ND for CI (OR 1.90 overall; 2.23 Asia-based) and dementia (OR 3.25 overall; 4.14 Asia-based). RD had the steepest MMSE

decline (MD -1.22 overall; -2.66 Asia-based). Other comparisons were not significant. Meta-regression showed no confounders by age and sex, with SUCRA ranked RD, ND, ED, and dipper consecutively.

Conclusion. RD, followed by ND, was the most detrimental pattern for cognitive outcomes, especially in Asia-based populations. Incorporating 24-hour ambulatory BP may identify high-risk patients, warranting further studies for strategic prevention.

Keywords: Ambulatory Blood Pressure Monitoring, Blood Pressure Variability, Cognitive Impairment, Dementia, Hypertension.

MP-12

Comparative Efficacy of Antihypertensive Drugs for Primary Stroke Prevention – A Network Meta-Analysis of Randomized Controlled Trials

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Background: Hypertension is a major modifiable risk factor for stroke, making antihypertensive therapy essential for primary stroke prevention. However, the comparative efficacy of different antihypertensive drug classes remains uncertain.

Objective: This study aims to evaluate the comparative efficacy of various antihypertensive drug classes in reducing the risk of stroke in patients with hypertension through a network meta-analysis of randomized controlled trials (RCTs).

MODERATED POSTER

Method: A search was conducted using various online databases, including PubMed, Google Scholar, Scopus, and ScienceDirect, to identify RCTs which were written in English and published before January 2025. A network meta-analysis was performed to compare the effectiveness of different drug classes, including angiotensin-converting enzyme inhibitors (ACEIs), angiotensin receptor blockers (ARBs), calcium channel blockers (CCBs), beta-blockers, and diuretics in stroke primary prevention. Independently, two reviewers (L.D.P. and A.A), extracted the data and assess the quality of studies using Cochrane RoB 2.0.

Result: This analysis included 43 RCTs involving 255299 participants with hypertension. Among the evaluated drug classes, non-dihydropyridine CCB demonstrated the highest efficacy in stroke prevention (RR 0.61; 95%CI 0.48 – 0.77), followed by dihydropyridine CCB (RR 0.62; 95%CI 0.54 – 0.72). Most of the studies had decent quality assessment with moderate heterogeneity across them with $I^2 = 39\%$. Egger's test showed nonsignificant results ($p = 0.16$), suggesting the absence of publication bias in the included trials.

Conclusion: This meta-analysis showed that calcium channel blocker emerges as the most effective option for reducing stroke risk, but considerations of adverse effects and individual patient profiles remain critical in treatment selection.

Keywords: *antihypertensive drugs; stroke; primary prevention*

Table 1. Quality appraisal of studies included

Study	D1	D2	D3	D4	D5	Overall
Liu, 2005 - FEVER	+	+	+	+	+	+
MRC, 1992	+	+	+	+	-	+
SHEP, 1991	+	+	+	-	+	+
Dahlof, 1991 - STOP	+	+	+	+	+	+
Liu, 1998 - SYST-China	+	+	+	-	-	+
Staessen, 1997 - SYST-Eur	+	+	+	+	+	+
UKPDS, 1998	+	+	+	+	+	+
UKPDS, 1999	+	+	+	+	+	+
Estacio, 1998 - ABCD	+	-	+	+	-	+
Kjeldsen, 2008 - ACCOMPLISH	+	+	-	-	-	-
ALLHAT, 2002	+	+	+	+	+	+
Dahlof, 2005 - ASCOT	+	+	+	+	+	+
Ruggenenti, 2011 - BENEDICT B	+	+	+	+	-	+
Ogihara, 2014 - COLM	+	-	+	+	+	+
Black, 2003 - CONVINC	+	+	+	+	+	+
Zanchetti, 2002 - ELSA	+	+	+	+	+	+
Tatti, 1998 - FACET	+	+	+	-	+	+
Matsuoka, 1995 - GLANT	+	-	+	+	+	+
Brown, 2000 - INSIGHT	+	-	-	-	-	-
Pepine, 2003 - INVEST	+	+	+	+	+	+
Baba, 2001 - J-MIND	+	+	+	-	-	+
Yui, 2004 - JMIC-B	+	+	+	-	-	+
Dahlof, 2002 - LIFE	+	+	+	+	+	+
Wikstrand 1991 - MAPHY	+	-	-	+	+	-
Borhani, 1996 - MIDAS	+	+	+	-	-	+
Schrader, 2005 - MOSES	+	+	+	+	+	+
Muramatsu, 2012 - NAGOYA HEART	+	+	+	+	+	+
NICS-EH, 1999	+	-	+	-	+	+
Hansson, 2000 - NORDIL	+	-	-	+	-	+
Ogawa, 2012 - OSCAR	+	+	+	+	+	+
Ogihara, 2011 - PATE	+	+	+	+	-	+
Malacco, 2003 - SHELL	+	-	-	+	+	+
Hansson, 1999 - STOP II	+	+	+	-	+	+
Julius, 2004 - VALUE	+	+	+	+	+	+
Narumi, 2016 - VART	+	-	-	-	+	+
Rosei, 1997 - VHAS	+	+	-	+	+	+
Kaplan, 2003 - SANBPS	+	+	+	+	+	+
Matsuzaki, 2011 - CTHPCETG	+	+	+	+	+	+
Suzuki, 2005 - E-COST	+	+	+	-	-	+
Beckett, 2014 - HYVET	+	+	+	+	-	+
Hansson, 1999 - CAPP	+	+	-	-	-	-
Lithell, 2003 - SCOPE	+	+	+	+	+	+
Kasanuki, 2009 - HU-CREATE	+	+	+	+	+	+

Domains:

D1: Bias arising from the randomization process.

D2: Bias due to deviations from intended intervention.

D3: Bias due to missing outcome data.

D4: Bias in measurement of the outcome.

D5: Bias in selection of the reported result.

Judgement



High



Some concerns



Low

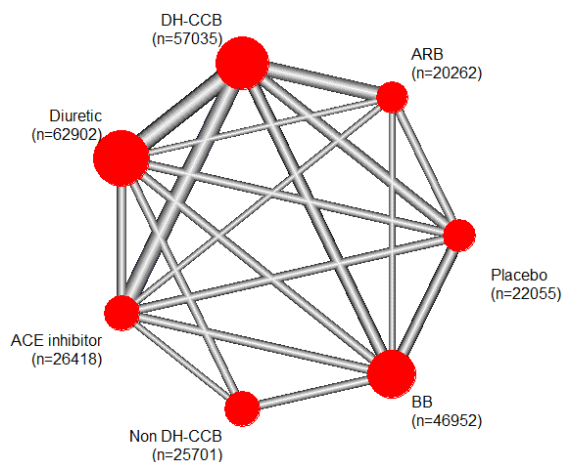


Figure 1. Network graph of this network meta-analysis

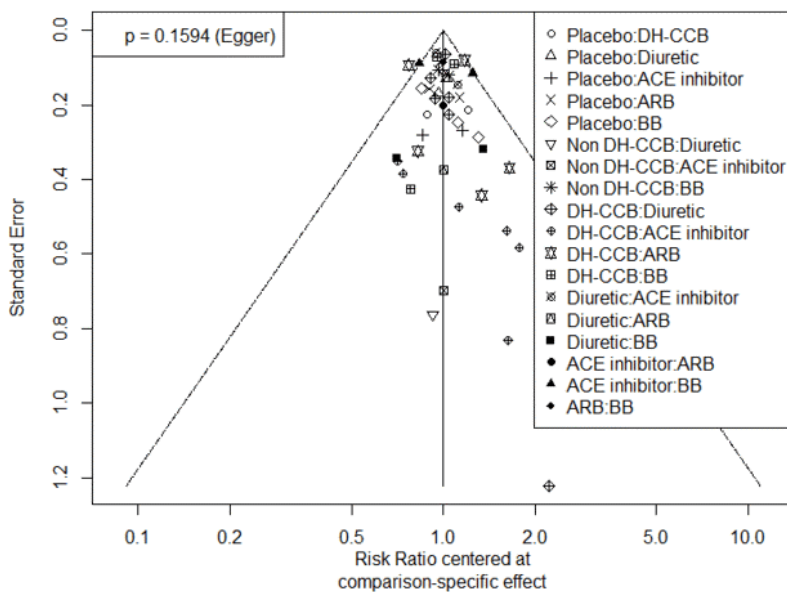


Figure 2. Funnel plot of this network meta-analysis

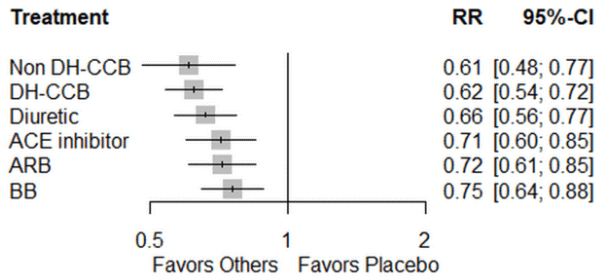


Figure 3. Forest plot of this network meta-analysis comparing various antihypertensive drugs for stroke primary prevention

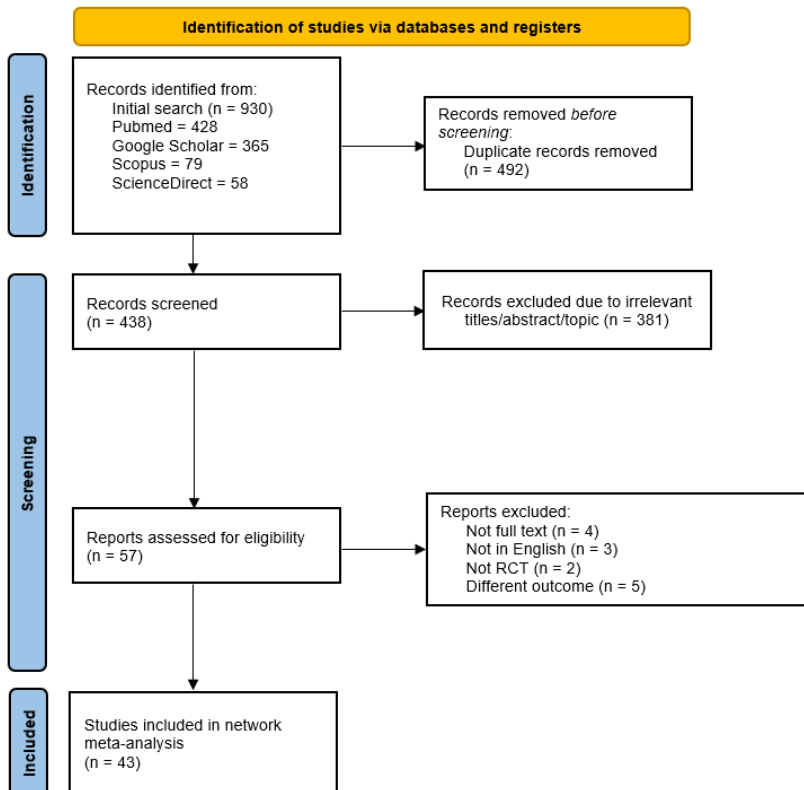


Figure 4. PRISMA of this study

MP-13

The Role of Blood Pressure Variability as a Risk Factor of Heart Failure Incidence: A Systematic Review and Meta-Analysis

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Background: Blood pressure variability (BPV) has been established as a risk factor for cardiovascular (CV) diseases, independent of the mean blood pressure level. However, the role of BPV as a risk factor of heart failure (HF) hasn't been eluded. This review aims to describe the potential role of BPV as a predictor of HF incidence in general population.

Objective: This review aims to describe the potential role of BPV as a predictor of HF incidence in general population.

Method: Three databases were searched for studies associating BPV and the outcome of HF incidence. The studies selected only patients without history of prior HF. Outcome of HF incidences will be measured as hazard ratio (HR) where meta-analysis of generic inverse variance and random effect model was conducted by RevMan 5.4.

Result: A total of 11 studies (6 RCTs, 2 retrospective cohorts, and 3 prospective cohorts) with no significant risk of bias and a total of 3,915,755 patients were included. Higher value of five BPV indices (standard deviation (SD), coefficient of variation (CV), average real variability (ARV), variation independent of the mean (VIM)) reached statistically significance for risk of HF incidence. ($p < 0.05$). SD of systolic blood pressure (SBP) (HR 1.25, CI 1.03-1.50, I^2 74%) has the highest risk of outcome compared to CV SBP, ARV SBP, VIM SBP, and CV of diastolic blood pressure (DBP) (HR 1.18, 1.20, 1.17, and 1.20 respectively). However, SD DBP and ARV DBP indices didn't reach statistical significance ($p = 0.39$ and 0.10 respectively).

Conclusion: Higher BPV value measured with SD SBP, CV SBP, ARV SBP, VIM SBP, and CV DBP are associated with incidence of HF in general population.

MP-14**HYPERTENSION AND OBSTRUCTIVE SLEEP APNEA IN THE ADULT: UNDERSTANDING THE TREATMENT STRATEGIES**

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Background. Obstructive sleep apnoea (OSA) is a disorder, characterised by repetitive episodes of upper airway obstruction, which can cause poor health status due to cardiovascular causes such as hypertension.

Objective. To assess the efficacy of various treatment for hypertension or Obstrucrive sleep apnea in adult patient.

Methods. Following PRISMA guidelines, data that was used is from PubMed and PMC on 27th December 2024 using MeSH keywords: "Hypertension", "Sleep Apnea Syndromes", and "Young Adult." Patients were excluded if they had cognitive impairment, severe chronic diseases, other sleep disorders, contraindications for Continuous positive airway pressure (CPAP) or oral appliance therapy, alcohol/substance abuse, sedative or psychotropic drug use, insufficient data, or comorbidities like renal dysfunction, type 1 diabetes, or prior cardiovascular events. The risk of bias was assessed using RoB 2.0 and ROBINS-I, with average low results.

Results. CPAP treatment significantly reduces blood pressure in patients with OSA and systemic hypertension, with a mean 24-hour ambulatory blood pressure reduction of 1.5–2.2 mmHg, particularly during nocturnal periods. Losartan and renal denervation (RDN) effectively lower blood

pressure, particularly in hypoxic or resistant hypertension. While CPAP is the gold standard, mandibular advancement devices (MAD) offer similar results with better compliance. Doxazosin and RDN mitigate hypoxia-induced nocturnal surges, reducing cardiovascular risks. Combining these therapies with monitoring will optimize outcomes.

Conclusion

CPAP effectively reduces blood pressure in OSA patients, but combining it with one of the other therapies such as losartan, RDN, MAD or Doxazosin may enhance outcomes for complex cases.

MP-15

Opening New Horizon of Novel Pharmacological "Zilebesiran" as siRNA-Based Therapeutics for Hypertension: A Systematic Review

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Background: Hypertension is a leading cause of mortality and disability-adjusted life-years worldwide. Zilebesiran is an investigational RNA interference therapeutic targeting hepatic synthesis of angiotensinogen, a key regulator of systemic blood pressure.

Objective: This study aims to do systematic search of literature for novel pharmacological "Zilebesiran".

Methods: We performed a systematic search according to PRISMA guidelines, using MEDLINE, PubMed, Cochrane Central Database, Scopus, and Google Scholar for trial, cohort, and case-control studies. We appraised studies that include subjects with mild to moderate hypertension, either

untreated or treated, with mean ambulatory systolic BP between 135 mm Hg and 160 mm Hg. Clinical outcomes included changes in serum angiotensinogen levels, systolic and diastolic blood pressure, and frequency of adverse events. Relevant articles appraised using guidelines from the Oxford Centre for Evidence-Based Medicine and Cochrane Risk of Bias Tool.

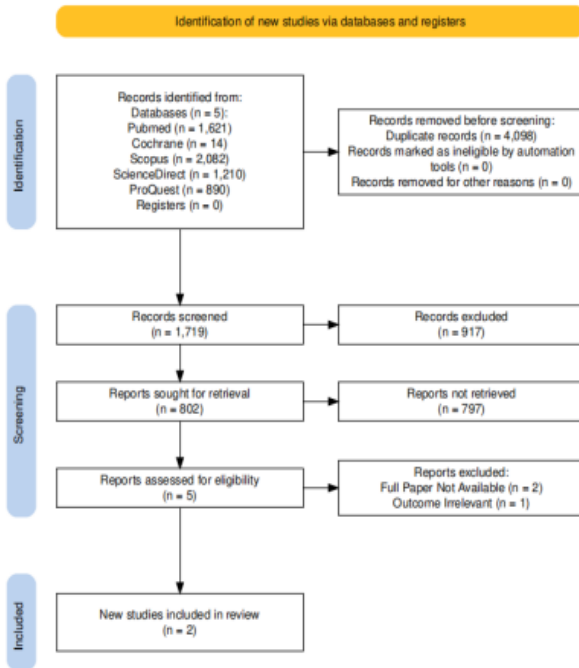
Result: A total 478 patients were included in the 2 eligible RCT studies we found. Based on these articles, administration of subcutaneous dose-dependent Zilebesiran at 3-month or 6-month intervals, there was a negative correlation between the Zilebesiran dose and the change from baseline in the mean 24-hour ambulatory systolic blood pressure. The decrease in systolic blood pressure also correlated with the degree of decrease in the serum angiotensinogen level. There are no clinically significant changes in serum levels of potassium, sodium, or creatinine or in eGFR were reported.

Conclusion: This systematic review found that single dose of subcutaneous Zilebesiran treatment in mild to moderate hypertension patients led to significant reductions in serum angiotensinogen levels and SBP.

Keywords: *Hypertension, Zilebesiran, Efficacy, Adverse Effect*

MODERATED POSTER

Author	Country	Study Design	Study Population	Intervention and Comparison	Follow Up	Outcomes	Study Findings	Conclusions
Alkhorj S, Desai, et al. (2023)	United Kingdom	RCT	84 patients with moderate/severe essential hypertension aged 18 to 65 years of age with treated or untreated hypertension who had a mean seated systolic blood pressure as measured by automated cuff of more than 130 to 165 mm Hg and a mean systolic blood pressure of 130 mm Hg or more as assessed by 24-hour ambulatory blood-pressure monitoring after washout of antihypertensive medications for at least 2 weeks, divided into: - 56 patients given single subcutaneous dose of Zilebesiran, divided into 7 groups (8 patients per each group) received 10, 25, 50, 100, 200, 400, 800 mg respectively - 28 patients given placebo	Intervention: Patient receive a single subcutaneous dose of Zilebesiran (10, 25, 50, 100, 200, 400, or 800 mg) or placebo Comparison: - Primary end point: frequency of adverse events - Secondary end points: change from baseline in the serum angiotensin system level and pharmacokinetic characteristics - Exploratory end points: changes from baseline in systolic and diastolic blood pressure as measured by 24-hour ambulatory blood-pressure monitoring at weeks 6, 8, 12, and 24	6, 8, 12, and 24 weeks	- Negative correlation between the Zilebesiran dose and the change from baseline in the mean 24-hour ambulatory systolic blood pressure ($p = -0.41$ at week 8; 95% CI: -0.28 to -0.21) - Decrease in systolic blood pressure correlated with the degree of decrease in the serum angiotensinogen level ($p = 0.52$, 95% CI: 0.42 to 0.61)	- Decrease in systolic blood pressure (>10 mm Hg) and diastolic blood pressure (>5 mm Hg) were seen after single doses of Zilebesiran of 200 mg or more at week 8 - No deaths or unplanned hospitalizations, and no patients received interventions for hypotension, hyperkalemia, or worsening of renal function. No clinically significant changes in serum levels of potassium, sodium, or creatinine or in the estimated glomerular filtration rate were reported	Dose-dependent decrease in serum angiotensinogen levels and 24-hour ambulatory blood pressure were sustained for up to 24 weeks (6 months) after a single subcutaneous dose of Zilebesiran of 200 mg or more
Oguzlu T, Bekiroglu, et al. (2024)	Canada, Ukraine, United Kingdom, and USA	RCT	394 patients included adults aged 18 to 75 years with hypertension who were either untreated or treated with a stable regimen of up to 2 antihypertensive therapies and had a daytime mean ambulatory systolic BP (SBP) between 135 mm Hg and 160 mm Hg following washout of background antihypertensive medications, divided into: - 19 to receive placebo - 19 to receive zilebesiran, 150 mg, once every 6 months - 18 to receive zilebesiran 300 mg, every 6 months - 19 to receive zilebesiran, 300 mg, every 3 months - 19 to receive zilebesiran, 600 mg, every 6 months	Intervention: Randomization to 1 of 4 subcutaneous Zilebesiran regimens (150, 300, or 600 mg once every 6 months or 300 mg once every 3 months) or placebo (once every 3 months) for 6 months Comparison: - Primary end point: change from baseline to month 3 in 24-hour mean ambulatory SBP for each Zilebesiran dose group vs placebo - Secondary end points: Changes in both 24-hour mean ambulatory SBP and office SBP from baseline to month 3 and month 6 - Other secondary end points: Changes in both 24-hour mean ambulatory SBP and office SBP from baseline to month 3 and month 6 - Exploratory end points: Change of the percentage of patients requiring rescue antihypertensives in the Zilebesiran groups	1, 3, and 6 months	- Change of 24-hour mean ambulatory SBP changes from baseline at 3 months (95% CI: -10.3 to -4.6) with 150 mg Zilebesiran once every 6 months; -10.0 mm Hg (95% CI: -12.0 to -7.9) with 300 mg Zilebesiran once every 3 months or every 6 months; -8.9 mm Hg (95% CI: -11.9 to -6.0) with 600 mg Zilebesiran once every 6 months, and 6.8 mm Hg (95% CI: 3.6 to 9.9) with placebo - LSEM (Least-Square Means) difference of Zilebesiran compared to placebo from baseline to month 3 were: -14.1 mm Hg (95% CI: -19.2 to -9.0 ; $P < .001$) with 150 mg Zilebesiran once every 6 months; -16.7 mm Hg (95% CI: -21.2 to -12.3 ; $P < .001$) with 300 mg Zilebesiran once every 3 months or every 6 months; and -15.7 mm Hg (95% CI: -20.8 to -10.6 ; $P < .001$) with 600 mg Zilebesiran once every 6 months - Over 6 months, 60.0% of patients receiving Zilebesiran had adverse events and 3.0% had serious adverse events. Meanwhile 50.1% patients had adverse events after receiving placebo and 6.7% had serious adverse events.	- Subcutaneous Zilebesiran doses of 150, 300, or 600 mg every 6 months or 300 mg every 3 months significantly decreased systolic blood pressure at 3 and 6 months vs placebo - Numerous drug-related adverse events occurred in 16.0% of Zilebesiran-treated patients, principally injection site reactions and mild hyperkalemia	In adults with mild to moderate hypertension, treatment with Zilebesiran across a range of doses at 3-month or 6-month intervals significantly reduced 24-hour mean ambulatory SBP at month 3



Tabel 1. Summary of Studies and PRISMA flowchart

MP-16

Targeting Optimal Ablation Sites in Renal Denervation for Resistant Hypertension: A Systematic Review and Meta-Analysis

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ABSTRACT

Background: Resistant hypertension, affecting 10%–20% of hypertensive patients, is defined by persistently high blood pressure despite three or more antihypertensive medications. Renal denervation (RDN), a novel therapeutic approach primarily targeting the main renal artery, has shown promise in managing resistant hypertension. Recent studies indicate that expanding the target to include both the main renal artery and its branches may enhance blood pressure (BP) reduction.

Objective: This systematic review and meta-analysis evaluated RDN efficacy in reducing BP in resistant hypertension by comparing combined targets (main renal artery and branches) versus main renal artery-only.

Methods: Quality assessment was performed using the Cochrane RoB 2.0 tool and meta-analysis was conducted using RevMan 5.4. Outcomes included office BP, 24-hour ambulatory BP monitoring (ABPM), daytime, and nighttime BP.

Results: A search across seven databases identified 5 articles for analysis, with three low-risk and two moderate-risk of bias. The meta-analysis indicates that targeting both the main renal artery and its branch renal arteries with renal denervation (RDN) significantly reduces overall systolic

blood pressure (SBP) by a mean difference (MD) of -5.55 mmHg (95% CI -7.47 to -3.64) and diastolic blood pressure (DBP) by an MD of -2.81 mmHg (95% CI -4.35 to -1.28), compared to targeting only the main renal artery. Subgroup analysis assessing office BP, 24-hour ABPM, daytime, and nighttime BP also demonstrated significant reductions in SBP and DBP with the combined-target approach.

Conclusion: RDN targeting both the main renal artery and its branches significantly enhances blood pressure reduction in resistant hypertension compared to targeting the main renal artery alone.

Keywords: *Resistant hypertension, renal denervation, main renal artery, branch renal arteries, blood pressure.*

MP-17

PROGNOSTIC VALUE REGRESSION OF ELECTROCARDIOGRAPHIC LEFT VENTRICULAR HYPERTROPHY ASSOCIATED DECREASING OF ADVERSE CARDIOVASCULAR EVENTS IN HYPERTENSIVE PATIENTS: A META-ANALYSIS

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ABSTRACT

Background: Hypertension is a long-term high blood pressure causing left ventricular hypertrophy (LVH). This condition can be detected by electrocardiography (ECG) and commonly associated with an increased risk of adverse cardiovascular events. However, the prognostic implications of LVH regression with antihypertensive therapy have not been extensively studied.

Objectives: To evaluate regression of ECG LVH in hypertensive patients with therapy related to decrease adverse cardiovascular events.

Methods: This study follows Preferred Reporting in Systematic Review and Meta-Analysis (PRISMA) guidelines. A systematic search was conducted using PubMed, Google scholar, Scopus, and Cochrane library databases until January 2025. The prognostic value of regression LVH was used hazard ratio (HR) with 95% confidence interval (95% CI). I^2 statistics was utilized to identify study heterogeneity. Significant heterogeneity was defined as a P-value <0.05.

Results: Twelve studies including eleven randomized clinical trials and one retrospective cohort study involved. A total of 17,118 patients in anti-hypertensive therapy experienced regression of LVH based on cornell voltage-duration product (CP) and/or sokolow-lyon voltage (SLV). These criteria were independently associated with significant decrease composite endpoint of cardiovascular death [HR 0.90 (95%CI 0.83-0.93), $I^2=88\%$, $p=0.01$], cardiovascular mortality [HR 0.82 (95% CI 0.73-0.93), $I^2=96\%$, $p=0.001$], stroke fatal/nonfatal [HR 0.91 (95% CI 0.83-1.00), $I^2=92\%$, $p=0.04$], and new-onset atrial fibrillation [HR 0.86 (95%CI 0.80-0.92), $I^2=0\%$, $p<0.0001$].

Conclusions: This meta-analysis suggests regression ECG LVH using CP and SLV criteria in hypertensive patients with therapy decrease adverse cardiovascular events. These findings offer important clinical implications for better outcomes.

Keywords: adverse cardiovascular events, electrocardiography, hypertension, left ventricular hypertrophy, regression.

MP-18

THE RELATIONSHIP BETWEEN POOR GLYCEMIC CONTROL AND HYPERTENSIVE DISORDERS OF PREGNANCY: A SYSTEMATIC REVIEW

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Background. The carbohydrate-rich diet and sedentary lifestyle today often contribute to poor glycemic control, fueling a global rise in glycemic disorders among young adults. This increases the risk of hypertensive disorders of pregnancy (HDP), a major cause of maternal complications and mortality.

Objective. To evaluate the association between maternal HbA1c levels (excluding type 1 diabetes) and HDP, focusing on specific HbA1c thresholds and critical gestational periods that predict increased risk.

Method. Following PRISMA guidelines, data were sourced from PubMed and ScienceDirect on 20th December 2024 using MeSH keywords: "Glycated Hemoglobin," "Pregnancy," and "Hypertension." HbA1c levels were the primary measurement tool, with $\leq 5.6\%$ indicating good glycemic control and $\geq 5.7\%$ signifying poor control. Exclusions included T1DM, systematic reviews, and meta-analyses. Bias was assessed using RoB 2.0 and ROBINS-I.

Result. Nine cohort studies with 182,388 participants found that high HbA1c significantly increased the risk of pre-eclampsia and gestational hypertension, with 2 studies rated low risk and 7 studies rated moderate risk. Mengjia Hu et al. reported a ~ 1.96 -fold rise in HDP for every 1% increase in HbA1c between the second and third trimesters, with average third-trimester HbA1c $\geq 5.9\%$ being a key predictor. However, Seiya Izumi et al. found that HbA1c $\geq 5.2\%$ before 24 weeks of gestation, though within the normal-to-high range, also increased HDP risk.

Conclusion. This review demonstrates a strong relationship between poor glycemic control and HDP, highlighting the importance of good glycemic controls for better maternal outcomes.

Keywords. *Glycated Hemoglobin; Hypertension; Pregnancy*

MP-19

Prognostic Value of Blood Pressure Variability in Patients with Heart Failure: A Systematic Review and Meta-Analysis

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Background: Studies have associated high blood pressure variability (BPV) with an increased risk of morbidity and mortality in various cardiovascular (CV) diseases. However, the prognostic importance of BPV in heart failure (HF) remains unknown.

Objective: This review aims to explore the potential prognostic value of BPV in HF population.

Method: We conducted a search on 3 medical databases and subsequently performed a meta-analysis of studies that described the association between BPV and composite outcomes in HF population. Composite endpoint (including all-cause mortality, CV mortality, CV hospitalization, nonfatal stroke, nonfatal myocardial infarction, and heart transplantation), all-cause mortality, CV mortality, and HF rehospitalization were calculated as pooled hazard ratios using a generic inverse variance and random effect model.

Result: A total of 12 cohort studies (1 prospective and 11 retrospective) with no significant risk of bias that comprises 28,636 patients with an average age of 62 years old were included. After performing the sensitivity analysis, the results showed that higher visit-to-visit BPV associated significantly with an increased risk of the composite endpoint (HR 1.31, CI 1.22–1.40, I^2 0%), all-cause mortality (HR 1.20, CI 1.10–1.30, I^2 0%), CV mortality (HR 1.12, CI 1.00–1.25, I^2 0%), and HF rehospitalization (HR 1.42, CI 1.31–1.55, I^2 0%). Additionally, U-shaped association between visit-to-visit BPV and the risk of the composite endpoint and cardiovascular mortality was demonstrated.

Conclusion: Higher BPV, measured as visit-to-visit variability, is significantly associated with composite endpoint, all-cause mortality, CV mortality, and HF rehospitalization in patients with heart failure.

MP-20

Decoding Exercise Strategies for Coronary Artery Disease: A Network Meta-Analysis of Aerobic, Resistance, and Continuous Training Modalities

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Introduction: Cardiovascular diseases, including coronary artery disease (CAD), cause 31.5% of global deaths. Exercise-based cardiac rehabilitation improves cardiovascular risk factors, quality of life, and exercise tolerance. Therefore, identifying the optimal exercise modality is necessary to improve CAD treatment management.

Objective: To evaluate the comparative effectiveness of aerobic, resistance, and continuous exercises as treatments for coronary artery disease.

Methodology: The study adhered to the PRISMA-NMA guidelines and the Cochrane Collaboration Handbook for conducting systematic reviews and

network meta-analyses. Literature searches were performed in PubMed, ScienceDirect, Wiley, and Cochrane databases up to January 2025. A network meta-analysis, using the Frequentist model and the netmeta package in R Studio, assessed the effects of various interventions on maximum oxygen consumption (VO_2 max) as primary outcome, with systolic blood pressure (SBP) and diastolic blood pressure (DBP) as secondary outcome.

Results: Twenty five studies with predominantly low risk of bias with a total of 980 participants were analyzed. For the primary outcome, aerobic interval training is the intervention which affects VO_2 max the most (-3.09 mL/kg/min; 95% CI: -3.09 to 6.77). Additionally, moderate continuous training significantly reduced systolic (-5.87 mmHg; 95% CI: -15.98 to 4.24) and diastolic blood pressure (-3.06 mmHg; 95% CI: -9.01 to 7.21).

Conclusion: Aerobic interval training is the most effective exercise intervention for coronary artery disease with higher VO_2 max capacity. However, further studies are needed to confirm findings and explore long-term benefits.

Keywords: *Coronary artery disease, aerobic training, aerobic interval training, moderate continuous training*

MP-21

Acute Aortic Dissection (AAD) Misdiagnosed as Acute Coronary Syndrome (ACS): The Crucial Role of Four-Extremity Blood Pressure (BP)

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Background: AAD is a life-threatening condition that can often be misdiagnosed ACS. This is particularly concerning as the inappropriate administration of double antiplatelet therapy (DAPT) and heparin for ACS can significantly impact the outcome in AAD. Early recognition and accurate diagnosis are crucial to improving prognosis.

Case Presentation: A 57-year-old male was referred to our emergency department from private hospital, presenting with chest pain radiating to his back, which had been intermittent for the past 24 hours with nausea and vomiting. ECG showed T-wave inversion in the inferior leads. He was diagnosed as NSTEMI and started potent DAPT (ticagrelor) and fondaparinux. Regarding our reassessment, he had long-standing uncontrolled hypertension (>40 years), dyslipidemia, and smoking history with diastolic murmur at the left upper sternal border and widened mediastinum from CXR, raising suspicion for an aortic pathology. To further investigate, we measured BP in all four extremities, revealing significant discrepancies: left-arm 92/44 mmHg, left-leg 61/36, right-arm 80/38, and right-leg 132/41. This differential BP prompted urgent CT angiography, which revealed AAD extending from aortic root to iliac arteries, and non-significant CAD. Patient was diagnosed with AAD Stanford Type A (DeBakey I) with severe aortic regurgitation. We plan for total arch replacement (Bentall procedure), elephant trunk implantation, and TEVAR. Unfortunately, several hours later, while surgery preparation, he developed cardiac arrest and subsequently passed away.

Conclusion: This case highlights the critical importance of differentiating between ACS and AAD particularly diagnostic clues for aortic pathology. Early recognition and accurate diagnosis can significantly alter treatment strategies and improve outcomes.

Keywords: *acute aortic syndrome, chest pain, acute coronary syndrome, early detection, blood pressure of four extremities.*

MP-22

Unmasking the Culprit: A Case of Coronary Fistula as a Possible Etiology of Secondary Hypertension in Female Patient

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Background: Hypertension is a global disease affecting 1.39 billion people worldwide. Among population with hypertension, the prevalence of secondary hypertension is around 5-10%. The etiologies of secondary hypertension vary from renal parenchymal disease, renal artery stenosis, and coarctation of the aorta. Coronary Artery Fistula (CAF) is a less common etiology of secondary hypertension. The incidence of CAF is 0.002% and 0.1% in general population and all cardiac catheterization patients, respectively. Here, we present a case of female patient with secondary hypertension presumably due to CAF.

Case presentation: A 40-years old female was admitted to emergency department due to crushing substernal chest pain. She had hypertension since 18 years old. Upon arrival, she was hemodynamically stable and was proceed to Primary PCI due to inferior ST-segment Elevation Myocardial Infarction. During angiography, a fistula was found from left anterior descending (LAD) to left atrium (Figure 1 and 2) besides total occlusion on right posterolateral artery and diffuse severe stenosis on

LAD. Transthoracic echocardiography revealed normal all chambers dimension, concentric left ventricular hypertrophy, and normal left ventricular (LV) systolic function (LVEF 63% Biplane Simpson). Her mean blood pressure is around 150/90 mmHg and was treated with Ramipril 1x5 mg and Amlodipine 1x10 mg. She was scheduled for Coronary Computed Tomography Angiography for her CAF.

Conclusion: CAF is a rare etiology in secondary hypertension. Although we didn't have direct association between CAF and secondary hypertension, wide pulse pressure and absence of other significant etiology may suggest CAF as a specific etiology in this patient.

MP-23

Blood Pressure as a Contributing Factor to Early Neurological Deterioration in Acute Ischemic Stroke: A Case Report

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Objective: To identify the causes of early neurological deterioration (END), or 'stroke in evolution,' and emphasize the role of blood pressure in its occurrence.

Background: The clinical course of acute ischemic stroke during the first few days is often unpredictable. Early neurological deterioration (END) refers to a decline in neurological function occurring within hours to days after the initial onset of acute ischemic stroke. A cohort study found that 16.7% of patients with acute lacunar stroke developed END, with hypoperfusion lesions associated with deterioration. Understanding the various aetiologies underlying END is crucial for effective management.¹⁻⁶

Methods: We present a case of early neurological deterioration

Results: A 35-year-old man presented to the emergency room with left-sided weakness and a left visual field disturbance, which began seven hours prior to admission. On initial physical examination, his blood pressure was 127/104 mmHg, Glasgow Coma Scale was 15, and NIHSS was 5. Within the first 24 hours, the patient's NIHSS worsened twice. His blood pressure in the emergency room ranged from 95/79 to 127/104 mmHg. Laboratory results indicated anaemia and signs of inflammation. One of the findings on imaging revealed an infarction in the right internal capsule. The patient had been diagnosed with mitral regurgitation seven months earlier.

Conclusion: Several factors were identified in patients, including hemodynamic status, infarct location, and increased inflammatory processes. Currently, no specific blood pressure targets exist for END, and management follows existing ischemic stroke guidelines. Although a definitive treatment for END is lacking, early identification and preventive measures can improve outcomes.

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MP-24

Purple Urine Bag Syndrome: A Rare Manifestation of Underlying End-Stage Organ Damage in Hypertension

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Abstract

Introduction: Purple Urine Bag Syndrome (PUBS) is a rare condition characterized by purple discoloration of urine. It typically occurs in patients with long-term urinary catheter use but is rarely observed as an initial finding in the emergency room, particularly in individuals with hypertension.

Case: A 64-year-old female with prolonged uncontrolled hypertension and diabetes developed stage 5 CKD due to non-adherence to antihypertensive therapy and lack of medical follow-up. She presented to the hospital with decreased consciousness, generalized edema, and minimal urine output. Examination revealed severe hypertension, uremic frost, and purple urine following catheterization. Investigations showed severe anemia, leukocytosis, and an eGFR of 2 mL/min. Urinalysis confirmed leukocyte esterase positivity, indicating a complicated UTI. Despite prompt antibiotic treatment and hemodialysis preparation, her condition rapidly deteriorated, culminating in septic shock and cardiac arrest in the intensive care unit.

Discussion: PUBS is associated with hypertension-induced CKD and UTIs caused by bacteria producing sulfatase and phosphatase enzymes. These enzymes metabolize indoxyl sulfate, a tryptophan byproduct, into indigo and indirubin pigments under alkaline urinary conditions. Uncontrolled hypertension accelerates CKD progression, creating a milieu for PUBS and sepsis due to vascular and renal damage.

This case underscores the critical connection between uncontrolled hypertension, CKD, PUBS, and sepsis. CKD-related uremia, systemic inflammation, and altered immune function exacerbate PUBS risk. Early hypertension control, CKD management, and timely UTI treatment are essential to prevent PUBS and its severe complications. Raising awareness of PUBS' multifactorial etiology is vital for timely intervention and reducing morbidity and mortality in high-risk populations.



MP-25

A CASE SERIES: SECONDARY HIPERTENSION DUE TO CONN'S SYNDROME AT DR SARDJITO HOSPITAL

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Introduction: Secondary hypertension is most common caused by Primary Aldosteronisme (PA), known as Conn's Syndrome. PA is frequently underdiagnosed[1,2]. Undetected or ineffectively treated PA results in acute life-threatening complication, increased cardiovascular morbidity and nephrotoxicity[3]. We report four cases of secondary hypertension caused by PA.

Case Illustration: All patient presented hypertension and recurrent limb weakness, consistently low serum potassium levels, elevated urinary potassium and metabolic alkalosis. Abdominal CT showed unilateral adrenal tumors. Two patients had adrenalectomy.

Discussion: PA is an abnormal high secretion of aldosterone of the adrenal cortex, leading to the increase of plasma aldosterone concentration, the inhibition of renin activity, and hence a syndrome, Conn's syndrome, manifested with hypertension, hypokalemia, and metabolic alkalosis[4,5]. The diagnosis of PA is made based on anamnesis, physical examination and supporting examinations. The management of PA includes non-pharmacological, pharmacological and surgical. Laparoscopic unilateral adrenalectomy is safe, efficient and curative in patients with unilateral adrenal disease[1]. The main goal of the therapy is to achieve normal

blood pressure, return to normokalemia, and also to prevent target organs damage[6].

Result: All patients survived. Two of them were restored to normal blood pressure and normal serum potassium levels after adrenalectomy surgical. The histopathology report was consistent with adrenal cortical adenoma. Two other patients refused adrenalectomy surgery and still need receiving routine antihypertensive therapy, potassium supplements and Mineralocorticoid Receptor Antagonists (MRAs) as outpatient.

Conclusion: Conn's Syndrome must be considered in the differential diagnosis of hypertension, especially in young patients or those presenting with recurrent hypokalemia. Accurate diagnostic assesment is crucial to ensure appropriate management

Key words: secondary hypertension, hypokalemia, Conn's Syndrome

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MP-26

In-Depth Analysis of Hypertension Medication Adherence and Its Correlation on Laboratory and Echocardiographic Outcomes

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Background: Uncontrolled hypertension can lead to several health problems. Medication adherence is one of the factors that control hypertension. However, data analyzing this is still rare in Indonesia.

Objective: This study aims to conduct a detailed analysis of hypertension medication adherence.

Methods: This study was a cross-sectional study conducted in Hasan Sadikin Hospital. Data were collected from the coronary artery disease registry from April 2022 to November 2023. Adherence to antihypertensive medication was measured using the MMAS-8 score, where a score of 8 is considered adherent and less than 8 is considered nonadherent. A score of 6-7 was considered as medium adherence and <6 as low adherence. In addition, demographic, risk factor, medication, echocardiographic, and laboratory data were collected.

Results: This study included 242 patients, the majority were males (80.6%) with a mean age of 58.8 years. Patients who were not adherent were 38.4% (65.6% medium adherence and 34.4% low adherence). The most common reason for nonadherence was inconvenience (20.7%), followed by forgetting to take medication (14.9%). Patients who are older, have a history of diabetes mellitus, and are non-smokers tend to be more adherent. Patients who were adherent tend to have a lower mean diastolic blood pressure (75.3 ± 10.6 vs. 78.0 ± 10.9 , p value 0.31). There were no differences in laboratory parameters and echocardiography between the two groups based on medication adherence status.

Conclusion: Age, history of diabetes mellitus, and smoking status were factors affecting medication adherence, and there was no correlation between adherence and laboratory and echocardiography parameters.

Keyword: *adherence; hypertension; medication.*

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PD-001

Correlation Between Lipid Profile, Insulin, Anthropometric Sizes, and Blood Pressure in Normotensive Young Adults Men

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Backgrounds. It usually takes a long time before CVD manifests. The "common soil" theory places Insulin Resistance Syndrome has a vital role in the occurrence of CVD and T2DM.

Objective. This study aims to examine the association between lipid profile, insulin levels, anthropometric measurements, and blood pressure in normotensive young adult men.

Methods. We examined cross-sectional data from the dissertation of S. Palar, PhD (2024), which included 80 healthy men aged 20 to 35. All participants had a systolic blood pressure (SBP) of less than 130 mmHg and a diastolic blood pressure (DBP) of less than 90 mmHg. Each volunteer underwent assessments of plasma lipoproteins, serum insulin levels, and anthropometric measurements.

Results. Mean(SD) total cholesterol concentration was 188.64 mg/dl (34.83), with mean LDL concentration of 123.76 mg/dl (35.37), HDL 51.40 mg/dl (10.37), and triglycerides (TG) 79.40 mg/dl (38.22), serum insulin 6.51 μ U/mL (6.62), BMI 23.52 of Kg/m² (3.17), waist circumference (WC) 85.44 cm (13.28). Mean (SD) of SBP 114.96 mmHg (7.94), DBP 73.46 mmHg (7.20). Diastolic blood pressure was significantly correlated with insulin levels ($r=0.23$, $p<0.05$), HDL levels ($r=-0.33$, $p<0.01$), TG ($r=0.36$, $p<0.01$), BMI ($r=0.32$, $p<0.01$), WC ($r=0.30$, $p<0.01$). Systolic blood pressure also correlated with HDL, TG, BMI, and WC, each at $p<0.05$.

Conclusion. In normotensive young adults, a significant correlation was

observed between HDL, triglycerides (TG), body mass index (BMI), and waist circumference (WC), particularly with diastolic and then systolic blood pressure. Additionally, diastolic blood pressure was significantly correlated with insulin levels in this population.

Key Words: *normotensive, diastolic, lipoprotein.*

PD-002

Anti-Inflammatory Effects of Thymoquinone on Myocardial Infarction

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ABSTRACT

Background: One of the active components of herbal plants like *Nigella sativa* is thymoquinone (TQ), which has anti-inflammatory qualities and can prevent the development of myocardial infarction. Inflammation in myocardial infarction can change fibroblasts into myofibroblasts and invite deposits of collagen types 1 and 3 so that the process of cardiac fibrosis occurs.

Objective: This study aims to determine the effect of TQ as an anti-inflammatory agent in mice induced with lipopolysaccharide (LPS).

Method: This study used a post-test only control study design using 30 male white rats of the sprague dawley strain which were divided into 5

groups, namely the group that only received saline (KI), the group induced by LPS only (KII), the group induced by LPS and received enalapril (KIII), the group induced by LPS and received 20 mg TQ (KIV), the group induced by LPS and received 40 mg TQ (KV), and the group induced by LPS and received a combination of TQ and enalapril therapy (KVI). Serum levels of IL-6, TNF- α , TGF- β , and CRP were measured using ELISA.

Results: This study showed that the group receiving enalapril therapy alone, TQ 20 mg, TQ 40 mg, or combination therapy of enalapril and TQ showed significantly lower mean levels of IL-6, TNF- α , TGF- β , and CRP ($p < 0.001$) compared to the KII group that only received LPS induction.

Conclusion: TQ has been shown to suppress the inflammatory response, thereby preventing the development of myocardial infarction in sprague dawley rats induced by LPS.

Keyword: Anti-inflammatory; Cardiac Fibrosis; Lipopolysaccharide; Thymoquinone.

PD-003

Association Between Uric Acid Levels and Stenosis Severity in Patients With and Without Renal Insufficiency

Abstract

Background: Hyperuricemia has been associated with an increased risk of atherosclerosis and coronary stenosis, especially in patients with renal insufficiency. However, we do not fully understand the independent role of uric acid levels on the degree of coronary stenosis in patients with and without renal insufficiency.

Purpose: This study aimed to evaluate the relationship between serum uric acid levels and the degree of coronary stenosis in patients with and without renal insufficiency.

Methods: This study was a cross-sectional observational study involving 853 patients with acute coronary syndrome who underwent coronary angiography. Serum uric acid levels were categorized into normal (<7.1 mg/dL) and high (≥ 7.1 mg/dL), while renal function was classified based on GFR (<60 ml/min/1.73 m² for renal insufficiency). Statistical analysis used the chi-square test and logistic regression to evaluate the relationship between variables.

Results: Among the 853 patients, 386 (45.3%) had renal insufficiency, while 467 (54.7%) did not. In the overall population, high uric acid levels were significantly associated with significant coronary stenosis ($\geq 50\%$) ($p = 0.005$). Patients with high uric acid levels were more likely to have significant coronary stenosis than patients with normal uric acid levels. However, in the subgroup of patients with renal insufficiency, the association between uric acid levels and stenosis was not significant ($p = 0.319$). The subgroup of patients without renal insufficiency also showed similar results, showing no significant association between uric acid levels and the degree of stenosis ($p = 0.154$). Risk factors such as age ($p < 0.001$), male gender ($p < 0.001$), and smoking status ($p = 0.008$) were significantly associated with coronary stenosis in both subgroups.

Conclusion: In the overall population, serum uric acid levels were significantly associated with the degree of coronary stenosis, but there was no independent significant effect in the subgroups of patients with and without renal insufficiency. Other risk factors, such as age, gender, and smoking status, have a more dominant role in the development of coronary stenosis.

Keywords: *gout, hyperuricemia, coronary stenosis, renal insufficiency, acute coronary syndrome, angiography*

PD-004

The Correlation between Blood Glucose Levels and Blood Pressure in Older Adults and Elderly in Bona Village, Gianyar

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ABSTRACT

Background: Diabetes and hypertension are metabolic disorders that often coexist in one individual, with hypertension affecting 50% to 80% of individuals with type 2 diabetes. These conditions share several common pathophysiological mechanisms, including endothelial dysfunction, vascular inflammation, insulin resistance, and oxidative stress, indicating their interconnected relationship. Understanding the interplay between blood glucose and blood pressure is crucial for effective disease management.

Objective: This study aims to analyze the correlation between blood glucose levels and blood pressure in the older adults and elderly population of Bona Village, Gianyar.

Methods: This study is an observational cross-sectional study which involved 82 participants aged 50 years and older in Bona Village, Gianyar. Random blood glucose and blood pressure measurements were taken using standard laboratory and clinical protocols. The Spearman's rank correlation test was used to study the correlation between systolic and diastolic blood pressure and random blood glucose level.

Results: Data from 78 participants were analyzed after excluding 4 participants due to incomplete measurements. The participants consisted of 59 females (75.6%) and 19 males (24.4%), with a mean age of 64.53 years. A significant positive correlation was observed between blood glucose and systolic blood pressure ($\rho = 0.327$, $p = 0.003$). However, no

significant correlation was found between blood glucose and diastolic blood pressure ($\rho = 0.151$, $p = 0.186$).

Conclusion: This study demonstrates a significant correlation between blood glucose and systolic blood pressure in the older adults and elderly population, emphasizing the need for integrated management of these parameters.

PD-005

Blood Pressure in Subtotal Nephrectomized Hypertensive Rat Model with Diabetes

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Background : Chronic kidney disease (CKD) has emerged as one of the most prominent causes of death and suffering in the 21st century. Several risk factor contribute to the development and progression, such as diabetes and hypertension. The occurrence and progression of CKD are known to be strongly associated with hypertension. Therefore, the development of experimental models may contribute towards to understanding the mechanism underlaying of CKD. The 5/6 nephrectomy has been using to describe a progressive renal disease, the experimental procedure are common to CKD observed in humans, its proven to clinically relevant.

Objective : what is the effect of subtotal nephrectomy on blood pressure in hypertensive diabetic rats.

Method : An experimental pre-test and post-test control group design compared normal blood pressure rats to 5/6 nephrectomy rats model with type 2 diabetes, analyzed using paired t-tests.

Result : There were significant differences in systolic blood pressure ($p = 0.006$), diastolic blood pressure ($p = 0.005$), and mean arterial pressure (M.A.P.) ($p = 0.005$).

Conclusion : An increase in blood pressure was observed in the control group of rats with nephrectomy induction. Blood pressure increase above 227/182 mmHg two weeks after the nephrectomy procedure. Systolic blood pressure >180 mmHg is commonly found in the 5/6 nephrectomy rat model. In this model, the remaining renal glomeruli undergo hypertrophy. A significant increase in both systolic and diastolic blood pressure was found.

Keywords : blood pressure, hypertension, chronic kidney disease, 5/6 nephrectomy.

PD-006

Bioinformatic Analysis of Datasets on the Development of Idiopathic Non-cirrhotic Portal Hypertension

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Background. Idiopathic non-cirrhotic portal hypertension is a rare disease wherein the cause of portal hypertension is unknown. This disease is very rare in that it only happens in 3 — 6 % of portal hypertension cases. The rarity of this disease leads to a lack of research into this topic, until now the mechanism of idiopathic non-cirrhotic portal hypertension is still

unknown. This study aims to identify the molecular mechanisms and potential biomarkers of idiopathic non-cirrhotic portal hypertension.

Methods. Two microarray datasets (GSE69601 and GSE77627) were selected from the Gene Expression Omnibus (GEO) database. The Geo2R tool was used to identify the common differentially expressed genes (DEGs) in each dataset. The common DEGs were further analyzed using Gene Ontology (GO) and pathway enrichment analysis using the ShinyGo tool. A network of protein-protein interaction (PPI) of DEGs was fabricated using STRING and Cytoscape, following that CytoHubba was used to identify the top 10 hub genes.

Results. From the two studies, 64 common DEGs were identified. Following the enrichment analysis of the DEGs, most DEGs were linked with natural killer cell activation, immunological synapse, and protein self-association which have been correlated with the pathogenesis of portal hypertension. The PPI network of common DEGs identified 24 nodes and 42 edges, from which the top 10 hub genes were inspected, CD79A, SLAMF1, KLRK1, HAVCR2, PRDM1, SLAMF7, PTPRC, CCL5, CD180, and CD37.

Conclusion. The bioinformatics study that has been conducted shows that there is an association between idiopathic non-cirrhotic portal hypertension.

Keywords. Bioinformatic; Idiopathic Non-cirrhotic Portal Hypertension

PD-007

Carotid Atherosclerotic Disease Predict Uncontrolled Hypertension in Hypertensive Heart Disease Patient

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ABSTRACT

Background. Routine screening of carotid artery was not recommended anymore for hypertensive patient by 2021 ESC Arterial hypertension guideline, unless when clinically necessary. In the other hand, even asymptomatic Carotid plaque can impaired baroreceptor function, increased SVR, and hormonal activation create a cycle of progressively worsening blood pressure control.

Objective. The aim of this study to assessed whether evidence of carotid plaque at first visit could predict BP control during follow-up.

Methods. We collected from total of 324 subject's with hypertensive heart disease and exclude patient with history of coronary artery disease, cerebrovascular disease, atrial fibrillation, valvular heart disease, e-GFR < 60, and not adherence to medical treatment. Patients were individually interviewed with a structured questionnaire for collecting baseline characteristic. They had carotid ultrasound and echocardiography examination. They were categorized by the presence of carotid plaque at baseline. Optimal blood pressure (BP) control was defined as average BP <140/90 mm Hg and <135/85 during follow-up for office and home BP, respectively. BP were measured according to current guidelines. All patients were also invited to measure their BP at home (HBP) using validated device. Patients were routinely followed up every month until 6-month.

Results. In this study, mean age of this patients were $50,5 \pm 5,9$ years old and 64.81% subjects were female. Patients with carotid plaque ($n=164$) were to be older ($P = 0.001$), to have uncontrolled diabetes ($P=0.025$), exhibit higher systolic BP ($P=0.001$), worse LDL-C level ($P=0.0001$), needed ≥ 2 pill combination for antihypertension ($P=0.001$) and higher left ventricular mass index than patient without carotid plaque. Optimal office BP control was adjudicated in 54.87% with and 76.2% without carotid plaque ($P=0.0000$), and optimal home BP in 60.97% with and 81.25% without carotid plaque ($P=0.0000$). Presence of carotid plaque was significantly associated with the reduced probability of controlled office BP during follow-up (both $P<0.001$), independently of significant effect of older age, higher baseline BP values, classes of medication, and severity of left ventricular hypertrophy.

Conclusion. In this study, we suggested that presence of carotid atherosclerosis, as marker of hypertension-mediated arterial tree damage, is a main predictor of long-term suboptimal BP control in treated patients with hypertensive heart disease.

Keywords: *Carotid stenosis, Uncontrolled hypertension, Carotid plaque.*

PD-008

The Incidence of Hospitalization Due to Malignant Hypertension in Hemodialysis Patients

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Background. Crisis Hypertension is most common patient's presentation in the emergency departement and characterized by the increased of blood pressure higher than 200/100 mmHg. The burden of malignant hypertension increases the incidence of readmission trends and hospitalizations in patients with regular hemodialysis.

Objective. This study aimed to analyze relationship of malignant hypertension on patients with regular hemodialysis to against incidence of hospitalization in OKU Timur Hospital, Belitang.

Methods. We conduct a retrospective observasional study with cross-sectional design and involved 63 patients with regular hemodialysis. We identified patients from January to November 2024. Analyze were examine using crosstab correlation and Chi-Square test.

Result. 63 patients with regular hemodialysis were exemine, there were 17 patients with Malignant Hypertension. A majority of patients were more likely to have malignant hypertension, 16 patients admitted to emergency department for hospitalizations (94.1%) than only one patient who does not going for hospitalization (5.9%), with a statistically significant ($P=0.007$) and Odd Ratio 0.089.

Conclusion. Hospitalization rates in ESKD patients with regular hemodialysis are increase consistently due to malignant hypertension. Although temporal trends showed improving readmission rates more patients within 1 month. Further research is needed into factors that contribute to these high rates to implement corrective measures.

Keywords: *Malignant hypertension; Hospitalization; Readmision; Regular Hemodialysis*

The Incidence of Hospitalization Due to Malignant Hypertension in Hemodialysis Patients

Introduction. Hypertension is highly comorbid in patients with regular hemodialysis. Hypertensive crisis is the most severe due to uncontrolled hypertension. This condition is often associated with significant morbidity and mortality¹. End-stage kidney disease (ESKD) is the most advanced stage of Chronic Kidney Disease (CKD) and a majority of patients with ESKD have malignant hypertension and have poor outcomes related to hypertension². Malignant hypertension is a hypertensive emergency, with rapid disease progression and poor prognosis. Recent reports show an increasing trend in hospitalizations. The study reported that ESKD patients who presented to the emergency department were significantly more likely to have hypertensive emergency. The Studying the Treatment of Acute Hypertension registry reported 6.9% hospital mortality and a 37% readmission rate 90 days after discharge for a hypertensive emergency³. Study results show that hypertension crisis is highly prevalent in patients with ESKD⁴. In most cases, malignant hypertension occur in patients with preexisting hypertension and can be associated with a recent cessation of antihypertensive therapy. These syndromes are serious and usually require hospitalization⁵. Thus, it is important to understand the trends in hospitalization rates, clinical characteristics, and outcomes in these patients.

Materials and methods. We performed an analysis of hospitalizations for Malignant Hypertension of patients with ESKD on dialysis from the

IRR (Indonesia Renal Registry) database of Hemodialysis unit Hospital for January 2024 to November 2024. The study was conducted in the Hemodialysis unit East OKU Hospital. The population consisted of consecutive over attending the emergency department (ED) and hospitalization.

Results. The demographic characteristics of patients on regular hemodialysis in table 1, show several things, on female is 34 (54%) more than male 29 (46%) and the average age in this study is 53.59 years with the youngest being 29 years and the oldest 74 years old. The etiology and comorbidities in the patients were dominated by Hypertension 38 (60.3%), Diabetes Mellitus, 15 (23.8%), and 10 (15.9%) other causes. So far, the average patient has been on regular Hemodialysis for 39.9 months, with the latest at 6 months and the longest at 115 months.

Table 1. Characteristics of demographic in patients with regular Hemodialysis

Characteristics	n (%)
Sex	
Men	29 (46%)
Woman	34 (54%)
Age (y)	53.59 (29-74)
Etiology	
Hypertension	38 (60.3%)
Diabetes Milletus	15 (23.8%)
Others	10 (15.9%)
Lengt of HD (month)	39.9 (6-115)

In table 2, clinical manifestation of patients. Patients had an average of total 43 (68.3%) AV shunt vascular access and 20 (31.7%) had Catheter Double Lumen (CDL) access. This can minimize the risk of access problems caused by infection factors. Because CDL access can increase the risk of infection in hemodialysis patients. The average hemoglobin on patients is 8.4 g/dl, with the lowest on 6.5 mg/dl to 10.59 mg/dl. This can be concluded that all regular hemodialysis patients have Hemoglobin

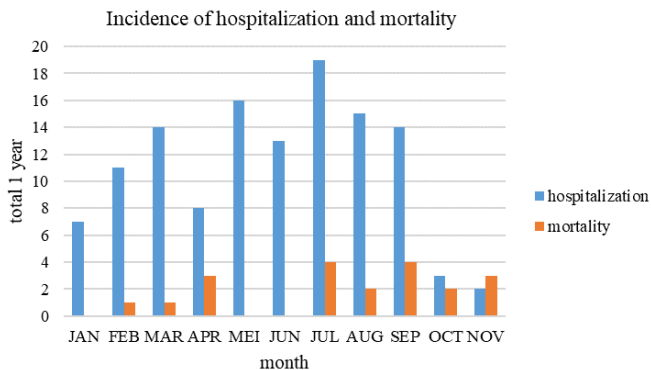
below of normal. This condition has many factors, especially the patient on regular Hemodialysis. and other causes. The patient's average Ultra Filtration (UF) volume was 2055 ml.

Malignant Hypertension is a hypertensive emergency with excessive blood pressure (BP) elevation and accelerated disease progression. There were 17 (27%) patients who had hypertension malignant and 46 (73%) who did not have malignant hypertension. Another important factor is adequacy hemodialysis which is measured from Kt/V or URR. The target of Kt/V for patients with regular Hemodialysis twice a week is 1.2. If less than 1.2, it is considered not to have achieved hemodialysis adequacy. This can affect hospitalization rates and also patient mortality rates, so it is important to measure them periodically.

Table 2. Clinical characteristics of patients with regular Hemodialysis

Characteristics	n(%)
Vascular Acces	
AV Shunt	43 (68.3)
CDL	20 (31.7)
Malignant Hypertension	
MHT	17 (27%)
No MHT	46 (73%)
Hemoglobin	8.4 (6.5-10.59)
Adequacy Hemodialysis	1.34 (0.8-1.8)
UF Goal rates	2055 (500-3500)

The incidence of hospitalization and mortality in regular hemodialysis patients varies. In Figure 1 and Table 3, there were 46 patients (73%) who experienced hospitalization and there were 20 patients (31.7%) who survived less than 1 year. This shows that there is no one-way relationship between hospitalization and patient mortality because the two are inversely proportional to each other.

Figure 1. Incidence of hospitalization and mortality**Table 3.** Total of hospitalization and mortality

Hopitalization	n (%)
Never	17 (27%)
Readmision	46 (73%)
Mortality	
Survive	43 (68.3%)
Not Survive	20 (31.7%)

Bivariate analysis shows that malignant hypertension is factors that influence patient for hospitalization rates. Table 4 below shows that the Chi-square test on the malignant hypertension factor has a significant relationship with a P Value of 0.007 ($P < 0.05$), with an OR value of 0.089.

Table 4. Analysis incidence of malignant hypertension (MHT) to against hospitalization

Factors	Hospitalizations		OR	95% CI	<i>P Value</i>
	Hospitalizations	Never			
MHT	16 (25.4%)	1 (1.6%)	0.089	0.011 - 0.728	0.007
No MHT	27 (42.9%)	19 (30.1%)			

In this study, the OR value obtained describes the estimated risk for increased hospitalization rates caused by malignant hypertension.

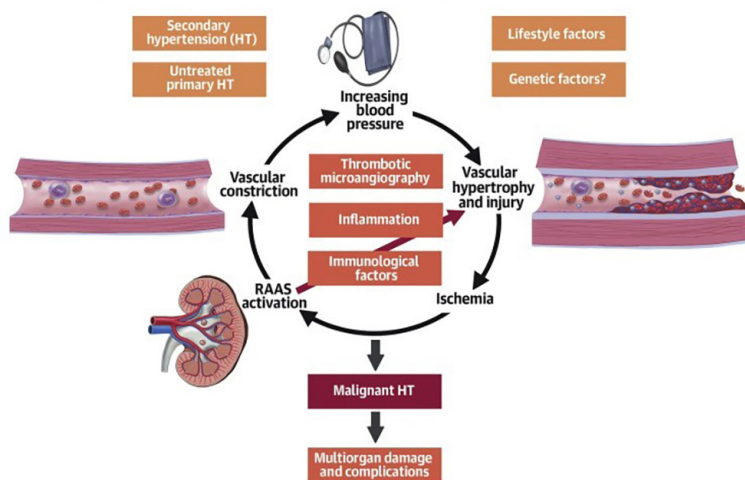
Discussion. There is very limited data on Malignant hypertension in patients with regular hemodialysis, and there is no definition or guidance in the literature for malignant hypertension in patients with regular hemodialysis³. Malignant hypertension is a hypertensive emergency with excessive blood pressure (BP) elevation and accelerated disease progression. Of the different types of hypertensive emergencies, malignant hypertension is characterized by extreme BP elevations and acute microvascular damage affecting various organs, in particular the retina, brain, and kidney⁶. In other definition, malignant hypertension is a hypertensive emergency characterized by the presence of a severe BP elevation (usually >200/120 mmHg) and advanced retinopathy, defined as the bilateral presence of flame-shaped haemorrhages, cotton wool spots, or papilloedema⁷. According to the AHA (American Heart Association) in 2007, malignant hypertension is not mentioned in the section on hypertensive emergencies, reflecting oversight of this form by the medical community⁸. This is in accordance with this study, incidence of malignant hypertension caused by patients with regular hemodialysis. There is debate whether the traditional definition fully. This is also reflected in current definitions with other causes⁸.

On Figure 2, describe the pathophysiology of Malignant Hypertension. The pathophysiology of hypertension in dialysis patients is a complex of multiple factors including volume overload, increase in arterial stiffness, activation of sympathetic nervous system, overactivity of renin-angiotensin system, and endothelial dysfunction. In general, volume

and salt regulation plays a crucial role in blood pressure control in these patients⁶.

Figure 2, pathophysiology of Malignant Hypertension⁶

CENTRAL ILLUSTRATION: Pathophysiology of Malignant Hypertension



Boulestreau R, et al. *J Am Coll Cardiol.* 2024;83(17):1688-1701.

From the study of *Kaneda et al.*, the conversion of normotensive or moderate hypertensive state to Malignant Hypertensive may sometimes result from the dialysis treatment itself. The onset of malignant hypertension was triggered by the negative sodium balance as a result of extreme removal of sodium and water by the hemodialysis. Kramer et al were studied histopathologically in patients with malignant hypertension, but no arterial stenosis was found in renal arteries or branches⁹.

In patients presenting at the ED with malignant hypertension, secondary causes can be found in 20–40% and most often consist of renal parenchymal disease and renal artery stenosis, whereas endocrine causes appear to be rare. However, the majority of patients with malignant hypertension have unrecognized or uncontrolled essential hypertension⁵. Many pathophysiological mechanisms are involved in the development and maintenance of malignant hypertension, but the initiating events for the sudden escalation in BP are not completely understood (figure 2)⁶.

Marked activation of the renin–angiotensin system is often present and associated with the degree of microvascular damage. In experimental models, the development of acute hypertensive microangiopathy is preceded by an increase in renal vasoconstriction and microvascular damage that leads to activation of the renin–angiotensin system⁷. Pressure-induced natriuresis further contributes to contraction of blood volume and activation of the renin–angiotensin system.

Patients with regular Hemodialysis are at high risk to develop malignant hypertension. While survival after malignant hypertension has considerably improved, it is still associated with significant morbidity and mortality⁶. To our knowledge, this is the first systematic analysis of hospitalizations due to patients with regular hemodialysis. Our study analyses show that hospitalization rates for malignant hypertension increased, but there was no significant increased for in-hospital mortality. This is consistent with the overall high mortality in hemodialysis patients from other causes. In general, these hospitalization rates for hemodialysis patients admitted for other conditions and likely reflect their overall poor health and disease burden. Although total a majority with malignant hypertension admitted in emergency department. Strategies to decrease readmission rates such as maintain dry weight and improve the rate of uncontrolled hypertension³.

Conclusion. Hospitalization rates on patients with regular hemodialysis are several lower than in the general Medicare population. In this study, Number of patients on hemodialysis owing to Malignant Hypertension likely to hospitalizations. Further research is needed into factors that contribute to these high rates to implement corrective measures.

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PD-009

Redefining the Role of Revascularization in Atherosclerotic Renal Artery Stenosis: A Case Report Demonstrating Transformative Clinical and Renal Outcomes

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Background Renal artery stenosis (RAS), predominantly caused by atherosclerosis, is associated with refractory hypertension, renal dysfunction, and cardiac disturbances. While randomized controlled trials (RCTs) often show limited benefits of revascularization over medical therapy, individualized approaches may benefit patients with severe disease or clinical deterioration.

Case Presentation A 65-year-old woman with persistent hypertension (systolic BP > 180 mmHg) despite three antihypertensive drugs, occipital headache, dizziness, and dyspnea presented with impaired renal function (serum creatinine 1.7 mg/dL, eGFR 34 mL/min/1.73 m²). Doppler ultrasonography confirmed bilateral RAS, and angiography showed 95% and 90% stenosis in the right and left renal arteries, respectively. Staged revascularization was performed with sirolimus drug-eluting stents over three months.

Results Both procedures were successful without complications. Blood pressure improved significantly post-intervention, stabilizing at 140/80 mmHg. Renal function also improved, with serum creatinine decreasing from 1.7 mg/dL to 1.4 mg/dL and eGFR increasing from 34 to 43 mL/

min/1.73 m². Symptomatic relief and cardiac function improvements were observed during follow-up.

Discussion This case underscores the transformative potential of revascularization in achieving significant clinical and renal improvements. While large trials like ASTRAL and CORAL have questioned routine revascularization, this case demonstrates its efficacy in appropriately chosen cases with severe bilateral stenosis. The outcomes illustrate the importance of balancing procedural risks with potential benefits, emphasizing that individualized, patient-specific strategies remain vital for optimizing RAS management.

Conclusion Revascularization offers substantial clinical and renal benefits in carefully selected cases of severe RAS. This report emphasizes the need for targeted interventions and refined selection criteria to optimize outcomes.

Keywords: Renal Artery Stenosis; Revascularization; Hypertension; Renovascular; Renal Function.

PD-010

The Analysis of Factors Affecting Antihypertensive Medication Adherence Among Pronalis Patients at Primary Care Center

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ABSTRACTS

Background. The control of hypertension aims to prevent the burden of cardiovascular disease. Although diagnosing hypertension relatively simple and effective treatment options are available, maintaining and

controlling the therapeutic regimen for hypertension has proven to be a challenging task. This situation is faced by the multifactorial factors, including individual, family members, and availability of healthcare facilities.

Objective. This study aimed to investigate factors associated with medical treatment adherence among prolanis members at Wonorejo Public Health Center.

Method. This study was a cross-sectional study conducted at Wonorejo Public Health Center in Kediri, East Java. A sample of 24 hypertensive patients was selected by simple random sampling among prolanis members in 2024. The dependent variable was medical treatment adherence evaluated using the MMAS-8 questionnaire. The independent variables were age, sex, education, income, duration of hypertension, and family support. The data were analyzed using SPSS 26th version.

Results. The results showed that 13 respondents (54.2%) had low compliance with antihypertensive treatment. Age (p -value 0.047 OR 3,9), education (p -value 0.000 OR 120), income (p 0,000 OR 55), and family support (p -value 0.000 OR 54) modulated the compliance. Meanwhile, gender (p -value 0.219) and duration of hypertension (p -value 0.239) did not affect hypertension treatment compliance.

Conclusion. Significant factors affecting antihypertensive medication adherence include age, education, income, and family support. Stakeholders play a crucial role by providing knowledge, support, coordination, and empowerment to ensure hypertensive patients adhere to their medications and prevent complications, particularly through family support efforts like education and emotional assistance.

Keyword: *Hypertension; Medication Adherence; Factors; Primary Care Center.*

PD-011

Relationship Between Hba1c and Troponin T Levels in Coronary Artery Disease Patients with Type 2 Diabetes Mellitus

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Background: HbA1c serves as a marker of long-term glycemic control, while troponin T is a sensitive biomarker of myocardial injury. In patients with T2DM, poor glycemic control may exacerbate vascular inflammation and myocardial stress, potentially influencing troponin T levels.

Objective: This study determines relationship between HbA1c and troponin T levels in coronary artery disease patients with type 2 diabetes mellitus complications.

Method: This study is a retrospective analytical study with a cross-sectional study design. The sampling method used consecutive sampling in CAD and T2DM of this study was HbA1c level and the dependent variable was troponin T level. Bivariate analysis with Spearman correlation test was used to analyze the correlation between the two variables in non-normally distributed data.

Result: Data from 39 patients diagnosed with coronary artery disease and type 2 diabetes mellitus obtained the most basic demographic characteristics in male gender as many as 23 patients (59%) and an average age of 58.69 ± 9.41 years old. Spearman correlation analysis showed that there is significant relationship between troponin T and HbA1c levels ($p = 0.035$) in CAD with complications of T2DM and the correlation coefficient

between the two variables showed a very strong correlation ($r = 1.000$). There is no relationship was found between troponin T levels and age ($p = 0.468$) or gender ($p = 0.978$).

Conclusion: There is significant correlation between HbA1c and troponin T in coronary artery disease complicated by T2DM.

Keywords: HbA1c; troponin T; coronary artery disease

PD-012

Characteristics of Hypertensive Patients Engaged in “Non-Communicable Disease Control” Activities at Public Health Centers in Samosir Regency, North Sumatera, Indonesia in April 2024

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Background: Hypertension is a major cause of premature death worldwide.

Object: To describe the characteristics of hypertensive patients in Samosir.

Methods: This descriptive cross-sectional study used total sampling methods. It was performed on 1,861 adults were involved in “Non-communicable Disease Control” in Samosir Regency in April 2024.

Result: Females predominated in this study (66.9% vs 33.1%). The age distribution was as follows: 0.8% of patients were aged 18-24, 1.7% were aged 25-34, 6.8% were aged 35-44, 16.7% were aged 45-54, 31.9% were aged 55-64, 29.7% were aged 65-74, and 12.4% were aged 75 and above. Based on BMI 39.7%(normal), 3.2% (underweight) 21.2%(overweight) 27.4%(obesity class I) 8.4%(obesity class II). Mostly education level at

elementary, junior and senior high school (33.2%, 31.7%, 19.3%). 81.4% patients are farmer. 141 patients has comorbid and DM(63.1%) and stroke (17%) was mostly found. 65.9% patients have keep in diet. 68.8% patients regularly took medication. 25.4% had a history of hypercholesterolemia. 24.2% had smoking history. Highest mean systolic reported 177,9 mmHg. 96.2% patient used amlodipine. Examinations in April showed that 69.4% of patients had blood pressure that was not at the target level.

Conclusion: The study found a predominance of female hypertensive patients, with most aged 55 and above. Normal BMI was seen in 39.7% and most had at least an elementary education and were farmers. A significant percentage of male patients had smoking history. Diabetes mellitus and stroke were the most comorbidities. Despite high adherence to dietary restrictions and medication, 69.4% of patients didn't meet blood pressure targets.

Keywords: hypertension, characteristic, non-communicable disease control, public health center.

PD-013

Identification of Potential Novel Target Therapy for Familial Hypertension: In Silico-based Multi-level Bioinformatic Analysis

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Abstract

Background: Familial hypertension is a genetic condition in which high blood pressure is inherited within families. Heritability is estimated at 30% to 60%, which indicates a strong genetic influence. However, unclear mechanisms limit the development of targeted treatments. Our study investigated developing an in silico-based therapeutic approach by identifying and validating critical genes associated with familial hypertension, providing a basis for developing new treatment targets.

Methods: This initial study utilized several bioinformatics tools, such as WebGsaltR, STRING, Cytoscape-CytoHubba v3.10.3, and SAVES v6.1. A protein-protein interaction network (PPIN) analysis and functional enrichment analysis were carried out to identify the hub gene and the key gene contributing to the underlying mechanisms of familial hypertension. Furthermore, ERRAT and PROCHECK analyses were conducted to assess the potential of the identified genes as novel therapeutic targets for familial hypertension.

Results: From an initial pool of 112 genes influencing the mechanisms of familial hypertension, we identified 10 key genes with significant

PPI enrichment ($p < 0.01$) and FDR values ($p < 0.05$) as the most critical contributors. Validation analysis highlighted SCN3B (Sodium Voltage-Gated Channel Beta Subunit 3), SCN2B (Sodium Voltage-Gated Channel Beta Subunit 2), and TRPM4 (Transient Receptor Potential Melastatin-4) among these 10 genes as potential candidates for developing novel therapeutic targets for familial hypertension. All three are ion channel subunits implicated in various cardiovascular and neurological conditions.

Conclusions: This study shows that SCN3B, SCN2B, and TRPM4 are potential genes that could be candidates for novel therapeutic targets in familial hypertension.

Keywords: Familial Hypertension, Bioinformatics, In-silico, Genetic factor, Therapeutic target.

In Silico-based Multi-level Bioinformatic Analysis

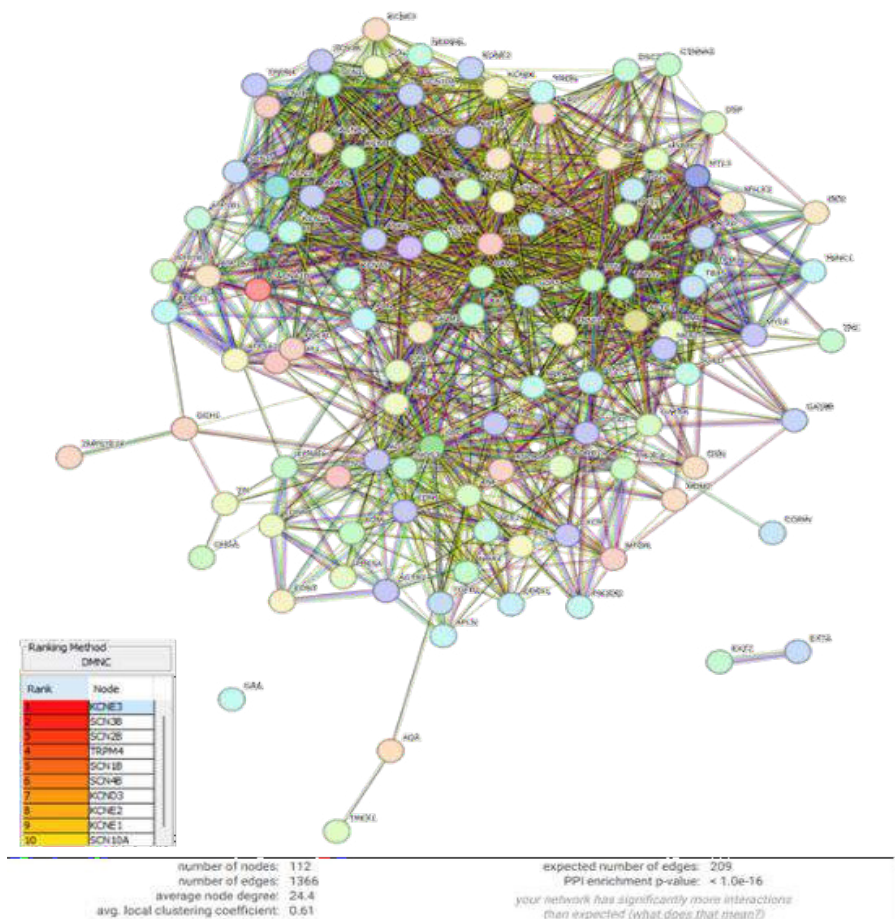


Figure 1. Protein-protein interaction network analysis using STING tools of the genes related to familial hypertension through co-functional systems based on biological process (gene ontology) PPI enrichment p-value showed the significant value ($< 1.0e-16$), indicating that the observed number of edges is significant and that the nodes are not random.

From the analysis, the most correlated and potent genes for familial hypertension are **SCN3B, SCN2B, and TRPM4**

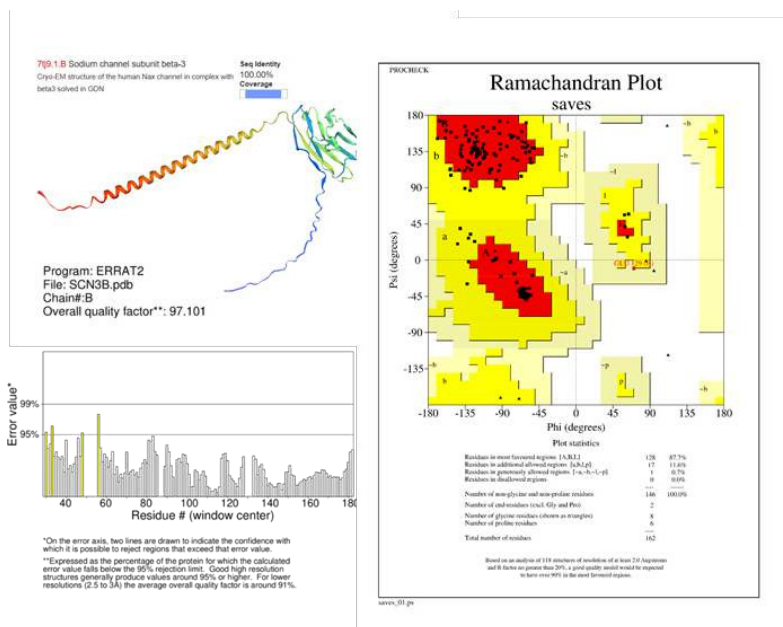


Figure 2. Construction of 3D protein structure of **SCN3B** using SWISS-MODEL interactive tools and validation of the structure through ERRAT and PROCHECK Ramachandran plot analysis using UCLA-DOE LAB — SAVES v6.1 tools. **ERRAT analysis** showed a great overall quality factor value of **97.101**, indicating this protein has a good high-resolution structure and is ready to be a drug target. **PROCHECK Ramachandran plot analysis** showed a very low value of residues in the disallowed region, which is 0.0%, and a very high value of residues in the most favored region, which is **87.7%**, a significant difference. This indicates that each amino acid in this protein has good phi and psi angles that stabilize the protein when it binds to the drug.

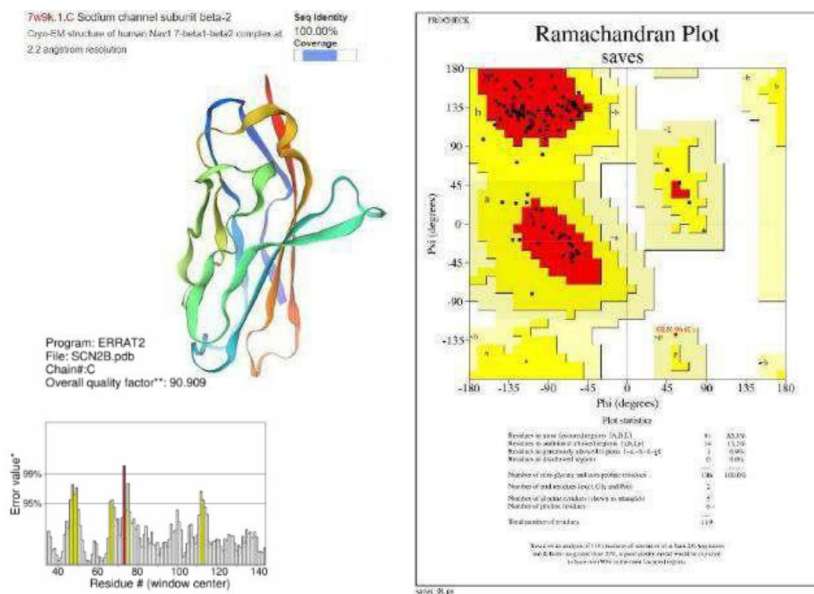


Figure 3. Construction of 3D protein structure of **SCN2B** using SWISS-MODEL interactive tools and validation of the structure through ERRAT and PROCHECK Ramachandran plot analysis using UCLA-DOE LAB — SAVES v6.1 tools. **ERRAT analysis** showed a great overall quality factor value of **90.909**, indicating this protein has a good high-resolution structure and is ready to be a drug target. **PROCHECK Ramachandran plot analysis** showed a very low value of residues in the disallowed region, which is 0.0%, and a very high value of residues in the most favored region, which is **85.8%**, a significant difference. This indicates that each amino acid in this protein has good phi and psi angles that stabilize the protein when it binds to the drug.



PD-014

Employing an In silico-based Multi-level Bioinformatic Analysis for The Hub-Gene of Resistant Hypertension and Identification of its Potential Novel Therapeutic Target: From Networking to the Validation

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Abstract

Background: Resistant hypertension (RHTN) defined as a blood pressure (BP) that remains above the recommended goal despite the concurrent prescription of 3 or 4 antihypertensive drugs, which is reported as 40% of hypertension patients. Recently, it seems that genetic factors contribute to RHTN. This study aims to develop an in silico-based therapeutic innovation targeting hub-gene by identifying and validating key genes involved in RHTN as a foundation for novel therapeutic targets.

Methods: This preliminary study was conducted using various bioinformatic analyzer tools. Protein-protein interaction network (PPIN) and functional enrichment analysis were performed to identify the hub-gene and the most contributing gene to the underlying pathomechanisms in RHTN. Additionally, ERRAT and PROCHECK analysis were performed to validate whether the genes obtained are able to be novel therapeutic targets candidates for RHTN or not.

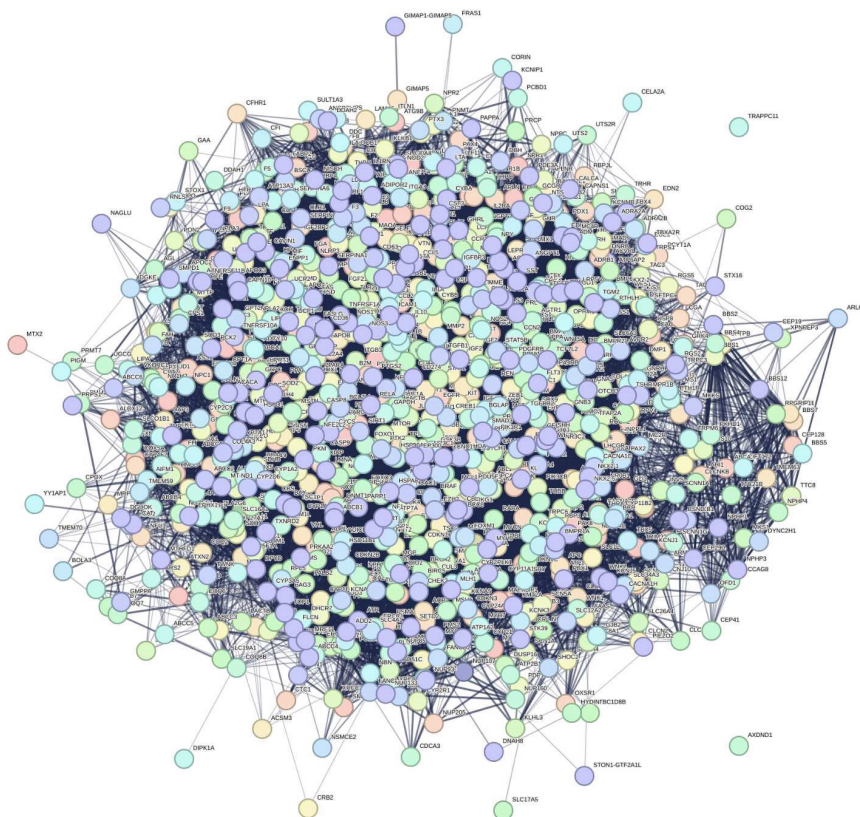
Results: There were 151 genes which are contributing to the underlying pathomechanisms in RHTN with significant PPI enrichment value ($p < 0.01$) and FDR value ($p < 0.05$). Additionally, we found top 10 of the most

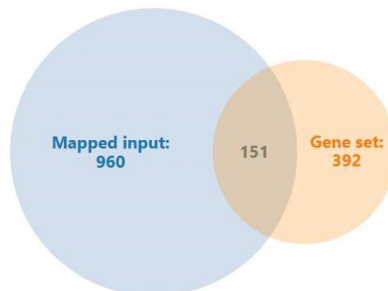
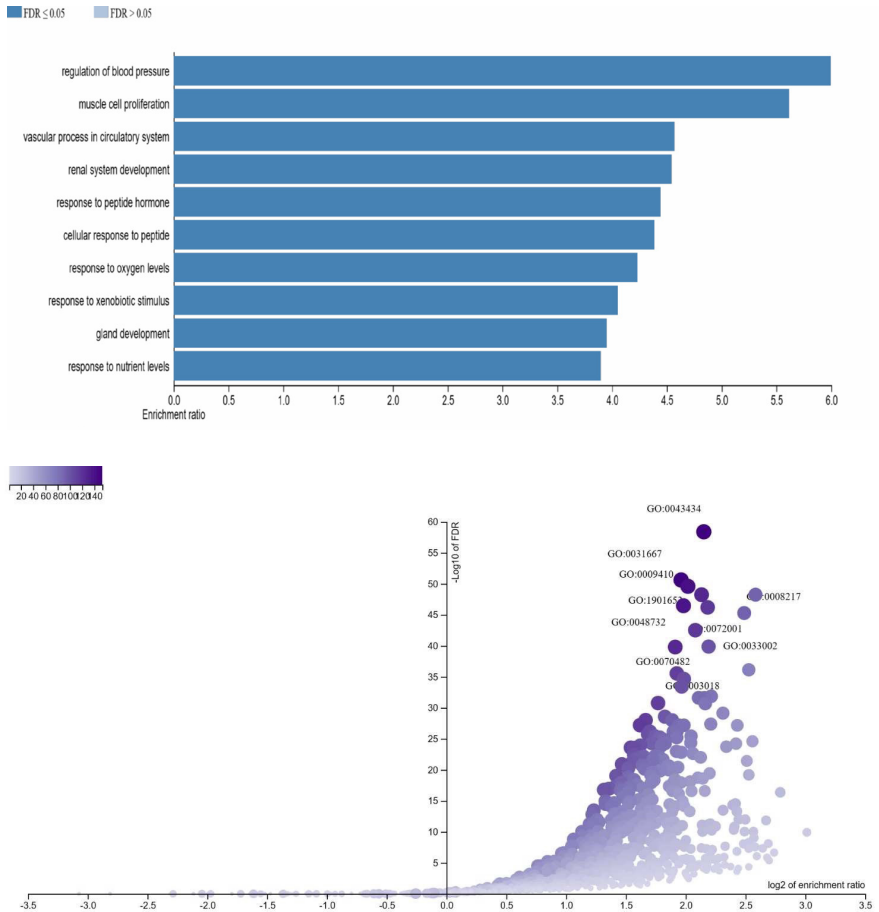
contributing genes to RHTN through cytoHubba analysis via DMNC approach. The validation analysis showed that JAK2, MAPK14, STK11, PCK2, SOCS1, and STAT5B are the possible genes among 10 genes obtained to be novel therapeutic targets candidates for this disease.

Conclusion: This study identified that JAK2, MAPK14, STK11, PCK2, SOCS1, and STAT5B are the key genes and the potent novel therapeutic targets candidates for RHTN. These results can be useful for future research to find the therapeutic agent targeting those genes to treat RHTN.

Keywords: Bioinformatic, In silico, Resistant Hypertension

Graphical Results





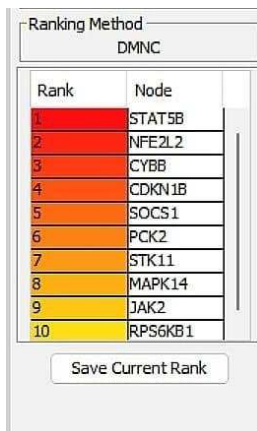
ACE	ACE	angiotensin I converting enzyme	1636
INS	INS	insulin	3630
AGT	AGT	angiotensinogen	183
AGTR1	AGTR1	angiotensin II receptor type 1	185
INSR	INSR	insulin receptor	3643
CAV1	CAV1	caveolin 1	857
PPARG	PPARG	peroxisome proliferator activated receptor gamma	5468
ADIPOQ	ADIPOQ	adiponectin, C1Q and collagen domain containing	9370
LEP	LEP	leptin	3952
EDN1	EDN1	endothelin 1	1906
CYP11B2	CYP11B2	cytochrome P450 family 11 subfamily B member 2	1585
RETN	RETN	resistin	56729
IRS1	IRS1	insulin receptor substrate 1	3667
HSD11B2	HSD11B2	hydroxysteroid 11-beta dehydrogenase 2	3291
ENPP1	ENPP1	ectonucleotide pyrophosphatase/phosphodiesterase 1	5167
IGF1R	IGF1R	insulin like growth factor 1 receptor	3480
CYP11B1	CYP11B1	cytochrome P450 family 11 subfamily B member 1	1584
AKT1	AKT1	AKT serine/threonine kinase 1	207
SCNN1B	SCNN1B	sodium channel epithelial 1 subunit beta	6338
PRKAR1A	PRKAR1A	protein kinase cAMP-dependent type I regulatory subunit alpha	5573
SCNN1G	SCNN1G	sodium channel epithelial 1 subunit gamma	6340
STAT3	STAT3	signal transducer and activator of transcription 3	6774
SLC2A4	SLC2A4	solute carrier family 2 member 4	6517
SCNN1A	SCNN1A	sodium channel epithelial 1 subunit alpha	6337
MTOR	MTOR	mechanistic target of rapamycin kinase	2475
COMT	COMT	catechol-O-methyltransferase	1312
CPS1	CPS1	carbamoyl-phosphate synthase 1	1373
AKT2	AKT2	AKT serine/threonine kinase 2	208
POMC	POMC	proopiomelanocortin	5443
IL1B	IL1B	interleukin 1 beta	3553
IL10	IL10	interleukin 10	3586
GCK	GCK	glucokinase	2645

PTPN1	PTPN1	protein tyrosine phosphatase non-receptor type 1	5770
ADM	ADM	adrenomedullin	133
GJB2	GJB2	gap junction protein beta 2	2706
GPT	GPT	glutamic--pyruvic transaminase	2875
IRS2	IRS2	insulin receptor substrate 2	8660
ABCC8	ABCC8	ATP binding cassette subfamily C member 8	6833
BRAF	BRAF	B-Raf proto-oncogene, serine/threonine kinase	673
EDNRA	EDNRA	endothelin receptor type A	1909
SRC	SRC	SRC proto-oncogene, non-receptor tyrosine kinase	6714
GHR	GHR	growth hormone receptor	2690
AGTR2	AGTR2	angiotensin II receptor type 2	186
CAT	CAT	catalase	847
JAK2	JAK2	Janus kinase 2	3717
PIK3CA	PIK3CA	phosphatidylinositol-4,5-bisphosphate 3-kinase catalytic subunit alpha	5290
PTGS2	PTGS2	prostaglandin-endoperoxide synthase 2	5743
TSHR	TSHR	thyroid stimulating hormone receptor	7253
GHRL	GHRL	ghrelin and obestatin prepropeptide	51738
TH	TH	tyrosine hydroxylase	7054
ALPL	ALPL	alkaline phosphatase, biomineralization associated	249
PPARA	PPARA	peroxisome proliferator activated receptor alpha	5465
NFE2L2	NFE2L2	NFE2 like bZIP transcription factor 2	4780
MAPK1	MAPK1	mitogen-activated protein kinase 1	5594
UCP2	UCP2	uncoupling protein 2	7351
LHCGR	LHCGR	luteinizing hormone/choriogonadotropin receptor	3973
PIK3R1	PIK3R1	phosphoinositide-3-kinase regulatory subunit 1	5295
IGF2	IGF2	insulin like growth factor 2	3481
GCGR	GCGR	glucagon receptor	2642
NFKB1	NFKB1	nuclear factor kappa B subunit 1	4790
CELA2A	CELA2A	chymotrypsin like elastase 2A	63036
KL	KL	klotho	9365
IGFBP1	IGFBP1	insulin like growth factor binding protein 1	3484
SIRT1	SIRT1	sirtuin 1	23411

CAPN10	CAPN10	calpain 10	11132
NAMPT	NAMPT	nicotinamide phosphoribosyltransferase	10135
TIMP1	TIMP1	TIMP metalloproteinase inhibitor 1	7076
MDM2	MDM2	MDM2 proto-oncogene	4193
PTPN11	PTPN11	protein tyrosine phosphatase non-receptor type 11	5781
PHEX	PHEX	phosphate regulating endopeptidase X-linked	5251
TBC1D4	TBC1D4	TBC1 domain family member 4	9882
NR5A1	NR5A1	nuclear receptor subfamily 5 group A member 1	2516
TNFSF10	TNFSF10	TNF superfamily member 10	8743
EDNRB	EDNRB	endothelin receptor type B	1910
FBN1	FBN1	fibrillin 1	2200
TSC2	TSC2	TSC complex subunit 2	7249
RAF1	RAF1	Raf-1 proto-oncogene, serine/threonine kinase	5894
FOS	FOS	Fos proto-oncogene, AP-1 transcription factor subunit	2353
GCG	GCG	glucagon	2641
ADIPOR1	ADIPOR1	adiponectin receptor 1	51094
STAT1	STAT1	signal transducer and activator of transcription 1	6772
PARP1	PARP1	poly(ADP-ribose) polymerase 1	142
SLC2A1	SLC2A1	solute carrier family 2 member 1	6513
CYBB	CYBB	cytochrome b-245 beta chain	1536
HRAS	HRAS	HRas proto-oncogene, GTPase	3265
GH1	GH1	growth hormone 1	2688
SMAD3	SMAD3	SMAD family member 3	4088
BGLAP	BGLAP	bone gamma-carboxyglutamate protein	632
INPPL1	INPPL1	inositol polyphosphate phosphatase like 1	3636
NR1H4	NR1H4	nuclear receptor subfamily 1 group H member 4	9971
KCNQ1	KCNQ1	potassium voltage-gated channel subfamily Q member 1	3784
SOCS1	SOCS1	suppressor of cytokine signaling 1	8651
PCSK9	PCSK9	proprotein convertase subtilisin/kexin type 9	255738
CDKN1B	CDKN1B	cyclin dependent kinase inhibitor 1B	1027
TSC1	TSC1	TSC complex subunit 1	7248
SLC9A1	SLC9A1	solute carrier family 9 member A1	6548
ITGB3	ITGB3	integrin subunit beta 3	3690

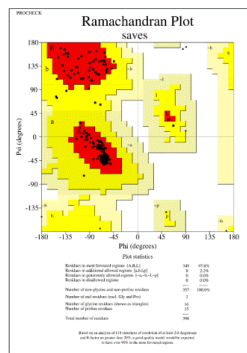
F7	F7	coagulation factor VII	2155
PRKCA	PRKCA	protein kinase C alpha	5578
MAPK14	MAPK14	mitogen-activated protein kinase 14	1432
MC4R	MC4R	melanocortin 4 receptor	4160
SREBF1	SREBF1	sterol regulatory element binding transcription factor 1	6720
CXCL12	CXCL12	C-X-C motif chemokine ligand 12	6387
MAPK3	MAPK3	mitogen-activated protein kinase 3	5595
PRKACA	PRKACA	protein kinase cAMP-activated catalytic subunit alpha	5566
BMP7	BMP7	bone morphogenetic protein 7	655
RPS6KB1	RPS6KB1	ribosomal protein S6 kinase B1	6198
CFLAR	CFLAR	CASP8 and FADD like apoptosis regulator	8837
ATP2B1	ATP2B1	ATPase plasma membrane Ca ²⁺ transporting 1	490
APC	APC	APC regulator of WNT signaling pathway	324
CYP11A1	CYP11A1	cytochrome P450 family 11 subfamily A member 1	1583
PNPLA3	PNPLA3	patatin like phospholipase domain containing 3	80339
PKM	PKM	pyruvate kinase M1/2	5315
SLC34A1	SLC34A1	solute carrier family 34 member 1	6569
STK11	STK11	serine/threonine kinase 11	6794
LPIN1	LPIN1	lipin 1	23175
TLR2	TLR2	toll like receptor 2	7097
GNRHR	GNRHR	gonadotropin releasing hormone receptor	2798
GDF15	GDF15	growth differentiation factor 15	9518
FGF21	FGF21	fibroblast growth factor 21	26291
CTSD	CTSD	cathepsin D	1509
SOCS3	SOCS3	suppressor of cytokine signaling 3	9021
RB1	RB1	RB transcriptional corepressor 1	5925
STAT5B	STAT5B	signal transducer and activator of transcription 5B	6777
FOXO1	FOXO1	forkhead box O1	2308
AHSG	AHSG	alpha 2-HS glycoprotein	197
TEK	TEK	TEK receptor tyrosine kinase	7010
CA2	CA2	carbonic anhydrase 2	760
GSK3B	GSK3B	glycogen synthase kinase 3 beta	2932
SRD5A2	SRD5A2	steroid 5 alpha-reductase 2	6716

RELA	RELA	RELA proto-oncogene, NF- κ B subunit	5970
SHOC2	SHOC2	SHOC2 leucine rich repeat scaffold protein	8036
NCOA1	NCOA1	nuclear receptor coactivator 1	8648
CREB1	CREB1	cAMP responsive element binding protein 1	1385
LRP5	LRP5	LDL receptor related protein 5	4041
SHC1	SHC1	SHC adaptor protein 1	6464
PTK2	PTK2	protein tyrosine kinase 2	5747
TRPV4	TRPV4	transient receptor potential cation channel subfamily V member 4	59341
PRKDC	PRKDC	protein kinase, DNA-activated, catalytic subunit	5591
NPR2	NPR2	natriuretic peptide receptor 2	4882
ASS1	ASS1	argininosuccinate synthase 1	445
PCK2	PCK2	phosphoenolpyruvate carboxykinase 2, mitochondrial	5106
HDAC9	HDAC9	histone deacetylase 9	9734
CYP1B1	CYP1B1	cytochrome P450 family 1 subfamily B member 1	1545
ROCK2	ROCK2	Rho associated coiled-coil containing protein kinase 2	9475
PCSK1	PCSK1	proprotein convertase subtilisin/kexin type 1	5122
UCP3	UCP3	uncoupling protein 3	7352
RARRES2	RARRES2	retinoic acid receptor responder 2	5919
MSTN	MSTN	myostatin	2660
SP1	SP1	Sp1 transcription factor	6667
OGT	OGT	O-linked N-acetylglucosamine (GlcNAc) transferase	8473



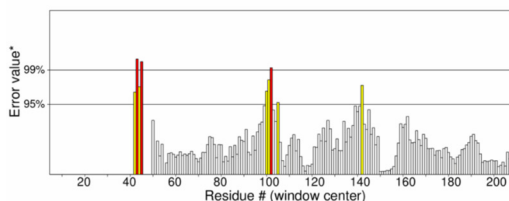
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Chain: :A
Overall quality factor*: 98.352

*On the error axis, two lines are drawn to indicate the confidence with which it is possible to reject regions that exceed that error value.
*Expressed as the percentage of the protein for which the calculated error value falls below the 95% rejection limit. Good high-resolution structures generally produce values around 95% or higher. For lower resolutions, 2.5 to 3.0 Å, the average overall quality factor is around 93%.

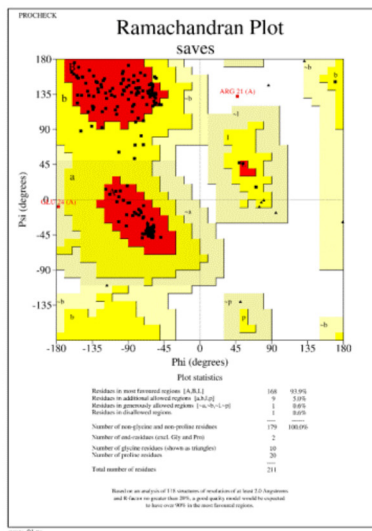


SOCS1

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Chain#: A
Overall quality factor*: 94.375



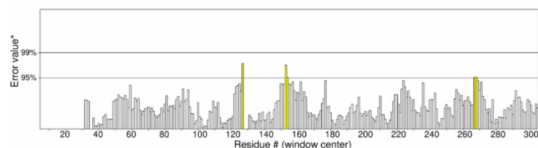
*On the error axis, two lines are drawn to indicate the confidence with which it is possible to reject regions that exceed that error value.
**Expressed as the percentage of the protein for which the calculated error value falls below the 95% rejection limit. Good high resolution structures generally produce values around 95% or higher. For lower resolutions (2.5 to 3Å) the average overall quality factor is around 91%.



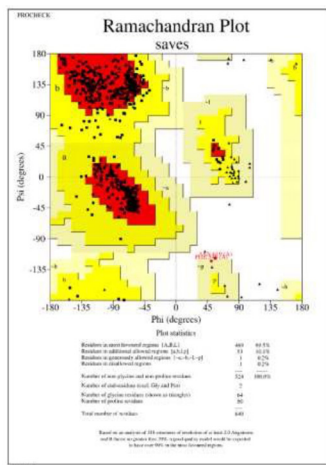
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PCK1

Program: ERRAT2
File: model_01.pdb
Chain#: A
Overall quality factor*: 97.647



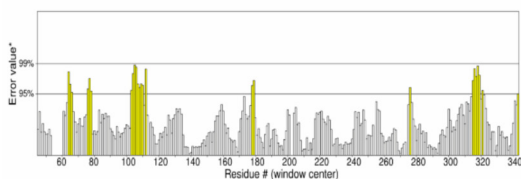
*On the error axis, two lines are drawn to indicate the confidence with which it is possible to reject regions that exceed that error value.
**Expressed as the percentage of the protein for which the calculated error value falls below the 95% rejection limit. Good high resolution structures generally produce values around 95% or higher. For lower resolutions (2.5 to 3Å) the average overall quality factor is around 91%.



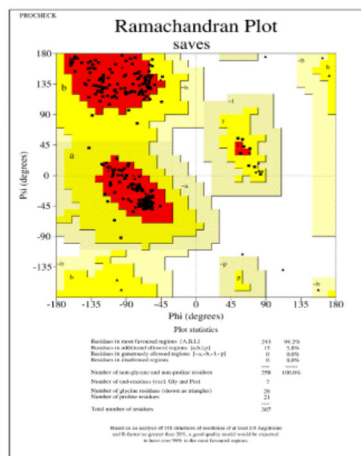
model_01.pdb

STK11

Program: ERRAT2
File: model_02.pdb
Chain: B
Overall quality factor*: 91.289



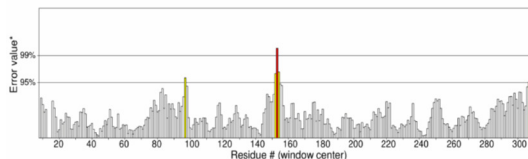
*On the error axis, two lines are drawn to indicate the confidence with which it is possible to reject regions that exceed that error value.
**Expressed as the percentage of the protein for which the calculated error value falls below the 95% rejection limit. Good high resolution structures generally produce values around 95% or higher. For lower resolutions (2.5 to 3Å) the average overall quality factor is around 91%.



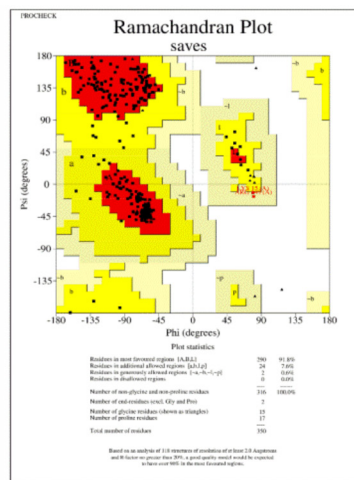
score: 91.29

MAPK14

Program: ERRAT2
File: model_01.pdb
Chain: A
Overall quality factor*: 97.329

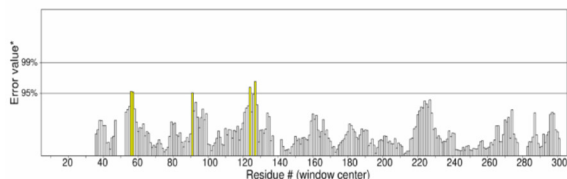


*On the error axis, two lines are drawn to indicate the confidence with which it is possible to reject regions that exceed that error value.
**Expressed as the percentage of the protein for which the calculated error value falls below the 95% rejection limit. Good high resolution structures generally produce values around 95% or higher. For lower resolutions (2.5 to 3Å) the average overall quality factor is around 91%.

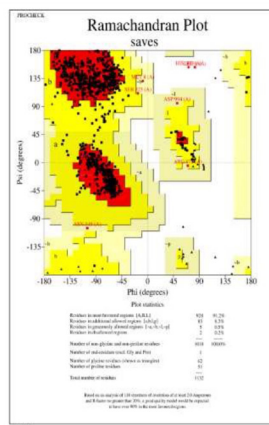


score: 97.33

Program: ERRAT2
File: model_01.pdb
Chain#:A
Overall quality factor**: 98.031



^{***}Expressed as the percentage of the protein for which the calculated error value falls below the 95% rejection limit. Good high resolution structures generally produce values around 95% or higher. For lower resolutions (2.5 to 3Å) the average overall quality factor is around 91%.



PD-015

Unveiling Elevated Lipoprotein (a) in Healthy Adults: A Single Center Insight

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Background. Lipoprotein(a) [Lp(a)] has emerged as a significant yet underrecognized cardiovascular risk factor, with limited data available, particularly in our community.

Objective. This study investigates Lp(a) levels among Indonesians undergoing routine medical check-ups (MCUs) and examines its associations with various demographic and clinical parameters.

Method. A cross-sectional study (2021–2024) was conducted on 904 MCU participants to assess Lp(a) levels, lipid profiles, BMI, abdominal circumference, kidney function, HbA1c, and medical history (HTN, ASCVD, DM), along with family history (HTN, heart disease, stroke), age, and gender. Gender differences in Lp(a) levels and the prevalence of elevated Lp(a) (>30 mg/dL) were analyzed using SPSS version 26.

Result. Among participants, 55.6% were obese, 18.7% had hypertension, 15.7% prediabetes, 8% diabetes, and 7.3% a history of ASCVD. Elevated LDL-C (>130 mg/dL) was found in 56.2%, associated with higher Lp(a) levels (20.4 ± 29.9 mg/dL). Elevated Lp(a) (>30 mg/dL) occurred in 18.8%, matching global prevalence. Gender differences were noted, with males showing lower Lp(a) (17.3 ± 24.7 mg/dL) than females (21.9 ± 32.7 mg/dL). These findings highlight significant associations between LDL-C, Lp(a), and demographic characteristics. Lp(a) is stable from childhood, genetically determined, and linked to ASCVD risk, with global prevalence ranging from 20–25%. Our findings of an 18.8% prevalence align with these estimates, and gender differences observed are consistent with prior research.

Conclusion. These findings highlight the growing relevance of Lp(a) as a critical independent cardiovascular risk factor in our community, emphasizing the need for routine screening in high-risk groups to enable early risk stratification and intervention.

Keywords: Lipoprotein a; gender differences; elevated Lp(a), routine screening; healthy adults.

PD-016

Left Ventricular Geometry Pattern and Its Mortality in Ischemic Stroke Patients

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Background : Ischemic stroke has high mortality rates, with hypertension being a critical risk factor. Left ventricular (LV) geometry may influence stroke outcomes. Echocardiography provides prognostic insights into LV geometry patterns, which include normal, concentric remodeling, and concentric hypertrophy. This study examined the relationship between LV geometry patterns and mortality in ischemic stroke patients.

Objective : To investigate the association between LV geometry patterns and mortality in ischemic stroke patients.

Methods: A cross-sectional study was conducted on ischemic stroke patients hospitalized at Dr. M. Djamil General Hospital from January to December 2023. Echocardiography was performed to classify LV geometry patterns, and in hospital mortality was recorded. Statistical analysis assessed associations between LV geometry and mortality.

Result: The study included 45 patients, 6.7% had normal geometry, 68.9% had concentric hypertrophy and 24.4% had concentric remodeling geometry. The mean age of the study population was 57.35 ± 13.64 years. Significant differences were observed among the three geometry patterns in terms of age, smoking status, hypertension, and history of anti-hypertension drug use ($P = 0.021$, $P = 0.028$, $P = 0.03$, $P = 0.03$, respectively). Patients with concentric hypertrophy were older, with a mean age of 61.42 years. The mortality rate was highest in patients with concentric hypertrophy (22.6%), followed by concentric remodeling (9.1%),

and none in patients with normal geometry. However, chi-square analysis revealed no significant association between LV geometry pattern and mortality ($P = 0.426$).

Conclusion: This study concluded that LV geometry patterns had no significant correlation with mortality among ischemic stroke patients.

Keywords: LV geometry, Ischemic Stroke, Mortality, Echocardiography.

Table 1 Characteristic and Echocardiographic finding in the study population according to types of left ventricular geometry

	Normal Geometry (n=3)	Concentric Hypertrophy (n=31)	Concentric Remodeling (n=11)	p Value
Characteristic				
Age, yrs	53.67 ± 21.57	61.42 ± 10.35	46.91 ± 15.15	0.021*
Men	1 (3.1%)	22 (68.8%)	9 (28.1%)	0.259**
Diabetes	1 (5.6%)	13 (72.2%)	4 (22.2%)	0.921**
Smoker	0 (0%)	21 (70%)	9 (30%)	0.028*
Systolic BP, mmHg	123.67 ± 9.07	132.39 ± 17.39	136.18 ± 21.66	0.567*
Diastolic BP, mmHg	74.0 ± 4.0	78.03 ± 11.28	72.45 ± 10.30	0.323*
Hypertension	0	22	5	0.03*
Body Mass Index, kg/m ²	27.67 ± 3.51	25.29 ± 3.21	24.0 ± 2.56	0.276*
Fasting blood glucose, mg/dl	155.33 (88-273)	122.03 (61-311)	106.64 (57-206)	0.373**
HDL, mg/dl	44.0 ± 7.81	37.87 ± 8.65	40.36 ± 16.00	0.487*
LDL, mg/dl	112 (93-140)	118 (55 -216)	123 (75 - 176)	0.93**
Cholesterol, mg/dl	180.33 ± 24.0	184.29 ± 55.83	192.91 ± 33.81	0.734*
HbA1C, %	6.07 (3.2-10.0)	6.37 (4.2-13.1)	7.26 (5-11.4)	0.476**
Anti-Hypertension	0 (0.0%)	22 (81.5%)	5 (18.5%)	0.03*
Beta blocker	1 (14.3%)	5 (71.4%)	1 (14.3%)	0.583**
ACEI	3 (6.7%)	31 (68.9%)	11 (24.4%)	0.345**
ARB	0 (0.0%)	19 (82.6%)	4 (17.4%)	0.068**
CCB	0 (0.0%)	20 (83.3%)	4 (16.7%)	0.044*
Echocardiographic findings				
LVEF, %	57.33 ± 5.51	59.71 ± 6.61	59.36 ± 4.82	0.82*
LVEDD, mm	45.67 ± 4.93	43.90 ± 7.04	41.82 ± 3.02	0.23*
LVESD, mm	27.67 ± 7.09	28 ± 6.03	27.55 ± 3.36	0.97*
LVSD, mm	11 (7-15)	13.71 (9-46)	9.18 (6-13)	0.007**

LVSS, mm	14 ± 6.00	15.52 ± 4.29	11.09 ± 2.50	0.007*
PWD, mm	10 ± 3.00	13.03 ± 2.99	9.73 ± 3.25	0.004*
PWS, mm	14.33±6.81	14.81±3.43	13.82±2.60	0.721*
LVMI, g/m ²	102±57.20	132.55±31.93	81.73±18.32	<0.001*
RWT	0.42 (0.37-0.51)	0.58 (0.17-1.60)	0.51 (0.43-0.72)	0.116**
LVEDV, ml	139.83 ± 29.77	131.29 ± 43.61	116.36 (16.66)	0.23*
LVESV, ml	51.65±25.40	53.01±22.97	49.57±12.43	0.897*
Wall motion abnormality	1(14.3%)	5 (71.4%)	1 (14.3%)	0.583**
PVAccT, ms	114.33±19.63	125.97±22.34	123.09±27.61	0.701*
TAPSE, cm	2.03 (1.4-2.5)	2.10 (1.8-2.7)	2.02 (1.7-2.5)	0.75**
Diastolic Dysfunction	1 (33.3%)	4 (12.9%)	1(0.09%)	0.54**
LAVolumeIndex	24.33 (13-36)	27.19 (12-90)	40.99 (12-146)	0.803**

* = Normal distribution

** = Non-normal distribution

Tabel 2. Chi Square analysis of association LV geometry with Mortalitas in ischemia stroke patients

LV Geometry	Mortality		P value
	Survive	Non Survive	
Normal	3 (100%)	0 (0.0%)	0,426
Concentric Remodeling	10 (90.9%)	1 (9.1%)	
Concentric Hypertrophy	24 (77,4%)	7 (22,6%)	
Total	37 (82,2%)	8 (17,8%)	

PD-017

Comparison of Left Atrial Strain and Diastolic Function Across Age Groups in Stroke Patients

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Abstract

Background: The assessment of left atrial strain (LAS) and diastolic function offers crucial insights into cardiovascular health in stroke patients. Age-related differences in these parameters may reveal distinct pathophysiological mechanisms underlying stroke.

Objective : To comparison of Left Atrial Strain and Diastolic Function across age groups in stroke patients.

Methods: A cross-sectional study was conducted on 26 stroke patients divided into two groups: below 40 years (n=13) and above 40 years (n=13). Echocardiographic parameters (S_CD, S_CT, S_R, and LAVmax) and diastolic function categories (ND and DD) were compared between the groups using Chi-Square and ANOVA test.

Results: This study identified significant age-related and systolic blood pressure differences in cardiac parameters among stroke patients. Patients under 40 had higher mean S_R values (27.38 ± 6.58) compared to those over 40 (18.61 ± 6.14 , $p=0.002$), along with lower S_CD and S_CT values ($p=0.004$ and $p=0.007$, respectively). Diastolic function was more impaired in the over 40 group, with significantly reduced e' septal (6.76 ± 1.83 vs. 10.84 ± 1.51 , $p=0.002$) and e' lateral velocities (8.76 ± 1.48 vs.

13.69 ± 3.66, p=0.001). Additionally, the left atrial volume index (LAVI) was significantly higher in patients over 40 (27.47 ± 13.66 vs. 20.41 ± 7.56, p=0.004), indicating structural changes with age.

Conclusion: Stroke patients over 40 years old exhibit significant differences in LAS and diastolic function compared to younger patients, highlighting age-related and systolic blood pressure. These findings emphasize the importance of tailored clinical management for different age groups in stroke care.

Keywords: *Left Atrial Strain, Diastolic Function, Stroke.*

PD-018

Medication Adherence as a Catalyst for Hypertension Treatment Success: An Observational Study from a Rural Area in Central Java

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Background: Hypertension, a systolic blood pressure of >140 mmHg and/or diastolic of >90 mmHg, is expected to affect 1.6 billion adults by 2025, globally. It also remains a major health issue in developing countries including Indonesia. Medication adherence is crucial for effective treatment, yet many hypertensive patients, especially in rural areas, struggle with compliance.

Objective: This study aims to explore how adherence to antihypertensive medications affects the success of treatment in patients.

Method: An observational cross-sectional study was conducted at Penawangan I Primary Health Care, Grobogan, Central Java, in May 2024. Participants were selected using purposive sampling based on inclusion criteria. Medication adherence was assessed using the Hill-Bone Compliance to High Blood Pressure Therapy Scale questionnaire. The association between medication adherence and the success of therapy was analyzed using the Chi Square test.

Result: A total of 26 participants were analyzed, with the majority being female (65.4%) and male (34.6%), The average age of female and male were (55.64±7.25) and (62.44±7.47) years, respectively. This study revealed a significant association with p-value = 0.006 (p-value <0.05) between medications adherence and effectiveness of therapy in hypertensive patients. Good medication adherence is a protective factor for blood pressure control, while low adherence contributes to uncontrolled hypertension.

Conclusion: This study highlights an association between adherence to antihypertensive medications and success of therapy in hypertensive patients. Larger-scale studies are needed to strengthen previous findings.

Keywords. *medication adherence; hypertension; treatment; antihypertensive drugs; primary health care.*

Characteristics		Total (n = 26)	Percentage (%)
Sex	Male	9	34.6
	Female	17	65.4
Age	≤60 years old	13	50
	>60 years old	13	50
Education Level	Elementary school	11	42.3
	Junior high school	12	46.2
	Senior high school	2	7.7
	Bachelor's degree	1	3.8
Job Status	Employed	11	42.3
	Unemployed	15	57.7
Duration of hypertension	≤5 years	20	76.9
	>5 years	6	23.1
Antihypertensive drugs	Monotherapy	22	84.6
	Combination	4	15.4

Figure 1. Characteristic table of the participants

Adherence Level	Therapeutic Success		<i>p value</i>
	Yes	No	
High	11	3	0.006
Low	3	9	

Figure 2. Association between antihypertensive medication adherence with treatment success

PD-019

The effect of Tea Mistletoe (*Scurrula atropurpurea*) and Mango Mistletoe (*Dendrophthoe petandra*) Leaves on Lipid Profiles of Healthy Individuals in Malang : A Phase 1 Clinical Trial

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Background: Traditional herbal remedies have gained increasing attention for their potential health benefits, particularly in cardiovascular health. Tea mistletoe (*Scurrula atropurpurea*) and mango mistletoe (*Dendrophthoe petandra*) (SADP) contain bioactive compounds with potential lipid-lowering effects.

Objective: This study evaluates the effects of SADP on lipid profiles and its potential role as an adjuvant in hypertension management among healthy individuals.

Methods: A phase 1, single-blind, quasi-experimental clinical trial was conducted on 26 healthy participants divided into intervention (n = 13) and placebo (n = 13) groups. Participants consumed mistletoe extract or placebo for 15 days. Lipid profiles, including total cholesterol, triglycerides, LDL, and HDL, were assessed pre- and post-intervention. Statistical analysis used paired t-tests ($p < 0.05$).

Results: The intervention group showed reductions in total cholesterol (-10.769 mg/dL, $p = 0.044$), triglycerides (-16.769 mg/dL, $p = 0.201$), LDL (-6.692 mg/dL, $p = 0.238$), and HDL (-19.462 mg/dL, $p = 0.238$). However, only the reduction in total cholesterol was statistically significant. The

placebo group exhibited a significant triglyceride reduction (-27.538 mg/dL, $p = 0.019$), indicating possible external influences.

Conclusion: Short-term consumption of SADP did not significantly alter lipid profiles. Further studies with larger samples and longer durations are needed to confirm their potential cardiovascular benefits.

PD-020

The Relationship Between Urea-Creatinine Ratio and Acute Myocardial Infarction Incidence at RSUD Abdoel Wahab Sjahranie from 2021 to 2023

ABSTRAK

Background : Acute Myocardial Infarction (AMI) is one of the leading causes of global mortality, with a decreasing incidence of STEMI and an increasing incidence of NSTEMI. In addition to cardiovascular complications, AMI is often accompanied by renal dysfunction, such as Acute Kidney Injury (AKI), which is assessed through serum urea and creatinine levels as well as the urea-creatinine ratio. The relationship between the urea-creatinine ratio and the type of AMI (STEMI and NSTEMI) still requires further investigation, especially in Indonesia.

Objective : This study aims to evaluate the relationship between the urea-creatinine ratio and the occurrence of AMI types (STEMI and NSTEMI) at RSUD Abdoel Wahab Sjahranie Samarinda and to identify related variables such as age, sex, hypertension, and diabetes mellitus.

Methods : This research used an analytical observational study design with a cross-sectional approach. The sampling technique was purposive sampling, involving 120 patients. Data collected included the distribution of patients based on age, sex, history of hypertension, diabetes mellitus, as well as urea, creatinine levels, and the urea-creatinine ratio. Statistical

analysis was performed using the Mann-Whitney U test and Chi-Square test.

Results : The results showed that urea levels (70.74 ± 59.83 mg/dL) and creatinine levels (1.65 ± 1.18 mg/dL) were significantly higher in STEMI patients compared to NSTEMI patients ($p < 0.001$). The urea-creatinine ratio was also higher in STEMI patients (45.50 ± 22.12) compared to NSTEMI patients (35.36 ± 15.34 ; $p = 0.013$).

Conclusion : STEMI patients have higher urea, creatinine levels, and urea-creatinine ratios compared to NSTEMI patients, reflecting more severe renal dysfunction. The urea-creatinine ratio may serve as an important parameter to assess the severity and risk of complications in AMI patients.

Keywords: *Acute Myocardial Infarction, STEMI, NSTEMI, Urea-Creatinine Ratio, Renal Dysfunction.*

PD-021

THE RELATIONSHIP BETWEEN THE DEGREE OF HYPERTENSION AND THE INCIDENCE OF DEPRESSION IN ESSENTIAL HYPERTENSION PATIENTS AT ONE OF THE FIRST HEALTH FACILITIES I JAMBI CITY

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Abstract

Introduction Hypertension is a condition when the blood pressure in the veins increased that occurred because heart pumped blood harder to meet the body needs of oxygen and nutrients. Hypertension and depression arise from complex interactions between biological, social, and behavioral factors. When depression is experienced by hypertensive patients, there may be a decreased in life quality, increased risk of complications, decreased dietary and/or hypertensive drugs adherence, as well as an increased risk of suicide.

Aims The purpose of this study is to determine the relationship between hypertension stages with depression incidence in patients with essential hypertension treated at Rawasari's Primary Health Centre, in Jambi city.

Methods The method used is analytical method with cross sectional study design using the questionnaire sheet (*Zung Self Rating Depression Scale*).

Result Among 64 subjects, 59.4% of patients with essential hypertension did not experience depression, while 40.6% did. Hypertension was most prevalent in the 60–64 age group (31.3%), with a higher proportion in women (62.5%). Most patients had hypertension for 1–5 years (48.4%), followed by 6–10 years (26.6%) and >10 years (25.0%). Stage 1 hypertension was more common (54.7%) than stage 2 (45.3%), and Amlodipine was the most prescribed treatment (53.1%). A significant association was found between hypertension stages and depression incidence ($p < 0.05$) in patients treated at Rawasari Primary Health Centre, Jambi City.

Conclusion There is a link between hypertension stages with depression incidence in patients with essential hypertension.

Keywords: Hypertension, Depression.

PD-022

Cardiorenal Syndrome Research Growth and Insights: A Bibliometric Analysis

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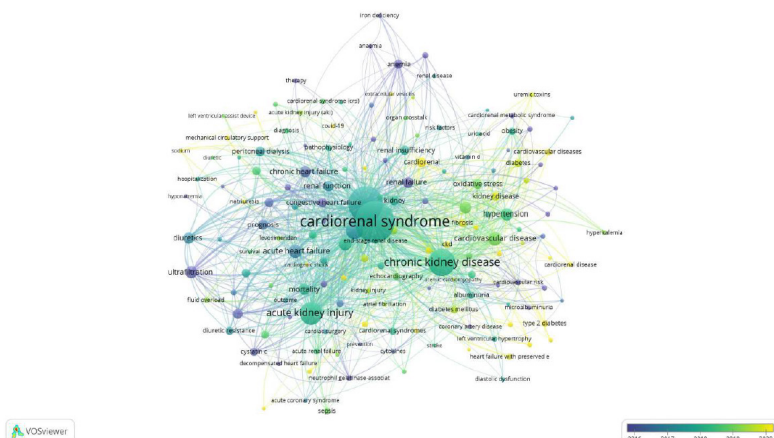
Background: Cardiorenal syndrome (CRS) represents a complex interplay between cardiac and renal dysfunction, significantly contributing to morbidity and mortality worldwide. As a multifaceted syndrome, CRS research encompasses diverse topics, including heart failure, chronic kidney disease, and hypertension, necessitating a bibliometric analysis to elucidate the field's intellectual landscape.

Objective: This study aims to provide a comprehensive bibliometric analysis of global CRS research, identifying key trends, influential authors, institutions, journals, and emerging themes in the field.

Result: CRS research has grown steadily, with an annual growth rate of 3.08%. The dataset includes 1,905 articles, 945 reviews, and 47 conference papers, averaging 24.62 citations per document. *Cardiorenal Medicine* contributed 102 articles, while the *European Heart Journal* recorded the highest h-index (27). Ronco C emerged as the most prolific author with 181 publications and an h-index of 44. The USA leads in productivity with 735 documents (21.4%), followed by affiliations from Monash University contributing 119 articles. Frequent keywords include “heart failure” (2,756 occurrences), “human” (2,755), and “cardiorenal syndrome” (2,728), underscoring the centrality of these topics.

Conclusion: CRS research demonstrates consistent growth, driven by key contributors and institutions. This analysis highlights the USA's leadership, Monash University's productivity, and emerging trends in heart failure and human-centered studies, providing valuable insights to guide future research directions.

Keywords: cardiorenal syndrome, bibliometric analysis



PD-023

Artificial Intelligence and Hypertension: A Growing Frontier in Medical Research

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Background: Hypertension remains a global health challenge, necessitating innovative approaches for its management and diagnosis. Artificial intelligence (AI) has emerged as a transformative tool in healthcare, offering potential advancements in understanding and addressing hypertension. A bibliometric analysis provides insights into the research landscape and trends at the intersection of AI and hypertension.

Objective: This study aimed to analyze the global research output on AI and hypertension using bibliometric techniques, highlighting key trends, influential contributors, and emerging areas of interest.

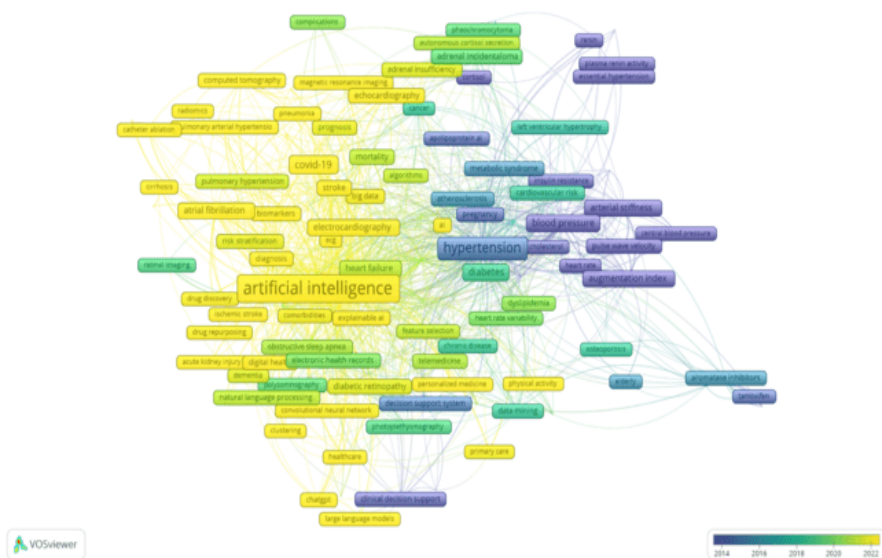
Method: A comprehensive bibliometric analysis was conducted using VOSviewer and Biblioshiny, encompassing 2,665 documents from 1967 to 2025. Data were retrieved from scientific databases, and key metrics, including document types, citation impact, leading journals, authors, and countries, were analyzed.

Results: The research output on AI and hypertension demonstrated an annual growth rate of 5.98%, with the highest publication volume recorded in 2023–2024 (416 to 645 documents). The USA led with 352 publications, followed by other high-income countries. The average citation per document was 16.12, with reviews (474) and original articles (1,959) dominating the literature. *Frontiers in Cardiovascular Medicine* published the most articles (57), while the *American Journal of Hypertension* had the highest h-index (24). Wang Y emerged as the most prolific author (35 documents). Emerging topics include AI-based clinical decision support,

telemedicine, and vascular hemodynamics.

Conclusion: Research on AI in hypertension is rapidly growing, driven by innovative diagnostic and management applications. Future studies should focus on underexplored areas such as AI-assisted vascular assessments and ethical deployment in clinical settings.

Keywords: artificial intelligence, ai, hypertension, bibliometric analysis, scientific mapping



PD-025

Effect of Exercise Training on Neurohumoral Activation in Chronic Heart Failure: A Systematic Review

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Abstract

Background. The progression of chronic heart failure is largely influenced by neurohumoral activities which may also be in charge to exacerbate the symptoms of heart failure. Excessive vasoconstriction, persistent tachycardia, related cardiac arrhythmias, and fluid retention which may lead to hypertension, are caused by elevated catecholamines and sympathetic nervous system activation. There is growing evidence that patients with chronic heart failure who engage in exercise training have lower resting sympathetic neural activation.

Objective. This study aims to compared the neurohumoral activities in chronic heart failure patients undergo exercise training.

Methods. The controlled studies of neurohumoral effect of exercise training in English published 2000-2024 from PubMed, Medline, ScienceDirect, Google-Scholar are systematically reviewed. The indicators include the change in catecholamine's level and its end effect, such as heart rate variability, blood pressure, plasma renin level, and cardiomyocyte neurohormone. Bias was assessed using the Cochrane Collaboration tool (ROBINS-I) and study quality assessed with Newcastle-Ottawa Scale.

Results. The final qualitative analysis included 24 studies. Brain Natriuretic Peptide/N-Terminal Pro-B type Natriuretic Peptide (BNP/NT-ProBNP) become the dominating indicator from those studies, as it is a neurohormone from cardiomyocyte. Most of the studies show a

decreased neurohumoral activation after the exercise training (namely lowered neuropeptide, increased heart rate variability, lowered resting and maximum blood pressure), but only few of them significant. The different types of exercise also contribute to the different result.

Conclusion. Our evaluations indicate that exercise training does have a reducing influence on neurohumoral activity, which could prompt more research into various forms of exercise training.

Keyword. *Exercise Training, Heart Failure, Neurohumoral activity, Sympathetic Nervous System.*

PD-026

Amlodipine's Dynamic Duo: Valsartan or Telmisartan? A Network Meta-Analysis of Fixed-Dose Combinations for Hypertension

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Background: Amlodipine/valsartan (Amlo/Val) and amlodipine/telmisartan (Amlo/Telmi) are the most widely used fixed-dose combinations for hypertension. However, direct head-to-head comparisons of their efficacy and safety are limited. This study employs a Network Meta-Analysis (NMA) to address this gap and provide robust insights.

Objective: To evaluate and compare the efficacy and safety of Amlo/Val and Amlo/Telmi in hypertension management.

Methods: Randomized controlled trials (RCTs) were identified through systematic searches in PubMed, EMBASE, and the Cochrane Library. Amlodipine was used as shared comparator. Primary outcomes included

total adverse events (TAE), target blood pressure achievement (control rate), and response rate. Risk Ratios (RR) with 95% confidence intervals (CI) were calculated using random-effects models, and indirect comparisons were performed using the Cochrane Bucher method.

Results: Nine RCTs were included in this NMA. The indirect comparison revealed that Amlo/Val showed a lower control rate in patients compared to Amlo/Telmi (OR: 0.90; 95% CI: 0.67–1.20; $P < 0.001$). Similarly, Amlo/Val demonstrated a lower response rate (OR: 0.91; 95% CI: 0.70–1.20; $P = 0.01$). Additionally, Amlo/Val was not superior in reducing the risk of adverse events compared to Amlo/Telmi (OR: 1.08; 95% CI: 0.74–1.58; $P = 0.01$).

Conclusion: In a safety study comparing Amlo/Val and Amlo/Tel, neither was found to be superior. However, in achieving control rate and response rate, Amlo/Tel appeared to be slightly superior, with approximately 10% better outcomes compared to Amlo/Val. Overall, the two combinations offer comparable benefits, and the choice between them may depend on factors such as availability, patient preference, and cost considerations.

PD-027

Dual Benefits of SGLT-2 Inhibitors: An RCT Meta-Analysis of Their Role in Hypertension in Diabetic Populations

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Background: SGLT-2 inhibitors are widely recognized for their benefits in managing both T2DM and hypertension by promoting osmotic diuresis and natriuresis through glucose and sodium reabsorption inhibition in the kidneys, thereby lowering blood pressure. However, variability in their blood pressure-lowering effects and long-term safety raises questions about the most effective agent for hypertensive T2DM patients.

Objective: This meta-analysis aimed to compare the efficacy and safety of various SGLT-2 inhibitors in managing hypertension among patients with T2DM, focusing on their effects on blood pressure.

Methods: Following PRISMA guidelines, a systematic search of PubMed, ScienceDirect, and Scopus was conducted using the keywords "SGLT-2 inhibitor" and "hypertension." Inclusion criteria were RCTs on adults (≥ 18 years) with hypertension and T2DM treated with SGLT-2 inhibitors. Studies involving pediatric and pregnant patients were excluded.

Results: Of 314 studies screened, 4 RCTs with 1598 patients met inclusion criteria. Empagliflozin 10 mg and 25 mg demonstrated significant reductions in mean 24-hour systolic and diastolic blood pressure, with the 25 mg dose showing a stronger effect. Dapagliflozin 10 mg also significantly reduced seated systolic blood pressure compared to placebo. Meta-analysis showed pooled reductions in systolic blood pressure (SBP: -4.27 mmHg; 95% CI: -5.11 to -3.43, $P < 0.00001$) and diastolic blood pressure (DBP: -3.83 mmHg; 95% CI: -4.10 to -3.57, $P < 0.00001$), favoring SGLT-2 inhibitors.

Conclusion: SGLT-2 inhibitors provide clinically meaningful blood pressure reductions in hypertensive T2DM patients, with empagliflozin 25 mg and dapagliflozin 10 mg being particularly effective.

Keyword: *SGLT-2 inhibitor, hypertension, T2DM, diabetes, meta analysis.*

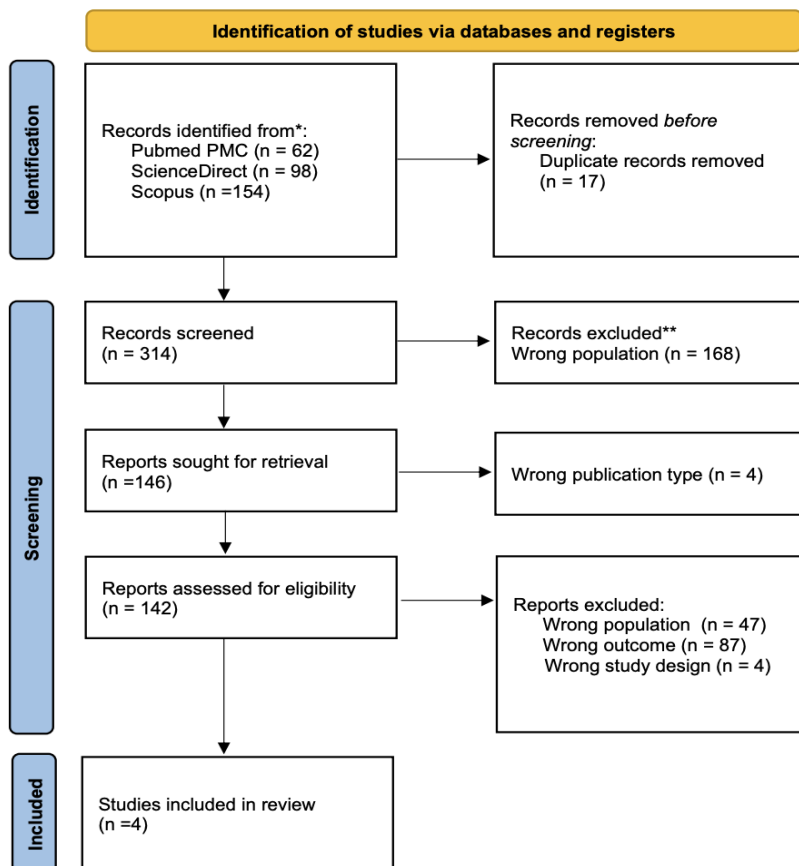


Figure 1. Study Flow of PRISMA Chart

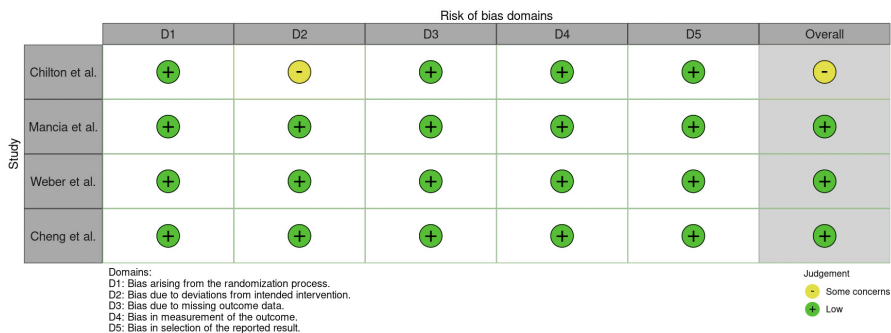


Figure 2. Risk of Bias Assessment

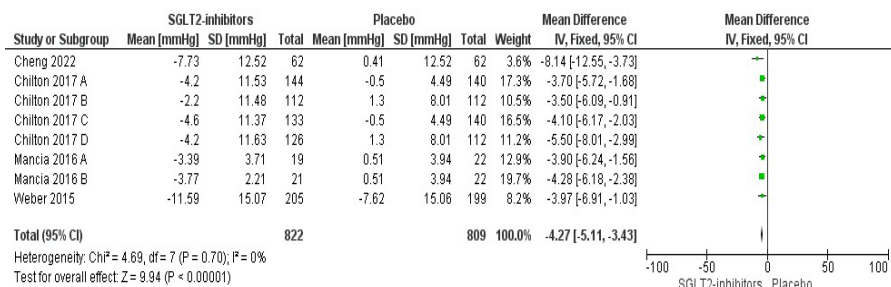


Figure 3. Plot Forest of SBP change

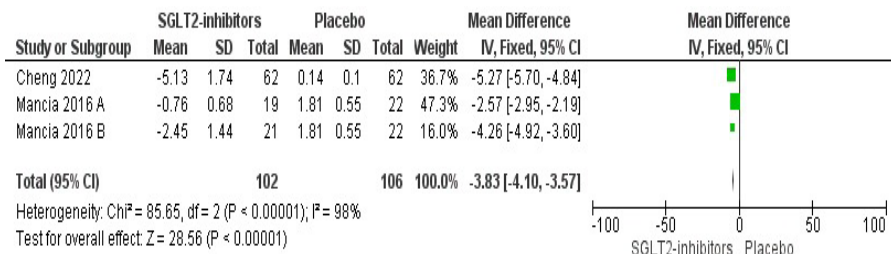


Figure 4. Plot Forest of DBP change

PD-028

Comparison between Mineralocorticoid Receptor Antagonist and Endothelial Receptor Antagonist for the Management of Patients with Resistant Hypertension: A Systematic Review and Meta-analysis

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Resistant hypertension (RH) is a condition in which a person's blood pressure cannot be controlled after taking three or more types of hypertension drugs at optimal doses. In the management of resistant hypertension, the use of mineralocorticoid receptor antagonist (MRA) is one of the preferred treatments, however a new class of drugs, endothelial receptor antagonist (ERA), is being developed. This systematic review aims to compare the efficacy of MRA compared to ERA in the management of RH. This systematic review and meta-analysis is based on the PRISMA guideline. There are four databases used in this systematic review, namely PubMed, ScienceDirect, SCOPUS, and ProQuest. Based on the results of the meta-analysis, there was a significant reduction in office systolic blood pressure in the use of MRA (MD = -9.32, CI95% -11.8 - -6.85, $p = <0.00001$, I² = 73%) and ERA (MD = -7.31, CI95% -9.64 - -4.97, $p <0.00001$, I² = 89%). There was a significant reduction in office diastolic blood pressure with the use of MRA (MD = -4.38, CI95% -5.85 - -2.90, $p = <0.00001$, I² = 51%) and ERA (MD = -4.28, CI95% -4.89 - -3.68, $p <0.00001$, I² = 38%). Based on the results obtained, the administration of MRA showed a better reduction in systolic and diastolic blood pressure compared to ERA. However, the differences that occur are not too different from one another. This shows the potential of using ERA as an alternative to HR when MRA cannot be given.

PD-029

Endothelin Receptor Antagonists vs. Aldosterone Synthase Inhibitors for Resistant Hypertension: A Network Meta-Analysis

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Background: Resistant hypertension (RHTN), affecting 10-30% of hypertensive patients, is difficult to control despite using multiple medications. This study evaluated two new type of drugs Endothelin Receptor Antagonist (Aprocitentan) Aldosterone Synthase Inhibitors (Baxdrostat and Lorundrostat) for their effectiveness in lowering systolic blood pressure in patients with RHTN.

Objective: To evaluate the efficacy of novel therapeutic agents (Aprocitentan, Baxdrostat, and Lorundrostat) compared to placebo and each other in lowering systolic blood pressure in patients with resistant hypertension.

Methods: A comprehensive search yielded 127 studies, with 4 randomized controlled trials meeting inclusion criteria. Bias was assessed (Cochrane RoB 2.0), and effects were pooled (NMAstudio). This PROSPERO-registered study is ongoing.

Results: We analyzed four randomized controlled trials comparing these drugs to placebo and each other. Our findings suggest that all three drugs are more effective than placebo by 4.46 (95% CI; -1.84–10.76; $P < 0.00001$; $I^2 = 39\%$) in reducing systolic blood pressure. Lorundrostat showed the most significant reduction (SMD: 5.60 [0.66–10.53]) compared to Aprocitentan, followed by Aprocitentan by (SMD: 0.23 [-5.10; 4.64]) more

compared to Baxdrostat, then Lorundrostat perform (SMD: 5.83 [0.14; 11.51]) more superior compared to Baxdrostat.

Conclusions: This network meta-analysis provides preliminary evidence supporting the use of these novel agents for RHTN. According to our network meta-analysis, Lorundostat showed the best results in lowering systolic, second to Aprocitentan, and Baxdrostat. However, more research is needed to confirm these findings and assess efficacy.

Keywords: *Resistant Hypertension; Aldosterone inhibitor; Endothelin Receptor Antagonist; Aprocitentan.*

PD-030

Mindfulness Therapy for Preeclampsia: A Systematic Review and Meta-Analyses as of Its Non-Pharmacological Role in Management

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Background. Pregnancy complications, particularly hypertensive disorders like pregnancy-induced hypertension (PIH) and preeclampsia (PE), contribute significantly to maternal and perinatal morbidity and mortality. Mindfulness-based interventions (MBIs) are emerging as promising non-pharmacological approaches to address modifiable risk factors such as stress and autonomic dysregulation, potentially improving outcomes for high-risk pregnancies.

Objective. This systematic review and meta-analysis evaluates mindfulness interventions for hypertensive disorders in pregnancy.

Methods. This systematic review and meta-analysis was conducted following PRISMA guidelines. Searches were performed across seven databases (PubMed, PMC, Google Scholar, ScienceDirect, Scopus and Wiley Online Library) up to December 19, 2024. Randomized controlled trials (RCTs) evaluating MBIs for PIH or PE were included, while systematic reviews, meta-analyses, and non-full-text studies were excluded. Risk of bias was assessed using Cochrane RoB 2.0, and quantitative analysis was conducted using Python.

Results. Five RCTs were included, assessing yoga, mindfulness training, and music therapy as MBIs. Yoga showed the most significant reduction in systolic blood pressure (pooled mean difference: -8.998 mmHg, 95% CI: -10.276 to -7.719) with negligible heterogeneity ($\text{Tau}^2 = 0$, Q-statistic: 0.284, $p = 0.594$). Mindfulness training and music therapy also reduced systolic blood pressure by -5.00 mmHg and -4.75 mmHg, respectively. Yoga further improved neonatal outcomes, such as higher birth weights and better APGAR scores.

Conclusion. Mindfulness-based interventions, particularly yoga, offer a cost-effective, non-invasive approach to managing hypertensive disorders during pregnancy. Further research with larger and more diverse populations is needed to establish their efficacy.

Keywords. *Mindfulness Therapy, Pregnancy-induced Hypertension, Preeclampsia.*

PD-031

How to Enable Spironolactone as Preferred Treatment for Uncontrolled Hypertension in Renal Dysfunction? Dual Combination of Spironolactone and Patiromer Versus Low-Dose Spironolactone in Patient with Renal Dysfunction: A Systematic Review and Meta-Analysis

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Background: Resistant hypertension management is challenging, especially in renal dysfunction. Use of spironolactone as its treatment should be cautious due to its hyperkalemic side effects. Patiromer, a novel potassium binder, could be a promising adjuvant.

Objectives: This study compares dual combination of spironolactone and patiromer versus low-dose spironolactone in CKD stage I-III.

Methods: Systematic search involving subjects receiving either combination of 8.4g once-daily oral patiromer and spironolactone or low-dose oral spironolactone (≤ 40 mg once-daily). The studies included patients with CKD stage I-III and uncontrolled hypertension ($\geq 130/80$ mmHg) after receiving usual treatment. Outcomes included mean differences in SBP, DBP, serum potassium levels, and serious adverse events (SAEs) from baseline to 52-weeks. Relevant articles were analyzed using RoB2.0, RevMan5.4, and Cochrane Bucher for indirect comparison.

Results: Meta-analysis comparing either combination therapy or low-dose oral spironolactone with placebo was conducted. Both treatments decrease SBP and DBP, combination therapy reduced serum potassium levels, while low-dose oral spironolactone showed no significant difference in reducing serum potassium compared to placebo. The indirect

comparison of combination therapy versus low-dose oral spironolactone showed an increase in SBP and DBP (mmHg) (MD=6.59; 95%CI=3.85–9.33; $P<0.0001$) and (MD=0.76; 95%CI=-1.68–3.2; $P=0.001$) respectively, decreasing in serum potassium levels (mmol/L) (MD=-0.65; 95%CI=-0.79–(-0.51); $P<0.0001$), and a lower risk of SAEs (OR=0.1; 95%CI=0.03–0.34; $P<0.0001$) compared to low-dose oral spironolactone.

Conclusion:

Dual combination of spironolactone and patiromer was not superior to low-dose oral spironolactone in reducing SBP and DBP. However, the combination therapy reduced serum potassium levels and had a lower risk of SAEs. Further research is still needed.

Keywords: *Dual Combination Spironolactone-Patiromer; Low-Dose Spironolactone; Resistant Hypertension; Chronic Kidney Disease; Outcome*

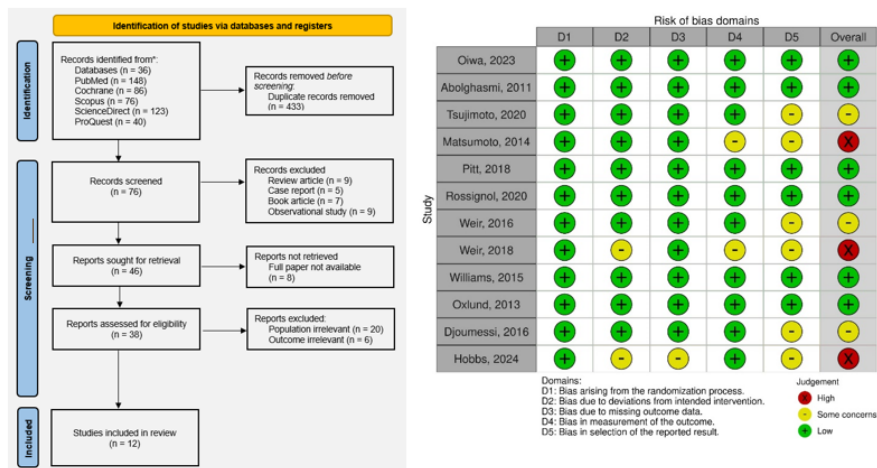
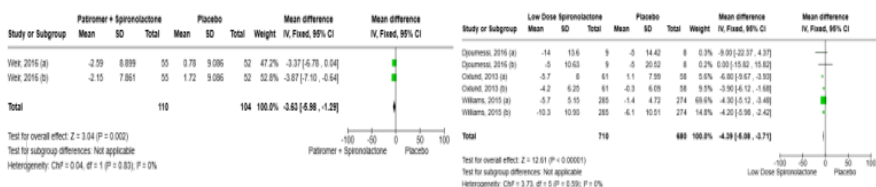


Figure 1. PRISMA Flowchart and Risk of Bias Analysis

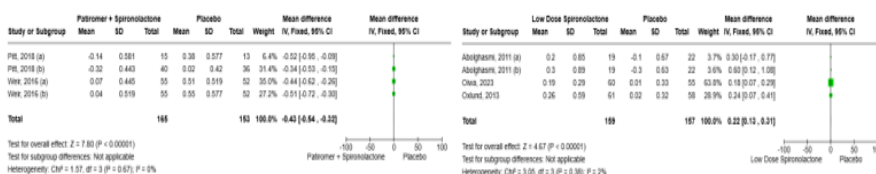
SBP (Treatment vs Placebo)



DBP (Treatment vs Placebo)



Serum Potassium Level (Treatment vs)



Serious Adverse Events (SAEs) (Treatment vs Placebo)

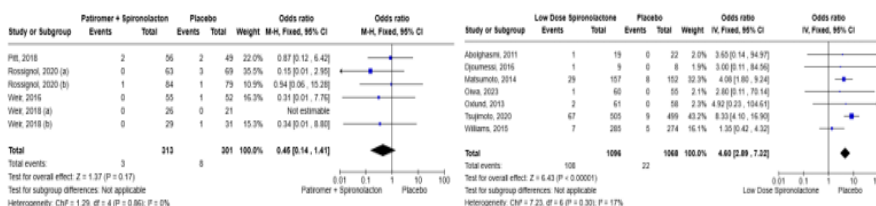


Figure 2. Meta-analysis Forest Plots

Table 1. Indirect Comparison between Combination of Patiromer and Spironolactone Versus Low-dose Spironolactone in Blood Pressure Reduction, Serum Potassium Level Increment, and Serious Adverse Events (SAEs) in Patient with Uncontrolled Hypertension and Chronic Kidney Disease (CKD) Stage I-III

	Mean Difference (MD) or Odd Ratio (OR)	Lower Limit	Upper Limit	p-Value
Systolic blood Pressure (SBP) mmHg	MD: 6.59	3.85	9.33	p<0.0001
Diastolic blood Pressure (DBP) mmHg	MD: 0.76	-1.68	3.2	p=0.001
Serum Potassium Level (mmol/l)	MD: -0.65	-0.79	-0.51	p<0.0001
Serious Adverse Events (SAEs)	OR: 0.1	0.03	0.34	p<0.0001

PD-032

Efficacy of Renal Denervation towards Ambulatory Blood Pressure Monitoring in Hypertensive Patients on Six Month Follow Up: A Systematic Review and Meta Analysis

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Background: Renal denervation is a noninvasive therapy for treatment-resistant hypertensive patients. The long-term effects of renal denervation on blood pressure still represent varying findings.

Aim: This study was conducted to determine the long term effects of renal denervation on ambulatory blood pressure monitoring in hypertensive patients.

Methods: Journal searches were conducted systematically through the Cochrane library, Pubmed, and Medline databases with the keywords blood pressure variability, renal denervation, and hypertension. Data analysis was performed using RevMan 5.4.

Result: There were 4 RCTs journals with a total of 589 participants. Renal denervation in hypertensive patients showed a reduction in 24-hour systolic blood pressure -3.89 [-8.15, 0.37] mmHg ($p=0.07$), 24-hour diastolic blood pressure -1.82 [-4.26, 0.63] mmHg ($p=0.15$), daytime systolic blood pressure -3.85 [-8.84, 1.14] mmHg ($p = 0.13$), daytime diastolic blood pressure -2.57 [-6.39, 1.26] mmHg ($p = 0.19$), night-time systolic blood pressure -4.30 [-7.43, -1.16] mmHg ($p = 0.007$), and night-time diastolic blood pressure -2.12 [-6.12, 1.88] mmHg ($p = 0.30$) compared to control group.

Conclusion: Renal denervation can reduce 24-hour, daytime, and night-time blood pressure but is not statistically significant, except for night time systolic blood pressure at 6 months follow up. Further research is needed regarding the long-term effects of renal denervation and the influence of drug adherence and renal denervation techniques.

PD-033

Efficacy of Transcutaneous Electrical Acupoint Stimulation (TEAS) in Managing Hypertension: A Systematic Review and Meta-Analysis

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Abstract

Background: Transcutaneous Electrical Acupoint Stimulation (TEAS), which combines traditional acupuncture principles with modern electrical stimulation, has emerged as a promising non-invasive therapy for regulating blood pressure. By targeting specific acupoints, TEAS is believed to modulate the autonomic nervous system, improve vascular function, and reduce stress, key factors in hypertension management. Its simplicity, safety, and minimal side effects make it an attractive alternative or adjunct to conventional treatments. However, a comprehensive evaluation of its efficacy is needed to inform clinical practice.

Objective: This systematic review and meta-analysis aimed to evaluate the efficacy of TEAS in reducing blood pressure among normal and hypertensive individuals and to explore its potential as an adjunctive treatment option.

Methods: Quality assessment was performed using the Cochrane RoB 2.0 tool and meta-analysis was conducted using RevMan 5.4. This study assessed changes in mean systolic blood pressure (SBP) and diastolic blood pressure (DBP), with the included studies evaluating the effect of TEAS over periods of 4 to 12 weeks.

Results: A search across seven databases identified 3 articles for analysis, with three low-risk. The meta-analysis shows that TEAS is associated with a significant reduction in mean SBP (standardized mean difference (SMD) = -1.18; 95% CI: -1.46 to -0.90), and mean DBP (SMD = -0.97; 95% CI: -1.24 to -0.70), when compared to usual care.

Conclusion: TEAS might be a promising adjunctive therapy for hypertension, as it significantly reduces both systolic and diastolic blood pressure. However, its safety and long-term benefits should be confirmed in larger trials.

Keywords: *Hypertension, Transcutaneous Electrical Acupoint Stimulation, Blood Pressure, Non-invasive Therapy*

PD-034

The Effectiveness of Antihypertensive Drugs in Treating Mild-to-Moderate Hypertensive Disorder of Pregnancy: A Systematic Review and Meta-Analysis

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Abstract

Background: The incidence of hypertensive disorders of pregnancy kept increasing over the last decades, yet available research on antihypertensive drugs safety and efficacy during pregnancy remains limited.

Objective: To assess the effectiveness of antihypertensive drugs in mild to moderate hypertension in pregnant women and their impact on maternal and neonatal outcomes.

Methods: This systematic review followed the PRISMA guidelines and searched databases such as PubMed, the Cochrane Library, Semantic Scholar, and EuropePMC for randomized controlled trials published within the last fifteen years. We calculated odds ratios (OR) and 95% confidence intervals (CI) using a random-effects model, I^2 was utilized to identify study heterogeneity and we assessed risk of bias.

Results: From 322 identified publications, only seven studies involving 222,012 pregnant women were eligible to be included in this review. Antihypertensive treatment significantly reduced the risk of severe hypertension (OR 0.51; 95%CI 0.44-0.58, $p<0.001$, I^2 95.2%) and preeclampsia (OR 0.70; 95%CI 0.62-0.78, $p<0.001$, I^2 87.0%). It also significantly reduced adverse neonatal outcomes, such as prematurity (OR 0.79; 95%CI 0.69-0.88, $p<0.009$, I^2 78.7%), low birth weight (OR 0.83; 95%CI 0.74-0.92, $p<0.001$, I^2 95.0%), or neonatal ICU admissions (OR 0.83; 95%CI 0.74-0.92, $p<0.001$, I^2 85.3%). No significant differences were found for placental abruption and small for gestational age between treated and untreated groups.

Conclusion: Antihypertensive drugs in pregnant women with mild to moderate hypertension significantly reduces many maternal risks and improves neonatal outcomes, affirming its safety and efficacy. This supports the continued use of antihypertensive drugs in managing hypertension in pregnancy.

Key Words: Hypertension, Pregnancy, Antihypertensive Drugs, Maternal and Neonatal Outcome

PD-035

Hypertensive Disorders in Pregnancy as a Cardiometabolic Risk Factor for Offspring: A Systematic Review of Cohort Studies

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Abstract

Background: Hypertensive disorders in pregnancy—preeclampsia and gestational hypertension—have been associated with complications affecting fetal well-being. However, their long-term impact on the cardiometabolic health of offspring remains incompletely understood.

Objective: To systematically review the association between hypertensive disorders in pregnancy and the risk of cardiometabolic disorders in offspring.

Methods: Eligible studies were cohort studies examining the outcomes of hypertensive disorders in pregnancy on offspring health. Data were extracted from seven studies meeting the inclusion criteria, including sample size, exposure definitions, and primary outcomes. A descriptive analysis was performed to identify patterns in outcomes. The primary outcome was a composite measure of total cardiometabolic events.

Results: Seven cohorts comprising approximately 2.5 million young adults were included in this analysis. The findings consistently showed that offspring of mothers with hypertensive pregnancy disorders had relatively higher blood pressure compared with those from normotensive pregnancies. Several studies also observed associations with increased body mass index, waist circumference, and glucose dysregulation. The relative risk of hypertension in offspring ranged from 1.23 to 1.97, depending on the type of maternal hypertensive disorder.

Conclusions: Exposure to hypertensive disorders in pregnancy was consistently associated with an increased risk of hypertension and cardiometabolic disturbances in offspring. These findings highlight the importance of long-term cardiovascular health monitoring in offspring of mothers with hypertensive pregnancies. Further research is needed to explore the mechanisms underlying these associations and to identify effective preventive strategies.

Keywords: *Hypertensive disorders in pregnancy; preeclampsia; gestational hypertension; offspring; cardiometabolic risk.*

PD-036

Second-Generation Aficamten as Novel Therapy for Symptomatic Obstructive Hypertrophic Cardiomyopathy: A Systematic Review and Meta-Analysis

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Introduction: Obstructive hypertrophic cardiomyopathy (oHCM) is characterized by increasing left ventricular outflow tract gradients (LVOT-G), leading to impaired cardiac function. Therapeutic options are often insufficient. Mavacamten, a first-generation tyrosine inhibitor in phase 3 trials, has a half-life of about seven days, complicating drug monitoring and side effect management, while aficamten, as a second-generation inhibitor, offers a more promising alternative with improved pharmacokinetic properties.

Objectives : This study aimed to investigate safety and efficacy of aficamten as potential therapy of oHCM.

Methods: We performed comprehensive search according to PRISMA guidelines, using MEDLINE, Pubmed, Cochrane, Scopus, and Google Scholar. Resulting 6 relevant articles from 290 selected. After analysis, 4 articles were eligible for meta-analysis. Relevant articles were appraised using *Oxford Center for EBM* and *Cochrane Risk of Bias*.

Results: REDWOOD-HCM and SEQUOIA-HCM trial, including 398 patients, all of studies has demonstrated significant reductions in resting and valsava LVOT-G, hemodynamic improvement, changes LVEF, lowering NT-pro BNP and Troponin I, and improving patients' NYHA after a 8-24 weeks treatment of aficamten. Aficamten was well-tolerated, with no serious MACEs and reducing HF symptoms. Meta-analysis showed aficamten significantly reduced incidence of MACEs ($P=0.006$; $OR=0.43$) and could reduce resting and valsava LVOT-G ($P<0.00001$; $P<0.00001$, respectively).

Conclusion: Aficamten offers promising therapeutic for patients with symptomatic oHCM, especially for those unresponsive to conventional medical therapy. Further prospective phase 3 studies are needed to establish aficamten as alternative therapy of oHCM.

Keywords: *Aficamten; Efficacy; Myosin Inhibitor; oHCM; Safety*

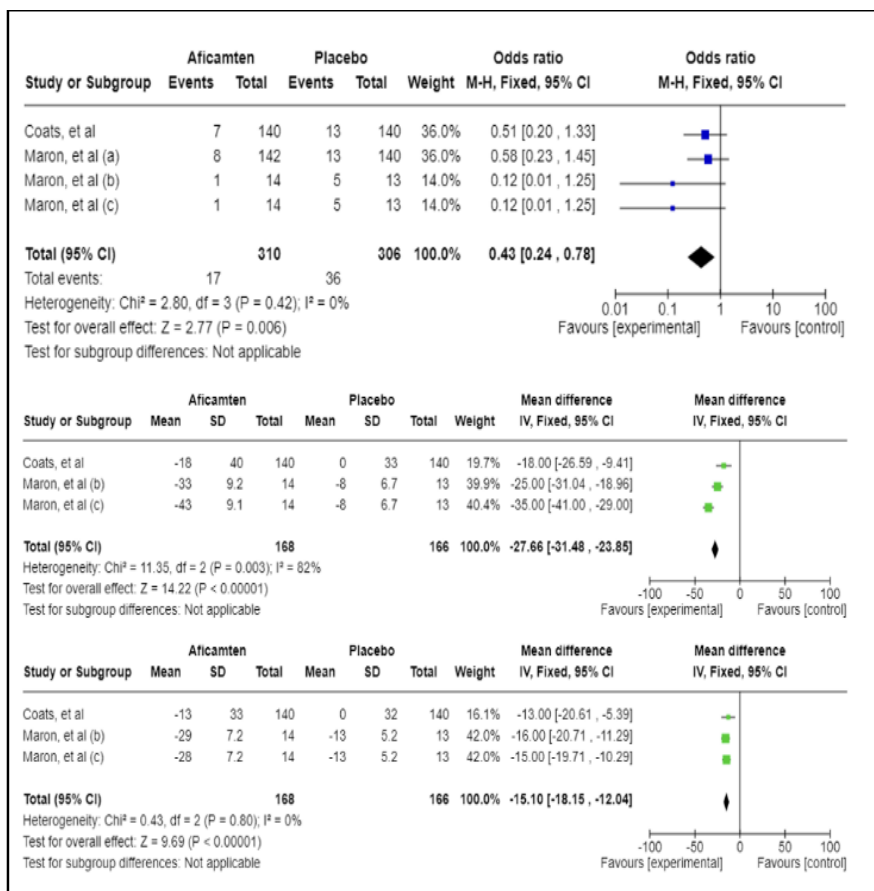


Figure 1. Meta Analysis of Safety and Efficacy Study in Aficamten.

PD-037

Comparing Pharmacological Approaches in Hypertension: Mechanisms and Therapeutic Efficacy of Diuretics, Beta-Blockers, and Renin-Angiotensin System Inhibitors in Multi-Organ Vascular Dysfunction: A Systematic Review and Network Meta-Analysis

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Hypertension contributes to multi-organ vascular dysfunction, affecting the brain, heart, and kidneys. Understanding the mechanisms and therapeutic efficacy of pharmacological interventions is essential for optimizing hypertension management, especially in cases of cerebro-cardio-renalovascular disease. This systematic review and network meta-analysis aimed to compare the mechanisms and therapeutic efficacy of diuretics, beta-blockers, and renin-angiotensin system (RAS) inhibitors in treating hypertension-related multi-organ vascular dysfunction. A comprehensive literature search identified studies evaluating the efficacy and mechanisms of diuretics, beta-blockers, and RAS inhibitors in hypertensive patients with multi-organ vascular damage. A network meta-analysis was performed to assess the therapeutic effects and underlying mechanisms. Data on blood pressure reduction, vascular function, and organ-specific outcomes were analyzed. The analysis included 25 studies. Diuretics and beta-blockers showed significant blood pressure reductions, with beta-blockers demonstrating superior cerebrovascular protection (mean difference -4.2 units, 95% CI -5.8 to -2.6). RAS inhibitors (ACE inhibitors and ARBs) were most effective for renal protection, reducing the risk of end-stage kidney disease (OR 0.72, 95% CI 0.65 to 0.80) and adverse cardiac events (0.84, 95% CI 0.78 to 0.91). Beta-blockers improved quality of life (mean difference 5.1 units), while RAS inhibitors reduced hospital admissions for heart failure (0.75, 95% CI 0.67 to 0.83). Diuretics did not significantly affect kidney function compared to other classes ($p>0.05$). RAS inhibitors demonstrated the strongest efficacy in preventing multi-organ vascular dysfunction. Diuretics, beta-

blockers, and RAS inhibitors each offer distinct benefits for managing hypertension-related multi-organ vascular dysfunction. RAS inhibitors, in particular, show promise for protecting all three organ systems. Larger cohort studies are needed to refine treatment strategies.

Keywords: Beta-blockers, Diuretics, Hypertension, Multi-organ vascular dysfunction, Therapeutic efficacy.

PD-038

BLOOD PRESSURE VARIABILITY CHARACTERISTICS IN PARKINSON'S DISEASE: A SYSTEMATIC REVIEW

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Abstract

Background: Parkinson's Disease (PD) involves motor and non-motor symptoms, including cardiovascular autonomic dysfunction. Blood pressure variability (BPV) is a key feature of this dysregulation and is linked to cardiovascular and neurological risks.

Objective: This review aimed to describe BPV characteristics in PD and its role as a marker of autonomic dysfunction.

Methods: A systematic review following PRISMA guidelines included studies from PubMed and other sources. Of 209 articles identified, exclusions for recency, accessibility, language, and relevance reduced the sample to 26, with four original studies meeting inclusion criteria. Additional searches yielded four more studies. Insights from prior reviews further enriched the findings.

Results: BPV in PD is marked by increased daytime and reduced nocturnal variability, with common non-dipping or reverse-dipping profiles. These patterns, linked to autonomic dysfunction, indicate heightened cardiovascular risk and are associated with orthostatic hypotension. BPV has also been correlated with markers of end-organ damage, such as white matter hyperintensities, suggesting a link to cognitive decline. However, methodological heterogeneity across studies limits direct comparisons.

Conclusion: BPV is a significant clinical feature in PD, reflecting underlying autonomic dysfunction. Further research should focus on standardizing BPV assessments and exploring interventions to reduce its impact on cardiovascular and neurological health.

PD-039

Revealing the Potential of Home Blood Pressure Monitoring (HBPM) for Resistant Hypertension Diagnosis: A Systematic Review and Meta-Analysis

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Background. Resistant hypertension (RH) is uncontrolled high blood pressure despite using three optimally dosed antihypertensive medications. It affects 10–20% of hypertensive individuals, about 500 million people globally, and increases cardiovascular risk. Although ambulatory blood pressure monitoring (ABPM) is the gold standard for diagnosing RH, its cost and limited feasibility restrict use, while home

blood pressure monitoring (HBPM) offers an easy approach and high patient acceptability.

Objective. This study evaluates the diagnostic performance of HBPM compared to ABPM in detecting resistant hypertension.

Method. A systematic literature search was conducted in PubMed, ScienceDirect, Cochrane, and manually. Keywords “resistant hypertension,” “HBPM,” “ABPM,” and “diagnosis” were combined with OR and AND operators. Studies other than English, systematic reviews, case reports, guidelines, books, and irrelevant publications were excluded. Study quality was assessed with QUADAS-2. HBPM’s sensitivity and specificity versus ABPM for diagnosing resistant hypertension were analyzed in RevMan 5.4.

Result. Out of 275 identified studies, six met the inclusion criteria after duplicate removal and screening. A meta-analysis of five studies, encompassing 1,663 subjects, revealed that HBPM has an overall sensitivity of 77% (95% CI: 65.8–85.2) and specificity of 63.6% (95% CI: 49.4–77.2) in diagnosing resistant hypertension. These results suggest that HBPM showed good diagnostic sensitivity performance, though its ability in ruling out the condition is less reliable.

Conclusion. This meta-analysis suggests that HBPM is a viable alternative for diagnosing resistant hypertension, though further studies with larger cohorts are needed to strengthen the evidence.

Keywords. *resistant hypertension, home blood pressure monitoring, ambulatory blood pressure monitoring*

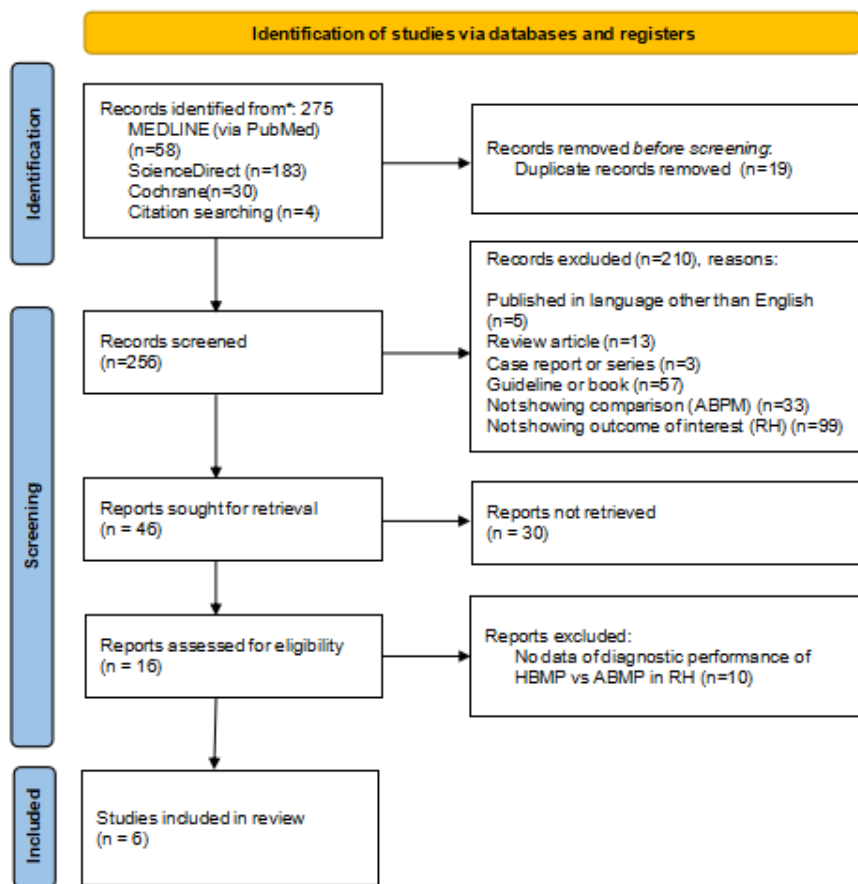


Figure 1. A PRISMA flow diagram illustrates the article selection process for evaluating the diagnostic performance of HBPM in detecting resistant hypertension.

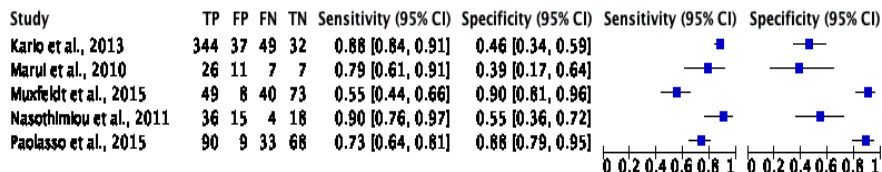


Figure 2. Forest plot of diagnostic performance of HBPM in detecting resistant hypertension.

PD-040

THE RENAL AND SAFETY PROFILE OF DAPAGLIFLOZIN IN INDIVIDUAL WITH NON-DIABETIC NEPHROPATHY: A SYSTEMATIC REVIEW AND DOSE SPECIFIC META-ANALYSIS

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Background: Recent studies have suggested dapagliflozin, a sodium-glucose cotransporter 2 inhibitor (SGLT2i), may offer renoprotective benefits for individuals with diabetes mellitus (DM). However, the renoprotective effects of dapagliflozin in patients with non-diabetic nephropathy have not been thoroughly explored.

Objective: This review aims to assess both the renal protective effects and the safety profile of dapagliflozin in individuals with non-diabetic nephropathy.

Method: Following PRISMA guidelines, we searched PubMed, Cochrane, Google Scholar, and Scopus until January 20, 2025. Of 1074 studies, three were included, assessed with ROB 2.0, and analyzed using fixed-effects meta-analysis in RevMan 4.0.

Results: We analyzed three studies with 478 participants receiving

10 mg of dapagliflozin or placebo. Adding dapagliflozin to standard treatment reduced overall blood pressure (SMD= -11,05; 95% CI [-12,91, -9,18]; p-value<0,00001) and diastolic blood pressure (SMD= -29,15; 95% CI [-31,56, -26,74]; p-value<0,00001), but no significant effect show in systolic blood pressure (SMD= 16,11; 95% CI [13,16, 19,05]; p-value<0,00001). Dapagliflozin significantly reduced incidence of serious adverse events to death (OR: 0,6; 95% CI [0,36, 0,98], p-value=0,04). No significant differences were found in estimated glomerular flow rate (eGFR) (SMD= -0,22; 95% CI [-2,58, 2,15]; p-value=0,86) and urine albumin-creatinine ratio (UACR) (SMD= -49,40; 95% CI [-219,48, 120,68]; p-value=0,57).

Conclusion: Dapagliflozin significantly reduced rates of serious adverse events and shows promising reduction in overall blood pressure, including systolic and diastolic blood pressure, and UACR levels. Indifferent results for eGFR may arise from the lack of available studies.

Keywords: Dapagliflozin, non-diabetic nephropathy, blood pressure, eGFR, UACR

PD-041

The Role of Fecal Microbiota Transplantation in Regulating Blood Pressure in Animal Models: A Systematic Review and Meta-Analysis

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Introduction. Fecal microbiota transplantation (FMT) is a transfer of functional fecal bacteria to the gastrointestinal tract to reconstruct new gut microbiome, which acts as an emerging treatment for resistant hypertension.

Objective. This study aimed to elucidate the efficacy of FMT in regulating blood pressure in animal models.

Methods. A comprehensive literature search was conducted through PubMed, Cochrane, and Embase. The two comparison groups were: 1) normotensive animal models (NN) versus hypertensive model FMT-treated normotensive animals (NF) and 2) hypertensive animal models (HH) versus normotensive model FMT-treated hypertensive animals (HF). The primary outcomes included systolic blood pressure (SBP) and diastolic blood pressure (DBP). The secondary outcome was heart rate. Random-effect (DerSimonian-Laird) model was exerted to measure the pooled mean differences (MD) for both comparisons.

Results. A total of 8 studies with a total of 200 samples were included (NN=53, NF=56, HH=45, HF=46). Normotensive animals treated with FMT from hypertensive animals demonstrated significantly greater SBP (MD 19.06; 95% CI [7.74, 30.37]; $p=0.0010$; $I^2=97\%$) and DBP (MD 17.79; 95% CI [4.21, 31.38]; $p=0.01$; $I^2=95\%$). Conversely, hypertensive animals treated with FMT from normotensive animals exhibited insignificant reduction in SBP (MD -17.78; 95% CI [-35.48, -0.07]; $p=0.05$; $I^2=98\%$) and DBP (MD -15.55; 95% CI [-34.86, 3.76]; $p=0.11$; $I^2=80\%$). No difference was observed for heart rate between both comparison groups. Numerous studies reported lower abundance of Bacteroides and greater abundance of Firmicutes in hypertensive animals through microbial profiling.

Conclusion. Fecal transplantation from hypertensive model increases SBP in DBP in animal model, suggesting the relationship between gut dysbiosis and blood pressure.

Keywords: fecal microbial transplantation; blood pressure; hypertension; gut dysbiosis; gut-brain axis.

PD-042

Renal Denervation In Resistant Hypertension: A Meta-Analytical Perspective – Can It Bridge The Gap?

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Background and Aims: Renal denervation (RDN) is a minimally invasive procedure aimed at reducing blood pressure (BP) in patients with uncontrolled hypertension. This meta-analysis evaluates the efficacy of RDN across multiple studies.

Objective : This study aims to determine the role of RDN for reducing SBP in hypertension patient with meta analysis methods.

Material and Methods: A systematic review and meta-analysis were conducted following Cochrane guidelines. Data were extracted from RCTs that assessed the impact of RDN on SBP. A random-effects (RE) model was applied, and mean differences (MD) with 95% confidence intervals (CI) were calculated. Statistical analyses were performed using R Studio.

Result: The meta-analysis included data from several high-quality RCTs. The pooled effect size from the RE model showed a significant reduction in SBP with RDN compared to control interventions, with an MD of -5.54 mmHg (95% CI: -9.09 to -1.99). This demonstrates that RDN consistently reduced SBP in patients with treatment-resistant hypertension. Subgroup analyses further supported these findings across different trial settings and patient populations.

Conclusion: RDN significantly lowers SBP in patients with uncontrolled hypertension, as shown by a clinically meaningful effect size. These results underscore the potential of RDN as a therapeutic option for managing hypertension, especially in cases resistant to conventional treatment.

Further studies are warranted to confirm long-term outcomes and explore mechanisms underlying these effects.

Keyword : *Renal Denervation, Uncontrolled Hypertension, Blood Pressure Reduction.*

PD-043

Olmesartan-Amlodipine Combination Therapy versus Olmesartan-Diuretics Combination Therapy for Hypertension: A Systematic Review and Meta-Analysis

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Background. Hypertension is a global health challenge causing significant cardiovascular morbidity and mortality. Effective management, including combination therapy, is critical to reduce complications. Olmesartan-Amlodipine (ARB+CCB) is known for its potent blood pressure-lowering effects and tolerability, while Olmesartan-Diuretics (ARB+Diuretic) is valued for its cost-effectiveness and synergistic mechanisms.

Objective. To compare the efficacy of Olmesartan-Amlodipine and Olmesartan-Diuretics in managing hypertension.

Methods. A systematic review and meta-analysis following PRISMA guidelines was conducted using seven databases (PubMed, PMC, Google Scholar, ScienceDirect, Scopus, and Wiley Online Library) up to December 2024. Randomized controlled trials (RCTs) evaluating these combinations for hypertension were included. Data were analyzed using Cochrane RevMan 5, and risk of bias was assessed with Cochrane RoB 2.0.

Results. Four RCTs were analyzed, assessing systolic blood pressure (SBP) and diastolic blood pressure (DBP). Olmesartan-Amlodipine showed a

non-significant reduction in SBP (SMD: -0.34, 95% CI: -0.93 to 0.25) and a greater but non-significant reduction in DBP (SMD: -0.61, 95% CI: -1.50 to 0.27). Both analyses exhibited high heterogeneity ($I^2 > 90\%$), reflecting study variations.

Conclusion. Both Olmesartan-Amlodipine and Olmesartan-Diuretics are effective for lowering blood pressure. While Olmesartan-Amlodipine showed a trend toward greater reductions, differences were not statistically significant. Treatment choice should consider patient-specific factors such as tolerability, comorbidities, and cost.

Keywords. *Olmesartan, Amlodipine, Diuretic, Combination Therapy, Hypertension.*

PD-044

Comparative Efficacy and Safety of Renal Denervation versus Spironolactone in the Management of Resistant Hypertension: A Systematic Review and Meta-Analysis

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Introduction. Resistant hypertension is a critical condition and an important indicator for identifying patients at high risk of cardiovascular disease (CVD), yet selecting the optimal therapeutic approach remains a significant clinical challenge.

Objective. This study aimed to assess and compare the efficacy and safety of renal denervation versus spironolactone in managing resistant hypertension.

Methods. A systematic review and meta-analysis were conducted following the PRISMA guidelines. PubMed, ScienceDirect, and the Cochrane Library were searched for randomized controlled trials (RCTs) comparing renal denervation with spironolactone in resistant hypertension. Primary outcomes included reductions in office, daytime, nighttime, and 24-hour systolic blood pressure (SBP) and diastolic blood pressure (DBP). Safety outcomes focused on changes in serum creatinine and potassium levels. Pooled effect estimates were calculated using a random effects model and are presented as mean differences (MD).

Results. Five RCTs with 361 participants (renal denervation:174, spironolactone:187) were analyzed. No significant differences were observed between renal denervation and spironolactone in reducing office SBP (MD:-0.31 mmHg, 95% CI[-6.81, 6.19], $p=0.93$, $I^2=71\%$) or DBP (MD:-1.74 mmHg,95% CI[-5, 1.51], $p=0.29$, $I^2=46\%$). Similar results were found for daytime, nighttime, and 24-hour BP. However, long-term spironolactone use significantly increased serum creatinine levels (MD:-4.80 $\mu\text{mol/L}$, 95% CI[-8.07, -1.52], $p=0.004$, $I^2=0\%$), with a non-significant trend toward elevated serum potassium (MD: -0.32 mmol/L, 95% CI[-0.80, 0.15], $p=0.18$, $I^2=94\%$).

Conclusion. Renal denervation and spironolactone showed comparable efficacy in managing resistant hypertension. However, renal denervation may offer a safer long-term option due to fewer adverse effects.

Keywords: *Renal denervation, Resistant hypertension, Spironolactone.*

PD-045

Discover Groundbreaking Approaches and Innovative in Pharmacological and Non-Pharmacological Therapies for Managing Resistant Hypertension Effectively - A Systematic Review

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Abstract

Introduction: Resistant hypertension (RH), defined as persistent high blood pressure despite triple therapy, poses significant health risks, including cardiovascular and renal complications. Recent advances in treatment options, including novel medications such as mineralocorticoid receptor antagonists (MRA), aldosterone synthase inhibitors (ASI), and dual endothelin receptor antagonists (ERA), along with renal denervation, offer promising alternatives for managing RH. This review evaluates the efficacy of these therapies in improving blood pressure control in resistant hypertension.

Objective: To evaluate the efficacy of pharmacological approaches such as mineralocorticoid receptor antagonists (MRA), aldosterone synthase inhibitors (ASI), and dual endothelin receptor antagonists (ERA) and renal denervation as non-pharmacological approaches.

Method: A literature search was conducted on PubMed, BiomedCentral, and Epistemonikos databases. Studies that match the eligibility criteria were included. The quality assessment tool used was the Cochrane Risk of Bias Tools for Randomized Controlled Trial.

Results: From 247 studies obtained, there are 13 included studies that match the eligibility criteria. Those studies consist of 5 pharmacological and 8 non-pharmacological studies. Pharmacological treatments assessed in this systematic review were MRA, ASI, and ERA. Overall this systematic review showed a better significant reduction of blood pressure in patients with RH that use those drugs. Meanwhile, the non-pharmacological treatment, renal denervation, showed an inconsistent result in reduction of blood pressure.

Conclusions: Emerging pharmacological treatments for RH, including MRA, ASI and ERA show better efficacy in reducing blood pressure in RH patients. Meanwhile, the non-pharmacological approach, renal denervation shows inconsistent results and still need further research.

Keywords: *Resistant hypertension; Non-steroidal mineralocorticoid receptor antagonists; Aldosterone synthase inhibitors; Dual endothelin receptor antagonists; Renal denervation.*

PD-046

Outcome possibilities for End Stage Renal Disease (ESRD) with Lupus on Cardiogenic Shock in Adults

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Abstract

Introduction. Chronic kidney disease (CKD) and hypertension are closely interlinked pathophysiologic states, such that sustained hypertension

can lead to worsening kidney function and progressive decline in kidney function can conversely lead to worsening blood pressure (BP) control.

Method. A systematic review was conducted according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A systematic search was conducted on studies published in the past 10 years (2014-2024), with a focus on data from reputable guidelines such as Google Scholar, PubMed, and Cochrane.

Result. After several rounds of article selection using inclusion and exclusion criteria. Four full-text articles were assessed and deemed to fit the criteria of good validity and relevance based on the University of Oxford Medical Evidence Centre. This is because these four journals explicitly stated the study design, the number of participants involved, a clear explanation of the randomization process, ensured that the treatment and or treatments were comparable, there were clear outcome measures, and the interventions used in the study were realistic.

Discussion. One of the risk factors for sepsis in patients with CKD is fluid management. Patients with CKD accompanied by hypertension make it difficult to regulate the inflow and outflow of needed fluids, in addition, reduced kidney function makes patients susceptible to infections that lead to sepsis.

Conclusion. Fluid therapy is crucial in CKD patients, especially those who have had sepsis. Using appropriate fluids taking into account blood pressure and kidney function needs to be done before providing fluid therapy to avoid complications from sepsis.

Keywords : *End Stage Renal Disease (ESRD), Lupus, Cardiogenic Shock*

PD-047

The Important Role of Health Workers in Education Related to Correct and Appropriate Physical Activity in Patients with Hypertension: A Systematic Review

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Background: Hypertension, or high blood pressure, is a common and significant risk factor for many diseases that affect people worldwide. Exercise provides a non-pharmacological, cost-effective, and accessible option for managing this chronic condition.

Objective: This systematic review aims to enhance understanding and inform current education on the effects of exercise interventions such as aerobic, resistance, and combined exercise training on blood pressure regulation in individuals with hypertension.

Methods: The systematic review was conducted following PRISMA guidelines and PICO criteria. The Randomized Controlled Trials (RCT) included in this study assessed the outcome of blood pressure changes resulting from various exercise methods. The findings are based on quantitative data regarding the study subjects. This study utilized the Cochrane Risk Bias Tool to evaluate bias in each study using Review Manager 5.4.

Results: 5 RCT studies were incorporated in this systematic review, involving a total of 196 subjects. The studies evaluated populations randomly assigned to aerobic exercise groups, resistance exercise groups, or a combination of both, along with one study that included different exercises such as Pilates compared to a control group. The mean age of the subjects was 56.7 years, and the group participating in one exercise method showed a significant reduction in blood pressure ($p < 0.05$).

The population that engaged in both exercise methods exhibited better results compared to those using only one type of exercise.

Conclusion: Physical exercise is crucial for lowering blood pressure. Adequate education and knowledge are essential for every healthcare provider.

Keywords: Aerobic exercise, education, hypertension, health workers, resistance training.

PD-048

Aprocitentan, A New Dual Endothelin Receptor Antagonist, for Treating Resistant Hypertension: A Systematic Review and Meta-analysis

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Background. Hypertension is a global health issue associated with cardiovascular mortality. However, in resistant hypertension, blood pressure targets are not achieved despite the availability of current treatments. Aprocitentan, a new dual endothelin receptor antagonist, is a novel antihypertensive drug targeting the endothelin pathway, which has shown efficacy in resistant hypertension.

Objective. This review aims to evaluate the efficacy of aprocitentan in treating resistant hypertension.

Method. A structured search of several databases was performed to identify randomized controlled trials (RCTs) on this topic. The selected RCTs were then critically appraised for validity and eligibility.

Result. Two RCT studies consisted of 1460 subjects were critically appraised. Both studies demonstrated the superiority of aprocitentan in lowering blood pressure in resistant hypertension compared to placebo. The overall standard mean difference (SMD) of diastolic blood pressure and systolic blood pressure is -0.60 and -0.34, respectively. These effects were statistically significant with doses of 12.5 mg and 25 mg in patients with resistant hypertension. The adverse events in both studies were well tolerated by the majority of subjects.

Conclusion. Aprocitentan demonstrated significant efficacy as a novel drug for treating resistant hypertension. Further research is needed to establish the efficacy and safety of aprocitentan, especially in Indonesia.

Keywords: Aprocitentan, resistant hypertension, blood pressure.

PD-049

The Effect of Hypertension Drugs on Auditory Function: A Comprehensive Systematic Review and Meta-Analysis

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Abstract

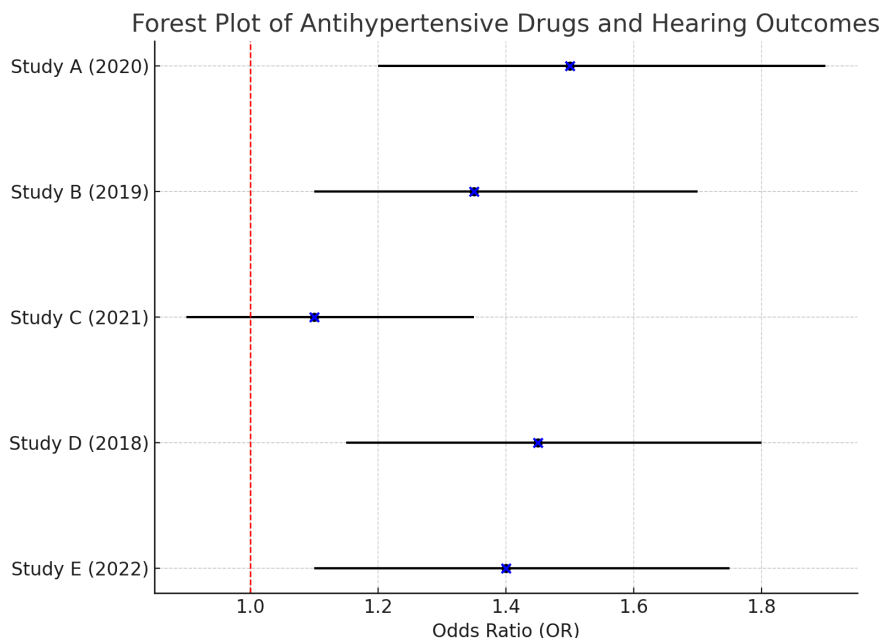
Background : Anti-hypertensive drugs have been related to hearing loss and other auditory disorder including tinnitus. While hypertension is a risk factor for hearing loss, the effects of antihypertensive medications on auditory function remain uncertain.

Objective : The goal of this systematic review and meta-analysis is to determine the relationship between antihypertensive drugs and auditory outcomes including hearing loss and tinnitus.

Methods : We conducted from PubMed, Embase, Cochrane Library, and Scopus databases for studies published up to January 2025. Randomised controlled trials, cohort studies, and case-control studies assessing hearing outcomes in hypertension patients were all considered eligible. The Newcastle-Ottawa Scale was used to retrieve data and grade their quality. A meta-analysis was performed to calculate pooled odds ratios (ORs) and 95% confidence intervals (CIs), with heterogeneity assessed using the I^2 statistic.

Result : Five studies with 6,500 participants met the inclusion criteria, out of 2,134 records discovered. Diuretics increased the risk of hearing loss (OR = 1.50, 95% CI: 1.20-1.90), while beta-blockers (OR = 1.35, 95% CI: 1.10-1.70) and calcium channel blockers (OR = 1.45, 95% CI: 1.15-1.80) were associated with tinnitus. Mixed antihypertensive drug use was significantly associated with hearing impairment (OR = 1.40, 95% CI: 1.10-1.75). Despite significant heterogeneity ($I^2 = 45\%$), the pooled OR for antihypertensive medicines and auditory outcomes was 1.38 (95% CI: 1.15-1.65).

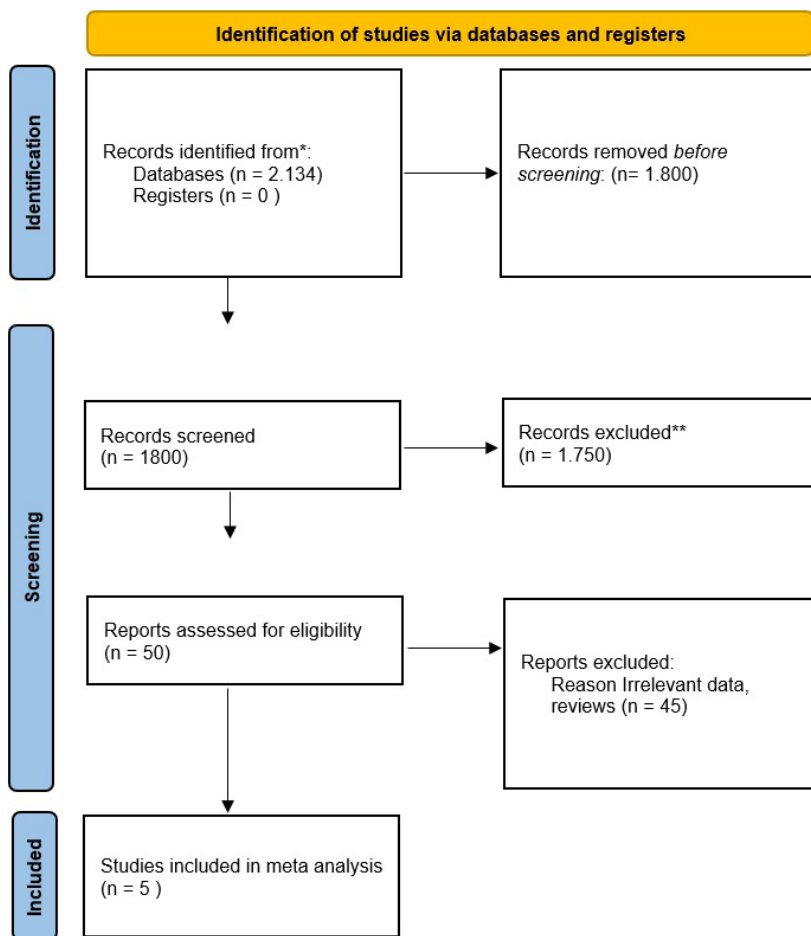
Conclusions : This review indicates that antihypertensive medications, especially diuretics and beta-blockers, may lead to adverse hearing outcomes. Clinicians may consider monitoring auditory function in patients using these medicines. More research is needed to investigate the underlying mechanisms.



Picture 1. Forest Plot of Antihypertensive Drugs & Hearing Outcomes

Study	Selection (★★★★)	Comparability (★★)	Outcome (★★★)	Total (★★★★★★★)
Study A (2020)	★★★	★	★★☆	★★★★★★☆
Study B (2019)	★★★	★	★★☆	★★★★★★☆
Study C (2021)	★★★	★	★★☆	★★★★★★☆
Study D (2018)	★★★	★	★★☆	★★★★★★☆
Study E (2022)	★★★	★	★★☆	★★★★★★☆

Picture 2. Newcastle Ottawa Scale (NOS) table



Picture 3. PRISMA Flow Chart 2020

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PD-050

Chronotherapy of Antihypertensive Medications and Its Impact on Blood Pressure Control and Cardiovascular Disease Risk: A Systematic Review and Meta-Analysis

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Background. Hypertension is a major risk factor for cardiovascular diseases, with its impact associated to circadian rhythms. Disruptions in circadian regulation of blood pressure can increase the risk of myocardial infarction and other cardiovascular complications. Chronotherapy, a therapeutic approach that synchronizes medical interventions with endogenous circadian rhythms, has emerged as a promising strategy for optimizing cardiovascular outcomes.

Objective. This meta-analysis systematically evaluates the efficacy of chronotherapy, in reducing CVD risk and enhancing clinical outcomes, as compared to conventional treatment schedules.

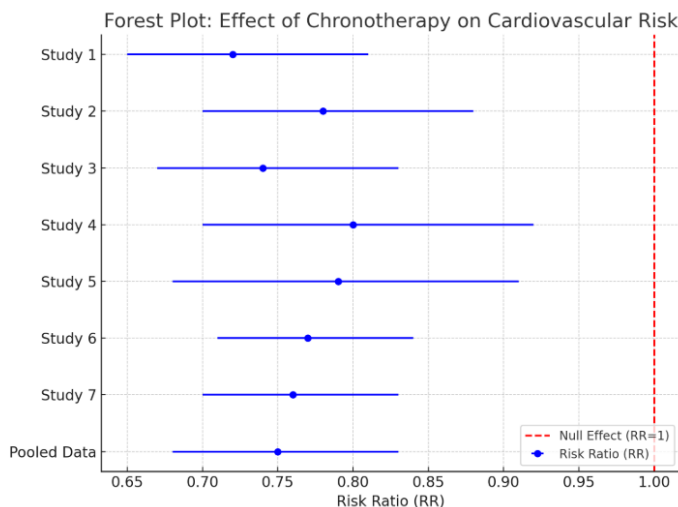
Methods. A systematic review was conducted using randomized controlled trials (RCTs) published in peer-reviewed journals up to Desember 2024. Studies included adults with CVD or at high risk, comparing evening or morning dosing of antihypertensives. Outcomes analyzed included major adverse cardiovascular events (MACE), blood pressure (BP) control, and safety. Of 450 initially identified records, seven studies (n=7,850 participants) were eligible. Data were pooled using meta-analytic techniques to calculate relative risks (RR) and mean differences with 95% confidence intervals(CI).

Results. Pooled analysis from seven studies showed that evening dosing significantly reduced MACE incidence (RR: 0.75; 95% CI: 0.68–0.83) compared to morning dosing. BP control was improved, with an average reduction of 5.3mmHg systolic (95% CI: -6.1 to -4.5) and 4.1mmHg diastolic (95% CI: -4.8 to -3.4). Adherence was marginally higher in the evening

dosing group, while adverse events were comparable across groups.

Conclusion. This meta-analysis demonstrates that chronotherapy, particularly evening dosing, effectively reduces cardiovascular risk and improves BP control. The findings suggest integrating chronotherapy into clinical guidelines for CVD management. Further research should explore its long-term outcomes and applicability across diverse populations.

Keyword. Chronotherapy, Hypertension, circadian rhythms, cardiovascular disease, Meta-analysis.

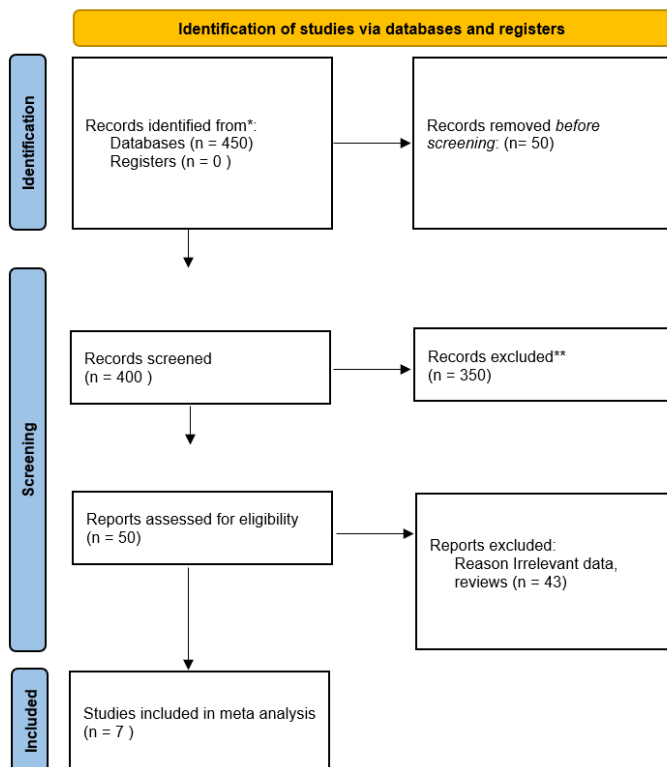


Picture 1. Forest Plot : Effect of Chronotherapy on Cardiovascular Risk

Newcastle-Ottawa Scale (NOS) Scores

Study	Selection (4)	Comparability (2)	Outcome (3)	Total Score (9)
Study 1	★★★★	★★	★★★	9
Study 2	★★★★	★★	★★★	9
Study 3	★★★★	★	★★★	8
Study 4	★★★★	★★	★★★	9
Study 5	★★★★	★★	★★★	9
Study 6	★★★★	★	★★★	8
Study 7	★★★★	★★	★★★	9

Picture 2. Newcastle-Ottawa Scale (NOS)



Picture 3. PRISMA Flow Chart 2020

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PD-051

Artificial Intelligence vs. Human Expertise in Diagnosing Acute Coronary Syndromes: A Meta-Analysis Focusing on 12-Lead Electrocardiogram Model

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Background: Machine Learning (ML) is a branch of artificial intelligence (AI) that uses algorithms to produce models capable of performing complex tasks. Diagnosing acute coronary syndromes (ACS) without myocardial damage is still subjective and relies heavily on the clinical expertise of healthcare professionals to interpret electrocardiograms (ECG). Artificial intelligence can help accelerate the diagnosis of ACS, prompting early intervention and better clinical outcomes.

Objective: This study evaluates the diagnostic accuracy of ML-based AI versus healthcare professionals in identifying ACS from 12-lead ECGs.

Method: A comprehensive search was done on electronic databases, including PubMed, Embase, MEDLINE, and Science Direct. Keywords used include artificial intelligence, electrocardiography, acute coronary syndrome, and diagnostic accuracy. All eligible studies were assessed using the New Castle Ottawa Scale (NOS). A meta-analysis on diagnostic test accuracy using Review Manager (RevMan) Version 5.4 was conducted.

Result: A total of 8 studies with fair or good quality were included, encompassing 22,731 ACS patients. Overall, the application of machine learning shows superiority over healthcare expertise, especially regarding sensitivity. The sensitivity range of artificial intelligence usage ranged from 0.75–0.98, while that of healthcare professionals ranged from 0.50–0.77. For specificity, the range was 0.91–1.00 and 0.85–0.96 for AI and healthcare professional expertise, respectively.

Conclusion: The results of recent evidence demonstrated the superiority of AI in detecting subtle ischemic ECG changes indicative of ACS, offering independence from observer variability. Continued refinement of AI models could enhance diagnostic reliability and patient outcomes.

Keywords: Artificial intelligence; human expertise; electrocardiogram

PD-052

Clinical and Prognostic Relevance of Dipping Patterns in Ambulatory Monitoring of Parkinson's Disease: A Systematic Review

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Background: Cardiovascular autonomic dysfunction is one of the most common non-motor symptoms in Parkinson's disease (PD). Disruptions in nocturnal blood pressure regulation, referred to as dipping patterns abnormalities, have been associated with disease severity and progression. Understanding the clinical and prognostic relevance of these patterns may provide valuable insights for managing PD.

Objective: To evaluate the clinical and prognostic relevance of dipping patterns observed through ambulatory blood pressure monitoring (ABPM) in PD patients.

Method: A systematic search was conducted on the PubMed, Cochrane and Science Direct databases from 2005-2024 to identify studies involving PD patients who underwent 24-hour ABPM. The extracted data included patient demographics, disease progression, and dipping categories (normal dipper, non-dipper, reverse dipper, and extreme dipper).

Result: A total of 47 studies were identified, with 17 meeting the inclusion criteria, which enrolled 1266 PD patients. The distributions of dipping

patterns was as follows: non-dippers accounted for 57,72% (632/1095), reverse dippers for 41,60% (302/726), normal dippers for 20,62% (187/907), and extreme dippers for 5,26% (23/437).

Conclusion: Patients with Parkinson's disease exhibit abnormal dipping patterns that are associated with negative prognosis. Identifying non-dipping and reverse dipping patterns through ABPM may serve as potential markers of cardiovascular autonomic dysfunction, which could help guide management strategies in PD.

Keywords: *Ambulatory Blood Pressure; Dipping Patterns; Parkinson's Disease.*

PD-053

DETERMINANT FACTORS OF RESISTANT HYPERTENSION AMONG ASIAN POPULATION: A META-ANALYSIS STUDY

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Abstract

Background: Resistant hypertension (RH) is a growing public health concern in Asia, where the prevalence of hypertension is rising.

Objectives: This meta-analysis aims to identify determinant factors associated with resistant hypertension in Asian populations.

Methods: We conducted this meta-analysis using electronic search engines including Scopus, PubMed, and Cochrane Library for eligible studies from 2000 to 2024. The odds ratio (OR) with 95% confidence

intervals (95%CI) was estimated as summary statistics using an inverse variance heterogeneity model in the meta-analysis.

Results: Nine studies with five cross-sectional and four retrospective cohort studies were included. 192341 patients, with 21730 were diagnosed as true RH. The findings of this meta-analysis showed that several factors were associated with resistant hypertension: Age > 55 years old (OR, 3.58; 95% CI, 1.43-8.93), Obesity (OR, 2.58; 95% CI, 1.52-4.37), Family history of RH (OR, 1.37; 95% CI, 1.02-1.84), Diabetes mellitus (OR, 2.17; 95% CI, 1.78-2.65), Peripheral vascular disease (OR, 1.67; 95% CI, 1.22-2.30), Chronic kidney disease (OR, 1.72; 95% CI, 1.38-2.14), Stroke (OR, 1.50; 95% CI, 1.31-1.72), and Duration of hypertension > 10 years (OR, 2.35; 95% CI, 1.08-5.08)

Conclusions: Our meta-analysis identified that age > 55 years old, a family history of RH, duration of hypertension > 10 years, and underlying diseases such as obesity, diabetes mellitus, peripheral vascular disease, chronic kidney disease, and stroke are determinant factors for developing RH among Asian populations. These findings are useful for clinicians in stratifying risk factors of RH and providing appropriate management.

Keywords: Resistant Hypertension, Asian Population.

PD-054

Prognostic Value of Triglyceride-glucose Index on Predicting Major Adverse Cardiovascular Events in Hypertensive Patients: A Systematic Review and Meta-Analysis

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ABSTRACT

Background: Triglyceride- glucose (TyG) index, a marker of insulin resistance, has been shown to be associated with the incidence of cardiometabolic diseases including hypertension. However, the prognostic role of TyG index is unknown. Hence, we aim to determine the association of TyG index with major adverse cardiovascular events (MACE) in hypertensive patients.

Methods: Systematic searching was conducted on 3 databases up till November 2024. We included studies with hypertensive patients despite their comorbidities. Outcome measured is MACE and its individual components. Random effect model meta-analysis is done to pool the results with similar reference point.

Results: Twenty observational studies with a total of 451,455 patients of 40 – 70 years old are included. Meta-analysis result shows that higher

TyG index is associated with a statistically significant increased risk of MACE (HR 1.90, CI: 1.41 – 2.57, I² 88%), myocardial infarction (HR 1.55, CI: 1.27 – 1.88, I² 0%), stroke (HR 1.84, CI: 1.41 – 2.39, I² 62%), all cause mortality (HR 1.86, CI: 1.70 – 2.03, I² 0%) and cardiovascular mortality (HR 1.08, CI: 1.04 – 1.11, I² 0%). Subgroups of older and younger population, male and female gender, diabetic and non- diabetic population, and higher BMI patients retains the statistically significant risk of MACE ($p < 0.05$). U-shaped phenomena of TyG index is also demonstrated with the risk of all cause mortality.

Conclusion: TyG index is a reliable prognostic marker of MACE in hypertensive patients and can be utilized in population despite their age, diabetic status, and gender.

Keywords : Triglyceride- glucose index; TyG ; triglyceride ; glucose.

PD-055

Efficacy and Safety of Combined Endothelin Receptor Antagonists and Phosphodiesterase-5 Inhibitors in Pulmonary Arterial Hypertension: A Systematic Review

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Background: Pulmonary hypertension (PH) is a progressive disease characterized by increased pulmonary arterial pressure, leading to right heart failure. Incident PAH patients (≤ 6 months) have worse survival than prevalent cases. Combination therapy may improve outcomes, requiring safety evaluation.

Objective: Systematically evaluate the efficacy and safety of combination therapy using endothelin receptor antagonists (ERA) and phosphodiesterase-5 inhibitors (PDE5i) in patients with pulmonary arterial hypertension (PAH).

Methods: Studies were identified from PubMed between December 16-20, 2024, using keywords "Endothelin receptor antagonists (ERA)", "Phosphodiesterase type 5 inhibitor (PDE5i)", " Pulmonary arterial hypertension", "Combination". Inclusion criteria were RCTs and Cohorts, involving Pulmonary arterial hypertension, combined ERA+PDE5i therapy. Exclusion criteria were animal studies, incomplete outcome reporting, irretrievable, non-English full texts. For quality assessments, we used ROB 2.0 for RCTs and ROBINS-I for Cohorts.

Results: Five studies were extracted based on several inclusion criteria from seven eligible studies we found. Three of these studies are cohort studies and two others are randomized controlled trials. All five studies showed positive results for the combination therapy of Endothelin receptor antagonists (ERA) and Phosphodiesterase type 5 inhibitor (PDE5i) for pulmonary arterial hypertension patients, where three studies show significant improvement in haemodynamic and functional parameters, and two studies support combination therapy for better survival estimates. All studies reported a low risk of bias.

Conclusion: Combination therapy ERA+PDE5i is efficacious in patients with Pulmonary Arterial Hypertension. Further research is required to confirm these results.

Keywords: Endothelin receptor antagonists (ERA), Phosphodiesterase type 5 inhibitor (PDE5i), Pulmonary arterial hypertension, Combination.

PD-056

Efficacy of Sacubitril/Valsartan versus olmesartan in Patients with Essential Hypertension : Systematic Review

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Background: Essential Hypertension presently sacubitril/valsartan or olmesartan is frequently used for essential hypertension. However, the efficacy of sacubitril/valsartan versus olmesartan remains unclear for essential hypertension. Hence, this systematic review aims to evaluate the efficacy of sacubitril/valsartan versus olmesartan as a treatment option in patients with essential hypertension.

Objective: Hence, this systematic review aims to evaluate the efficacy of sacubitril/valsartan versus olmesartan as a treatment option in patients with essential hypertension.

Method: Studies were identified from PubMed, Science Direct, and Google Scholar using keywords ((sacubitril/valsartan) AND (olmesartan)) AND (essential hypertension) on December 20-30th 2024. Eligible studies were selected based on the inclusion and exclusion criteria. Studies included were associated with essential hypertension that lasted 5 years, clinical trial, randomized controlled trial, and cohort. We exclude reviews, studies on animal, pediatric patients, case reports and series, meta-analysis, and unavailability of full papers. Then, the quality of studies included was assessed using ROB for RCTs, ROBINS for CTs and cohort.

Result: Through inclusion criterias mentioned above, three studies were extracted from five eligible one. We include 3 randomized controlled trials in this systematic review with 2.599 patients. Treatment with sacubitril/

valsartan was effective and provided superior BP reduction with higher patients achieving target BP goals than olmesartan with mild-to-moderate hypertension and is generally effective, safe and well tolerated. All studies reported a low risk of bias.

Conclusion: Sacubitril/Valsartan has better efficacy than olmesartan in maintenance therapy of essential hypertension. Further research is needed to confirm these results.

Keywords: Sacubitril/valsartan, Olmesartan, Essential hypertension

PD-057

Sotatercept as a Novel Therapy for Pulmonary Arterial Hypertension : A Systematic Review

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Background: Sotatercept is a fusion protein that is able to trap activins and growth differentiation factors which play roles in the development of pulmonary arterial hypertension.

Objective: This systematic review aims to evaluate the efficacy of sotatercept as a treatment option for pulmonary arterial hypertension.

Method: We extracted data from the PubMed Central (PMC), Science Direct, and PubMed databases using keywords (sotatercept) AND (pulmonary arterial hypertension). Studies were selected according to the inclusion and exclusion criteria. Studies included focused on pulmonary arterial hypertension within the past 5 years, clinical trial, randomized controlled

trial, and cohort. Excluded were reviews, animal studies, pediatric patients, case reports and series, meta-analysis, and those without full-text availability. Then, the quality of studies included was assessed using RoB 2.0 for RCTs, also ROBINS-I for CTs and cohort.

Result: From seven eligible studies, we extracted four randomized controlled trial studies and one clinical trial based on inclusion criteria. All studies are considered low risk of bias. Studies included pointed significant improvement for pulmonary arterial hypertension patients in terms of reduction in pulmonary vascular resistance and increased 6-minute walk distance. Some reported adverse events of the drug, such as thrombocytopenia and elevated haemoglobin levels, but no deaths were considered related. One study supports the long-term safety and sustained clinical benefits of sotatercept for pulmonary arterial hypertension.

Conclusion: In conclusion, sotatercept demonstrates significant improvements in the treatment of pulmonary arterial hypertension and holds potential as a new treatment choice. However, we need further studies to confirm these findings.

Keywords: Sotatercept, Pulmonary arterial hypertension.

PD-058

Breaking the Resistance: A Comparative Effectiveness of Renal Denervation Modalities and Antihypertensive Medications in Managing Resistant Hypertension - A Network Meta-Analysis with Meta-Regression of Randomized Clinical Trials

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Introduction: The global rise in hypertension and its comorbidities has led to an increasing prevalence of resistant hypertension (RH), posing a challenge despite advances in antihypertensive therapy. Minimally invasive interventions like catheter-based renal denervation (RDN), including newer techniques such as radiofrequency (RFN) and ultrasound-mediated (USM) RDN, offer potential improvements in clinical outcomes. This study evaluates the safety and efficacy of various interventions, including types of RDN, for managing RH.

Methods: We conducted a systematic search across seven databases following the PRISMA Checklist. Study quality was assessed using the ROB-2 tool. Network meta-analysis and meta-regression were performed using the R-Studio netmeta package.

Results: This study analyzed 28 trials, showing a low risk of bias. RFN-RDN was most effective in reducing both 24-hour (MD -4.90; 95% CI -9.33 to -0.47) and office diastolic blood pressure (DBP) (MD -5.10; 95% CI -11.81 to 1.61), while antihypertensive therapy was most effective for reducing 24-hour systolic blood pressure (SBP) (MD -10.56; 95% CI -18.13 to -2.99) and improving estimated glomerular filtration rate (MD -13.20; 95% CI -21.44 to -4.96). USM-RDN reduced office SBP (MD -13.20; 95% CI -32.28 to 5.88), but the control group had fewer adverse effects (OR 0.49; 95% CI 0.06 to 3.89).

Conclusion: In managing RH, RFN RDN has proven to be a highly effective approach in improving blood pressure. However, antihypertensive therapy remains crucial due to its significant benefits on renal function.

PD-059

Assessing the Impact of Renal Denervation on Resistant Hypertension: A Systematic Review with Meta-Analysis

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ABSTRACT

Background. Resistant hypertension, defined as blood pressure (BP) remaining above target levels despite optimal doses of at least three antihypertensive agents, including a diuretic, poses a significant clinical challenge. Renal denervation (RDN) has emerged as a novel, minimally

invasive intervention aimed at modulating sympathetic nervous system activity to achieve BP reduction. However, its efficacy and safety remain subjects of ongoing investigation.

Objective. This systematic review and meta-analysis aim to evaluate the efficacy and safety of RDN in reducing BP among patients with resistant hypertension.

Method. A systematic search was conducted in PubMed, EMBASE, and Scopus databases for studies published up to 1 January 2025. Randomized controlled trials (RCTs) evaluating RDN versus sham procedures or standard medical therapy in patients with resistant hypertension were included. Data on BP reduction, adverse events, and procedural outcomes were extracted. Random-effects models were employed to calculate pooled estimates, and heterogeneity was assessed using the I^2 statistic.

Result. Twelve RCTs comprising 3,2,174 patients were included. RDN significantly reduced systolic BP by an average of 0.25 mmHg (95% CI: -0.75 to 0.25; $p < 0.00001$) compared to sham. Diastolic BP also decreased by 0.11 mmHg (95% CI: -0.25 to 0.48; $p = 0.54$). The incidence of adverse events was low and similar across groups, demonstrating the safety of RDN.

Conclusion. Renal denervation is a safe and effective intervention for reducing BP in patients with resistant hypertension. Further studies with long-term follow-up are warranted to assess its durability and impact on cardiovascular outcomes.

PD-060

Novel Insights into Frontal Plane QRS-T Angle Across Hypertension Dipping Patterns Without Left Ventricular Hypertrophy: A Network Meta-Regression

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Background: Circadian blood pressure (BP) patterns have distinct prognostic implications. Among them, non-dipper and reverse-dipper hypertension are linked to poor cardiac outcomes. The frontal plane QRS-T angle (fQRS-Ta) is a novel electrocardiographic marker of ventricular repolarization heterogeneity, in which a widening fQRS-Ta is linked with worsened cardiac outcomes. However, its relationship with hypertension dipping patterns remains unexplored.

Objective: To evaluate fQRS-Ta across hypertension dipping patterns without left ventricular hypertrophy (LVH) and the potential influence of age and sex.

Method: Following PRISMA guidelines (PROSPERO CRD42024625858), nine databases were searched up to December 2024 for studies reporting fQRS-Ta in the extreme dipper, dipper, non-dipper, and reverse dipper hypertensive patients without LVH. The risk of bias was assessed using the ROBINS-E tool. A Bayesian network meta-analysis calculated mean

differences (MD) with 95% credible intervals (CrI) and surface under the cumulative ranking (SUCRA) values. Node-splitting analysis examined consistency. Network meta-regression explored the impact of age and sex.

Result: Four cohort studies involving 660 patients (mean age 50.8 ± 11.4 years) with generally low risk of bias were included. Reverse-dipper had significantly wider fQRS-Ta than dipper (MD 41.90° , 95% CrI $12.37^\circ - 70.72^\circ$), while other comparisons were not significant. SUCRA ranked reverse-dipper, non-dipper, and dipper sequentially. Data for extreme dippers were insufficient. Meta-regression indicated no confounders by age or sex, and node-splitting revealed no inconsistency.

Conclusion: Reverse-dipper hypertensive patients without LVH exhibit significantly wider fQRS-Ta than dipper and a trend toward wider angles than non-dipper, demonstrating its diagnostic potential. Further research is warranted to confirm these findings and address the extreme dippers population.

Keywords: *Ambulatory Blood Pressure Monitoring; Blood Pressure Variability; Electrocardiography; Frontal Plane QRS-T Angle; Hypertension*

PD-061

Epilepsy Incidence Modification by Angiotensin II Receptor Blockers in Adult Hypertensive Patients: Systematic Review

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Background: Arterial hypertension contributes to epilepsy by upregulating cerebral angiotensin receptor activity and altering GABAergic and dopaminergic pathways. Epileptic animal models have shown that angiotensin II receptor blockers (ARBs) improve prognosis and, specifically losartan, inhibit epileptogenic cerebral TGF- β signalling. Human evidence is currently limited.

Objective: Elucidating ARB modification of epilepsy incidence in humans.

Methods: PubMed, Scopus, SAGE, EBSCOhost, and ClinicalKey were searched for primary research reporting on the effect of ARBs on epilepsy incidence in hypertensive adults without any history of epilepsy or antiseizure medications. Risk of bias assessment was conducted using ROBINS-I V2.

Results: Three retrospective cohorts were narrowed down from 555 hits. Two studied epilepsy in the general hypertensive population and the other focused on epilepsy after ischemic stroke. Patients treated with ARBs significantly lowered epilepsy incidence compared to no ARBs. Furthermore, Doege et al (HR 0.77) and Wen et al (HR 0.72) reported the same compared to all other antihypertensives as a group. Among ARBs, losartan consistently performed best. The protective effect of ARBs remained consistently significant across ages, stroke, and other subgroups. However, younger patients with less comorbidities benefitted

the most. Chang et al and Wen et al had moderate whilst Doege et al had serious risks of bias. All three studies had moderate risks in participant selection due to lack of standardized start time. Chang et al and Doege et al reported inability to control for at least one major confounder.

Conclusion: ARBs, particularly losartan, display protective effects against epilepsy incidence across different risk groups uniquely among antihypertensives.

PD-062

Efficacy of Acupuncture in Increasing Quality of Life in Hypertension Patients: A Systematic Review and Meta-Analysis

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Background: Hypertension is one of the most common chronic diseases worldwide, with approximately 46% of affected adults being unaware of their condition. It is a significant risk factor for various disease complications and remains as a leading cause of premature death globally. While antihypertensive medications act as a main treatment to reduce disease burdens, alternative therapies such as acupuncture may offer additional benefits. This study aims to assess the efficacy of acupuncture as a complementary treatment in improving the quality of life, focusing on general health and vitality in hypertension patients.

Methods: We searched PubMed, ProQuest, and ScienceDirect databases for randomized controlled trials of acupuncture versus control groups on hypertension patients. We excluded studies focusing on protocols, studies without quantitative measurement of QoL, and those not written in English. The data was converted into mean differences and analyzed using the Review Manager 5.4.

Results: Meta-analysis was done using 3 studies with a total of 229 hypertension patients. The included studies' duration ranged from 5 to 12 weeks. Acupuncture treatment in hypertension patients showed increase in vitality level by 1.04 points ($p = 0.44$; 95% CI: -1.60 – 3.67; $I^2=0\%$) and increase in general health level by 4.79 points ($p=0.02$; 95% CI: 0.78 – 8.80; $I^2=11\%$).

Conclusion : Acupuncture can lead to increased levels of vitality and general health in hypertension patients.

Keywords : *Acupuncture, hypertension, quality of life.*

PD-063**Double Burden: The Impact of Gestational Hypertension and Gestational Diabetes on Long-Term Cardiovascular Disease Risk**

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Background: Gestational hypertension (GH) and gestational diabetes mellitus (GDM) affect 5–10% of pregnancies worldwide and are critical predictors of long-term cardiovascular disease (CVD) in women. Women with GH or GDM face significantly elevated risks of chronic hypertension, type 2 diabetes, and other metabolic disorders within five to ten years postpartum. Given that CVD is the leading cause of mortality among women globally, integrating GH and GDM into routine postpartum screening is essential for early intervention and reducing long-term health burdens.

Objectives: This systematic review synthesizes current evidence on the impact of GH and GDM on long- term CVD risk to inform future research and enhance clinical practices.

Methods: Following PRISMA 2020 guidelines, we reviewed six cohort studies encompassing 1,223,449 women. Studies were identified through comprehensive searches in PubMed, Web of Science, Cochrane, Wiley, and Scopus databases to ensure robust data on CVD outcomes. The Newcastle-Ottawa Scale was employed to assess the risk of bias in the included studies.

Results: Women diagnosed with GH and/or GDM exhibited significantly higher risks of developing postpartum CVD, with hazard ratios ranging from 1.25 to 23.33. The highest risk, a 23-fold increase in myocardial infarction, was observed in women experiencing both GH and GDM. Key mechanisms contributing to this heightened risk include persistent insulin resistance, vascular dysfunction, and systemic inflammation.

Conclusion: GH and GDM during pregnancy substantially increase the risk of postpartum CVD, underscoring the need for enhanced postpartum surveillance and targeted intervention strategies. Early identification and proactive management of high-risk women are crucial to mitigate long-term cardiovascular morbidity and mortality, highlighting the importance of integrating gestational complications into standard postpartum care protocols.

Keywords: Gestational Hypertension, Gestational Diabetes Mellitus, Cardiovascular Disease, Postpartum Risk.

PD-064

Comparative Efficacy of Nebivolol Versus Atenolol for the Treatment of Isolated Systolic Hypertension: A Systematic Review

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Background: Isolated systolic hypertension (ISH), common in older adults, involves elevated systolic pressure with normal diastolic pressure, increasing cardiovascular risk. Effective management is crucial, with beta-blockers like Nebivolol and Atenolol commonly prescribed. Nebivolol, a third-generation beta-blocker, offers selective beta-1 antagonism and nitric oxide-mediated vasodilation, improving hemodynamics. Atenolol, a second-generation option, lacks these vasodilatory effects.

Objectives: This systematic review aims to compare the efficacy, safety, and overall outcomes of Nebivolol versus Atenolol in the treatment of ISH.

Methods : Studies from PMC, Pubmed, and Lancet were extracted using keywords like "isolated systolic hypertension", "nebivolol", and "atenolol". Outcomes included blood pressure control, cardiovascular risk reduction, and adverse events. Studies were selected based on inclusion criteria, primarily randomized controlled trials. Meta-analyses, reviews, case reports, and animal studies were excluded. The ROBINS-I tool and Revised Cochrane Risk of Bias Tool (RoB 2) assessed the study quality.

Results: This review analyzed five eligible studies, involving 334 patients, to compare Nebivolol and Atenolol for isolated systolic hypertension. Of the studies, three had a low risk of bias and two had a moderate risk. Four studies showed Nebivolol was more effective in lowering blood pressure across all age groups, while one found no significant difference. Two studies indicated Nebivolol reduced cardiovascular risk, and one showed

it controlled aortic pulse pressure better. Additionally, one study found Nebivolol had fewer adverse effects compared to Atenolol.

Conclusions: Nebivolol could be more effective than atenolol in reducing blood pressure, adverse effects, and cardiovascular risk, but more studies are needed on safety.

PD-065**Efficacy of Water-only Fasting to Normalization of Blood Pressure in Hypertension Patients: A Systematic Review**

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Background: Hypertension is defined as blood pressure above 140/90mmHg. Water-only fasting recently gained attention as a potential approach to normalize blood pressure through mechanisms like vascular regulation.

Objective: This systematic review evaluates the efficacy of water-only fasting in managing hypertension.

Methods: Studies were extracted from several online databases; namely Pubmed, ResearchGate, and Google scholar with the keywords "Hypertension" AND "Water-only Fasting" on 12 December 2024. These studies went through screening, data extraction, and analysis through several inclusion and exclusion criteria. The inclusion criteria used are Water-only Fasting at least 4 days, Hypertension, and Clinical Trial. Other fasting regimes, animal studies, books, reviews, systematic reviews, meta-analyses, and inaccessible full texts were omitted. ROBINS-1 was used to rate the eligible studies' level of quality.

Results: Six articles met the criteria, which included a total of 388 patients with an age range of 25-75 years. Only 1 study was of serious concern, 4 of moderate risk, and 1 of low risk. All studies demonstrated that water-only fasting inclusion in the treatment plan effectively decreases blood pressure of hypertensive patients up to 14 mmHg for SBP and up to 13 mmHg for DBP, and achieved normotension after fasting. Side effects such as headache, fatigue, weight loss, and vomiting were treated accordingly.

Conclusions: Our study suggests that water-only fasting can be an effective controller for high blood pressure to induce normotension. Further research on groups with a larger population should be done with control groups to better determine the reliability of water-only fasting as a therapeutic option for intervention.

Keywords: Water-only fasting, hypertension.

PD-066

Telemonitoring Blood Pressure Monitoring Following a Stroke and/or Transient Ischemic Attack : A Systematic Review on Randomized Controlled Trials

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Background: Effective blood pressure (BP) control is crucial for post-stroke and transient ischaemic attack (TIA) patients. Telemonitoring, which enables remote BP tracking and patient-clinician communication, has emerged promising in enhancing BP management. However, its efficacy in stroke and TIA management, particularly within randomized controlled trials (RCTs), remains to be comprehensively evaluated.

Objective: to synthesize evidence from RCTs of telemonitoring on BP control in post-stroke and/or TIA patients.

Method: Studies were derived from the PubMed, PMC, and SpringerLink databases using Mesh keywords including blood pressure monitoring, hypertension, and stroke on January 9, 2025. Accessible full text RCTs were screened. Reviews, study protocol, duplicates and irrelevant studies were excluded. JADAD scores were used to assess the quality of the included studies.

Results: 239 studies were screened, 6 RCTs were included and extracted for data comprising 972 patients with history of Stroke and/or TIA. Studies from 2013-2024 compared BP baseline values with after telemonitoring BP in a 12-month-period especially in Systolic Blood Pressure (SBP) values. 4 RCTs have found the Telemonitoring of BP promising in such a population with lower SBP observed in a 12-month-period of monitoring. However, 2 RCTs have found no significant improvement in BP control in the same duration of time period and debated the feasibility and fidelity of this method. JADAD scores showed good to moderate quality of studies.

Conclusion: More recent studies showed a more promising way of helping BP control in post-stroke and TIA patients. However, limitations exist with different approaches of patient-doctor communication pre-intervention.

Keywords: Blood pressure monitoring; Hypertension; Stroke.

PD-067

Intensive Lifestyle Modification on Neurocognition among Individuals with Resistant Hypertension : A Systematic Review on Randomized Controlled Trials

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Background: Resistant hypertension (RH), defined as persistent high blood pressure despite treatment, provides challenges to clinicians and

it increases neurocognitive risks. Lifestyle modifications may improve neurocognition.

Objective: To evaluate evidence from randomized controlled trials (RCTs) on their effects in this population.

Method: Studies were derived from the PubMed, PMC, and SpringerLink databases using keywords including resistant hypertension, lifestyle, and cognition modification on January 10, 2025. Accessible full text RCTs were screened. Reviews, study protocol, duplicates and irrelevant studies were excluded. JADAD scores were used to assess the quality of the included studies.

Results: 380 studies were screened, 4 RCTs from 2010-2023 were included and extracted with 3341 RH patients. 3 Studies with overweight/obese patients showed that intensive lifestyle modification comprising behavioural weight management and exercise shows that cognitive function was improving in specific areas such as in executive function and processing speed. However, one RCT found there were no meaningful changes in specific cognitive function, as in memory, language, and processing speed. Though, it is found that intensive BP controls is with higher protective amounts against development of Mild Cognitive Impairment and Dementia. In addition, improvements of BP were observed despite cognition function in RH with Intensive lifestyle modification. JADAD showed excellent and moderate qualities.

Conclusion: While the evidence for specific cognitive benefits is mixed, intensive lifestyle interventions may offer protective effects against neurocognitive decline and BP control, highlighting their value as adjunctive strategies in RH management.

Keywords: Lifestyle modifications; Resistant Hypertension; Cognition.

PD-068

Unveiling Fetal Cardiac Function Impairment in Hypertensive Disorders of Pregnancy, How Far It Is Affected? A Systematic Review and Meta-analysis

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Background: Impairment in fetal cardiac function is associated with increased fetal cardiac afterload caused by high placental vascular resistance in hypertensive disorders of pregnancy (HDP). Numerous studies have examined the effect of HDP on fetal cardiac function; however, the findings remain inconclusive.

Objective: This study aims to strengthen the existing evidence regarding the impact of HDP on fetal cardiac function.

Methods: A literature search was conducted using PubMed, ScienceDirect, Google Scholar, and Scopus. Original studies reporting fetal cardiac function in HDP were analysed. Study quality was assessed using the Newcastle-Ottawa Scale, and a meta-analysis was performed using R software with random-effects models (Prospero ID: CRD42025635722).

Result: A systematic literature search of 2731 preliminary studies identified 15 eligible studies involving 2837 participants. HDP is linked with altered fetal cardiac function, as indicated by an increased left ventricular myocardial performance index (LV-MPI) [MD 0.06 (0.02, 0.10); p 0.004] and impaired diastolic function, reflected by decreased mitral valve A-wave peak velocity (MV-A PV) [MD -4.75 (-8.82, -0.67); p 0.02], mitral valve E-wave peak velocity (MV-E PV) [MD -1.58(-2.72, -0.43); p 0.006], tricuspid valve A-wave peak velocity (TV-A PV) [MD -4.96 (-9.16, -0.77); p

0.020], and tricuspid valve E-wave peak velocity (TV-E PV) [MD -3.19(-6.29, -0.09); p 0.043]. There is no significant difference in fetal RV-MPI, IRT, ICT, ET, PA PSV, Ao PSV, TAPSE and MAPSE.

Conclusion: HDP is linked to reduced fetal cardiac function compared to normotensive pregnancies. Further research is needed to clarify the specific interrelationship between HDP and fetal cardiac function.

Keywords: *fetal cardiac function; hypertensive disorders of pregnancy; cardiac function; pregnancy-induced hypertension.*

PD-069

Optimizing Inhaled Treprostinil (iTre) in Pulmonary Hypertension associated with Interstitial Lung Disease (PH-ILD): A Systematic Review of Efficacy, Safety, and Clinical Outcomes

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Background: Pulmonary Hypertension (PH), defined by a resting mPAP ≥ 25 mmHg, significantly complicates the clinical course of Interstitial Lung Diseases (ILDs), termed PH-ILD. Inhaled Treprostinil (iTre), a potent prostacyclin analogue, is recognized in clinical guidelines as a therapy for PH-ILD due to its vasodilatory effects.

Objective: This systematic review aimed to assess the efficacy, safety, and clinical outcomes of iTre in managing PH-ILD.

Methods: A comprehensive literature search was conducted from the PubMed Central (PMC) and PubMed (January 8th-13th, 2025) focused on studies of Inhaled Treprostinil for Pulmonary Hypertension associated with Interstitial Lung Disease published within the preceding five years. Included studies were randomized controlled trials (RCTs), and cohort. Reviews, pediatric and animal studies, case reports and series, meta-analyses, and those with insufficient data were excluded. Potential biases were assessed using RoB 2.0 for RCTs and ROBINS-I for cohort studies.

Results: Five studies were ultimately selected for inclusion, comprising four RCTs and one cohort study. All studies demonstrated favorable clinical outcomes including efficacy and safety for iTre in managing PH-ILD. Two studies demonstrated significant improvements in functional capacity, as evidenced by a 6MWT >30 meters. Furthermore, three studies showed improved hemodynamics and long-term safety, with one reporting reduced pericardial effusion after six months. Importantly, all studies exhibited low risk of bias.

Conclusions: iTre demonstrated significant clinical benefits in PH-ILD patients, including improved hemodynamics and a favorable safety profile. This supports the consideration of iTre as a therapeutic option for PH-ILD patients. Comparative effectiveness research and cost-effectiveness analyses are warranted.

Keyword: Inhaled Treprostinil (iTre), Pulmonary Hypertension (PH), Interstitial Lung Disease (ILD), Prostacyclin Analogue.

PD-070

Assessing the Efficacy of Device-guided Breathing in the Management of Hypertensive Patients: A Systematic Review and Meta Analysis of Randomized Controlled Trial

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Introduction: Hypertension affects 1.28 billion people worldwide, with the prevalence rising annually. While pharmacological therapies remain the cornerstone of hypertension management, non-pharmacological interventions are slowly gaining traction due to the need for outcome improvement of standard treatment. Device-guided breathing (DGB) emerges as a novel approach leveraging biofeedback and controlled breathing to influence blood pressure regulation. Thus, this meta-analysis evaluates the efficacy of DGB in managing hypertension, synthesizing data from diverse randomized controlled trials (RCTs).

Methods: Aligning to the PRISMA guidelines, relevant studies were identified from PubMed, Wiley, Cochrane, ProQuest, Epistemonikos, EMBASE, and Clinicaltrials.gov. The Risk of bias was assessed using ROB 2.0 and the meta-analysis was done using R Software with the Netmeta package.

Results: Eighteen RCTs involving 1,042 patients were analyzed. The quality assessment indicated a low risk of bias. DGB significantly reduced breathing frequency (MD = -1.55; 95% CI = -2.35 to -0.75; $p = 0.0002$) and office diastolic blood pressure (DBP) (MD = -3.08; 95% CI = -5.49 to -0.67; $p = 0.01$) compared to sham procedure. However, no significant differences were observed in other outcomes, including 24-hour DBP, home DBP, home heart rate (HR), office HR, 24-hour systolic blood pressure (SBP), home SBP, and office SBP.

Conclusion: While overall effects on blood pressure were mixed, significant reductions in office DBP suggest potential applications of DGB in specific clinical settings or populations. Future studies need to explore which population and setting will benefit the most from DGB integration into the multi-modal management of hypertension.

PD-071

Evaluating the Blood Pressure-Lowering Effects of Potassium Chloride in Individuals With Coronary Artery Disease: A Systematic Review

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Background: Coronary artery disease (CAD) is a common hypertensive caused disease in cardiovascular patients. Coronary artery disease is caused by arterial damage and atherosclerosis progression which were exacerbated by elevated blood pressure. Potassium chloride is a compound consisting of potassium and chlorine that is commonly used as a salt substitute which can regulate blood pressure.

Objective: To evaluate the blood pressure-lowering effects of potassium chloride in individuals with CAD, providing evidence-based insights into its clinical utility.

Methods: Systematic review derived from databases, such as PubMed, ScienceDirect, and Elsevier which include randomized clinical trials filtered using keywords "Potassium Chloride", "Hypertension", and "Coronary Artery Disease". Systematic reviews, meta-analyses, case series, and case reports have been excluded. Seven studies were selected, focusing on reduction of blood pressure level and urinary electrolytes levels. Study quality was assessed using RoB 2.0. The following data are evaluated by more than two independent investigators to reduce bias.

Results: The analysis yielded a total of 4862 patients, covering seven randomized clinical trials. In potassium chloride-treated groups, all studies show increased potassium excretion, while sodium excretion was inconclusive due to different follow up periods. The outcome of the risk of bias assesment utilizing RoB 2.0 shows some concerns. However, overall studies suggested progressively decreasing blood pressure level.

Conclusion: Potassium chloride enhances reduction of coronary artery disease by lowering blood pressure level and urinary electrolyte levels. However, its effects remain inconclusive compared to a placebo, highlighting the need for further research.

Keywords: Potassium Chloride, Hypertension, Coronary Artery Disease.

PD-072

Efficacy of Renal Denervation in Lowering Blood Pressure at 6 Months Post-Procedure for Resistant Hypertension: A Systematic Review and Meta-Analysis of Randomized Sham-Controlled Trials

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Background: Patients with resistant hypertension (RH) are at increased risk of cardiovascular diseases, including stroke and myocardial infarction. Renal denervation, targeting the sympathetic nervous system, is an emerging treatment for RH.

Objective: This systematic review evaluates the efficacy of renal denervation in lowering blood pressure in RH patients at 6 months post-intervention.

Method: 2 individuals independently search the PubMed, Europe PMC and ScienceDirect databases systematically up to 27 December 2024 using the keywords "renal denervation", "resistant hypertension", "efficacy" and "sham". Randomised sham-controlled trials were included. Systematic review, meta-analysis, clinical trials and trials on animals were excluded. The pooled mean reduction in 24-hour ambulatory systolic blood pressure (ASBP) at 6 months was analysed using the inverse variance formula to obtain mean difference (MD) and 95% confidence intervals (CI) with fixed-effect modelling. The risk of bias was measured using the Revised Cochrane Risk of Bias Tool (RoB 2).

Result: 4 studies with 942 patients with RH were analysed. 3 studies had low risk and 1 study had some concerns of bias. The MD in reduction of 24-hour ASBP between patients receiving renal denervation and sham procedure at 6 months post-intervention is -3.03 mmHg (95% CI [-4.93, -1.13], $P = 0.002$; $I^2 = 0\%$).

Conclusion: Renal denervation significantly reduces the ASBP of patients with RH at 6 months post-procedure compared to a sham-procedure. However, longer follow-up studies are required to confirm its long-term efficacy.

Keywords: renal denervation, resistant hypertension.

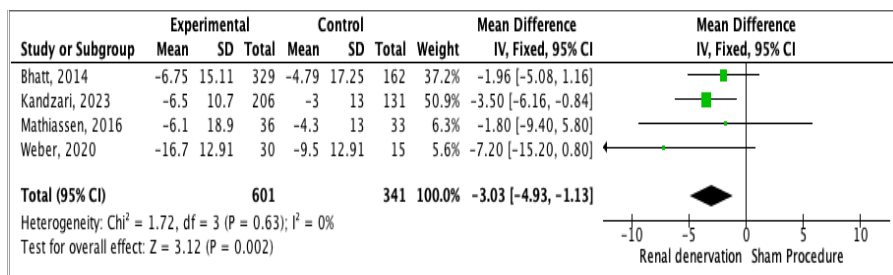


Fig 1. Forest Plot

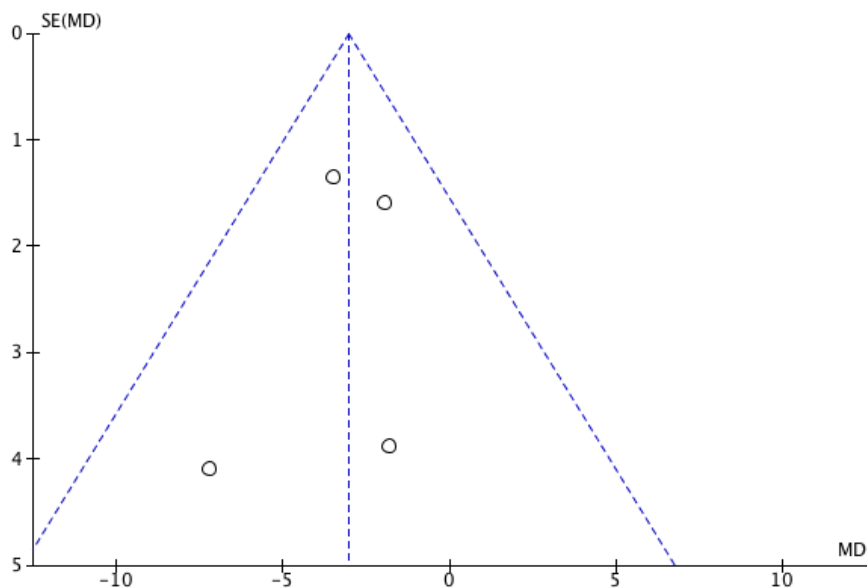


Fig 2. Funnel Plot

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)
Bhatt, 2014	+	+	+	+		+
Kandzarl, 2023	+	+	+	+	+	+
Mathlassen, 2016	+	+	+	+	+	+
Weber, 2020	+	+	+	+	+	+

Fig 3. Risk of Bias

PD-073

THE GLOBAL PREVALENCE AND POTENTIAL DETERMINANTS OF RESISTANT HYPERTENSION: A META-ANALYSIS

ABSTRACT

Background: Resistant hypertension entails severe complications, yet there is minimal data available on its prevalence and the associated risk factors.

Objectives: To determine the global prevalence and potential contributing factors of resistant hypertension.

Methods: The study employed a meta-analysis design to consolidate existing research on resistant hypertension. Scopus, Embase, and PubMed were the selected databases for the search strategy, covering the period from January 5th to February 20th, 2024. Data collection encompassed author information, study designs, sample sizes, locations, endpoints, prevalence rates of resistant hypertension, and associated factors. Statistical analysis involved single-arm meta-analysis to establish the frequency of resistant hypertension across studies. Furthermore, the Mantel–Haenszel test or inverse variance method was utilized to determine potential contributing factors associated with resistant hypertension.

Results: In our study, a total of 42 articles were included, comprising data from 1,641,846 patients. Our investigation unveiled the prevalence of resistant hypertension among hypertensive patients was 21.0%. Additionally, we identified several factors associated with an increased risk of resistant hypertension, including age, duration of hypertension, BMI, SBP, DBP, pulse pressure, diabetes mellitus, dyslipidemia, coronary heart disease (CHD), chronic kidney disease (CKD), microalbuminuria, left ventricular hypertrophy (LVH), and estimated glomerular filtration rate (eGFR). However, we did not find any association between male gender, smoking, and the risk of resistant hypertension.

Conclusion: Our study has identified the global prevalence of resistant hypertension and potential associated factors. These findings can serve as a reference for developing strategies to manage resistant hypertension.

Keywords: Resistant hypertension; prevalence; predictors; meta-analysis.

PD-074

Low-Dose Aspirin for Pre-eclampsia Prevention in Healthy Nulliparous Pregnant Woman: A Systematic Review

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Background: Pre-eclampsia is a life-threatening pregnancy complication characterised by high blood pressure and proteinuria. It is associated with a higher incidence of preterm births and increased maternal and perinatal mortality rates. Low-dose aspirin is considered a possible intervention to prevent pre-eclampsia, due to its antiplatelet effect.

Objective: This systematic review aims to assess aspirin's efficacy in preventing pre-eclampsia in nulliparous pregnant women.

Method: 3 individuals independently search the PubMed, Europe PMC and ScienceDirect databases systematically up to 3 January 2024 using the keywords "preeclampsia", "aspirin", "prevention" and "efficacy". Randomised controlled trials (RCTs) and clinical trials are included. Systematic review, meta-analysis and trials on animals were excluded. The risk of bias for randomised trials would be measured using the Revised Cochrane Risk of Bias Tool (ROB 2) and the ROBINS-I tool would be used to assess non-randomised trials.

Results: 4 RCTs with a total of 16,815 pregnant women meet the inclusion criteria. All studies had a low risk of bias. 2 studies found a decrease in the incidence of preeclampsia with 60 mg aspirin. 1 study found that 81 mg aspirin does not reduce the incidence of pre-eclampsia but only delays its occurrence. 1 study found no association between 160 mg aspirin therapy and pre-eclampsia incidence. The difference in results may be due to the different dosages of aspirin used in each trial.

Conclusion: In conclusion, aspirin can potentially prevent the occurrence of pre-eclampsia in nulliparous pregnant women. However, more studies are required to confirm these findings.

Keywords: aspirin, pre-eclampsia, nulliparous pregnancy.

PD-075

Efficacy of Empagliflozin as a Novel Therapeutic Agent for Hypertension: A Systematic Review

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Introduction: Hypertension is one of the most significant risk factors for both cardiovascular and cerebrovascular diseases worldwide. To date, management of hypertension revolves around a combination of lifestyle management and pharmacological agents. Recent research has suggested that empagliflozin, a SGLT-2 inhibitor to have some beneficial effects on blood pressure.

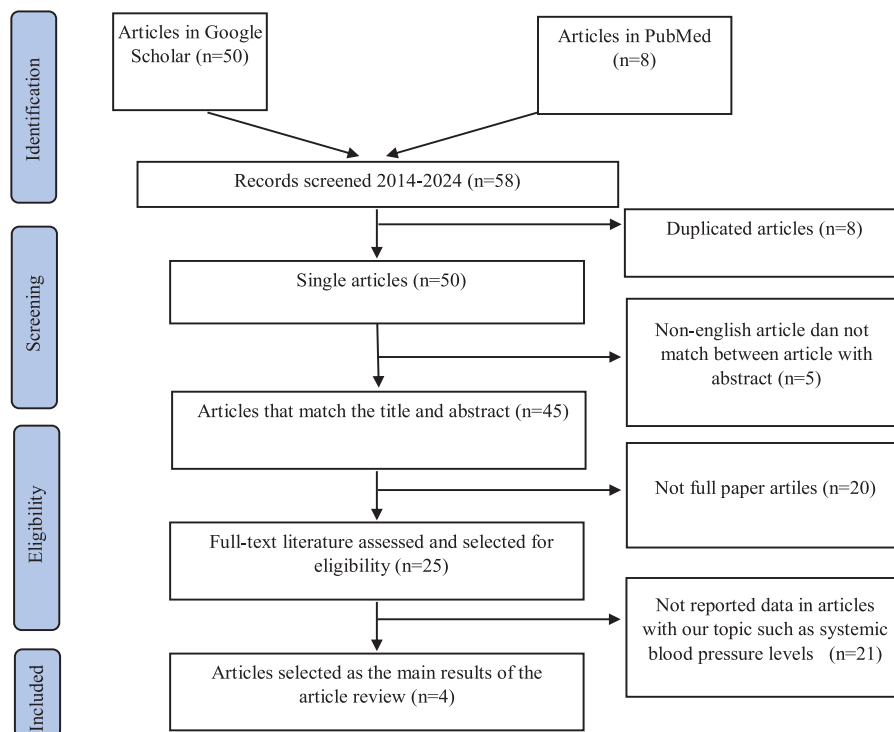
Methods: The systematic review are reported following the PRISMA guidelines. We included retrospective cohort study from electronic search engines including Google Scholar and PubMed databases with publication due dates from January 2014 to December 2024.

Results: This systematic review included 4 studies with a total of 1204 subjects, with variable dosage range.. We observed that all of the studies included suggested that empagliflozin does have some benefits for reducing blood pressure in hypertensive patients. Tikkanen, et al (2014) in their trial has shown significant improvements for blood pressure and HbA1c levels. Ferdinand et al (2019) in their study involving African Americans, also reported noted decrease in blood pressure. Similarly, in a study involving elderly patients by Cheng, et al (2022) concluded that patients receiving empagliflozin have significant reduction of blood pressure compared to controls. These findings were later corroborated by Tanaka et al (2024) in their post hoc analysis of EMBLEM trial also shows significant improvement in blood pressure.

Conclusion: Current analysis has shown that empagliflozin does have significant benefit for hypertensive patients, and further research and trials are warranted to validate the results.

Keywords: *Empagliflozin, Hypertension, SGLT-2 Inhibitor, Blood Pressure.*

Figure 1. PRISMA Study Flow Chart



PD-076

Auditory Modulation of Blood Pressure: Assessing the Efficacy of Music as Non-Invasive Adjuvant Therapy in the Management of Hypertension - A Systematic Review and Meta-Analysis

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Introduction: Hypertension, affecting over 1.13 billion people globally, is a major risk factor for cardiovascular diseases, highlighting the need for effective management. While pharmacological treatments are commonly used, the potential of non-invasive therapies like music has not been fully explored. Music influences blood pressure by activating the parasympathetic nervous system, reducing cortisol levels, improving endothelial function, and enhancing heart rate variability. Thus, this study aims to evaluate the effectiveness of music as a complementary therapy for controlling blood pressure in hypertensive patients.

Methods: Adhering to the PRISMA guideline, relevant studies were identified from PubMed, Scopus, Cochrane, ProQuest, Wiley, Epistemonikos, Springer, and ScienceDirect. Quality appraisal used RoB 2.0, meta-analysis was conducted with R, and meta-regression with STATA 16.0.

Results: This meta-analysis included 21 randomized controlled trials involving 1,228 participants with overall quality assessment indicating a low risk of bias. Our findings demonstrated that music therapy was effective in reducing both systolic blood pressure (SBP) (MD = -4.85;

95% CI = -8.15 to -1.55; $p = 0.004$) and diastolic blood pressure (DBP) (MD = -2.02; 95% CI = -3.77 to -0.28; $p = 0.02$). However, there were no significant differences observed in mean arterial pressure, heart rate, or respiratory rate outcomes. Meta-regression analysis revealed that no independent covariates influenced the overall outcomes, except for age ($p = 0.0007$), which was found to affect SBP outcomes.

Conclusion: Music therapy has proven effective in controlling blood pressure in hypertensive patients, offering a promising complementary treatment alongside conventional medication.

PD-077

Current Strategies for Managing Hypertension in Paraganglioma: A Systematic Review

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ABSTRACT

Background: Paragangliomas are rare neuroendocrine tumors that may secrete catecholamines, leading to secondary hypertension. Hypertension in paraganglioma can be persistent, paroxysmal, or refractory, posing challenges in diagnosis and management. Effective blood pressure (BP) control is crucial to minimize cardiovascular complications and surgical risks.

Objective: This systematic review aims to evaluate the current strategies for managing hypertension in patients with paraganglioma, focusing on pharmacological therapies and preoperative optimization.

Method: A comprehensive literature search was performed using PubMed, EMBASE, and Scopus databases up to 8 January 2025. Eligible studies included randomized controlled trials, observational studies, and case series discussing antihypertensive treatments, preoperative management, and outcomes in patients with paraganglioma. Data were synthesized narratively and quantitatively where appropriate. Risk of bias of included studies were assessed using the Newcastle Ottawa Scale (NOS).

Result: Sixteen studies (n = 3,647 patients) highlighted alpha-blockers as the primary BP control strategy, effective in 87% of cases. Beta-blockers were frequently employed as supplementary agents following alpha blockade to address tachycardia. Calcium channel blockers and angiotensin receptor blockers provided additional control. Preoperative BP optimization reduced hypertensive crises by 15%. Minimally invasive surgery shortened recovery and stabilized BP. Following NOS assessment, eligible studies had low bias.

Conclusion: Hypertension management in paraganglioma relies on alpha-adrenergic blockade as first-line therapy, supplemented by beta-blockers and other antihypertensives as needed. Preoperative optimization is critical for reducing perioperative risks. Further research is needed to refine pharmacological regimens and improve long-term outcomes.

PD-078

Hypertension Unmasked: A Very Rare Case of Interrupted Aortic Arch (IAA) in Late Adolescence with Good Functional Capacity

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Background: IAA is a rare congenital malformation (2:100,000 live births), with very high mortality rate (75-90%), characterized by the absence of luminal continuity between the ascending and descending thoracic aorta. The objective of this report is to highlight the importance of awareness regarding differential diagnoses for elevated blood pressure (BP) in hypertension patient, particularly late adolescence, with IAA as a potential underlying cause.

Case Presentation: A 17-year-old male presented to the clinic with a history of elevated BP. He denied any symptoms and was actively involved in various sports (e.g., basketball). He had a history of fatigue at one year of age without any developmental problems. BP measurements revealed significant discrepancies between the extremities (right arm:148/80 mmHg, left arm:145/83, right leg:110/73, left leg:118/80). SpO₂ was consistently >95% across all extremities and other physical examinations were unremarkable. Electrocardiogram demonstrated left ventricular hypertrophy. Echocardiography revealed mild pulmonary regurgitation and left ventricular ejection fraction of 80% (TAPSE: 32 mm). A computed tomography angiography confirmed IAA type B with collateral circulation from the right subclavian artery to the descending aorta (AOD) and from the left common carotid artery to the AOD. To evaluate functional capacity, a treadmill stress test was performed, resulting in an aerobic capacity of 9.75 METs in 9 minutes. However, the patient refused all treatment due to his highly functional daily activities.

Conclusion: This case highlights the importance of evaluating BP in all four extremities to identify rare but critical conditions such as IAA, aortic coarctation, and aortic aneurysm/dissection. Early recognition and comprehensive investigation are essential for timely intervention and improved outcomes across all populations.

Keywords: hypertension, interrupted aortic arch, adolescence, early detection, critical disease.

PD-079

Hypertension In A Young Woman

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INTRODUCTION: Hypertension at the age of < 40 years needs to exclude secondary causes of hypertension, which are often primary hyperaldosteronism, renal artery stenosis, fibromuscular dysplasia, takayasu arteritis and glomerulonephritis. Hypertension associated with glomerulonephritis accounts for 40-60% depending on the cause. Glomerulonephritis due to C3 glomerulopathy is estimated to be between 2-3 cases per 1,000,000 population.

CASE ILLUSTRATION: A 29-year-old woman with complaints of headache and foamy urination. History of hypertension 6 months, blood pressure reached 200mmHg. The examination showed nephritic syndrome; BP: 180/100mmHg; edema negative, proteinuria3+; hematuria2+; protein excretion 6.8grams/24hours; creatinine 1.7mg/dl; albumin 3.8g/dl; C3:111(N); C4:38(N), HbsAg-antiHCV negative; ANA test 12.8 (negative), anti ds-dna 3.07(negative); dopler ultrasonography: bilateral acute parenchymal kidney disease, membranoproliferative kidney biopsy, C3 immunofluorescence positive. Blood pressure decreased to 130/80mmHg

with methylprednisolone 3x16mg, simvastatin 10mg, nifedipine GITS 30mg, ramipril 5mg, mycophenolatemofetil 2x360mg,

DISCUSSION: The indications for renal biopsy in this patient were acute nephritic syndrome and acute renal failure of unclear cause. C3 glomerulopathy is characterized by C3 immune deposits on immunofluorescent examination on renal biopsy. The pathogenesis of hypertension in C3 nephropathy is sodium retention, increased renin-angiotensin-aldosterone system and sympathetic nerve activity. Therapy of hypertension in C3 glomerulopathy is ACE inhibitors or angiotensin receptor blockers. mycophenolatemofetil and corticosteroids are immunosuppression therapy helps change the course of C3 glomerulopathy.

CONCLUSION: A 29-year-old woman with hypertension was reported to have C3 nephropathy. The patient was given a combination of ACE inhibitors and calcium channel blockers with a good response and immunosuppressants with mycophenolatemofetil and corticosteroids to prevent the progress of C3 glomerulopathy.

KEYWORDS: Secondary hypertension, C3 nephropathy, mycophenolatemofetil, renal biopsy.

PD-080

Redefining the Role of Revascularization in Atherosclerotic Renal Artery Stenosis: A Case Report Demonstrating Transformative Clinical and Renal Outcomes

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Background: Renal artery stenosis (RAS), predominantly caused by atherosclerosis, is associated with refractory hypertension, renal dysfunction, and cardiac disturbances. While randomized controlled trials (RCTs) often show limited benefits of revascularization over medical therapy, individualized approaches may benefit patients with severe disease or clinical deterioration.

Case Presentation: A 65-year-old woman with persistent hypertension (systolic BP > 180 mmHg) despite three antihypertensive drugs, occipital headache, dizziness, and dyspnea presented with impaired renal function (serum creatinine 1.7 mg/dL, eGFR 34 mL/min/1.73 m²). Doppler ultrasonography confirmed bilateral RAS, and angiography showed 95% and 90% stenosis in the right and left renal arteries, respectively. Staged revascularization was performed with sirolimus drug-eluting stents over three months.

Results: Both procedures were successful without complications. Blood pressure improved significantly post-intervention, stabilizing at 140/80 mmHg. Renal function also improved, with serum creatinine decreasing from 1.7 mg/dL to 1.4 mg/dL and eGFR increasing from 34 to 43 mL/

min/1.73 m². Symptomatic relief and cardiac function improvements were observed during follow-up.

Discussion: This case underscores the transformative potential of revascularization in achieving significant clinical and renal improvements. While large trials like ASTRAL and CORAL have questioned routine revascularization, this case demonstrates its efficacy in appropriately chosen cases with severe bilateral stenosis. The outcomes illustrate the importance of balancing procedural risks with potential benefits, emphasizing that individualized, patient-specific strategies remain vital for optimizing RAS management.

Conclusion: Revascularization offers substantial clinical and renal benefits in carefully selected cases of severe RAS. This report emphasizes the need for targeted interventions and refined selection criteria to optimize outcomes.

Keywords: Renal Artery Stenosis; Revascularization; Hypertension; Renovascular; Renal Function.

PD-081

Unilateral Adrenal Tumor With Hypertensive Emergencies: A Case Report

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Abstract

Background: Hypertensive emergencies are frequently observed in clinical practice, with essential hypertension being the primary etiology. However, 10% of patients with hypertension have secondary hypertension,

with endocrine disorders accounting for around 10% of these cases and primary aldosteronism (PA), specifically adrenal adenomas, as one of the causes. This rare case report aims to highlight the importance of identifying the secondary cause of hypertension and its management.

Case Illustration: A 50-year-old woman presented with complaints of nosebleeds, headaches, and blurred vision. She had a history of hypertension and recurrent hypokalemia. Upon examination, potassium level on urine test was normal. Echocardiography showed concentric left ventricular hypertrophy. Abdominal-pelvic CT imaging identified an unspecified nodule in the right adrenal gland.

Discussion: One of the differential diagnosis in this case is PA due to an adrenal adenoma. To confirm this etiology, further diagnostic evaluation is needed. While adrenalectomy is the first-line treatment for PA, the procedure can be postponed in certain cases. Follow-up is required to monitor tumor size, and symptomatic therapy should be initiated to manage the patient.

Result: The patient was prescribed a combination of antihypertensive medication along with potassium supplementation for hypokalemia. Additionally, spironolactone 25 mg was initiated to manage PA. The patient showed significant improvement in her symptoms.

Conclusion: Secondary hypertension, such as PA, should be considered in patients with long-standing hypertension. Early detection, comprehensive diagnostic assessment, and prompt treatment with multidisciplinary approach are critical for the optimal management and the prevention of complications.

Keyword: Hypertension, primary aldosteronism, adenoma, hypokalemia

PD-082

A 45-year-old man with End Stage Renal Disease and hypertension controlled with Continuous Ambulatory Peritoneal Dialysis : A Case Report

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ABSTRACT

Introduction : Hypertension is one of the main risk factors for chronic kidney disease, while decreased kidney function can cause worsening of hypertension control. Hypertension in ESRD patients receiving haemodialysis or CAPD is very common and often inadequately controlled which causes increased cardiovascular risk and affects patient survival.

Case description : A 45 year old man suffering from hypertension since 1.5 years ago, regularly taking triple anti-hypertension. He was diagnosed ESRD 1 year ago, underwent hemodialysis twice-a-week, routinely took anti-hypertension medication and 40 mg furosemide. The average blood pressure is still high, SBP 180 -200 mmHg, DBP 100-120 mmHg. Patients had history of CVA and often experience seizures only during hemodialysis. Patient decided to switch to CAPD three months ago. Currently CAPD is functioning well and BP can be controlled with an average BP of 140/80 mmHg without taking anti-hypertension

Discussion : Hypertension and ESRD are closely related conditions. Factors that can influence hypertension in ESRD patients undergoing hemodialysis include excess fluid volume, arterial stiffness, increased activity of the sympathetic nervous system and RAA, endothelial dysfunction and use of erythropoietin.

Result : In CAPD patients, better control of body fluids accompanied by continuous dialysis can contribute to better blood pressure control. In this patient CAPD is well tolerated, reduced hypertension significantly and no reoccurrence of seizure.

Conclusion : We report a 45 year old man with hypertension who developed ESRD who underwent hemodialysis. Hypertension can be well controlled when patients switch to CAPD.

Keywords : End Stage Renal Disease (ESRD), Hypertension, Haemodialysis, Continuous Ambulatory Peritoneal Dialysis (CAPD).

PD-083

A Rare Entity of Acute Simultaneous Cardio-Cerebral Infarction in a Young Adult Patient

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Background: Simultaneous cardiocerebral infarction is rare, with a prevalence rate of < 1% and a high mortality rate. The incidence of CCI in young adults has not been reported in any studies.

Case Illustration: A 22-year-old man presented with right-sided hemiparesis and altered mental status (NIHSS 21) since 7 hours before admission. He had no history of any previous illness. The physical examination revealed GCS E2M4V2, a blood pressure of 178/99 mmHg, and a regular heart rate of 90 bpm. The brain CT revealed an ischemic infarct in the left basal ganglia. The ECG showed STEMI of the inferior lead with elevated troponin level of 20 ng/mL. The patient underwent

conservative medical therapy due to his family refusing PCI and mechanical thrombectomy. He received dual antiplatelets, anticoagulants, high-dose statins, antihypertensives, and inotropic drugs. The neurological symptom improved with NIHSS 6 on the fifth day of treatment, and he was discharged on the tenth day of treatment.

A 30-year-old man presented with acute confusion and excessive vomit. He had a history of congestive heart failure, and x-ray showed cardiomegaly. His ECG showed non-elevated ST segment with a significant rise in troponin I level within 24 hours. His echocardiography examination showed reduced ejection fraction (24%) with right wall motion abnormalities and dilatation of the left atrium and left ventricle. The CT scan showed a cortical to subcortical infarct of left frontotemporal lobe and lacunar infarct of left lentiform nucleus, bilateral thalamus, and bilateral corona radiata. There was a slight increase of intracranial pressure. Reperfusion or thrombolytic therapy was not performed due to late onset, but anticoagulant and dual antiplatelets were administered before he got discharged on the seventh day.

Discussion: We present a case series of the co-occurrence of AMI and AIS in young adults. In our case, the patient experienced neurological symptoms without any previous known cardiac complaints. The underlying pathogenesis of CCI may be attributed to the atherosclerotic process that may occur simultaneously in both coronary and cerebral arteries or neurogenic stunned myocardium due to autonomic nervous system dysfunction. The dilemma in this case is which condition requires intervention first.

Conclusion : CCI is a challenge for clinicians. Delay in management will result in disability or even death.

Keywords : Cardiocerebral infarction, acute myocardial infarction, acute ischemic stroke.

PD-084

Exaggerated Hypertension Secondary to Djenkolism: A Case Report

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ABSTRACT

Introduction: Hypertension may develop into a life-threatening condition known as a hypertensive crisis. Djenkol (*Archidendron jiringa*) contains djenkolic acid that can possibly cause acute kidney injury, leading to exacerbated hypertension in patients with a history of controlled hypertension.

Case Illustration: A 59-year-old woman was admitted to the Emergency Department of Mijen General Hospital with abdominal discomfort, bloody urine, and nausea. Her complaints arose after she had eaten approximately 500 grams of djenkol. A history of controlled hypertension was confirmed. The patient was fully alert with elevated blood pressure (216/105 mmHg), while other vital signs were within normal limits. Physical examination revealed tenderness especially in the left flank region. The patient was diagnosed with djenkolism and received intravenous Ringer Lactate and oral sodium bicarbonate as the main therapy. Symptomatic therapies and anti-hypertensive drugs were also administered. Supporting examinations revealed an increased level of serum creatinine and the presence of erythrocytes, leukocytes, and epithelial cells on urinalysis. The patient was discharged after being hospitalized for 3 days.

Discussion: Djenkol (*Archidendron jiringa*) contains djenkolic acid that may crystallize and lead to acute kidney injury. Acute kidney injury is characterized by an increased level of serum creatinine and reduced urine output, indicating the presence of a fluid imbalance. Various problems

may follow, including elevated blood pressure. In a patient with a history of hypertension, a hypertensive crisis is more likely to occur. Thorough history taking, early diagnosis, and immediate treatment are crucial to minimize morbidity and mortality.

Conclusion: Djenkolism may induce crisis in hypertensive patients.

Keywords: Hypertension; Djenkol; Acute Kidney Injury.

PD-085

Bilateral Pontine Intracerebral Hemorrhage with Foville Syndrome as a Complication of Chronic Hypertension

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Abstract

Background: Hypertension serves as a major risk factor for intracerebral hemorrhage (ICH). The World Stroke Organization (WSO) reports an annual incidence of approximately 18.88 million cases, with a prevalence reaching 29%.¹

Objective: To emphasize the significance of prompt identification of ICH and its clinical features indicative of brainstem syndromes

Method: A 55-year-old male presented with sudden onset of altered consciousness and right-sided hemiparesis, beginning four hours prior to hospital admission. The patient had a history of chronic hypertension, which predisposes him to ICH due to the rupture of microaneurysms. Neurological examination revealed left horizontal conjugate gaze palsy, partial paresis of cranial nerves III, IV, and VI bilaterally, as well as left-sided peripheral facial nerve palsy, with more prominent right-sided

hemiparesis. A non-contrast head CT scan confirmed the presence of bilateral ICH in the pons. Chronic hypertension is a significant risk factor for ICH, particularly in the brainstem, with the pons contributing to approximately 10% of such cases. Clinical findings and imaging led to the diagnosis of Foville syndrome, characterized by ipsilateral facial paralysis, hearing disturbance, and diplopia. The hemorrhagic lesion, classified as dorsal type according to Chung and Park's classification, aligns with the location of Foville syndrome. This case underscores the importance of early diagnosis and management of intracerebral hemorrhage in patients with chronic hypertension, particularly in the brainstem.^{2,3,4}

Result: Bilateral pontine ICH caused by chronic hypertension in this case led to brainstem syndrome symptoms, specifically towards Foville syndrome

Conclusion: Chronic hypertension is a significant risk factor for intracerebral hemorrhage (ICH), which can manifest as brainstem syndrome

Keyword: *Intracerebral Hemorrhage, Chronic Hypertension, Brainstem, Pons, Foville Syndrome, Microaneurysm*

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PD-086

A Young Man with Hypertension with Post Infectious Glomerulonephritis (PIGN) and Secondary Focal Segmental Glomerulosclerosis (FSGS)

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INTRODUCTION: Hypertension at a young age is a rare case, which needs further evaluation. PIGN is more common in children. However, it can also be found in young adults, who have an airway infection or skin infection. Secondary FSGS may happen because of an infection, or drug, or a disease that affects the entire body.

CASE: 18 year old man, came with complaints of swelling in both legs, since 3 months ago. In addition, high blood pressure was detected (150/90 mmHg). Two weeks earlier, the patient complained of cough and fever, which had improved. Laboratory showed albumin 1.38 gr/dL; cholesterol 739 gr/dL. Urinalysis obtained erythrocytes 2+ protein 4+ Albumin Over. Protein excretion 3 grams/24 hours. X-rays showed a picture of pneumonia. The patient underwent renal biopsy with a picture of PIGN and Secondary FSGS. The patient was treated with methylprednisolone 3x16mg, ramipril 1x2.5mg and albumin transfusion.

DISCUSSION: Symptoms of PIGN and secondary FSGS include hematuria, hypertension, proteinuria, and high cholesterol. The most common cause of PIGN infection is caused by streptococci, e. coli or other bacteria which are quite varied. Immunocompromised conditions are also a cause of PIGN. We suspect that this patient has PIGN due to a history of previous airway infection and the presence of pneumonia on chest x-ray.

CONCLUSION: A young man aged 18 years with hypertension with PIGN and secondary FSGS, who responded to therapy and had a good outcome, has been reported.

KEYWORDS: Hypertension, post infectious glomerulonephritis, focal segmental glomerulosclerosis.

PD-087

PVC Trigeminy in Hypertensive Heart Disease: A Case Report Highlighting the Challenges of Medication Non-Adherence in the Elderly

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Nonadherence to medication remains a significant challenge in managing chronic diseases. Uncontrolled hypertension is a leading risk factor for HHD. Over time, HHD can progress to severe complications, including heart failure and arrhythmias. This case report emphasizes the severe consequences of medication noncompliance in hypertensive patient and underscores the importance of adherence. A 70-year-old woman with a 10-year history of hypertension presented with palpitations and dyspnea. On admission, her BP was 171/74 mmHg, and an ictus cordis was palpated at the 6th ICS along the left anterior axillary line. Heart sounds were S1-S2 with prominent S1, and a grade III systolic murmur. The ECG showed LVH and trigeminy PVC. Chest radiography revealed cardiomegaly. The patient had poor medication adherence due to adverse effects and was prescribed angiotensin receptor blockers. During hospitalization, she received Furosemide, Spironolactone, and Bisoprolol. Follow-up was arranged upon discharge to monitor medication adherence. A nonadherence to medications, a common issue in the elderly. Education alone is insufficient, a strong doctor-patient relationship is key to improving adherence. Physicians who communicate clearly and create a supportive environment are enhancing adherence. Regular blood pressure check-ups also play role in increasing patient awareness. Several days after discharge, this

patient did activities without any symptoms, also BP was controlled and normal sinus rhythm ECG. Nonadherence to medication is a challenge in managing chronic hypertension and preventing complications. This case highlights the severe consequences of poor adherence and the need for comprehensive strategies. With proper management and support, patients can achieve symptom resolution.

Keyword: *Hypertensive heart disease; medication nonadherence; PVC trigeminy.*

PD-088

Cyclosporine Induced Hypertension Post-Allogenic Hematopoietic Stem Cell Transplantation in Pediatric Patient: A Challenge in Diagnosis and Management

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Background: This case report highlights the importance of early recognition and treatment for cyclosporine-induced hypertension in pediatric patients.

Case Illustration: A 16-year-old male diagnosed with acute lymphoblastic leukemia underwent a matched-sibling donor allogeneic hematopoietic stem cell transplantation (HSCT). By day 54 post-HSCT, a progressive elevation in blood pressure was observed, with an average reading of 134/92 mmHg and an average heart rate of 104 beats per minute. Initial antihypertensive management with amlodipine (5 mg daily) was implemented, aiming to achieve a blood pressure below the 90th percentile. Despite this, the patient's hypertension persisted, necessitating the introduction of a combination therapy with bisoprolol and nifedipine, which successfully achieved blood pressure control.

Discussion: Hypertension in this patient was attributed to cyclosporine A, which was utilized for Graft-versus-Host Disease (GVHD) prophylaxis and management. The use of angiotensin-converting enzyme (ACE) inhibitors was avoided due to the heightened risk of acute kidney injury (AKI) associated with concurrent administration of nephrotoxic agents. Instead, calcium channel blockers (CCBs) were preferred as the initial antihypertensive therapy.¹ However, monotherapy with CCBs proved insufficient in achieving optimal blood pressure control, necessitating the addition of beta-blockers. The combination of beta-blockers and CCBs demonstrated improved glomerular filtration rate (GFR) and was speculated to provide effective blood pressure control while ensuring adequate suppression of the renin-angiotensin-aldosterone system (RAAS).²

Result: Blood pressure was successfully controlled with a combination of nifedipine and bisoprolol.

Conclusion: A multidiscipline approach and tailored therapy based on the patient's condition is required to achieve good control of blood pressure in pediatric patients with cyclosporine-induced hypertension.

Keywords: Cyclosporine; hypertension; hematopoietic stem cell transplantation; pediatric.

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PD-089

Cancer Therapy-related Hypertension in Breast Cancer Survivor : Life Saving or Saving Lives?

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Abstract

Background: Anticancer drugs are life-saving advancements but may contribute to hypertension as risk factor for reduced LV ejection fraction in patients undergoing cardiotoxic breast cancer treatment.

Case: A 72-year-old female patient with breast carcinoma underwent chemotherapy with a regimen consisting of Paclitaxel, Carboplatin, and Trastuzumab. She had diet-controlled hypertension. Baseline echocardiography revealed normal LVEF of 60.4%, ACE-I and beta-blocker as cardioprotective treatment was initiated. During third chemotherapy cycle, she experienced dyspnea with stage II hypertension and decline in eGFR from 56.64 to 36.81. Echocardiography revealed a reduced LVEF of 48.5%. Consequently, Paclitaxel and Carboplatin were discontinued. Cardioprotective therapy along with antihypertensive was implemented. She continued Trastuzumab monotherapy up to eighth cycle. Restaging assessments revealed a further decline in LVEF to 27.3% with stage II hypertension. Consequently, Trastuzumab was subsequently discontinued, and a more aggressive antihypertensive regimen, including beta-blocker, ARNI, and loop diuretics, was initiated to better manage the condition. Chemotherapy was then switched to Capecitabine. At outpatient follow-up, she reported no significant cardiac complaints and blood pressure within normal limit with increasement of e-GFR (44.66). Echocardiographic evaluation was scheduled for the next visit.

Discussion: Cancer therapy-related hypertension caused by reduced nitric oxide generation, oxidative stress, or increased sympathetic outflow. Management of hypertension adheres to standard guidelines, however, it should be taken to address rebound hypotension after cessation of cancer therapy.

Conclusion: Cancer survivors has increased risk of hypertension-associated cancer therapy that can cause complications such as heart failure or kidney disease, thereby requiring a multidisciplinary approach for saving their lives.

Keywords: *Cancer therapy; hypertension; antihypertensive therapy; breast cancer.*

PD-090

Intradialytic Hypertensive Crisis in a Chronic Kidney Disease Patient with Resistant Hypertension: A Case Report

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Abstract

Introduction: Intradialytic hypertension (IDH) occurs in approximately 5%-15% and predicts cardiovascular mortality. This case report highlights the challenges in managing and preventing IDH in chronic kidney disease (CKD) patients on hemodialysis (HD).

Case illustration: A 62-year-old male, CKD on HD for 3 years with resistant hypertension (RH) in six antihypertensive medications, presented to the dialysis unit for a routine HD session. The patient complained of

dyspnea with hemoptysis at 2,5 hours of heparin-free HD procedure. Physical examination revealed blood pressure (BP) 282/129, hypoxemia (SpO₂ 80%), and severe rales in both lungs. Laboratory findings showed anemia and thrombocytopenia. The patient was treated with high-flow oxygenation, immediate discontinuation of dialysis, and intravenous nitrate administration with close BP monitoring.

Discussion: Volume overload and increased vascular resistance are important factors responsible for IDH. Patients with IDH typically have small interdialytic weight gains which mask extracellular volume excess, resulting in less prescribed ultrafiltration. Achievement of dry weight mass is associated with BP mean reduction and protection from the malignant phase of hypertension. Therapy shall aim to control hypertension globally due to high BP load during the out-of-dialysis period. Nevertheless, when the increased BP in IDH reaches dangerously high levels, acute lowering of BP is needed.

Result: The patient was admitted to the inpatient department following the resolution of symptoms, improved oxygen saturation (98%), and controlled BP (202/107). The correct dry weight was reassessed and antihypertensive medications were adjusted.

Conclusion: Dry weight reduction and daily BP control are important in managing and preventing the malignant phase of IDH.

Keywords: chronic kidney disease; dry weight reduction; hypertensive crisis; intradialytic hypertension; resistant hypertension.

PD-091

Hypertension Along With Massive Hemorrhagic Pericardial Effusion and Pleural Effusion in Peritoneal Dialysis Patient: A Case Report

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Abstract

Introduction: Uremic pericarditis and pericardial effusion are possible complications among patients with ESKD. Hypertension may develop as a result of excessive pericardiocentesis, aggravating a pre-existing hypertensive condition and being a significant independent risk factor for cardiovascular disease and mortality in ESKD patient.

Case illustration: A 19-year-old male patient on peritoneal dialysis since 2018, with 4 exchanges per day presented to the emergency department with left chest pain and shortness of breath. Physical examination revealed no fever, tachycardic at 110 bpm, BP of 80/60 mmHg, pericardial rub on auscultation and distended jugular vein. The ECG showed no ST segment. Chest X-ray revealed cardiomegaly, pulmonary oedema and pleural effusion. Echocardiography revealed massive pericardial effusion with no visualized intracardiac thrombus. The laboratory findings were anaemia with Hb 7,4, potassium 2,1, ureum 96, creatinine 7,5. Emergency pericardiocentesis and serial fluid evacuation was performed with total 3790 mL, hematic and exudate fluid (protein 6,1 g/L). Cytobacteriological and acid bacilli staining was negative. ANA, TSH, HIV, HBsAg and anti HCV was also negative.

Discussion: The accumulation of toxic metabolites may contribute to the pathogenesis of uremic pericarditis. Bleeding diathesis in peritoneal dialysis patients raises the risk of hemorrhagic pericardial tamponade.

Infection, malignancy, autoimmune or iatrogenic are possible etiology of hemorrhagic pericardial effusion.

Result: With appropriate treatment the patient was discharge ten days after treatment.

Conclusion: Acute pericarditis along with pericardial effusion is one of complications in dialysis patients and can be life-threatening. In the management of cardiac tamponade, hypertension due to excessive removal of pericardial effusion fluid must be considered.

Keywords: Hypertension, Pericardial Effusion, End Stage Kidney Disease (ESKD), Peritoneal Dialysis.

PD-092

Challenges in Managing Glucocorticoid-Induced Resistant Hypertension in Systemic Lupus Erythematosus Presenting with Optic Neuritis and Lupus Nephritis: A Case Report

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Resistant Hypertension (RHTN) was nearly twice as prevalent in patients with Systemic Lupus Erythematosus (SLE). A combination of traditional (age, sex, obesity) and disease-related risk factors (immune system dysfunction, inflammation, renal involvement, drug side effects) may contribute to HTN in SLE patients.

Eighteen-year-old male presented with headache and blurred vision 1 month before admission, was diagnosed with severe SLE and emergency HTN with kidney and eye as target organ damage. He was initially given high dose intravenous glucocorticoid (GC) for his optic neuritis and lupus nephritis and continued with oral GC. Nicardipine drip therapy continued

by three oral antihypertensive drugs (angiotensin receptor blocker (ARB, "A"), calcium channel blocker (CCB, "C"), and thiazide like diuretic ("D") were also given for his blood pressure (BP) management. Despite maximum doses of oral antihypertensive drugs, the BP target could not be achieved. He was reassessed with RHTN due to GC and was given Mineralocorticoid receptor antagonist (MRA). Just after stopping GC and being given an MRA, the BP could be controlled.

Despite its important role in the acute phase, GC significantly causes BP rise in SLE. Latest guidelines recommend restricted GC use especially in high doses given its detrimental effects of long-term exposure. Rapid tapering of GC use, along with RAAS blockade agents are required as effective treatment for HTN in SLE patients. But in this case, BP target was not achieved, so spironolactone as a MRA was added which is the most effective drug added to A+C+D for the treatment of RHTN.

Keyword: *Resistant Hypertension; Systemic Lupus Erythematosus; Glucocorticoids*

PD-093

Recognizing and Managing Type 1 Cardiorenal Syndrome in Acute Decompensated Heart Failure Patient in The Emergency Room Setting: A Case Report

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Introduction: Dysfunction in the heart or kidneys may induced dysfunction of the other, which could confuse physicians in emergency settings that could lead to wrong treatment. Cardiorenal syndrome (CRS) type 1 occurs in almost 50% of hospitalized patients with acute decompensated heart failure.

Case Illustration: A 36-year-old Malayan-Mongoloid male came to emergency room with worsening short of breath related to activity following with peripheral oedema. Chest pain and changes urinary volume prior was denied. Physical examination found high blood pressure, high jugular venous pressure along with crackles, and peripheral oedema. Increased ureum 176 mg/dL and creatinine 10.8 mg/dL with relatively normal hemoglobin 12,5 g/dL were found, indicating an acute disorder. X-ray and echocardiography showed cardiomegaly with pulmonary oedema dan dilated LV with LVEF 51%. The patient was given fluids, loop diuretic, beta-blocker, and ACE-I. Due to deterioration of kidney function, the patient had to undergo hemodialysis and discharged after.

Discussion: The failing heart unable to regenerate forward flow, resulting in prerenal hypoperfusion which activates RAAS axis, sympathetic nervous system, dan arginine vasopressin secretion, leading to fluid retention, increased preload, lost filtration, and declining GFR, resulting oliguria and congestion. Although loop diuretic is an essential treatment, it can induce the braking phenomenon and distal tubular hypertrophy which could lead to diuretic resistance.

Conclusion: It is important to recognize type 1 cardiorenal syndrome when treating emergency patients so that the kidney disorder that occurs is not seen as an independent disorder.

Keywords: Cardio-Renal Syndrome; heart failure; oliguric; renal function.

PD-094

Chronic Cor Pulmonale in Pulmonary Arterial Hypertension Caused by Post Tuberculosis Lung Disease

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Cor pulmonale is the pathological changes associated signs and symptoms of right ventricular failure resulting from pulmonary arterial hypertension in the setting of parenchymal lung disease. The morbidity in chronic cor pulmonale is constantly increase. We present the case of a 76-year-old female patient with symptoms of right heart failure. The patient had a history of pulmonary tuberculosis a year before. Laboratory test showed polycythemia, blood gas analysis showed hypercapnia and hypoxia. Echocardiography showed a significantly elevated estimated systolic pulmonary artery pressure of 82 mmHg, right atrial and ventricle dilatation, un-coaptation tricuspid and tricuspid annular plane systolic excursion 1.2 cm. After exclusion of other etiologies of pulmonary arterial hypertension, the diagnosis of type 3 pulmonary artery hypertension was made. The diagnosis of cor pulmonale is based on signs of right heart failure, hypercapnia, hypoxia, polycythemia, blood hyperviscosity, pulmonary arterial hypertension and right ventricular dilatation. We initially treated the patient oxygenation supply, phosphodiesterase-5 inhibitor sildenafil as selective vasodilator and diuretic to decrease the congestion. Oxygen administration is necessary in this condition considering lung transplantation is not available. Initial management of this patient show improvement of right heart failure symptoms. Life expectancy depends on the adequacy of oxygen deliver. Chronic cor pulmonale needs to be considered in patients with history of tuberculosis who presented right heart failure. This needs to be a special concern because Indonesia has the third highest burden of tuberculosis in the world.

Keywords: pulmonary arterial hypertension, post tuberculosis lung disease, chronic cor pulmonale.

PD-095

NSTEMI in Chronic Kidney Disease stage V on Hemodialysis (Cardio Renal Syndrome)

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Non-ST Elevation Myocardial Infarction (NSTEMI) is a form of acute coronary syndrome that occurs due to decreased blood flow to the heart without ST segment elevation on the electrocardiogram. The incidence of NSTEMI in patients with end-stage chronic renal failure with hemodialysis is 85.30% of cases with the second highest risk factor after age being hypertension with a prevalence of 67.60%. We present the case of a 48-years-old male patient in the Internal Medicine ward of Pariaman Hospital with complaints of left chest pain that had increased since 30 minutes before admission, shortness of breath and swelling of both legs. The patient had been undergoing routine hemodialysis for the past 2 years, the patient has a history of hypertension since 2009. From the results of the ECG examination, ST depression was found in leads I, AVL, V3-V4 and there was an increase in cardiac enzymes, namely CK-MB and troponin I. In patients given anticoagulants, namely fondaparinux, in accordance with the ESC 2023 guidelines. Meanwhile, to stabilize blood pressure, the patient was given amlodipine 1 x 10 mg and candesartan 1 x 16 mg. Hemodialysis can increase chest pain in acute phase of NSTEMI so patient is postpone for hemodialysis during the acute phase. After initial therapy, the patient's complaints improved and hemodialysis was performed as scheduled. Management of NSTEMI in hemodialysis patients requires significant attention due to the common hemodynamic instability.

Keyword: NSTEMI, Chronic Kidney Disease, Hypertension, Hemodialysis.

PD-096

Premature Coronary Artery Disease in Female with Multiple Modifiable Disease: A Case Report

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Background: Risk factors of coronary artery disease (CAD) are classified into modifiable and non modifiable. Non modifiable risk factor include age, gender, ethnicity and family history and while modifiable risk factor such as hypertension, hyperlipidemia, diabetes mellitus, obesity, smoking and poor diet.¹ Premature CAD is an aggressive disease with frequent ischemic recurrences and premature death.² Left anterior descending and single vessel disease were the most common found in patient with premature CAD.³

Case Illustration: A 34 years old female was referred from rural hospital with stable angina pectoris. The patient came with chief complaint chest pain radiating to the back and hand since last 8 months. The patient was known with diabetes and hypertension but uncontrolled well. Previously been hospitalized as NSTEMI. From vital sign shown that the blood pressure was 151/92 mmHg, respiration rate 20x/minute and the heart rate 73x/minute. The electrocardiogram showed sinus rhythm with inverted T wave in lead V1-V5. The patient also took laboratory examination and result shown she had HbA1C 6,3% and triglyceride 262. The patient is planned to have angiography. From the examination of coronary angiography shown that she had critical stenosis in left anterior descending and therefore coronary stenting is place after that. The patient later discharged in 2 days, with no complain of chest pain.

Conclusion: Hypertension, diabetes and hyperlipidemia are some of modifiable disease that can lead to CAD. Prevention and treating with the optimal management will eventually decrease the event of coronary artery disease.

Keyword: Modifiable risk factor; premature coronary artery disease.

PD-097

T Inverted in Electrocardiography (ECG) of Gestational Hypertension, Is It Myocardial Ischemic?

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Abstract

Introduction: Gestational hypertension is blood pressure elevations ($\geq 140/90$ mmHg) without proteinuria after 20 weeks of gestation with twice measurements at least 4 hours apart from the first measurement. Hypertension in pregnancy is ranked as the second leading cause of death in pregnant women in 2020 (1,110 cases). The elevation in blood pressure during pregnancy is caused by the body's reaction to fetal growth which affects the function and morphology of the heart. Therefore, supporting examinations such as ECG can be considered in pregnant women as a marker of cardiac dysfunction. The ECG in pregnancy can be found T wave inversion which can be also accompanied by ST segment depression and left axis changes in the QRS wave.

Case: A nineteen years old woman presented with the first latent phase stage of labor and gestational hypertension. The ECG results in this patient showed T inversion with atypical chest pain and negative troponin.

Discussion: The changes of T wave can be seen in different conditions, including ischemia, ventricular hypertrophy, and cardiomyopathy. In hypertension pregnancy, there is an elevation in cardiac output followed by changes in ventricular wall strength and end-diastolic volume. This result is an increase of stroke volume and myocardial contractility, therefore the heart will physiologically dilate. The cardiovascular system almost completely returns after 2 weeks of birth.

Conclusion: Inversion of the T wave is not only found in pathological conditions, but also in physiological conditions, such as in pregnancy.

Keyword: Gestational Hypertension, Hypertension in Pregnancy, ECG, T Inverted.

PD-098

TREATMENT OF MALIGNANT HYPERTENSION AND HYPERTENSIVE RETINOPATHY IN NEFRITIS LUPUS: A CASE REPORT

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Background: Hypertension is commonly observed in patients with Systemic Lupus Erythematosus (SLE), especially those with advanced lupus-associated kidney damage. While malignant hypertension is rare, it represents a serious complication and can contribute to organ damage. Additionally, hypertensive retinopathy in SLE patients may indicate active disease and worsening renal involvement.

Objective: To report a case of malignant hypertension and hypertensive retinopathy as early manifestations of lupus nephritis (LN) and discuss the treatment approach.

Methods: A 21-year-old female with complaints of high blood pressure, joint pain, leg swelling, and facial puffiness, along with sudden vision loss over the past week. Ophthalmologic examination diagnosed hypertensive retinopathy. Laboratory tests revealed elevated blood pressure 190/120 mmHg, anemia with hemoglobin 10.2 g/dL, leukopenia, thrombocytopenia, proteinuria (+2), and high anti-dsDNA levels 512 IU/mL. Doppler ultrasound of renal arteries was normal. Optical coherence tomography (OCT) revealed subretinal fluid and exudates. Based on clinical findings, the patient was diagnosed with LN and malignant hypertension.

Results: The patient was treated with cyclosporine, methylprednisolone, hydroxychloroquine, and five antihypertensive medications. After initiating treatment, the patient's blood pressure was successfully controlled, and her clinical condition improved, including resolution of ocular findings and stabilization of renal function.

Conclusion: Early detection and aggressive management of malignant hypertension and hypertensive retinopathy are crucial in SLE patients with lupus nephritis. A comprehensive treatment approach, including immunosuppressive therapy and antihypertensive medications, is vital for preventing organ damage and achieving remission.

Keywords: *Maligna Hypertension, Retinopatya Hyertension, LN and SLE.*

PD-099

Outcome Possibilities of Renal Artery Stenting in a Young Individual with Resistant Hypertension due to Bilateral Renal Artery Stenosis: An Evidence-Based Case Report

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Abstract

Introduction: Renal artery stenosis remains a challenge as there is still limited consensus for the diagnosis and management. We reported a case of a young male with bilateral renal artery stenosis (BRAS).

Case Illustration: A 35-year-old male with hypertension (BP 140/90 mmHg, previously 190/100 mmHg) presented with cephalgia. Doppler ultrasound showed tardus parvus waveform or flattened arterial curves on bilateral arcuate arteries and the left renal interlobar artery, with low resistance index suggesting bilateral intrarenal artery stenosis.

Discussion: RAS predominantly occurs in hypertensive male over 50 years of age and most are classified atherosclerotic RAS. Worsening

hypertension following the angiotensin converting enzyme inhibitors (ACEi) or angiotensin receptor blocker (ARB) initiation is suggestive of RAS. Doppler ultrasonography is sufficient in diagnosing RAS. Renal artery stenting in younger population should be considered to avoid long-term cardiovascular events.

Results: Four studies regarding renal artery stenting in RAS were included. The participants' mean age was 69.4 years, with comorbidities including hyperlipidemia and atherosclerosis. Blood pressure measurements indicated a significant reduction after revascularization, with mean systolic pressure decreasing from 160-170 mm/Hg to 140-146 mm/Hg. Renal function evaluation showed improvement of mean estimated glomerular filtration rate (eGFR) from 50.25 mL/min/1.73 m² to 53-54 mL/min/1.73 m² one-year post-procedure. Procedural complications included embolism (1.8%) and allergic reactions (10.71%). The stenting procedure is considered safe and effective to treat hypertension in bilateral RAS.

Conclusion: RAS is an important resistant hypertension cause in young adults. Renal artery stenting is efficacious and safe in bilateral renal artery stenosis.

Keywords: resistant hypertension; bilateral renal artery stenosis; renal artery stenting; young individual.

PD-100

Hypertensive Emergency and Recurrent Pleural Effusion in a Hemodialysis Patient After Central Venous Stenosis Angioplasty: A Case Report

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Abstract

Introduction: Hypervolemia with the sign such as hypertension, edema, dyspnea, fatigue and will be come long-term risk of cardiac remodeling and heart failure.¹ Heart failure is recorded as the main cause of pleural effusion in hemodialysis patients.² Arteriovenous fistulas (AVFs) will significantly affect the cardiovascular system.³ The risk of central venous stenosis due to previous central venous catheter installation is more than double. Percutaneous Transluminal Angioplasty (PTA) with or without stent installation is a treatment of vascular stenosis.⁴⁻¹²

Objective: To assess the incidence of hypertensive emergencies and recurrent pleural effusion whether they are related to dialysis adequacy in patients with a history of central venous stenosis post angioplasty.

Case description: A 47-year-old male patient was diagnosed with CKD V on hemodialysis twice a weeks since November 2023. Patient had a history of infection in the CDL and AVF. The patient underwent PTA in May 2024 due to central venous stenosis. In the 6 months after angiography, the ipsilateral enlargement returned to normal and the blood pressure

was around 130-140 mmHg due to the high-pressure balloon and the drug-coated balloon. A history of readmission with bilateral pleural effusion has been reduced. Echocardiography examination obtained LV concentric remodeling with good LV contractility EF 61% (Simpson 57%), good diastolic function, mild TR.

Conclusion: Central Vein Stenosis is associated with not achieving dialysis adequacy, causing resistant hypertension. Blood pressure (BP) and volume control are important components in patient dialysis that have major impact on patient symptoms, quality of life and cardiovascular complications.

Key word : *central venous stenosis, hemodialysis , dialysis adequacy, angioplasty, pleural effusion, hypertension*

PD-101

Adults Nephroblastoma and Hypertension

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Background. This report demonstrated a case of nephroblastoma, a rare and aggressive kidney tumor in adults.

Case Illustration. A 42-year-old-female sought consultation with her primary care physician for right flank pain and headache, with history of hypertension. She had no complaint in urinary tract system, no fever, but with dramatic weight loss in 3 months period (approximately 11 kg).

Discussion. She then referred to Nephrology and Hypertension Division at Mohammad Hoesin Hospital. Physical examination showed her blood pressure was 155/90 mmHg, and pressure pain and palpable mass

in the right flank area of the abdomen, and normal kidney function. The Abdominal CT with contrast showed enlarged right kidney with inhomogenic isodense mass (12.6 x 14.6 x 13.6 cm), pelviocalyceal distortion and perirenal fat infiltration. Her bone survey examination showed the tumor had not spread.

Results. The patient was treated with antihypertensive drug Candesartan 8 mg per day, and was consulted to Urology Department. She underwent nephrectomy. The Pathology Anatomy Department confirmed the diagnosis of Adult Nephroblastoma, pure blastomal-type of right kidney. After the surgical procedure, she had the second Abdominal CT with contrast for evaluation showed no sign of residual mass. The Oncology Department consultation was done, and conservative modality had been chosen.

Conclusion. We described a rare case of adult nephroblastoma and Hypertension. The clinical evaluation, imaging and pathology workup and treatment were addressed. The patient was treated with oral antihypertensive drug once daily, then treated surgically (nephrectomy) for the kidney mass.

Keyword. *Adult nephroblastoma, hypertension, nephrectomy*

PD-102

Multiple Abscess Cerebri in Patient with CKD Stage V and Resistance Hypertension: A Challenge for Rare Finding Complication

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Abstract

The incidence of multiple cerebral abscesses is relatively low, particularly in patients with significant comorbidities like CKD and resistant hypertension, making such cases noteworthy for medical literature. The intersection of multiple cerebral abscesses with advanced CKD and resistant hypertension presents a complex clinical challenge, requires a multidisciplinary approach involving nephrologists, neurologists, and infectious disease specialists.

A 66-year-old man was admitted to the hospital with weakness in his left extremity, also presenting with deteriorating mental state. Patient has high blood pressure of 170/82 mmHg and a history of chronic kidney disease. Motor function on the left side of the body significantly reduced, with a score of 2/2/4/4. Brain CT scan is showing multiple circular lesions surrounded by hypodense areas.

Patients with brain abscess usually present with fever, headache, and focal neurologic deficits. However, this classical presentation is not observed in

this patient, as in immunocompromised patients, the clinical symptoms are even more non-specific. This case illustrates the need to consider a diverse array of infections when diagnosing neurological symptoms in patients with other health issues such as CKD and hypertension.

Intracranial abscesses, while infrequent, pose serious and potentially lethal infections due to inflammation and infection within the brain. Individuals with chronic kidney disease (CKD), especially those on dialysis, face a higher risk of severe bacterial infections such as methicillin-resistant *Staphylococcus aureus* (MRSA), particularly if they have central venous catheters or arteriovenous grafts.

In conclusion, a comprehensive approach involving appropriate diagnostic workup, antifungal therapy, and multidisciplinary care is essential to achieve the best outcome.

PD-103

Blood Pressure Management During Peripartum Period in Severe Preeclampsia and Presumptive Lupus Nephritis: A Case Report

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Background: Managing severe preeclampsia in suspected lupus nephritis patient is challenging due to the complex interactions between pregnancy-induced hypertension and autoimmune kidney disease. Optimal hypertension management in this condition must consider the safety of both mother and infant.

Case Illustration: A 30-year-old female at 26 weeks of gestation with ITP and AIHA secondary to SLE. She presented with headache and blurred vision along with the onset of hypertension at 24 weeks of gestation. She was fully-alert, blood pressure of 197/105 mmHg, severe thrombocytopenia (1000/ μ L), albuminuria with 24-hour urine protein 748.4 mg, and serum creatinine 0.6 mg/dl (eGFR 123.6 ml/min/1.73m²). Brain CT reveals no infarction nor haemorrhage lesion. She was diagnosed with severe preeclampsia associated with SLE. Blood pressure were managed with intravenous MgSO₄ and nifedipine, overlapped with oral methyldopa and nifedipine GITS. Pregnancy termination was performed.

She opted to breastfeed despite the need for optimal immunosuppressive and antiproteinuric medications. Then blood pressure was managed with methyldopa and nifedipine GITS. She was advised to have periodic evaluation of proteinuria, including the need for renal biopsy.

Discussion: Hypertension during peripartum period is significant concern because its potential complications for both the mother and foetus. The drugs of choice including methyldopa, beta-blockers (labetalol, metoprolol and bisoprolol are safe, with atenolol best avoided) and dihydropyridine CCB (nifedipine). However, postpartum methyldopa required monitoring for postpartum depression. ACE-inhibitors, ARB, and renin inhibitors are not recommended in pregnancy. But ACE-inhibitors can be administered to breastfeeding mothers unless the neonate is premature or has renal failure.

Conclusion: Choosing the correct antihypertensive during peripartum period is crucial, while focusing on the management of the underlying condition.

Keywords: Antihypertensive, Peripartum, Preeclampsia, SLE.

PD-104

Family Medicine Approach in A Productive Age Male with Uncontrolled Hypertension and End-Stage Chronic Kidney Disease

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Abstract

Hypertension is a condition where blood pressure elevates $\geq 140/90$ mmHg after two examinations. Hypertension's shifting trend showed rising cases in the productive group aged 35-44 years as the second highest group. Uncontrolled hypertension could cause an organ damage, including chronic kidney disease (CKD). CKD is a condition characterized by progressive renal damage lasting ≥ 3 months and become a prevalent non-communicable disease globally. CKD's shifting trend now affects productive age groups, driven by modifiable and non-modifiable risk factors. CKD management encompasses pharmacological and non-pharmacological approaches to prevent the complications and worsening of CKD. One of the non-pharmacological approach that can be given is the family medicine approach. The holistic, integrated, comprehensive, and continuous care could prevent CKD progression, complications, enhances quality of life, and minimizes treatment costs. This study provide comprehensive analysis involving the role of family environment in the disease treatment then educate the patient and their families to prevent complications and worsening of CKD on a productive age (41 years old) male with hypertension (ICD 10-I10) and CKD Stage 5 (ICD 10-N18.5) using a family medicine approach. The primary data obtained through anamnesis, physical examination, and visitation to the

patient's home. Secondary data were obtained from medical records of the patient in Puskesmas Juanda, Samarinda. Patient-centered, family-focused, and community-oriented based interventions shows increasing scores in solving problems encountered by the patient and their family in the treatment process. Family medicine approach support the treatment process of CKD patients to strive for the better patient's quality of life.

Keywords: Hypertension, Chronic Kidney Disease, Productive Age, Family Medicine, Holistic.

PD-105

The Fatal Intersection of Hypertension, Gout and CKD: A Case of Infected Tophus

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Abstract

Introduction: Tophaceous gout, caused by chronic hyperuricemia, could be complicated by infections, particularly in patients with comorbidities. Although uncommon, patients with hypertension could exacerbate renal

dysfunction which reduces urate clearance and increases the risk of systemic infections and sepsis.

Case: A 52-year-old male with a history of hypertension presented to the emergency room with severe pain in both hands and feet, accompanied by fever and multiple purulent tophi on his lower extremities. He had been bedridden for three weeks due to fatigue, which led to the development of a Grade 1 pressure ulcer on his back. On examination, the patient appeared febrile, hypertensive, and tachycardic. Laboratory tests revealed anemia, elevated inflammatory markers, and worsening renal function. He was diagnosed with infected tophus and CKD. Treatment included intravenous antibiotics, colchicine, and pain control, with debridement planned. Despite these measures, his condition deteriorated, and he developed septic shock. The patient was transferred to the ICU, where he experienced multi-organ failure and died after 48 hours of intensive care.

Discussion: This case highlights the critical interplay between hypertension, CKD, and gout. Hypertension accelerates renal decline, further impairing urate clearance and predisposing patients to recurrent gout flares and infections. Bedridden status and malnutrition increase the risk of systemic complications such as sepsis. Early recognition, aggressive infection management, and a multidisciplinary approach are crucial in managing these high-risk patients, although mortality rates remain high in severe cases.

PD-106

Spontaneous Intracerebellar Hemorrhage in Patient With Hypertensive Crisis and Acute Kidney Injury: a Case Report

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Abstract

Background: Hemorrhagic stroke is a leading cause of death and disability among stroke patients. One of its primary causes is hypertension. Although cerebellar hemorrhage is a relatively rare occurrence in hemorrhagic stroke cases, it can lead to severe complications that may result in death.

Objective: Highlight Hypertension crisis as spontaneous intracerebral hemorrhage etiology

Case Report: A 54-year-old male admitted with sudden-onset dizziness, accompanying with double vision and weakness of the left limbs one hour prior to admission. Physical examination showed blood pressure 230/126 mmHg, left-beating nystagmus, left facial nerve and hypoglossus nerve paralysis, and left hemiparesis. Serum creatinine level was 1.60 mg/dL and estimated glomerular filtration rate (eGFR) was 50.9 mL/min. Head CT showed intraparenchymal hemorrhage in the left cerebellum (volume of ± 3.28 cc).

Discussion: Cerebellar hemorrhage is a rare, accounting for approximately 9–10% of all hemorrhagic stroke cases. Hypertension is the most common cause of cerebellar hemorrhage, acute kidney injury can worsening the hypertension manifestation and can lead to serious complication like intracranial hemorrhage. Patient present with acute vestibular syndrome. The Blood Pressure target for intracerebellar hemorrhage patient is SBP

140-160 mmHg, patient treated with intravenous antihypertension like Nicardipine.

Conclusion: Cerebellar hemorrhage is a rare occurrence in patients with hemorrhagic stroke. Hypertension is the most common causes. However, it can lead to life-threatening complications due to its proximity to the brainstem. Therefore, proper blood pressure management is crucial in these cases.

Keyword: Hypertension, Intracerebellar hemorrhage.

PD-107

Resistant Hypertension, CKD G5A on PD with Mechanical Complication due to Omentum Wrapping

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Abstract

Introduction: Resistant hypertension is defined as blood pressure above 140/90 mmHg despite use of three or more antihypertensive drugs at optimal doses, including a diuretic. Management includes lifestyle changes and pharmacotherapy. Patients with end-stage renal failure require renal replacement therapy, which includes hemodialysis, peritoneal dialysis, and kidney transplantation. Continuous Ambulatory Peritoneal Dialysis is a form of PD that is performed independently. A common non-infectious complication of CAPD is omentum wrapping, requiring surgical intervention (omentectomy).

Case Illustration : A male patient with a history of hypertension presented with difficulty exchanging CAPD fluid and neck pain. His vital signs showed severe hypertension (230/120 mmHg) and physical examination revealed pale conjunctiva, pretibial edema, and a moderately ill general condition. Laboratory showed anemia (Hb 9.7), and kidney function impairment (creatinine 13). Imaging revealed cardiomegaly and contracted kidneys. Patient was diagnosed with resistant hypertension, CKD G5A on CAPD, and omentum wrapping.

Discussion: Patient initially sought care for CAPD fluid obstruction, but was found to have severe hypertension. He was treated with nicardipine, candesartan, bisoprolol, clonidine, spironolactone, and hemodialysis. Surgical intervention was needed to resolve the omentum wrapping.

Result: After surgery and pharmacological therapy, patient's CAPD exchanges became easier, blood pressure stabilized at 140/90 mmHg, and neck pain resolved. He was discharged with improved CAPD function and appropriate antihypertensive medications.

Conclusion: Early diagnosis and proper management of resistant hypertension are crucial for improving patient outcomes and preventing complications, such as omentum wrapping in CAPD.

Keywords: Resistant hypertension, CAPD, omentum wrapping.

PD-108

Validation and Assessment of Novel Morphology-Voltage-P-wave Score for Diagnosing Left Ventricular Diastolic Dysfunction in Patients with Hypertension (VANESSA Trial)

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Background: Hypertension is a major risk factor for cardiovascular disease, often associated with left ventricular diastolic dysfunction (LVDD). Electrocardiogram (ECG) parameters, including P-wave duration and voltage, may provide valuable insights into the detection of LVDD.

Objective: This study aimed to validate and assess the diagnostic utility of novel Morphology-Voltage-P-wave Score (MVP Score) in identifying LVDD among patients with hypertension.

Method: This study was a single centre, prospective study, included 50 consecutive patients with hypertension between January – June 2024. The novel MVP score consists of three components: P wave dispersion, P wave morphology, and P wave voltage (Table 2). Based on echocardiography results, patients were categorized as LVDD and no LVDD group. Patients with LVEF<55%, congenital heart disease, infiltrative cardiomyopathy, coronary artery disease, chronic kidney disease, valvular heart disease, bundle branch block, and arrhythmia were excluded.

Result: The patients were categorized into two groups based on the presence of LVDD. The mean age of the study was 57 ± 11 years, with 14 patients of the participants being male. LVDD group had lower mean P wave voltage in lead I and longer mean P wave duration than no LVDD group. The MVP score of the LVDD group exhibited a significantly higher than no LVDD group ($p= 0.01$). MVP score more than 2 could assist in

diagnosing LVDD with 78.35% sensitivity, 75.1% specificity, and AUC 0.743 (95%CI 0.601 – 0.885).

Conclusion: MVP score could be assessment tool for diagnosing LVDD in patients with hypertension due to its cost-effectiveness, availability, and easy-to-use formula.

[VANESSA Trial; ClinicalTrials.gov Identifier: NCT06779513]

Keywords: *morphology voltage p-wave score; diastolic dysfunction; hypertension*

Table 1. Baseline characteristics

	Total (n = 50)	Patients		p
		LVDD (n = 29)	No LVDD (n = 21)	
Characteristics				
Age, years	57 ± 10.7	58.8 ± 9.3	53.2 ± 12.8	0.25
Gender				0.74
Male, n (%)	14 (28%)	10	4	
Female, n (%)	36 (72%)	19	17	
Body Mass Index (kg/m²)	19.92 ± 3.4	19.54 ± 3.4	20.72 ± 3.4	0.44
Echocardiography Parameters				
LA diameter, mm	34.4 ± 5.5	34.9 ± 5.6	33.4 ± 5.5	0.27
IVSd, mm	11.7 ± 2.5	11.8 ± 2.5	11.4 ± 2.8	0.51
LVIDd, mm	43.8 ± 6.5	43.9 ± 6.5	43.5 ± 6.9	0.45
PWTd, mm	11 ± 2.7	11.1 ± 3	10.9 ± 1.9	0.68
IVSs, mm	14.7 ± 3.1	14.6 ± 2.9	14.9 ± 3.5	0.12
LVIDs, mm	27.2 ± 6.7	27.9 ± 7.1	25.8 ± 5.6	0.41
PWTs, mm	15.8 ± 2.8	15.7 ± 3.1	15.9 ± 2.3	0.28
LVEF, %	69.9 ± 8.1	69.9 ± 7.5	70.1 ± 9.4	0.07
LVMI	113.9 ± 34.9	118.5 ± 39.3	104.1 ± 20.6	0.59
RWT	0.5 ± 0.1	0.53 ± 0.15	0.53 ± 0.14	0.32
TAPSE, mm	22.4 ± 3.1	22.4 ± 2.9	22.4 ± 3.6	0.63
E/A ratio	0.95 ± 0.37	0.84 ± 0.42	1.3 ± 0.22	0.03

EDT, ms	215 ± 49	188.9 ± 52.8	228 ± 38.8	0.04
E/e'	9.9 ± 3.9	12.7 ± 4.4	8.2 ± 2.1	0.02
Electrocardiography Parameters				
P wave voltage in lead I, mV	0.08 ± 0.03	0.07 ± 0.03	0.09 ± 0.02	0.03
P wave dispersion	45.8 ± 24.9	52.7 ± 26.9	31.3 ± 10.3	0.02
IAB				0.13
No IAB	36	17	19	
Partial IAB	10	8	2	
Advanced IAB	4	4	0	
MVP Score	3 ± 2	3 ± 1	2 ± 1	0.01

LA: Left atrium

EDT: E-wave Deceleration Time

IVSd: Interventricular Septal diastolic

LVIDd: Left Ventricular Internal Diameter diastolic

PWTd: Posterior Wall Thickness diastolic

IVSs: Interventricular Septal systolic

LVIDs: Left Ventricular Internal Diameter systolic

PWTs: Posterior Wall Thickness systolic

LVEF: Left ventricle ejection fraction

LVMI: Left ventricle mass index

RWT: Regional Wall Thickness

TAPSE: Tricuspid annular plane systolic excursion

IAB: Interatrial Block

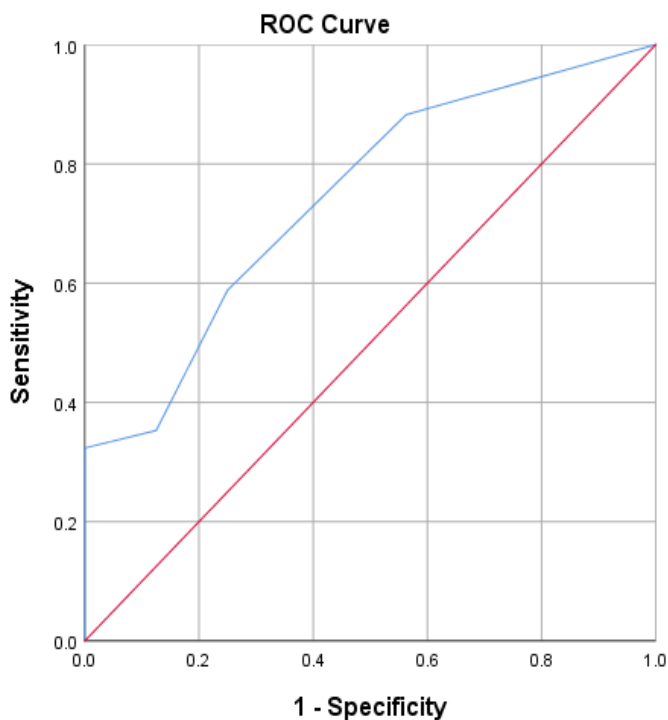
MVP: Morphology-Voltage-P-wave Score

Table 2. Novel MVP score components and the assigned points

Variable	Value	Score
P wave dispersion	<40 ms	0
	40 – 60 ms	1
	>60 ms	2
P wave morphology in inferior leads	No IAB	0
	Partial IAB	1

	Advanced IAB	2
P wave voltage in lead I	>0.2 mV	0
	0.1 – 0.2 mV	1
	<0.1 mV	2

IAB: Interatrial block (no IAB if P wave duration <120 ms; partial IAB if P wave duration >120 ms without biphasic morphology in the inferior leads; and advanced IAB if P wave duration >120 ms with biphasic morphology in the inferior leads.



Diagonal segments are produced by ties.

MVP score in diagnosing LVDD: AUC 0.743 (95%CI 0.601 – 0.885)

Figure 1. ROC curve analysis of MVP score in diagnosing LVDD

PD-109

Silent Hemorrhagic Stroke Due to Coexistence Uncontrolled Hypertension and Diabetes: A Case Report

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Introduction: Although hypertension is well established as the main risk factor for stroke, individuals with diabetes could have silent cerebral lesion that clinically invisible.

Illustration: A 52-year-old Malayan-Mongoloid female came to emergency room with sudden paresthesia on the left side of the body with temporary dysarthria eight hours prior. The patient has uncontrolled diabetes mellitus type-2 and hypertension. Blood Pressure was 163/87 mmHg. There was no hemiplegia and cranial nerves paralysis, but the patient insisted on paresthesia. Laboratory tests were normal except for blood glucose 438 g/dL and HbA1c 8,8%, urine ketone was negative. Due to the persistent discomfort, we calculated ABCD2 score, and the score was 6, indicating high risk of stroke. Brain-CT showed bleeding in the right pons with perifocal edema. The patient was treated for four days and was discharged without any additional neurological disorders.

Discussion: Both of hypertension and diabetes cause vascular endothelial dysfunction, increased early-age arterial stiffness, systemic inflammation and thickening of the capillary basal membrane. Due to diabetic, neuropathy and microangiopathy can cause silent lesion in brain that change patient perception in neural stimuli. ABCD2 scores is a simple modality that can help physician increase awareness the possibility of a stroke, if the patient has insignificant complaints.

Conclusion: Patient with hypertension and diabetes who has insignificant neurological complaints cannot be directly concluded as simple transient

ischemic attack or neuropathy, stroke awareness in these patients needs to be increased. ABCD2 score may aid clinical judgment.

Keywords: Haemorrhagic stroke; Hypertension; Diabetes; ABCD2 score; Silent stroke

PD-110

Secondary Hypertension in Patient with Ethanol Intoxication with Limited Resources: A Case Report

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Abstract

Introduction: Ethanol intoxication can be fatal due to its effect that can induced multiple organ failure including elevated blood pressure. The management can be complicated, especially in settings with low-resource hospital. This case report highlight the blood pressure of patient with ethanol intoxication lead to hypertensive crisis.

Case Illustration: A 41-year-old male presented to the emergency department with decreased consciousness and shortness of breath for the past 5 hours, following the ingestion of 4 bottles of 70% alcohol. Upon arrival, the patient was somnolent with a respiratory rate of 28 breaths per minute and showed blood pressure of 200/120 mmHg. A nasogastric tube (NGT) was inserted, which drained approximately 150 mL of black, tarry fluid. Laboratory results revealed hemoconcentration, acute kidney injury (AKI), and severe metabolic acidosis. The patient was managed with intravenous fluids, proton pump inhibitors, thiamine, anti-hypertensive drugs and subsequently underwent hemodialysis. The patient's clinical condition gradually improved and discharged in stable condition on the fifth day of hospitalization.

Discussion: Ethanol intoxication can affect multiple organ systems, including elevated blood pressure with various mechanisms. These mechanisms involve sympathetic nervous system activation, increased renin and cortisol levels, modification of carotid baroreceptor response, and increased peripheral vascular muscle tone. In cases of severe ethanol intoxication with concomitant severe metabolic acidosis, hemodialysis may be considered as an adjunctive treatment to rapidly remove ethanol and correct metabolic disturbances.

Conclusion: Ethanol intoxication can be life-threatening, but with prompt and appropriate management, even in settings with limited resources, favorable outcomes can be achieved.

Keywords: Ethanol intoxication; Hypertension; Hemodialysis; Limited resources.

PD-111

The Effectiveness of Furosemide as Prevention of Postpartum Hypertension in Women with Preeclampsia: An Evidence-Based Case Report

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Abstract

Background: Preeclampsia, one of the hypertension disorders in pregnancy (HDP), increases the risk of postpartum hypertension and significantly affects maternal morbidity. Antihypertensive medications,

like furosemide, are beneficial in controlling blood pressure after delivery. However, the effectiveness of furosemide in preventing postpartum hypertension still requires further research.

Case Illustration: A 40-year-old female, G4P2A1H2, presented at 36-37 weeks of gestation with pre-eclampsia and fetal distress. Before the cesarean section, the patient underwent hypertensive crisis management to stabilize her blood pressure. This case raises the question of whether administering furosemide can significantly prevent postpartum hypertension in this patient.

Discussion: A literature search found three studies on PubMed, two on Cochrane, none on Scopus, and nine on ScienceDirect. One article that met the inclusion criteria was selected from 14 articles retrieved using specific keywords across four databases. The study involved 384 women with HDP, randomized into furosemide and placebo groups.

Results: A short course of furosemide reduced the risk of persistent hypertension by 60% on day 7 postpartum (aRR 0.40, 95% CI 0.20–0.81). Although there was no significant difference in patients with severe HDP, women with non-severe HDP had a greater risk reduction of 74% by randomizing furosemide (aRR 0.26, 95% CI 0.10–0.67). The recovery time of non-severe HDP patients with furosemide was 2 days faster than placebo (95% CI 1.22–2.15).

Conclusion: Furosemide significantly improved blood pressure control and accelerated the time to resolution of hypertension in women with non-severe HDP. Therefore, patients should receive a short course of furosemide after delivery to reduce the risk of postpartum hypertension.

Keywords: *furosemide, prevention, postpartum hypertension, pre-eclampsia.*

PD-112

The Challenging in Managing Blood Pressure in Hemodialysis Patient

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INTRODUCTION: Hypertension (HT) affects the great majority of CKD patients, with prevalence ranging from 60% to 90% depending on the stage and etiology of the disease, and it is a significant independent risk factor for CV disease, progression to end-stage kidney disease (ESKD) and mortality.^{1,2} In Indonesia, based on the results of the 2023 health survey show a 30.8% prevalence of hypertension in the population aged ≥ 18 years based on the results of blood pressure measurements.³ The pathophysiology of hypertension in patients treated with maintenance hemodialysis (HD) is multifactorial, some factors that contribute to hypertension in patients treated with hemodialysis include volume overload, arterial stiffness, enhanced activity of the sympathetic nervous and renin-angiotensin-aldosterone systems, endothelial dysfunction, and use of erythropoietin stimulating agents.^{1,2,4,5} Among patients unable to normally regulate plasma volume, increased cardiac output attributable to volume or sodium excess, occurring in the setting of high systemic vascular resistance, leads to hypertension.^{4,5} Extracellular volume overload is common in hemodialysis, driven by interdialytic weight gains (typically attributable to excess dietary salt) and sodium from dialysate (depending on the dialysis prescription).^{4,5}

CASE ILLUSTRATION: A 71-year-old man with uncontrolled blood pressure, since 5 months ago, there are no headache, chest pain, coughing and shortness of breath, the patient has swelling in the legs and feeling tired quickly after activities, the patient sleeps with 1 pillow and has a good appetite. The patient can do activities at home independently, but cannot

walk too much because of the pain in the waist due to a history of falls 3 years ago. The patient has been anuria since 5 months ago, bowel movements have been smooth, there is no history of bloody stools. Daily food history is a food that cooked from home. The patient is a regular HD at Dr Soetomo Hospital in the morning shift twice a week. Body weight in this patient is 70kg with Interdialytic weight gain (IDWG) $\pm 1,5-1,9$ kg with kt/v $\pm 1,2 - 1,3$ and Home BP Monitoring (HBPM) is $\pm 180/100$ mmHg.

Past Medical History : The patient has been taking dialysis since 2.5 years, HT since 6 years ago, HNP since 3 years ago (before HD).

Medication History : Irbesartan 150mg (morning), Bisoprolol 2,5mg (morning), Nifedipine GITS 30mg (afternoon), Methyldopa 250mg (morning and night), Paracetamol if there is a pain, Erythropoietin was not regularly depending on the blood pressure. The medication of the patient are not on time and usually changing.

The laboratory results : Hb 8,9gr/dl, Hct 28%, MCV 88 fl, MCH 28 pg , WBC $9.340 \times 10^3/\mu\text{L}$, Neutrofil 67 %, Limfosit 18,8% , Trombosit $279.000 \times 10^3/\mu\text{L}$, BUN 33 mg/dL, Kreatinin 12,6 mg/dL, SI 79,8 $\mu\text{g/dL}$, TIBC 217 $\mu\text{g/dL}$, ST 36,7%, HDL 45 mg/dL, LDL 69 mg/dL, Uric Acid 6,4 mg/dL, SGOT 21 U/L, SGPT 27 U/L, Albumin 3,41 g/dL, Fosfat serum 2,8 mmol/L , Na 137 mmol/L, K 4,1 mmol/L, Cl 99 mmol/L.

The Radiology results : In chest X-Ray there are cardiomegaly accompanied by aortosclerosis and elongation of the aorta.

Home BP Monitoring : Before Management BP $\pm 180/100$ mmHg, After Management BP $\pm 130/70$ mmHg.

The patient was diagnosed with Uncontrolled Hypertension, ESRD on Hemodialysis, Anemia. The management were diet high calorie 2000 kcal/day, protein 1gram/kg/day, salt < 2 gram/day, Irbesartan 300mg q.d. (in the morning), Bisoprolol 2,5mg q.d. (in the afternoon), Nifedipine GITS 30mg q.d. (at night), Methyldopa 250mg t.i.d, Paracetamol (as needed), Erythropoietin injection 3000iu twice a week.

PD-114

Dual Benefits of SGLT-2 Inhibitors: An RCT Meta-Analysis of Their Role in Hypertension in Diabetic Populations

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Background: SGLT-2 inhibitors are widely recognized for their benefits in managing both T2DM and hypertension by promoting osmotic diuresis and natriuresis through glucose and sodium reabsorption inhibition in the kidneys, thereby lowering blood pressure. However, variability in their blood pressure-lowering effects and long-term safety raises questions about the most effective agent for hypertensive T2DM patients.

Objective: This meta-analysis aimed to compare the efficacy and safety of various SGLT-2 inhibitors in managing hypertension among patients with T2DM, focusing on their effects on blood pressure.

Methods: Following PRISMA guidelines, a systematic search of PubMed, ScienceDirect, and Scopus was conducted using the keywords "SGLT-2 inhibitor" and "hypertension." Inclusion criteria were RCTs on adults (≥ 18 years) with hypertension and T2DM treated with SGLT-2 inhibitors. Studies involving pediatric and pregnant patients were excluded.

Results: Of 314 studies screened, 4 RCTs with 1598 patients met inclusion criteria. Empagliflozin 10 mg and 25 mg demonstrated significant reductions in mean 24-hour systolic and diastolic blood pressure, with the 25 mg dose showing a stronger effect. Dapagliflozin 10 mg also significantly reduced seated systolic blood pressure compared to placebo. Meta-analysis showed pooled reductions in systolic blood pressure (SBP: -4.27 mmHg; 95% CI: -5.11 to -3.43, $P < 0.00001$) and diastolic blood pressure (DBP: -3.83 mmHg; 95% CI: -4.10 to -3.57, $P < 0.00001$), favoring SGLT-2 inhibitors.

Conclusion: SGLT-2 inhibitors provide clinically meaningful blood pressure reductions in hypertensive T2DM patients, with empagliflozin 25 mg and dapagliflozin 10 mg being particularly effective.

Keyword : SGLT-2 inhibitor, hypertension, T2DM, diabetes, meta analysis

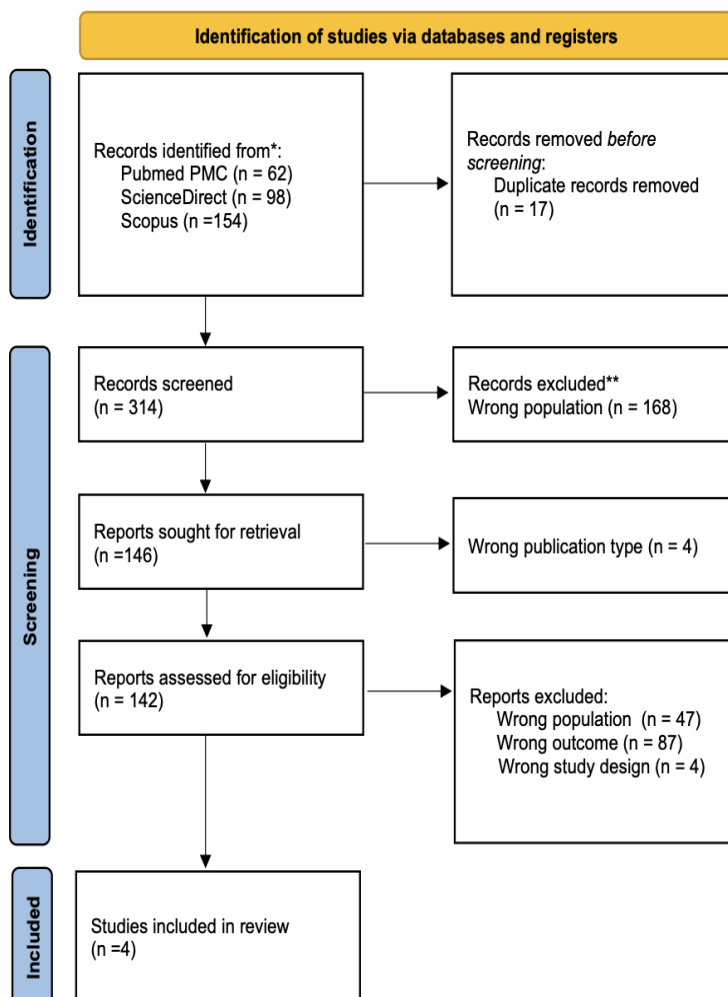


Figure 1. Study Flow of PRISMA Chart

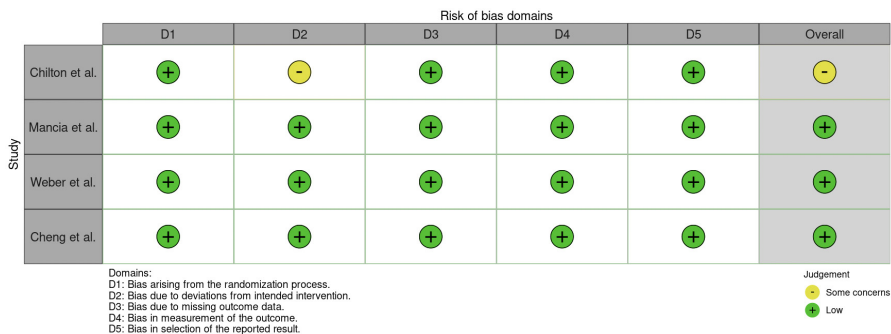


Figure 2. Risk of Bias Assessment

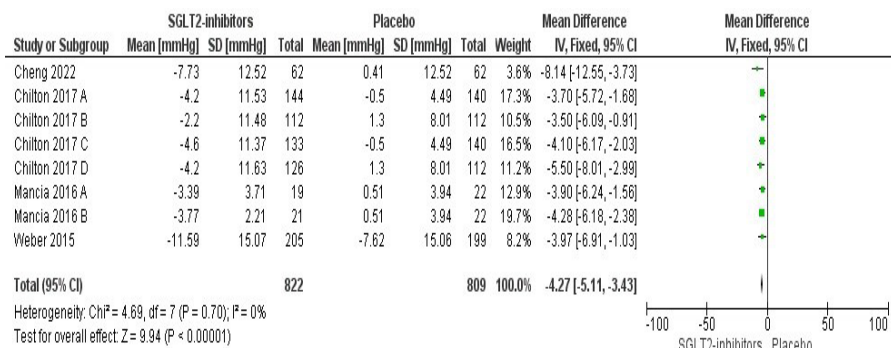


Figure 3. Plot Forest of SBP change

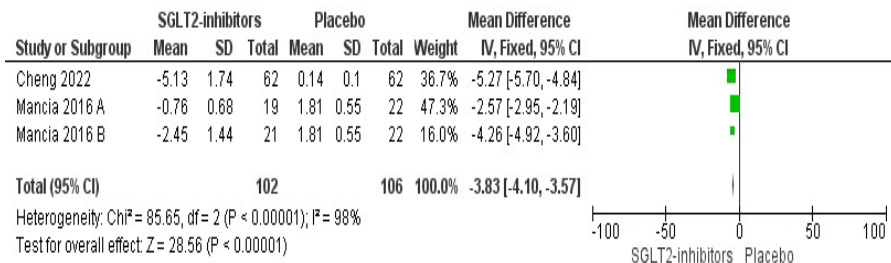


Figure 4. Plot Forest of DBP change

PD-115

Uncontrolled Type 2 Diabetic Mellitus with Hypertension Leading to Diabetic Kidney Disease

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Introduction: Diabetic Kidney Disease (DKD) is a common microvascular complication of type 2 diabetes mellitus (T2DM), often aggravated by hypertension. Both conditions contribute to kidney damage, which can progress to end-stage renal disease (ESRD) if not properly managed.

Case Illustration: An 81-year-old male with a 15-year history of T2DM and a 13-year history of poorly controlled hypertension presented with bilateral edema in the extremities and fatigue. He reported inconsistent adherence to medications. Laboratory tests, including HbA1c, urinalysis, serum creatinine, and estimated Glomerular Filtration Rate (eGFR), were conducted.

Discussion: Uncontrolled T2DM and hypertension are key risk factors for DKD, leading to progressive renal damage. T2DM is characterized by insulin resistance and impaired insulin secretion, while hypertension is a common comorbidity in patients with T2DM. In this case, the patient's long-standing hyperglycemia and hypertension resulted in elevated serum creatinine, albuminuria, and reduced eGFR, indicative of severe kidney damage. The combination of these factors accelerated the progression of DKD. Tight glycemic and blood pressure control is essential in preventing further renal decline.

Result: The patient's blood pressure was 170/100 mmHg. Laboratory showed that the patient had high blood glucose levels (HbA1C 9.7%), elevated serum creatinine (2.29 mg/dL), albuminuria (19,321 mg/g

creatinine), lower eGFR (27.99 mL/min/1.73 m²), and significant proteinuria (3+). These findings led to a diagnosis of DKD, with evidence of severe kidney damage.

Conclusion: This case highlights the importance of strict blood glucose and blood pressure control to prevent DKD. Early intervention and regular monitoring are essential in managing patients at risk for kidney damage.

Keywords: Diabetic Kidney Disease; Hypertension; Type 2 Diabetic Mellitus.

PD-116

Cerebral Infraction Due to Smoker's Polycythemia in Limited Facility Setting: A Rare Case

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Introduction: Polycythaemia estimated to occur in 1 in 100,000 people each year and its complications are associated with thromboses. These thrombotic events are transient ischaemic attack or strokes with an incident rate 70%. Still not widely known that smoker's polycythaemia could related to stroke events.

Case Illustration: A 64-year-old Malayan-Mongoloid male came to emergency room with sudden paralysis of the left side of the body, dysarthria, dysphagia, and confusion ten hours prior. There were no signs of acute or chronic infection, and dehydration due to gastrointestinal loss. The patient was smoke 24 cigarettes per day for more than 10 years and had hypertension. Physical examination found normal blood pressure with left side body paralysis and some cranial nerves paralysis. Brain CT showed infraction in right corona radiata and left thalamus. There were

upsurge of haemoglobin 20g/dL and haematocrit 63% which suspecting us to smoker's polycythaemia. Due to limitation JAK2 617V mutation and EPO concentration couldn't be measured. The patient was treated with antiplatelet and phlebotomy.

Discussion: Smoking deprives the bone marrow of oxygen that triggers the increased production of erythropoietin by the kidneys and pushes erythrocytosis. Clot formation occurred because of the sluggishness of blood flow and increased interaction of platelets with the vessel walls due to erythrocytosis, and increased viscosity.

Conclusion: Secondary polycythemia can induce stroke, and it is important to recognize the case in emergency setting and motivate patients to stop smoking.

Keywords: Stroke; Hypertension; Secondary Polycythaemia; Heavy Smoker.

PD-117

Uncontrolled Type 2 Diabetic Mellitus with Hypertension Leading to Diabetic Kidney Disease

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Discussion: Uncontrolled T2DM and hypertension are key risk factors for DKD, leading to progressive renal damage. T2DM is characterized by insulin resistance and impaired insulin secretion, while hypertension is a common comorbidity in patients with T2DM. In this case, the patient's long-standing hyperglycemia and hypertension resulted in elevated serum creatinine, albuminuria, and reduced eGFR, indicative of severe kidney damage. The combination of these factors accelerated the progression of DKD. Tight glycemic and blood pressure control is essential in preventing further renal decline.

Result: The patient's blood pressure was 170/100 mmHg. Laboratory showed that the patient had high blood glucose levels (HbA1C 9.7%), elevated serum creatinine (2.29 mg/dL), albuminuria (19,321 mg/g creatinine), lower eGFR (27.99 mL/min/1.73 m²), and significant proteinuria (3+). These findings led to a diagnosis of DKD, with evidence of severe kidney damage.

Conclusion: This case highlights the importance of strict blood glucose and blood pressure control to prevent DKD. Early intervention and regular monitoring are essential in managing patients at risk for kidney damage.

Keywords: Diabetic Kidney Disease; Hypertension; Type 2 Diabetic Mellitus.

PD-118

HYPERTENSIVE CRISIS IN YOUNG ADULT PATIENT WITH MULTIPLE RISK FACTOR KNOWN AFTER SUDDEN EPISTAXIS POSTERIOR : A CASE REPORT

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Background: Hypertension is a condition where systolic blood pressure is ≥ 140 mmHg and/or their diastolic blood pressure is ≥ 90 mmHg. Hypertensive crisis is an acute severe elevation in blood pressure, which can present as hypertensive urgency or emergency. Hypertension commonly acquired in older age patient, but young individuals have an underrecognized hypertension issue and risk factor that could lead to hypertensive crisis and the complication.¹⁻³

Case Illustration: A 28-year-old male was admitted to the hospital with presented sudden nose bleed from 30 minute before hospitalized. The patient also complained about headache, nausea, palpitation and dizziness. At admission, BP was 200/140 mmHg, HR 120 bpm regular, and oxygen saturation 98% room air. Previous medical history was uncontrolled hypertension and dyslipidemia for almost 3 years. The patient smokes around 1-2 packs a day. And the patient has 30.1 body mass index. For family history, the patient's father had history of hypertension and cardiovascular disease. At hospital, this patient bleed with estimated 200ml blood loss. The patient was treated with posterior nasal tamponade and taking captopril 50mg oral, amlodipine 10mg oral, and tranexamic acid 500mg intravenous. After 24 hours observation, the blood pressure was controlled.

Conclusion: Uncontrolled hypertension and multiple risk factor lead to hypertensive crisis and increase the risk of epistaxis posterior. There were additional important risk variables such as illiteracy and illness ignorance

in young adults. The awareness of hypertension in young adults must be increase and early lifestyle changes must be implemented.⁴⁻⁶

Keywords: hypertension, young – adult, epistaxis, risk factor

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PD-119

THE EFFECT OF VAPOR NICOTINE LEVELS ON MALONDIALDEHYDE (MDA) CONCENTRATIONS IN THE LUNGS OF MALE WISTAR RATS

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Abstract

Background: Vapes generally contain nicotine, similar to the nicotine found in tobacco cigarettes, with varying concentrations. The negative effects of nicotine are well-known, including damage to lung function, characterized by an increase in malondialdehyde (MDA) as a marker of oxidative stress in tissues.

Objective: To investigate the effect of nicotine levels in vapor on the malondialdehyde (MDA) levels in the lungs of male Wistar rats.

Methods: Twenty-eight male Wistar rats were randomly divided into 4 groups: control group (K), vape group with 0 mg nicotine (V0), vape group with 6 mg nicotine (V6), and vape group with 12 mg nicotine (V12). Each group was exposed to vape aerosol daily for 8 weeks. MDA levels in lung tissue samples were measured at the end of the study. Statistical analysis of one-way ANOVA with post hoc test was performed.

Results: A significant dose-dependent increase in lung MDA levels was observed, with the highest levels in the group exposed to 12 mg vape aerosol, followed by the 6 mg and 0 mg groups.

Conclusion: Vape exposure can lead to increased MDA levels in lung tissue, with the MDA levels being directly proportional to the nicotine concentration.

Keywords: *Vape, lung MDA, nicotine.*

PD-120

A 28-year-old Man with Secondary Focal Segmental Glomerulosclerosis Associated with Uncontrolled Hypertension

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Abstract

Introduction: Focal Segmental Glomerulosclerosis (FSGS) is associated with various clinicopathological conditions, including hypertension. We report here a case of secondary FSGS associated with hypertension.

Case illustrations: A 28-year-old man with a 3-days history of frequent tingling sensations and shortness of breath. They mentioned regularly visiting the internal medicine clinic with FSGS and uncontrol hypertension. His blood pressure on admission was 160/90 mmHg. Physical examination and laboratory tests revealed hypertensive cardiac dysfunction, hypocalcemia, renal dysfunction (serum creatinine, Cr 2.0 mg/dl, blood urea nitrogen, BUN 32.0 mg/dl), proteinuria (positive ++++), normal blood sugar levels (Hba1c 6.5 %) and lacunar infarct. Chest X-ray showed cardiomegaly (cardiothoracic ratio = 52.2 %). He was treated for primary hypertension and corticosteroid.

Discussion: FSGS can cause nephrotic syndrome in 40% of adult patients, which is the main cause of ESRD in 50% of affected patients. Renal biopsy showed FSGS lesions and endothelial cell injury. We consider that the nephrotic-range proteinuria in this patient was associated with the development of secondary FSGS in uncontrolled hypertension. Antihypertensive therapy, including ARB, rescued renal dysfunction and

nephrotic syndrome. Although the characteristic pathology remains uncertain, secondary FSGS should be considered in patients with hypertension and nephrotic-range proteinuria. The most important causes of secondary FSGS are conditions associated with high intraglomerular filtration pressure, including uncontrolled severe hypertension.

Result: In this patient hypertension may develop of secondary FSGS and heavy proteinuria.

Conclusion: We report a 28-year-old man with uncontrolled hypertension who develop FSGS has shown a partial respon with corticosteroids and antihypertensive therapy.

Keywords: Focal segmental glomerulosclerosis, Hypertension, Malignant nephrosclerosis, Antihypertensive therapy, Nephrotic-range proteinuria.

PD-121

RESISTANT HYPERTENSION ec RENOVASCULAR ec FIBROMUSCULAR DYSPLASIA in CKD ec CHRONIC GLOMERULONEPHRITIS G5Ax on CAPD

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Abstrak

Resistant hypertension is defined as a condition of $\geq 140/90$ mmHg blood pressure that has not been controlled despite lifestyle modifications and therapy with three antihypertensive drugs at optimal doses. Renovascular hypertension is one of the causes of resistant hypertension in CKD. Renovascular hypertension is a condition of increased blood pressure

due to narrowing of the arteries that flow to the kidneys. This condition can be caused by the deposition of atherosclerotic or non-atherosclerotic plaques. Fibromuscular dysplasia (FMD) is a rare condition that affects blood vessels, especially arteries. In FMD, the walls of blood vessels thicken and grow abnormally. FMD occurs in <10% of cases of renovascular hypertension. In this case report, it was reported that a young woman with renovascular hypertension and FMD in CKD G5Ax on CAPD which is difficult to control with medication so a more comprehensive approach is needed to determine the next management to control blood pressure and other cardiovascular complications. The management of renovascular hypertension includes treatment with ACE inhibitors, ARBs, diuretics and CCBs. Treatment of cardiovascular factors such as smoking, obesity, surgical interventions such as angioplasty or renal artery bypass may be necessary to address narrowing or blockage of the renal artery. Therapy of resistant hypertension can include lifestyle modification, optimal medication and interventional measures. Early diagnosis and treatment can improve the clinical symptoms of hypertension and can prevent kidney failure.

Keyword: Resistant hypertension; Renovation hypertension; FMD; CKD; CAPD

PD-122

Progression of Acute Kidney Disease to End-Stage Renal Disease in a Postpartum Case with Hypertensive Heart Disease and Hypertensive Encephalopathy

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Background: Acute Kidney Disease (AKD) is defined as kidney dysfunction and/or structural abnormalities with health implications lasting less than 3 months, including Acute Kidney Injury (AKI). AKI is characterized by changes in serum creatinine (SCr) and urine output within 48 hours or 7 days. Both AKI and AKD are associated with high morbidity and mortality, as well as the development and progression to Chronic Kidney Disease (CKD). CKD is a condition where kidney damage or function decline persists for at least three months, with or without a decreased glomerular filtration rate (GFR) below 60 mL/min/1.73m². CKD may present with signs of kidney damage, such as albuminuria or hematuria, after excluding urological causes.

Case Presentation: A 32-year-old pregnant woman (28 weeks gestation) with her third child presented with shortness of breath since January 2024, aggravated by activity, along with leg edema and productive cough. Initial diagnosis indicated kidney dysfunction, and she underwent hemodialysis twice, followed by pregnancy termination. In February

2024, she was re-admitted with severe shortness of breath, oliguria, and edema. Management included oxygen therapy, fluid control, PRC transfusion, and routine hemodialysis twice a week. Medications included IV furosemide, nifedipine, candesartan, and supplements. The patient showed improvement in blood pressure and breathing, but continued monitoring was required to prevent further complications and optimize kidney function.

Conclusion: This case emphasizes the importance of comprehensive diagnosis and management in postpartum patients with AKD to prevent progression to CKD. Multidisciplinary support and patient education are crucial to ensure ongoing therapy and long-term monitoring.

Keywords: AKD, CKD, Peripartum Cardiomyopathy, Hypertensive Retinopathy, Hypertensive Encephalopathy.



Indonesian Society of Hypertension
Perhimpunan Dokter Hipertensi Indonesia