ANNUAL CONFERENCE
ISAR-DC CON 2024

DELHI CHAPTER OF INDIAN SOCIETY FOR ATHEROSCLEROSIS RESEARCH

in collaboration with Department of Biochemistry,
Hindu Rao Hospital and North DMC Medical College, Delhi

Theme:- Integrating Basic Science and Clinical Insights in Atherosclerosis Management

Venue: Dr. Passey Sabharwal,
Hindu Rao Hospital & North Delhi Medical College, Delhi

SOUVENIR CUM NEWS LETTER

Department of Biochemistry, Hindu Rao Hospital & North DMC Medical College, Delhi
E-mail: secretary.delhi.chapter.isar@gmail.com; Web: delhichapterisar.co.in

EDITORIAL BOARD

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Message from DGHS

प्रो.(डॉ.) अतुल गोयल
Prof. (Dr.) Atul Goel
MD (Med.)
स्वास्थ्य सेवा महानिदेशक
DIRECTOR GENERAL OF HEALTH SERVICES

सत्यमेव जयते

भारत सरकार
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
स्वास्थ्य सेवा महानिदेशालय
Government of India
Ministry of Health & Family Welfare
Directorate General of Health Services

MESSAGE

I am happy to learn that Department of Biochemistry (Hindu Rao Hospital & North DMC Medical College) is organizing the **Annual Conference of the Delhi Chapter of the Indian Society for Atherosclerosis Research (ISAR-DCCON 2024)**, on **9th November 2024 at the Institution**. Hindu Rao Hospital (MCD), one of Delhi's most esteemed and historic healthcare institutions, has now evolved into a medical college, making significant contribution towards healthcare education and innovation.

I am also happy to note that **Delhi Chapter of ISAR** committed to advancing knowledge in **atherosclerosis** and related fields through annual conferences, symposia, and diverse academic activities. This society unites experts from a variety disciplines, including **Basic Sciences, Biochemistry, Molecular Biology, Cardiology, Cardiovascular Science, Epidemiology, Pharmacology**, and many more. It provides an open platform for all professionals engaged in basic and clinical research in atherosclerosis.

With the theme **"Integrating Basic Science and Clinical Insights in Atherosclerosis Management,"** this year's conference promises to be an enriching experience, featuring presentations from experts, stimulating panel discussions, and valuable opportunities for **young professionals** to present their research. The event will provide participants with advanced knowledge, enabling them to implement effective preventive measures against atherosclerosis, both personally and within the community at large.

I extend my best wishes to the **Organizing Committee** for a smooth and successful execution of this event.

(Atul Goel)

16.10.2024.
New Delhi.

Room No. 448-A, Nirman Bhawan, New Delhi-110108
Tel. No.: 011-23061063, 23061436, Fax No.: 011-23061024, email-dghs@nic.in

Message from Chief Guest

Sir Ganga Ram Hospital

DEPARTMENT OF CARDIOLOGY

Prof. (Dr.) J.P.S. Sawhney
DM, FESC, FACC
Chairman Department of Cardiology
Member Sir Gangaram Trust Society

It is my pleasure to extend my best wishes to the Indian Atherosclerosis Society for the upcoming prestigious conference. As Chairman of the Department of Cardiology and Chair of the Indian Clinical Practice Guidelines for Dyslipidemia Management, this event represents our shared commitment to excellence in prevention and treatment of Atherosclerosis.

In an era where cardiovascular diseases continue to be a leading health concern and dyslipidaemia being the major risk factor for coronary artery disease, I am confident that this conference will contribute to advancing our understanding and management of atherosclerosis.

I feel that this conference will be a definite success, fostering both innovation and the application of best practices in the management of atherosclerosis across India.

I look forward to the meaningful conversations, impactful discussions, latest research insights, and collaborative exchange among leading experts setting new benchmarks in our fight against atherosclerosis.

Best wishes to the conference secretariat and all attendees for a successful and inspiring conference.

Dr. JPS Sawhney

5 Nov'2024
New Delhi

Sir Ganga Ram Hospital Marg, Rajinder Nagar, New Delhi-110 060
Tel. : 91-11-25861746, 42251531• ICCU : 91-11-25861766, 42251592, 42251593 • Fax : 91-11-42437231
E-mail : jpssawhney@yahoo.com • Website : www.preventivecardiologyclinic.com • www.sgrh.com

Message from Director, Health Administration

MUNICIPAL CORPORATION OF DELHI
DEPARTMENT OF HOSPITAL ADMINISTRATION
Office of Director Hospital Administration
18th Floor, Dr. S.P. M. Civic Centre, Jawahar Lal Nehru Marg, New Delhi –110002

MESSAGE

I am happy to learn that Department of Biochemistry (Hindu Rao Hospital & North DMC Medical College) is organizing the Annual Conference of the Delhi Chapter of the Indian Society for Atherosclerosis Research (ISAR-DCCON 2024), on 9th November at Hindu Rao Hospital (MCD).

Given the rising burden of heart disease, particularly in the wake of the COVID-19 pandemic, the theme of this year's conference—*"Integrating Basic Science and Clinical Insights in Atherosclerosis Management"*—is both timely and vital.

Hindu Rao Hospital, one of the oldest hospitals has now transformed into a thriving medical college and educational hub under the Municipal Corporation of Delhi. With well-established programs such as MBBS, DNB, DA, B.Sc. MLT, and B.Sc. Nursing, the hospital remain committed to providing quality healthcare education and innovation, especially to the most underserved populations of Delhi NCR and neighbouring states.

I am confident that, this event will provide a unique platform for participants to engage with esteemed experts and offers young professionals, including basic scientists and healthcare practitioners from diverse fields, an opportunity to showcase their pioneering research and the knowledge shared and the collaborations forged here will lead to significant advancements in atherosclerosis management, ultimately enhancing patient care and outcomes.

May this event lead to groundbreaking discoveries and lasting progress in the fight against cardiovascular disease. I extend my best wishes to the organizing committee for a successful and impactful conference.

(Dr. Akshay Dharmarha)
Director, Hospital Administration

23.10.2024

New Delhi

Message from Medical Superintendent, HRH

Dear Delegates and Guests,

It is a true pleasure and an honor to welcome you to Hindu Rao Hospital, a distinguished institution dedicated to delivering healthcare to our community. As the Medical Superintendent, I am committed to ensuring that everyone who comes receives compassionate, personalized care within a safe and supportive environment. Our team is steadfast in its efforts to continually enhance our medical facilities, introduce innovative treatments, and elevate patient care practices, all while upholding the values that define our institution.

I am happy to note that Annual Conference of the Delhi Chapter of the Indian Society for Atherosclerosis Research (ISAR-DCCON 2024), is being hosted by our Department of Biochemistry this year at Hindu Rao Hospital. Given the increasing prevalence of cardiovascular disease worldwide, this year's theme "Integrating Basic Science and Clinical Insights in Atherosclerosis Management" reflects our shared commitment to addressing one of the most pressing health challenges of our time.

ISAR-DCCON 2024 provides an invaluable forum for connecting with distinguished leaders and experts in the field, while offering an unparalleled opportunity for emerging scientists and clinicians to present pioneering research. We believe that the exchange of ideas and collaborative spirit fostered here will drive substantial progress in atherosclerosis research, ultimately leading to enhanced patient outcomes and more effective care strategies.

On behalf of the organizing committee, I extend a warm and heartfelt welcome to all participants. I also express deep appreciation to Dr. Rajeev Ranjan, Head of the Department, and Dr. Harsh Vardhan Singh, Senior Biochemist & Organizing Secretary, for their commitment and vision in bringing this first-ever conference to the Biochemistry Department at Hindu Rao Hospital. Their dedication has been instrumental in creating what promises to be a transformative event that will inspire innovation and contribute meaningfully to our fight against cardiovascular disease.

May this conference be a resounding success, paving the way for continued advancement and collaboration in the field of atherosclerosis.

Warm regards,

(Dr. Anand Narnoliya)
Medical Superintendent

Message from Dean, NDMC Medical College

Dear Delegates,

I extend my warmest congratulations to department of biochemistry on organizing the upcoming Annual Conference of the Delhi Chapter of the Indian Society for Atherosclerosis Research (ISAR-DCCON 2024), scheduled to take place on 9th November at North DMC medical college & Hindu Rao Hospital (MCD).

India's current health scenario presents a daunting double-edged sword, where the nation grapples with the overlapping burdens of Communicable Diseases (Infectious diseases like tuberculosis, HIV, malaria, and vaccine-preventable illnesses) and Non-Communicable Diseases (Chronic conditions such as cardiovascular diseases (CVD), cancer, diabetes, and chronic respiratory diseases).

Atherosclerosis, a major NCD, significantly contributes to India's CVD burden, leading to increased morbidity, mortality, and economic strain.

This prestigious conference aims to bring together experts from various fields to share knowledge, discuss recent advancements, and promote research in atherosclerosis. The event will feature keynote lectures, paper presentations, and panel discussions by renowned experts.

Your tireless efforts and dedication to promoting research and knowledge in atherosclerosis will undoubtedly make this conference a resounding success. The impressive lineup of speakers, panel discussions, and presentations will provide a valuable platform for experts and delegates to share insights and advancements.

I encourage all faculty members, residents, and students to participate in this conference, which promises to be an enriching experience. Your presence will not only enhance your knowledge but also contribute to the success of this event.

I applaud your commitment to advancing medical science and education. Your hard work reflects the institution's values and commitment to excellence.

Best wishes for a successful and enriching conference.

Dr. (Prof.) Vinay Kumar Tiwari,
Dean
North DMC Medical College

Message from President, DC-ISAR

Greetings from Delhi Chapter ISAR!!

It is a pleasure and honor to communicate with you as the President of the Delhi Chapter of this prestigious body ISAR dedicated to Atherosclerosis research!

The identification and treatment of standard modifiable risk factors (SMuRFs: hypertension, diabetes mellitus, hypercholesterolemia, and smoking) leads to reductions in cardiovascular disease (CVD). However, Recent evidence highlights the importance of triglyceride-rich lipoproteins (TGRLs). Clinical trials (2021 ACC Expert Consensus on Hypertriglyceridemia , AHA/ACC Cholesterol Guidelines) have suggested use of statins , omega 3 fatty acids and fibrates in severe hypertriglyceridemia. Furthermore, Inflammation is a major factor in progression of atherosclerosis with hsCRP as the proven consistently reliable indicator of inflammatory cardiovascular disease risk. Large scale randomized studies (COLCOT and LoDoCo2) showed that a low dose (0.5 mg/day) of colchicine lowered the risk of acute cardiovascular events. Colchicine is now the first drug approved by the Food and Drug Administration for the treatment of cardiovascular inflammation in US in June of 2023

The current understanding of the molecular, cellular, genetic, and environmental contribution to atherosclerosis comes from research in individual pathways as well as the systems. However, till health is holistically managed the prevention of atherosclerosis is a dream.

I congratulate Dr Harshvardhan Singh and his team for putting together this visionary Conference on Atherosclerosis which will be an academic feast for sure and further evoke insights in translational research.

May DC-ISAR always be a vibrant society as it contributes effectively and significantly to guide research and management of Atherosclerosis.

Best Wishes

Dr RITU SINGH
President, DC-ISAR & Former National President ISAR
MD, FIME, FISAR, FIMSA, WHO fellow (Lab Genetics) AIIMS, Delhi
Genomics Fellow DHR (University of Florida, USA)
Director Professor & HOD, Deptt. of Biochemistry
LHMC & Associated SSKH & KSCH hospitals, New Delhi 110001
Ph: 9811173213, email: drritusingh19@gmail.com

Message from President Elect, DC-ISAR

Dear Dr. Harsh Vardhan Singh,

Organizing Secretary, ISAR-DC CON 2024,

I am thrilled to learn about the Annual Conference of the Delhi Chapter of the Indian Society for Atherosclerosis Research (ISAR-DCCON 2024), scheduled for November 9, 2024, at Hindu Rao Hospital & North DMC Medical College, organized by the Biochemistry Department under our leadership, organizing such a significant event.

As heart disease continues to emerge as a major health concern, particularly in the wake of the COVID-19 pandemic, this year's conference theme, "Integrating Basic Science and Clinical Insights in Atherosclerosis Management," is both timely and crucial. I believe it will provide an enriching experience for all participants.

I look forward to engaging discussions with leading experts and the valuable opportunities it offers for young professionals to present their research work.

Wishing the conference a Grand Success!

Best regards

(Dr Jagrati Bhatia)
President Elect
DC ISAR
Professor
Department of Pharmacology
All India Institute of Medical Sciences, Delhi

Message from Chairperson, Scientific Committee, DC-ISAR

It is indeed a privilege to have a conference of the Delhi Chapter of the Indian Society for Atherosclerosis Research (ISAR) hosted by the Department of Biochemistry, North DMC Medical College and Hindu Rao Hospital.

The Delhi Chapter of ISAR was founded in 2014 and has grown to include 157 members from our capital city. Our aim is to spread awareness amongst our fraternity and clinical colleagues regarding the new biomarkers identified and the latest recommendations for reporting and management of atherosclerosis through scientific activities like webinars, CMEs, conferences, etc

Towards this, the Hindu Rao Hospital and associated North DMC Medical College have been very proactive and we are happy that their Department of Biochemistry under the able leadership of its head, Dr. Rajiv Ranjan, has organized this conference with the very dynamic Dr. Harshvardhan Singh as Organizing Secretary. This hospital is one of the oldest institutes of Delhi, an esteemed healthcare organization of India, imparting modern as well as indigenous medical healthcare to its patients. Their involvement with the National Societies and their attitude of implementing the latest in healthcare for the care of their patients is commendable.

I am honoured to be a part of the organizing committee of this CME and I wish the whole efficient vibrant team a successful event.

I look forward to many more academic collaborations in the future as well.

S Bhargava

[Dr. Seema Bhargava]
Chairperson, Scientific Committee
Chairperson & Sr Consultant
Department of Biochemistry
Sir Ganga Ram Hospital, New Delhi
Immediate-Past President, ACBI
Member, IFCC Evidence Based Laboratory Medicine Committee
Member, IFCC Task Force for Laboratory Medicine Practice Guidelines
Immediate-Past Chairperson CAHO-Diagnostic Division

Message from Secretary, DC-ISAR

Dear Esteemed Participants,

It is my great pleasure to welcome you to the Annual Conference of the Delhi Chapter of ISAR - DCCON 2024, hosted by the Department of Biochemistry at Hindu Rao Hospital & North DMC Medical College, New Delhi. A special greeting is extended to all participants who share a passion for advancing medical knowledge and a commitment to a holistic approach in managing Coronary Artery Disease.

The theme for this year's conference, "Integrating Basic Science and Clinical Insights in Atherosclerosis Management," reflects our goal to explore comprehensive strategies for addressing coronary artery disease. This event, scheduled for 9th November 2024, will bring together experts, practitioners, and researchers to share their valuable expertise and experiences, fostering learning and collaboration.

We recognize the pivotal role that young researchers and students play in shaping the future of medical science. This conference offers a unique platform for them to present their work, receive insightful feedback, and build connections with both peers and mentors. We encourage all young participants to engage actively in the discussions, be inspired by the wisdom of seasoned professionals, and seize this enriching opportunity.

As the Organizing Secretary, I, along with my Office bearers & esteemed colleagues, am excited to welcome you to witness the dynamic exchange of ideas and the vibrant display of research from both senior experts and emerging talents. Together, let's strive to make this conference a truly memorable and impactful event.

We look forward to your enthusiastic participation and the collective success of the Annual conference of ISAR DC CON 2024.

Warm regards,

(Dr Harsh Vardhan Singh)
Organizing Secretary
ISAR DC CON 2024

Message from Treasurer, DC-ISAR

Message

Dear Delegates,

The annual conference of ISAR-DC, being hosted this year by the Department of Biochemistry, Hindu Rao Hospital and North DMC Medical College, provides an opportunity to get latest updates in basic as well as clinical research in the vast field of atherosclerosis. As ISAR-DC members are from different branches and specialities, this platform is an excellent place for much-needed interaction between basic and clinical scientists.

Young, budding researchers also get an opportunity not only to present their work, but also to interact with renowned researchers.

As a treasurer of ISAR-DC, I feel privileged to welcome you all to this academic feast.

Looking forward to a fruitful interaction with all of you.

Regards

(Dr Rajeev Goyal)
Treasurer, DC-ISAR
Professor
Dept. of Biochemistry
LHMC and associated hospitals

Message from Editor's Desk, DC-ISAR

Dear DC- ISAR Members

I am thrilled to return as the editor of the Newsletter and Souvenir for DC-ISAR. Being a part of this society is a true privilege. Our commitment to advancing research and nurturing young talent in atherosclerosis is vital to alleviating the disease burden in our community.

I would like to extend my heartfelt gratitude to Dr. Ritu Singh, President of DC-ISAR, for her invaluable mentorship that has guided me throughout my journey with ISAR.

My sincere thanks to Dr Harsh Vardhan Singh, Secretary DC-ISAR and the Organizing Secretary of this CME for his steadfast support. He has worked tirelessly to ensure that this CME is a resounding success.

It's inspiring to see so many young scientists and scholars engage with the CME through their oral and poster presentations. All the students whose research has been accepted and published here truly deserve accolades for their hard work and dedication. Their efforts not only contribute to the advancement of knowledge in our field but also inspire others to pursue excellence in research

A huge thank you to all the authors who contributed writing the wonderful and inspiring articles,

Lastly, I would like to thank our enthusiastic readers, dedicated students, and esteemed members of the society for their invaluable support in making this Newsletter and Souvenir a compelling read

Dr Parul Goyal
Professor, Biochemistry, ABVIMS-Dr RMLH
Executive Member DC-ISAR

Former Secretary ISAR National Body

PROGRAM SCHEDULE

S. No.	Time	Speaker	Topics	Chairperson
1	08:00 A.M. - 09:00 A.M.		Registration	
2			Inaugural Ceremony (09:00 A.M. - 10:00 A.M.) & Power Point Presentation (10:00 A.M. - 11:00 A.M.)	
3	09:00 A.M. - 09:10 A.M.		Welcome by Dr. Hardik Vardhan Singh (HOD)	
4	09:10 A.M. - 09:15 A.M.		Introduction by Dr. Sagar Kapur & Rekha Vora	
5	09:15 A.M. - 10:15 A.M.	Chairperson: Dr. Rajiv Gupta (DMC)	Session 1 Young Victorious (Oral Presentation)	Dr. S.B. Sharma (PHC) Dr. Pradeep Kumar Dubey (GBP) Dr. Vinay Chaturvedi (AIIMS) Dr. Harman Kaur (GSC)
6	10:15 A.M. - 11:15 A.M.	Chairperson: Dr. A.K.S. Singh (MGIMS)	Session 2 Young Victorious (Oral Presentation)	Dr. M.S. Bhatt (HOD) Dr. Rana Pratap (VMMC)
7	11:30 A.M. - 12:30 P.M.		Tea Break	
8	11:30 A.M. - 12:30 P.M.		Mystery of the Most Sudden to Believe Show	
9	12:30 P.M. - 12:45 P.M.	Dr. Krystal Chauhan (DU)	The Crucible of Pro-Radical and Other reactive species in Atherosclerosis and other cardiovascular diseases	Dr. Nishant Das (AIIMS) Dr. Rajeev Lochan (AIIMS) Dr. Sunil Ahlawat (MAM) Dr. Sonia Roy (PHC)
10	12:45 P.M. - 01:00 P.M.	Dr. Anish Mewar (AIIMS)	Redox and Markers of Myocardial Damage	Dr. Archana Singh (Asso) Dr. Pankaj Das (HOD) Dr. Sandeep Mishra (VMMC)
11	01:00 P.M. - 01:15 P.M.	Dr. Dhruv Kumar (Moderator) (AIIMS)	Role of Imaging and Interventional Radiology in the Management of Atherosclerotic Disorders	Dr. Shivam Prakash (AIIMS) Dr. V.K. Yadav (HOD)
12	01:15 P.M. - 01:30 P.M.	Dr. Rachana Agarwal (RGSH)	Hypertension & Cardiology: Light Points and Black or White	Dr. Avinash Agarwal (VMMC) Dr. Rana Shukla (VMMC) Dr. Mamta Kanchan (VMMC)
13	01:30 P.M. - 02:30 P.M.		Lunch	

14	01:47 PM – 02:00 PM	Inaugural Function Felicitation of dignitaries, Lamp lighting Chief Guest Dr. JPS Sawhney Guest of Honour Dr. Akshay [illegible] Dr. Anand [illegible], Medical Superintendent Dr. VK Tiwari, Dean Dr. [illegible] Singh, President Dr. Seema Bhargava, Chairperson Scientific Committee Dr. Rajiv Ranjan, HOD Biochemistry Dr. Harsh Vardhan Singh, Secretary Dr. Rajeev Goyal, Treasurer Release of Souvenir cum newsletter of DC-ISAR DC-ISAR Lifetime Achievement award		
15	02:00 PM – 02:20 PM	Dr. JPS Sawhney (SGRH)	CSI – Clinical practice Guidelines for the management of Dyslipidemia	Dr. [illegible] Dwivedi (UCMS) Dr. [illegible] Srivastava (UCMS) Dr. [illegible] (AIIMS)
16	02:20 PM – 03:20 PM	Panel Discussion on "Prevention and Management of Atherosclerosis"	Moderator Dr. [illegible] (AIIMS) Panelists Dr. J P S Sawhney (SGRH) Dr. Sangeeta Sharma (IHBAS) Dr. Hemant Sharma ([illegible]) Dr. [illegible] Sharma ([illegible]) Dr. Seema Bhargava (SGRH) Dr. [illegible] Singh ([illegible]) Dr. [illegible] Singh (LHMC)	
17	03:20 PM – 03:40 PM	Dr. Zahid Ashraf (Jamia Millia Islamia University)	Lung [illegible] Risk and Cardiovascular Disease: A New Paradigm	Dr. L.M. Srivastava (AIIMS) Dr. [illegible] Narayan Yadav (AIIMS) Dr. [illegible] ([illegible])

OFFICE BEARERS

S.No.	Name	Designation
1	Dr Ritu Singh	President
2	Dr Jagriti Bhatia	President Elect
3	Dr Gajender Singh Ranga	Vice President
4	Dr Harsh Vardhan Singh	Secretary
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14	Dr Rachna Agarwal	Executive member
15	Dr Archna Singh	Executive member
16	Dr Bhumika Upadhyay	Executive member

Lifetime Achievement Awards

Dr. S. B. Sharma

Professor, Dept. of Biochemistry, SMS&R, Sharda University

Dr. S.B. Sharma, is presently working as Professor in the Dept. of Biochemistry at SMS&R, Sharda University after her superannuation (Ex- Director Professor in the Dept. of Biochemistry, University College of Medical Sciences, University of Delhi) she is having vast teaching experience (about 40 yrs.) of Biochemistry to undergraduate and post –graduate medical students. She has the distinction of supervising several PhD and MD students. She is very actively involved in research on diabetes and cardiovascular diseases. Her quest for developing new drugs from medicinal plants made her a unique researcher in this area, where she has the distinction of discovering new active molecules from different medicinal plants, for which she has been granted one US and two Indian patents. She is having more than one hundred research papers to her credit. Her research findings have been published in national and International Journals of repute. Being an active researcher, she was honored as fellow of Association of Clinical Biochemists of India. She has several medals and awards to her credit. She is a peer for review on several journals and an active reviewer of research projects for funding by various scientific agencies. She is also the immediate past president of ISAR-DC. She is associated with ISAR since 1998 and served the Society as treasurer, Joint Secretary, Vice President, President Elect and President of National Indian Society for Atherosclerosis. She has also organized national and international conferences at various places.

Lifetime Achievement Awards

Dr RITU SINGH

Professor & Head, Dept. of Biochemistry, LHMC, Delhi

Dr. Ritu Singh embarked on her medical career in 1982 at the Armed Forces Medical College (AFMC), completing her MBBS in 1986 from Lady Hardinge Medical College (LHMC) and an MD in Medical Biochemistry at UCMS and GTB Hospital. She gained extensive clinical experience across notable private hospitals, including Sir Ganga Ram Hospital, Majeedia Hospital (now Hamdard Institute of Medical Sciences and Research), and Modi Hospital. Her public-sector tenure includes work at ESI Basaidarapur, VMMC, AIIMS, and LHMC, while internationally, she furthered her expertise at the Burnet School of Medicine, University of Florida.

Her credentials are distinguished, with a WHO fellowship in Laboratory Genetics (2001), certification in hospital administration from NIHFW (2023), and a DHR Fellowship in Cardiovascular Genomics from the University of Florida (2015), awarded by ICMR and the Ministry of Health & Family Welfare. In 2016, she completed advanced training in medical education at CMC Ludhiana, adding to her memberships with the International Medical Sciences Academy (2001) and ISAR (2019).

Currently, Dr. Singh serves as Head of the Biochemistry Department at LHMC, where for the past 15 years, she has led workshops on advanced genetic methodologies, including PCR, HPLC, ARMS PCR, Real-Time PCR, and AI in diagnostics. Her laboratory was recently showcased by NIHFW to senior administrators nationwide. As LHMC's medical education coordinator and cultural head, she has also established a Student Leadership Mission, fostering leadership and engagement within the student community.

An authority in her field, Dr. Singh is Editor-in-Chief of *Lippincott Illustrated Reviews (SAE) Biochemistry* (2021 onwards) and a Lead Assessor for NMC inspections. Her dedication to atherosclerosis research spans decades, with notable contributions to ISAR, where she has served as Treasurer, Secretary, and President of the National Body. As the founding Secretary of ISAR's Delhi Chapter, she organized impactful conferences, including the 2019 National Conference at LHMC and recent CMEs for ISAR and ACCLMP in 2023 and 2024.

Her research, funded by DHR, DBT, and ICMR, on genomics and proteomics in myocardial infarction has been widely published and advances the understanding of MI prevention and recurrence. Dr. Singh has guided over 60 MD, DM, and PhD theses in atherosclerosis and related

fields. Her accolades include the Sri Venkateshwara Cardiac Research Medal (2010, 2013), Lord Sreenivasa Medal (2013), and international awards from APOBM (2012) and APSAVD (2011).
The Delhi Chapter of ISAR is honored to recognize Dr. Ritu Singh with the Lifetime Achievement Award for her outstanding contributions to medical science and education.

A1: CSI CLINICAL PRACTICE GUIDELINES FOR DYSLIPIDEMIA MANAGEMENT

Dr. JPS Sawhney

Dyslipidemia is a key risk factor for coronary artery disease (CAD). The Cardiological Society of India (CSI) has developed clinical practice guidelines for the Indian population. These guidelines emphasize the targeted management of dyslipidemias pertinent to India, with a particular focus on elevated low-density lipoprotein (LDL) cholesterol, non-high-density lipoprotein cholesterol (non-HDL-C), triglycerides, and lipoprotein(a).

The CSI guidelines address dyslipidemia management across various population groups, including the elderly, young adults, children, and patients with specific comorbidities such as stroke, peripheral artery disease, kidney failure, post-transplant conditions, HIV, and familial hypercholesterolemia. Drawing on data from Indian studies where available, supplemented by international guidelines (primarily European), and expert opinion from Indian cardiologists, these recommendations advocate the principles: "earlier is better," "lower is better," "longer is better," and "together is better" for comprehensive dyslipidemia management.

Key Recommendations:

- Non-fasting lipid profiles are recommended for both risk assessment and treatment planning.
- Routine lipid screening should commence at age 18.
- Lipid profile reports should include standardized references and outline risk estimation alongside treatment goals.
- LDL-C goals are stratified by risk levels:
    - Low-to-moderate risk (general population): <100 mg/dL
    - High risk (diabetes and hypertension with additional risk factors): <70 mg/dL
    - Very high risk (existing cardiac disease, stroke, peripheral vascular disease): <55 mg/dL

- Genetic causes, such as familial hypercholesterolemia and elevated lipoprotein(a) levels, should be actively screened.
- Combination therapy with statins and non-statin agents is recommended for the safe and effective management of CAD.
- For patients with high triglycerides (>150 mg/dL), targeting non-HDL cholesterol is advised.

These guidelines aim to offer a structured approach to lipid management in India, tailored to the specific needs of the population, with the ultimate goal of reducing CAD-related morbidity and mortality.

A2: THE CENTRALITY OF FREE RADICALS AND OTHER REACTIVE SPECIES IN ATHEROSCLEROSIS AND OTHER CARDIOVASCULAR DISEASES

Shyamal K. Goswami, Former Professor, School of Life Sciences, JNU, New Delhi

Atherosclerosis, an inflammatory vascular disorder, has been of intense interest since the early twentieth century. Among the contributory factors are, inflammation, endothelial dysfunction, and altered lipid metabolism. The etiology of atherosclerosis and other associated conditions like diabetes, chronic inflammation, metabolic syndrome etc., includes aberrant generation of free radicals and other reactive species. Free radicals like $O_2^{\bullet-}$, (Superoxide), $ONOO^-$ (Peroxynitrite), and reactive species like H_2O_2 are generated in our body through numerous metabolic reactions, mitochondrial electron transport system, and by certain designated enzymes like NADPH oxidases. Up until the end of twentieth century, free radical and reactive species were considered major toxicants causing several cardiovascular and neurodegenerative diseases. To cope with their toxic effects, cells also have a battery of antioxidants that rapidly attenuate them. In the past decades, there has been a paradigm shift when it was established that these species are in fact signaling molecules regulating numerous physiological processes, and their aberrant or inappropriate generation causes cellular dysfunction and diseases. Accordingly, a new field of Redox Biology has emerged in which these reactive species are studied as a common thread of several diseases. Novel therapeutics are also being developed for treating such dysregulated generation of reactive species.

A3: BIOCHEMICAL MARKERS OF MYOCARDIAL DAMAGE

Dr Anjali Manocha

Vice-Chairperson and Senior consultant

Department of Biochemistry

Sir Ganga Ram Hospital, New Delhi

Biochemical markers of myocardial damage continue to play a pivotal role in the diagnosis and management of acute coronary syndromes. Since 50% of the patients may have non-diagnostic electrocardiograms, biochemical markers add value to the diagnosis of myocardial infarction. The earliest markers like aspartate aminotransferase, LDH and creatinine kinase are now obsolete. These were followed by isoenzymes of LDH and later by the widespread use of CK-MB subunit activity. In recent years, a highly specific biomarker, cardiac troponin has emerged as an indispensable tool and has increased the diagnostic accuracy for the diagnosis of acute chest pain. In 2018, the European Society of Cardiology published the fourth universal definition of myocardial infarction, in which a biomarker, the high sensitivity cardiac troponin (hs-Troponin) acquired a central role in the diagnosis algorithm. Certain newer markers like cytokines have also shown promise as alternative markers to cardiac troponins. Specific exosomal proteins and miRNA's have also been found to be associated with CVD and in combination with the troponins, may improve the risk stratification, diagnosis and prognosis of acute coronary syndromes.

With the development of standardized and efficient methods, CVD diagnosis and treatment has the potential to be revolutionized and future research in this field would aid in the development of personalized treatments.

A4: ROLE OF IMAGING AND INTERVENTIONAL RADIOLOGY IN THE MANAGEMENT OF ATHEROSCLEROSIS: AN OVERVIEW

Prof. Deep Narayan Srivastava, Department of Radiology, North DMC Medical College & Hindurao Hospital, Delhi.

Cardiovascular diseases (CVD) are a major health concern worldwide and atherosclerosis is the main cause of CVD.

Atherosclerosis is a systemic and chronic inflammatory disease, which is characterized by plaque formation and can affect different vascular beds.

Imaging of atherosclerosis could guide therapeutic interventions. Ultrasound with Doppler, Computed tomography (CT), Magnetic resonance imaging (MRI), Positron emission tomography (PET) and Angiography are the main imaging modalities available for the assessment of atherosclerotic burden and for potential prediction of future events.

Interventional radiology is a minimally invasive modality used for treatment.

The introduction of new hybrid imaging techniques like PET/MRI allows for the simultaneous evaluation of anatomical and metabolic characteristics of tissues.

An overview of coronary and non-coronary atherosclerosis and the current understanding of different available imaging techniques, the integration of these techniques in clinical practice for superior risk stratification and therapeutic planning as well as monitoring of interventional and medication-based treatment strategies will be discussed.

A5: APOLIPOPROTEIN E GENOTYPE, LIPID PROFILE & RISK OF STROKE

Dr Rachna Agarwal1, Dr C B Tripathi2, Dr Suman Kushwaha3

1Professor & Head, Department of Neurochemistry

2 Associate Professor & Head, Department of Biostatistics

3Professor & Head, Department of Neurology

Institute of Human Behavior & Allied Sciences, Delhi

Stroke is the second most frequent cause of mortality and disability worldwide with two thirds strokes occurring in individuals older than 65 years of age. It is a multifactorial disease with heterogenous etiopathogenesis. Various studies show that the human apolipoprotein E (ApoE) may have an impact on stroke occurrence which is substantiated by the fact that there is strong correlation between APOE genotyping with cholesterol metabolism, atherosclerosis, ischemic heart diseases, cerebral amyloid angiopathy and stroke. ApoE gene is located on chromosome 19 coding for apolipoprotein E. It is present in three isoforms: ApoE2, ApoE3 and ApoE4 with six

genotypes E2/2, E2/3, E2/4, E3/3, E3/4 and E4/4. On this back ground the present study was taken up to find out the distribution various ApoE genotype in stroke and association of ApoE4 with stroke.

Methodology: A cross-sectional study was performed on non-diseased and diseased subjects with stroke from outpatient services of Neurology department of Institute of Human Behavior & Allied Sciences (IHBAS), New Delhi (India). All the subjects with acute onset of persistent neurological deficit were diagnosed as stroke, confirmed by neuroimaging (CT/MRI), whereas in control group subjects included were attending the department of Neurology in same hospital for illness other than stroke and without any memory complaints. The patients of head injury presenting with stroke were excluded. APOE genotyping was done in all subjects by ARMS-PCR method.

Results: In stroke group, there were 112 subjects (Mean age 57.61 ± 15.21 years; 41 females & 71 males), and control group had 113 patients (mean age: 57.45 ± 14.25 years; 49 females & 64 males). Genetic analysis performed to identify the frequency of six possible ApoE genotypes among diseased and non-diseased subjects. The ApoE3/3 genotype was most predominant genotype in both groups, whereas ApoE3/4 had second most frequency of occurring in stroke group (13.4%) and Control group (10.60%). No subject in stroke group had ApoE4/4. However, 01 subject in control group had ApoE4/4/ (Table 1). ApoE4 allele was present in 17 subjects in stroke as compared to 13 subjects in control group. Association study showed that ApoE4 allele as risk factor (AOR=1.36; 95% CI: 0.63 - 2.96), showing a weak association.

Discussion: The genetic contribution in stroke is polygenic. However, very few studies have been taken up to study the role of ApoE variation in development of stroke. Luthra et al 2002 and Ganaie et al 2020 examined the association of ApoE gene polymorphism with stroke in Indian population. The present study, ApoE4 allele showed 1.32 folds odds for developing stroke. Similar findings have been reported by Ganaie et al. who also reported that ApoE4 allele had 2.74 folds odds for developing ischemic stroke in ethnic Bengali population of west Bengal. We have also found that ApoE4 allele has strong association with AD & Other dementias, whereas weak association with Parkinson's disease in our studies. However further studies need to be done to find out the association ApoE4 allele with various neurological diseases.

A6: LONG NONCODING RNA AND CARDIOVASCULAR DISEASE: A NEW PARADIGM

Prof. Mohammad Zahid Ashraf

Dean, Faculty of Life Sciences, Jamia Millia Islamia, New Delhi – 110025.

Email id: zashraf@jmi.ac.in

Long noncoding RNAs (lncRNAs) are transcribed RNAs that are not translated into functional proteins. Functionally, lncRNAs plays diverse role in disease development and progression as they can modulate and regulate gene expression and signaling pathways because of their ability to interact with DNA, RNA, microRNAs, and proteins such as chromatin modifiers and also dependent on their localization within the nuclear or cytosolic compartment. Further, they play a crucial role in regulating the epigenetic landscape of the human genome. Recent findings have shown a strong regulatory role of lncRNAs on cardiovascular tissue homeostasis in health and disease. Thrombosis in the context of cardiovascular disease affects mainly the blood vessels supplying the heart, brain and peripheries and it is one of the leading causes of death worldwide. Hypoxia, such as observed at high-altitude, obstructive sleep apnea and SARS-CoV2 viral infection have long been suggested as risk factors for thrombosis. With this pretext, we aimed to study the role of non-coding RNAs in context of hypoxia-induced thrombosis majorly focussing on the lncRNAs. We have explored the lncRNA landscape of High-Altitude Deep Vein Thrombosis (HA-DVT). The transcriptome profile of HA-DVT patients describes novel potential mechanisms of interaction between lncRNAs, the coding genes, miRNAs, and regulatory transcription factors that define the thrombotic signature and may be used in establishing lncRNAs as a biomarker. The study concludes that the lncRNA-*LINC00659* and *UXT-AS1* regulate the expression of prothrombotic genes. Hypoxia triggers inflammation and contributes to endothelial activation, promoting a pro-thrombotic phenotype. We have explored the lncRNA profile of the hypoxia exposed endothelial cells and identified lncRNA LINC00607, as a potential epigenetic regulator of the endothelial prothrombotic state under hypoxia, adding a new mechanistic tangent into the previously established hypoxia-induced endothelial prothrombotic milieu. Epigenetic mechanisms can significantly influence

gene expression, cell differentiation, tissue development, and susceptibility to diseases. In quest to understand the epigenetic changes in HA-DVT patients we have identified Thrombomodulin gene as potential candidate for methylation, regulated by hypoxia-induced epigenetic mechanism. Additionally, given that the precise role of miRNAs in the etiphysiology of venous thrombosis (VT) is limited we have identified miR-145 as a key molecule for regulating thrombus formation in VT employing network-based bioinformatics approach and *in vivo* experiments. In conclusion, lncRNAs hold great promise to serve as important future therapeutic targets of cardiovascular disease. Future research should examine the potential role of interventions that increase or normalize lncRNA expression.

Oral Presentation Abstracts

OP 01: TO STUDY THE CORRELATION OF SUBCLINICAL HYPOTHYROIDISM WITH METABOLIC SYNDROME AND OBESITY

Vishwajeet Roy[1]*, Rohan Rajput[1], Sana Alam[1], Kailash Chandra[1]

Department of Biochemistry, HIMSR, New Delhi

Introduction: Thyroid disorders are prevalent worldwide, affecting millions, with India hosting a significant burden. Subclinical hypothyroidism (SCH), marked by elevated TSH levels with normal thyroid hormones, is especially common and linked to metabolic syndrome (MetS), obesity, and cardiovascular risks. Research shows SCH impacts lipid profiles, glucose metabolism, and blood pressure, increasing the likelihood of MetS and related health issues. This study aims to examine the relationship between SCH and MetS parameters such as BMI, waist circumference, lipid levels, glucose, and blood pressure in the Indian population. Results may guide early diagnosis and intervention, helping mitigate cardiovascular and metabolic disease risks.

Materials and methods: This cross-sectional study involved 160 patients with subclinical hypothyroidism (SCH), conducted over one year at Hamdard Institute of Medical Sciences, New Delhi. Eligible patients were aged 25-65 years with elevated TSH (>4.94 mIU/L) and normal FT3 and FT4 levels. Exclusion criteria included overt thyroid disease, pregnancy, and certain medications. Blood samples were collected after overnight fasting to analyze thyroid function, glucose, and lipid profiles. Anthropometric measurements, BMI, waist circumference, and blood pressure were recorded. Metabolic syndrome was defined using NCEP ATP III criteria. Tests utilized the ARCHITECT CMIA analyzer and Beckman Coulter AU 480, employing chemiluminescence and enzyme-based assays.

Result: In this study, out of 160 subclinical hypothyroidism patients, 119 (74.4 %) subjects have been detected with metabolic syndrome. No statistically significant difference of biochemical parameters were found in males and females (p value < 0.05). Furthermore, biochemical parameters were assessed as per the BMI level of the subjects. Interestingly, an increasing trend of TSH were found with increasing BMI of study subjects (p value > 0.05).

Conclusion: This study found a strong association between high BMI and elevated cholesterol, LDL-C, and triglycerides in subclinical hypothyroidism patients, with 74.4% showing metabolic syndrome, emphasizing the need for early diagnosis and management.

Keywords: Hypothyroidism, Metabolic syndrome, Triglycerides, Cholesterol, Obesity.

OP 02: ASSOCIATION OF SERUM SCLEROSTIN LEVELS WITH METABOLIC SYNDROME AND BONE MINERAL DENSITY IN PREDIABETES

Dasapalli Veenapriya, Manoj Kumar Bhaskar, Ajay Chauhan, Parul Goyal, Anil Taneja
Department of Biochemistry, Department of Medicine, Department of Radiology,
ABVIMS & DR RML Hospital, New Delhi-110001
Presenting author email id: d.veenapriya@gmail.com

Introduction: Sclerostin is a circulating 190 amino acid glycoprotein secreted by osteocytes. As a result of Prediabetes there are higher Sclerostin levels inhibiting Wnt-signalling pathway suppressing osteoblast activity downregulating the bone turn over leading to increased bone fragility and fracture risk in T2DM.

Higher Sclerostin levels, Serum lipid profile and HOMA-IR are associated with Atherosclerosis and abnormal CIMT as wnt signalling pathway implicates in pro proliferation of aretrial and vascular smooth muscle cells regulating endothelial inflammation, vascular calcifications.

Bone Mineral Density is a measure of Bone strength measured by DXA scan by calculating Tscore. Bone homeostasis is disturbed in Prediabetes and diabetes due to impaired Wnt signalling pathway.

Materials and methods: A cross-sectional observational study held at Department of General Medicine, Biochemistry and Radiology at ABVIMS & DR RML HOSPITAL, New DELHI during a period of January, 1 2021 to May 31 2022 and sample size calculated to be 50 diagnosed Prediabetic patients and 50 healthy controls making it 100 in each group.

Results: Results revealed significantly higher levels of Sclerostin (ng/mL) in prediabetics 18.22 ± 19.4 compared to controls 11.08 ± 4.73 ($p<0.013$). A significant negative correlation of sclerostin with BMD and T-score in prediabetics ($p<0.001$) was

also seen. We also found that 42% patients have osteopenia and 18% patients have osteoporosis in prediabetes.

Conclusions: In prediabetes patients, serum levels of sclerostin can be considered as a surrogate marker for early detection of bone status and detection of bone mineral mass & quality. CIMT can be performed to evaluate the use- fulness of sclerostin as a marker for atherosclerosis

OP 03: ASSESSMENT OF IMPACT OF NEWLY INTRODUCED STRUCTURED FOUNDATION COURSE IN COMPETENCY-BASED MEDICAL CURRICULUM FOR MBBS UNDER-GRADUATES

Mehak Preet Singh[1], Priyank Udagani[1], Harnam Kaur[1], Sonam Bhatia[1], Rumani Dhull[1]

[1] Department of Biochemistry, ESIC Medical College & Hospital, Faridabad, Haryana

e-mail – mehakpreetsingh005@gmail.com

Introduction: The MBBS course is a highly challenging course that demands discipline, motivation, ethics, hard work, lifelong learning, communication and social skills, and knowledge. A new competency-based curriculum was rolled out across medical schools in India from the year 2019. The foundation course aims to bring students from different socio-economic and educational backgrounds on an equal footing for their way ahead.

Materials and methods: The study was designed as a quasi-experimental, cross-sectional study. Freshly admitted MBBS undergraduate students were included in the study. An online well-structured google form containing pre-tested, pre-validated questionnaire (20 in number) with 5-point Likert scale to assess opinion on various domains as envisaged in the foundation course. The students attempted the questionnaire before and then again after the completion of the foundation course. Data from 96 paired subjects (47 males, 49 females) was analysed.

Results: The 5-point Likert scale had 20 items which the students could rate from strongly agree, agree, don't know, disagree, or strongly disagree. A statistically significant change in opinion was observed in some statements on ethics, professionalism, etc after the completion of the foundation course.

Conclusion: The implementation of foundation course will help students become more professional in their approach to modern medicine. It makes them realize the importance of ethics, communication, and gender sensitization, being inquisitive and

overall orients them for lifelong learning. The results of our study demonstrate that students attested to the need for the foundation course.

Keywords: Curriculum, foundation course, cross-sectional study, professional, students

OP 04: COMPARATIVE QUANTITATIVE PROTEOMIC PROFILING FROM EXOSOMES OF NON-INVASIVE SALIVA, URINE, AND BLOOD IDENTIFYING AND VALIDATING EARLY DIAGNOSTIC BIOMARKERS IN PATIENTS WITH CORONARY ARTERY DISEASE

Pratibha Sharma[1,2], Rajinder K Dhamija[1], Krishna Kishore Inampudi[2], Ambuj Roy [2]

[1]Institute of Human Behaviour and Allied Sciences, Delhi, India

[2]All India Institute of Medical Sciences, New Delhi, India

Aim: To identify the early biomarkers from plasma, saliva, and urine exosome proteins associated with coronary artery disease (CAD).

Background: Biofluid exosome sources are an easy, accessible, and emerging trove of biomarkers in CAD. It is a chronic inflammatory disease having a long asymptomatic phase of fatty-fibrous development in arteries leading to angina, myocardial infarction, and death. This study was aimed at identifying non-invasive early biomarkers from various biofluid exosomes associated with CAD.

Methods: Plasma, saliva, and urine exosomes were isolated each from 22 CAD patients aged 18-65 years and their matched healthy controls using differential ultracentrifugation methods as the gold standard. The exosomes were identified and characterized using various techniques such as nanoparticle-tracking analysis, western blotting (Anti-Flotilin-1, Anti-TSG-101, Anti-CD63, and Anti-CD9), scanning, and immuno-transmission electron microscopy-TEM and SEM. Differentially expressed proteins were identified by Mass Spectrometry Orbitrap, and the data was analyzed using Proteome Discoverer software. Interaction networks and pathways were analyzed using STRING, Cytoscape, and KEGG respectively and gene enrichment ontology analysis was performed. A few proteins were validated in larger samples using ELISA.

Results: We have identified 2976, 198, and 508 proteins after mass spectrometry, and 115, 19, and 22 proteins showed differential expression in plasma, saliva, and urine respectively. We selected the proteins with significant fold differences of ≥ 2 folds, peptide match >2, and p-value < 0.05 in CAD and healthy controls. Apolipoprotein AI,

AII, APOB, and APOCI/ II showed comparative differences among the three groups of samples. We identified all the common and unique differentially expressed proteins in these. These proteins were involved in the regulation of biological processes, metabolic processes, cell communication, cellular component movement, defense response, and transport. We observed Cystatin S protein as significantly expressed from saliva exosomes in all repeat experiments. Also, we have observed and validated the decreased levels of uromodulin protein from urine exosomes in stable and recent-MI CAD patients.

Conclusion: For the first time, novel plasma, saliva, and urine exosome differential protein signatures are shown to be associated with CAD disease. Uromodulin and Cystatin S may be the most potential early biomarkers. The results are subjected to further validation, considering the larger Indian population with CAD and its related diseases.

OP 05: TARGETING CCR5 TO MODULATE MDSCS AND TREGS MEDIATED IMMUNOSUPPRESSION IN ATHEROSCLEROTIC DISEASE

Komal Sagar[1], Shamima Akhtar[1], Prakash Ranjan Mishra[2], Alpana Sharma[1]

[1]Department of Biochemistry, AIIMS, New Delhi

[2]Department of Emergency Medicine, AIIMS, New Delhi

Introduction: Myocardial infarction (MI) triggers intense immune activation, driving inflammation and plaque instability. Immune cells recruitment via chemokine receptor-ligand plays central role in facilitating immune cell recruitment to inflamed tissues. We investigated immune profiles in MI patients and assessed role of CCR5 blockade on immune regulation and atherosclerotic plaque composition *in vivo*.

Materials and methods: A case-control study (n=20/ group) with atherosclerosis patients (MI-STEMI) and healthy controls. Flow cytometry, Q-PCR, microscopy, ELISA to assess receptor-ligand function and phenotype in disease progression. CCR5 receptor was blocked using DAPTA as an inhibitor (*in vitro* and *in vivo*), 10^{-8} M and i.p 3ng/day for 15 days in C57BL6 mice & its role on MDSCs and Tregs functionality was assessed.

Results: MI patients showed elevated levels of CD3CD4+ T cells, Tregs, and MDSCs subsets, along with heightened CCR5 expression, with no significant upregulation of

CCL5. Inflammatory cytokines IL-6, IL-1β, TNF-α, and IFN-γ were elevated. MDSCs and Tregs exhibited dysfunction, expressing both pro- and anti-inflammatory markers. DAPTA treatment increased IL-10, TGF-β, and FOXP3 with reduced IFN-γ expression in Tregs and MDSCs. Blocking CCR5 enhanced the immunosuppressive function of both MDSCs and Tregs in HFD mice.

Conclusion: CCR5 blockade with DAPTA restores anti-inflammatory responses in advance atherosclerotic disease by modulating Treg and MDSC function and alters plaque composition, suggesting therapeutic potential for inflammation resolution.

OP 06: EXPLORING THE RELATIONSHIP BETWEEN LIVER FUNCTION AND CORONARY ARTERY DISEASE: A CLINICAL INVESTIGATION

Huda Naaz[1], Anita Rani[2]

[1] Department of Biochemistry, VMMC and Safdarjung hospital, New Delhi.

Email id: hudanaaz17@yahoo.com

Introduction: CAD is characterized by narrowing of coronary arteries. The liver plays a pivotal role in metabolic activities, including lipid metabolism, glucose regulation and detoxification. Its dysfunction can cause systemic complications including dyslipidemia, which is a risk factor for atherosclerosis and CAD [1]. Recent investigation suggests that liver profile components such as AST, ALT, ALP, albumin, and bilirubin may have prognostic significance in CAD [2].

Materials and methods: A cross-sectional study including 50 angiographically proven (>50% stenosis in one or more coronary vessels) cases of CAD and 50 age and sex matched Angio-normal controls. Blood samples were taken to assess liver profile including ALT, AST, ALP, Total bilirubin, Albumin.

Results: The CAD cases showed significantly higher levels of liver enzymes as compared to controls. The mean ALT in cases was 43.6 ± 16.2 U/L versus 21.3 ± 8.4U/L in controls ($p < 0.001$); mean AST 41.1 ± 12.7 U/L for CAD patients versus 23.5 ± 8.5 U/L in controls ($p < 0.001$); mean ALP is 95.4 ± 25.1 U/L in cases versus 72.8 ± 15.6 U/L in controls ($p < 0.001$). The mean albumin level in CAD patients was 3.2 ± 0.4 g/dL, which is significantly lower than 4.4 ± 0.3 g/dL in controls ($p < 0.001$). The mean total bilirubin level in CAD patients was 1.0 ± 0.3 mg/dL, compared to 0.7 ± 0.1 mg/dL in controls ($p < 0.001$).

Conclusion: This study demonstrates significant alterations in liver profiles among CAD cases as compared with the control group.

Key words: coronary artery disease (CAD), Alanine aminotransferase (ALT), Aspartate aminotransferase (AST), Alkaline phosphatase (ALP)

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OP 07: COMPARATIVE ANALYSIS OF AN INSULIN SENSITIVITY SURROGATE MARKER VERSUS HOMA INDICES FOR DETECTING ABNORMAL CARDIOMETABOLIC RISK

Pratip Jana[1*], Smita Roy[2], Parul Goyal[2], Rajeev Kumar[3]

1 Department of Biochemistry, L.H.M.C. & Associated Hospitals, New Delhi.
2 Department of Biochemistry, A.B.V.I.M.S. & Dr. R.M.L. Hospital, New Delhi.
3 Department of Biochemistry, A.B.V.I.M.S. & Dr. R.M.L. Hospital, New Delhi.
4 Dept. of Laboratory Medicine, Max Super-speciality Hospital, Saket, New Delhi

*Presenting Author: Dr. Pratip Jana; jana.pratip@gmail.com

Introduction: The multifactorial pathogenesis of Metabolic Syndrome (MetS) results in development and transition of MetS to Cardiovascular Disease (CVD). This study examines the performance of Single-Point Insulin Sensitivity Estimator (SPISE), an index independent of insulin estimation, against Homeostatic Model Assessment (HOMA) indices, for detecting MetS and CVD risk.

Materials & methods: This cross-sectional study, enrolled 282 consenting treatment-naive adults, comprising 176 MetS cases (diagnosed by NCEP ATP-III criteria). Fasting venous sample was collected from each patient for assessing blood glucose, lipid profile, serum insulin, from which, SPISE (for insulin sensitivity), HOMA-IR (for insulin resistance), HOMA-β (for insulin secretion) and Framingham Risk Score (FRS), was estimated for all. Carotid intimal-medial thickness (CIMT) was also calculated.

Results: Mean age of subjects was 34.7 ± 4.8 years. Kruskal–Wallis test showed significant differences in values for SPISE, HOMA-IR, HOMA-β, and CIMT among

cases and controls ($p < 0.001$). Spearman Rank Correlation showed SPISE was significantly correlated with known markers. CIMT & FRS were used to individually stratify study population into patients at "low – intermediate risk" and "high risk" for CVD development. ROC curve analysis showed that SPISE had comparable percentage diagnostic accuracy with HOMA indices for detection of high-risk cardiometabolic status. Univariate linear regression showed SPISE had a significant β & R^2 coefficient for detection of CVD risk.

Conclusion: SPISE is a valuable and relatively inexpensive index for abnormal cardiometabolic risk detection in resource-limited settings where insulin estimation and Carotid doppler facilities are unavailable. However, studies with larger sample sizes may substantiate its clinical utility.

Keywords: Single Point Insulin Sensitivity Estimator, Insulin Resistance, Metabolic Syndrome, Cardiovascular disease, Carotid Intima-Media Thickness, Framingham Risk Score.

OP 08: THE ROLE OF WHITE BLOOD CELLS AND NEUTROPHIL-TO-HDL RATIO IN PREDICTING DECREASED LEFT VENTRICULAR EJECTION FRACTION IN HEART FAILURE: AN IN-DEPTH ANALYSIS

Pradeep Kumar Dabla[1*], Dharmsheel Shrivastav[1], Vimal Mehta[2], Swati Singh[1*]

[1] Department of Biochemistry, G.B. Pant Institute of Postgraduate Medical Education & Research, New Delhi, India.

[2] Department of Cardiology, G.B. Pant Institute of Postgraduate Medical Education & Research, New Delhi, India

[*] Presenting Author: Swati Singh; Email ID: swatisingh17392@gmail.com

Introduction: Systemic inflammation, particularly involving white blood cells, has been implicated in the development and progression of heart failure. This study aimed to explore the association between white blood cell parameters and reduced LVEF in heart failure patients.

Material and methods: The study included 200 patients of coronary artery disease confirmed through angiography. Lymphocytes, neutrophils, and the neutrophils to HDL ratio were assessed as potential predictors of reduced LVEF. Regression analysis and

receiver operating characteristic (ROC) analysis were conducted to evaluate the correlation between blood components and LVEF.

Results: The results revealed significant differences in white blood cell levels, including lymphocytes and neutrophils, among heart failure patients with reduced ejection fraction. Regression analysis demonstrated a negative correlation between LVEF and blood components. ROC analysis indicated that lymphocytes, neutrophils, and the neutrophil-to-HDL ratio showed promise as predictors of reduced LVEF in coronary artery disease patients.

Conclusion: These findings suggest that white blood cell parameters, specifically lymphocytes and neutrophils and neutrophil to HDL ratio, have potential as predictive markers for reduced LVEF in heart failure patients. Further research is warranted to validate these findings and explore their clinical implications in risk assessment and treatment planning for individuals with heart failure and coronary artery disease.

Keywords: Coronary artery disease, Heart Failure, Left ventricular ejection fraction, Neutrophil-to-HDL Ratio, White blood cells

OP 09: RATIO OF GA /HBA1C CAN BE TAKEN AS AN ATHEROSCLEROTIC RISK FACTOR IN HEALTHY INDIVIDUALS BUT NOT IN OBESE

Jia Ur Rehman[1*], Manju Bala[2], Deepak Jain[3]

[1] Department of Biochemistry, Lady Hardinge Medical College, New Delhi

[2] Department of Biochemistry, Pt B D Sharma PGIMS, Rohtak, Haryana

[3] Department of Medicine, Pt B D Sharma PGIMS, Rohtak, Haryana

*Presenting author: zia.siddiqui1508@gmail.com

Introduction: Fructosamine is a ketoamine formed by glycosylation of total serum proteins, primarily albumin. Albumin and other plasma proteins have greater susceptibility to glycation as compared to intracellular proteins like hemoglobin, hence the blood levels of Glycated albumin (GA) exhibit a broader fluctuation than Glycated hemoglobin (HbAlc). Atherosclerosis is a condition where cholesterol deposition causes narrowing of arteries. HBA1c is a marker of diabetes and its increase levels in blood is commonly associated with dyslipidemia.

Material and methods: 80 subjects of age between 20-40 years were enrolled, 40 of them were obese (BMI ≥30) and 40 were apparently healthy (BMI<25). Blood samples

collected in red capped vacutainer for GA, Albumin, Lipid profile and in purple capped vacutainer for HBA1c. Lipid Profile, HBA1c and Albumin were measured on auto analyser using standard kit-based methods. GA was estimated by ELISA method.

Results: In the present study, mean value of GA/HBA1c ratio, GA and serum albumin were higher in healthy individuals as compared to Obese. The mean value of LDL cholesterol and total cholesterol were higher in obese. The difference was statistically significant ($p < 0.05$).

Conclusion: The ratio of GA/HBA1c with LDL-c and total cholesterol was positively correlated in healthy individuals as compared to obese where it was negatively correlated. Higher mean value of GA attributes to higher albumin levels in healthy subjects. Obesity induced inflammation causes lower serum albumin levels in blood. Hence, GA/HBA1c ratio can serve as an atherosclerotic risk factor in healthy subjects.

Keywords: Fructosamine, Glycated Albumin (GA), HBA1c, Atherosclerosis, Lipid Profile.

OP 10: FERRITIN AND DYSLIPIDEMIA: A POTENT THREAT TO ACUTE MYOCARDIAL INFARCTION?

Priyank Udagani[1], Parul Goyal[2], Parvatagouda[3], Harnam Kaur[1], Sonam Bhatia[1]

1 Department of Biochemistry, ESIC MCH, Faridabad

2 Department of Biochemistry, ABVIMS, Dr RML Hospital, New Delhi

3 Department of cardiology, ABVIMS, Dr RML Hospital, New Delhi

Email: priyank.udagani@gmail.com

Introduction: Coronary artery disease has spiked by 300 percent among Indians in the past three decades. Iron, an essential element for many important cellular functions in all living organisms, can catalyze the formation of potentially toxic free radicals. Iron is a transition metal that can catalyse toxic redox reactions, and it is involved in many harmful biological reactions and diseases in human body. Excessive iron has been proposed to be a potent risk factor for CHD.

Methodology: The present study is a prospective nested case-control study of 55 cases of AMI and 60 controls age and gender matched subjects from tertiary care centre in New Delhi. The diagnosis of MI was based on the history of prolonged chest

pain (>30 min) and it was confirmed by typical changes in ECG and elevation of CK-MB levels. Control group included 60 healthy volunteers in same age.

Results: Mean value of cases and controls Ferritin 211.34±126.1 and 58.05±36.82. The mean and SD of cholesterol 166.16±38.06 and 107.07±15.36, LDL 104.98±41.72 and 54.03±14.78, VLDL 24.11±13.74 and18.13±2.26 in cases and controls respectively with p<0.0001 and for TG 119.78±69.83 and 92.47±8.57, with p< 0.007.

Conclusion: In conclusion increased ferritin levels can be considered as the risk factor of CAD in conjunction with other risk factors. TG, LDL-c, VLDL-c, TG and SF levels were raised in patients of AMI and found to be statistically significant. It can be concluded that there exists a relationship in lipid profile and SF with AMI therefore dyslipidemia and raised SF levels are the features of CAD.

Keywords: Coronary artery, toxic free radicals, biological reactions.

OP 11: PROSPECTIVE STUDY DETERMINING ROLE OF ANGIOTENSIN RECEPTOR NEPRILYSIN INHIBITOR COMPARING ARNI VERSUS TELMISARTAN IN RESISTANT HYPERTENSION

Divya Parashar[1*], Gunjan Sharma[1], Shridhar Dwivedi[2], Vinod Sharma[2]

[1] Department of Pharmacology, Delhi Institute of Pharmaceutical Sciences and Research University, New Delhi

[2] Department of Cardiology, National Heart Institute, East of Kailash, New Delhi

*Presenting author email id: divparashar76@gmail.com

Introduction: Resistant Hypertension (RHTN) is a clinical challenge, characterized by high blood pressure that remains uncontrolled despite treatment with three-drug antihypertensive agents at maximum tolerated doses. This study compares the efficacy of Angiotensin Receptor Neprilysin Inhibitor (ARNI) with Telmisartan, an Angiotensin Receptor Blocker (ARB), in managing RHTN.

Materials and methods: *Study Population:* A prospective study was conducted on 280 hypertensive patients, with 46 classified as RHTN. *Interventions:* Patients were randomized to receive either ARNI (50-100 mg twice daily) or Telmisartan (40-80 mg once daily), adjusted based on blood pressure response. *Measurements:* Ambulatory Blood Pressure Monitoring (ABPM) was used to track systolic and diastolic blood pressure. Renal function markers were assessed using standard lab procedures. The

primary endpoint was reduction in systolic and diastolic BP, while secondary endpoints included the proportion of patients reaching target BP (<140/90mmHg) and improvements in renal biomarkers.

Results: ARNI demonstrated superior efficacy in BP reduction compared to Telmisartan, with a greater number of patients achieving target BP. Moreover, ARNI significantly improved renal function, with notable enhancements in GFR and potassium regulation, suggesting a Reno protective effect.

Conclusion: ARNI (sacubitril/valsartan) was more effective more than Telmisartan in managing RHTN, leading to superior BP control and renal function improvement. This suggests ARNI as a potent therapeutic option for resistant hypertension, offering cardiovascular and renal protection.

Keywords: Hypertension, Angiotensin Receptor Blockers, Neprilysin, Blood Pressure Monitoring, Renal Function.

OP 12: ASSOCIATION OF SINGLE NUCLEOTIDE POLYMORPHISM OF KCNJ11 (RS 5219) WITH TYPE 1 DIABETES MELLITUS

Preeti Chauhan[1], Ritu Singh[1], Vakati Pranay[1]

[1] Lady Hardinge Medical College, New Delhi.

Presenting author email id: v.pranaynarayana@gmail.com

Background: The KCNJ11(rs5219) gene belongs to the potassium gene family and is responsible for encoding an inward-rectifier potassium channel known as Kir 6.2, which plays a crucial role in regulating insulin secretion by depolarizing cell membrane of beta cells of pancreas and any SNP in gene KCNJ11 may lead to Type I Diabetes Mellitus.

Objectives: (i) To find the association between KCNJ11(rs 5219) and Type I DM

(ii) To find the association between Kir 6.2 levels and Type I DM

Material and methods: (i) Study design: Case-Control analytical study

(ii) Place of study: Dept of Biochemistry in collaboration with Dept of Paediatrics, LHMC, New Delhi.

(iii) Study Population: 100 healthy controls and 100 cases of Type I DM under 15 years of age.

(iv) Method: DNA extraction, amplification of DNA by PCR, detection of PCR products by agarose gel electrophoresis, RFLP for PCR products & detection by gel electrophoresis; Kir 6.2 levels by sandwich ELISA.

Results: There is a significant correlation between KCNJ11 and rs5219 with OR 0.18 and CI (0.09-0.33) and Kir 6.2 levels significantly high in cases than in control with p value <0.01

Conclusion: Hence concluded that the expression of Kir 6.2 was significantly high in Type I DM.

Poster Presentation Abstracts

PP 01: ATHEROGENIC PROFILE IN NEWLY DIAGNOSED LEAN AND OBESE PATIENTS OF TYPE 2 DIABETES MELLITUS

Shanmuga Priya K[1], Mohit Mehndiratta[1], SV Madhu[2], Rajarshi Kar[1]

[1] Department of Biochemistry, UCMS & GTB Hospital, Delhi, India.

[2] Director Professor, Department of Endocrinology, UCMS & GTB Hospital, Delhi, India.

Presenting author: Shanmuga Priya K, Email id: drspucms@gmail.com

Introduction: Dyslipidemia is known to be the driving force behind the development of atherosclerosis and its resultant cardiovascular disease. Both these conditions are characterized by increase in pro-atherogenic lipids compared to anti-atherogenic lipids. Atherogenic Indices have been developed to predict CVD risk without increasing the cost of testing, however most of the studies done till date have used these indices in patients who have already suffered a coronary event. Dyslipidemia is most prevalent in cases of T2DM. Therefore, this study was designed to assess atherogenic risk (via atherogenic indexes) in newly diagnosed treatment naive lean and obese patients of T2DM.

Material and methods: Newly diagnosed lean and obese patients of T2DM (not on any treatment) were recruited and grouped into lean (BMI<18.5 kg/m^2) and obese (BMI≥25 kg/m^2) groups. Blood was collected in fasting state for estimation of glycemic parameters and fasting lipid profile. Atherogenic Indices (LDL-C/HDL-C, TC/HDL-C, non-HDL-C, Atherogenic coefficient, lipoprotein combined index and Atherogenic Index of Plasma) were calculated using predefined formulas.

Observation: The mean age (years) was 52.1 (10.6) in the lean group and 51.5 (10.4) in the obese group. LDL-C/HDL-C, TC/HDL-C, non-HDL-C, Atherogenic coefficient, lipoprotein combined index and Atherogenic Index of Plasma were higher in obese group compared to the lean group.

Conclusion: Our study is the first to document increased atherogenic risk in both lean and obese patients (newly diagnosed) with T2DM. Although CVD risk is higher amongst the obese patients, aggressive control of plasma lipids is required in all patients of T2DM irrespective of BMI.

Keywords: Dyslipidemia, atherogenic index of plasma, Type 2 diabetes mellitus, atherosclerosis

PP 02: EVALUATION OF SERUM NETRIN-1 LEVELS AS A POTENTIAL BIOMARKER FOR DIABETIC RETINOPATHY

Mo. Abuzar, Navneet Kaur, Taskin Khan, Jaspreet Kaur, Alpana Saxena, Bhumika Upadhyay*

Department of Biochemistry and Ophthalmology, HIMSR, New Delhi

Email id: abuzar.kabir18@gmail.com

Introduction: Diabetes, a metabolic disorder causing micro and macro vascular complications like neuropathy, retinopathy, nephropathy, and atherosclerosis in the long run has increased worldwide. Netrin-1, a laminin related protein is known to have role in progression of chronic inflammation. Studies in animal models have indicated that neural binding sites of Netrin function as angiogenic regulators. Therefore, targeting Netrin-1 as potential biomarker in human subjects may have therapeutic implications in microvascular complications of diabetes like diabetic retinopathy (DR).

Materials & methods: The total sample size was 90, with group1- healthy control, group-2 & group 3 clinically confirmed diabetes mellitus subjects without and with retinopathy (n=30) aged 35-80 years, both males and females' patients were taken from Department of Biochemistry and Ophthalmology of HIMSR and HAHC hospital, New Delhi with ethical permissions. We measured serum Netrin 1 levels by ELISA in all three groups and compared it with the serum total cholesterol, triglycerides, LDL, HDL, and VLDL levels. Statistical analysis was done using SPSS version 29.0 software.

Results: The study revealed significantly elevated Netrin-1 levels in group-1(6.060±0.535) vs group-2 (9.568±0.453) ($p < 0.001$), and higher mean levels in group 2 (9.568±0.453) vs group-3 (10.757±0.35) ($p = 0.042$), higher levels of total cholesterol and LDL-C with p-value ($p < 0.001$) in both group-1 vs group-2 and group-2 vs group-3 was found, with consistent trends of increased Netrin-1 levels.

Conclusion: Netrin -1 is known to reduce inflammation by interacting with chemokines and inflammatory cytokines. The biochemical basis of higher netrin levels could be to counter the inflammatory state of diabetes. Serum Netrin-1 levels in diabetic retinopathy

patients were found to be higher, and it correlated with disease severity, and had a high sensitivity and specificity for diagnosis, indicating its potential as a biomarker.

Keywords: Serum Netrin-1, Diabetic Retinopathy, Atherosclerosis, Lipid Profile, Biomarkers

PP 03: ASSOCIATION OF SERUM ADIPONECTIN AND IGF-1 WITH ATHEROSCLEROSIS IN POLYCYSTIC OVARIAN SYNDROME

Lamthrila Mongzar[1*], Neera Sharma[2], Lokesh Kumar Sharma[3], Sanjeet Panesar[2], Bindu Kulshreshtha[3], Anjum Ara[4]

[1] Department of Biochemistry, ABVIMS & Dr. RML Hospital, New Delhi

[2] Department of Community Medicine, ABVIMS & Dr. RML Hospital, New Delhi

[3] Department of Endocrinology, ABVIMS & Dr. RML Hospital, New Delhi

[4] Department of OBGYN, ABVIMS & Dr. RML Hospital, New Delhi

Presenting Author: Lamthrila Mongzar; Email id: liomongzar@gmail.com

Introduction: Adiponectin and insulin-like growth factor 1 (IGF-1) play significant yet contrasting roles in the development of atherosclerosis, a leading cause of cardiovascular disease. Adiponectin, a novel adipocyte-derived hormone, exhibits anti-inflammatory and anti-atherogenic properties. Low levels of adiponectin, especially of HMW forms, are often linked to obesity and systemic inflammation, both of which are significant risk factors for atherosclerosis.

Conversely, IGF-1, a hormone similar in structure to insulin, while essential for cellular growth and metabolism, has been linked to increased vascular smooth muscle proliferation and inflammation, leading to plaque instability, exhibiting pro atherogenic properties.

Studies show adiponectin levels were inversely related to IGF-1 levels and adiponectin can attenuate atherogenesis by suppression of IGF-1 levels, however insufficient evidence exists pertaining to this claim.

Materials and methods: This cross-sectional observational study, enrolled 140 individuals aged 15-45 years, comprising 70 treatment-naive PCOS cases and 70 controls. Serum IGF-1 and HMW Adiponectin levels were estimated by competitive and sandwich ELISA method respectively. Fasting venous sample was collected for assessing lipid profile. AIP calculated using log (TG/HDL-C)

Results: Results revealed a significantly lower levels of HMW Adiponectin (3.207 ng/mL vs 4.199 ng/mL, p<0.001), higher levels of IGF-1 levels (135.8 ng/mL vs 124.2 ng/mL, p=0.016) and higher AIP levels (0.42 vs 0.40, p=0.043) in PCOS cases when compared to controls.

Conclusions: Adiponectin and IGF-1 levels are significantly associated with atherosclerosis in PCOS. Elevated levels of IGF-1 and low levels of adiponectin indicate a plausible association with atherogenesis.

Keywords: Adiponectin, insulin-like growth factor-1, cardiovascular disease, atherosclerosis, polycystic ovarian syndrome

PP 04: PREVALENCE AND PATTERNS OF DYSLIPIDEMIA IN DELHI: PROSPECTIVE STUDY TO PREVENT HEART DISEASE

Gloria Taiveinai Ro K*[1], Vineet Banga[2], Smita Roy[1]

[1]Department of Biochemistry, ABVIMS & DR RML hospital, New Delhi, India

[2] Department of Pathology, Acharya Shree Bhikshu government hospital, Moti Nagar, New Delhi, India

*Email id: glotaivei123@gmail.com

Introduction: Dyslipidemia involves abnormal blood lipid levels, such as high cholesterol, high triglycerides, high LDL, and low HDL. It can be genetic (primary) or due to other diseases (secondary). Atherosclerosis causes artery narrowing from cholesterol-rich plaque buildup, reducing blood flow to the heart and leading to cardiovascular disease. Cardiovascular disease is the leading cause of death worldwide and dyslipidemia contributes as a major risk factor to it. Effective therapies and public awareness are key to prevention.

Materials and methods: A cross-sectional study in out-patient department and in-patient department, Acharya Shree Bhikshu government hospital (Govt of NCT of Delhi), Moti Nagar, New Delhi (n=1650, male=931; females=719) for period of 4 months (1st June 2024 to 30th September 2024).

Results: Of the subjects studied, 22.18% had hypercholesterolemia, 40.78% had hypertriglyceridemia, 36.55% had low HDL, 14% had high LDL levels, 31.64% had high total cholesterol-HDL ratio and 70.42% had abnormalities in one of the lipid parameters.

Dyslipidemia was diagnosed using National Cholesterol Education Programme (NCEP) guidelines.

Conclusion: Prevalence of dyslipidemia is very high; therefore, regular screening of patient's lipid profile and healthy lifestyle promotion is strongly recommended to prevent heart diseases and other non-communicable diseases.

Keywords: Dyslipidemia, heart disease, National Cholesterol Education Programme, hypercholesterolemia, hypertriglyceridemia

PP 05: ASSOCIATION OF GALECTIN-3 AND INFLAMMATORY MARKERS (HS-CRP, IGF-1) WITH CAROTID ATHEROSCLEROSIS IN PREDIABETES AND DIABETES

B Ramesh[1], Yashasvi Panghal[1], Parul Goyal[1], Ajay Chauhan[2], Sarita Jilowa[3]

[1] PG Resident, Department of Biochemistry, ABVIMS & RMLH, New Delhi

[2] PG Resident, Department of Medicine, ABVIMS & RMLH, New Delhi

[3] Professor, Department of Radiodiagnosis, ABVIMS & RMLH, New Delhi

* Email id:rameshbasanaboina17@gmail.com

Introduction: Galectin-3 is a pro inflammatory signaling factor which promotes inflammation of pancreatic islet beta cells and insulin resistance which leads to Diabetes. It is involved in biological activities including inflammation, fibrosis, apoptosis, pre mRNA splicing. Galectin-3 has a close correlation with HbA1c, FPG and hs-CRP and plays important role in atherosclerosis. In this study we elucidated the role of Galectin -3 in prediabetes and Diabetes correlating it with cardiovascular disease risk by assessing the carotid intima media thickness [CIMT].

Materials and methods: Three groups, patients with diabetes, prediabetics and healthy controls participated in the study and biochemical parameters such as FBS, HBA1c% lipid profile were performed. Fasting Insulin was estimated to calculate the insulin resistance by HOMA-IR. hs-CRP, IGF-1(estimated by ELISA technique) were performed along with the carotid atherosclerosis evaluation by CIMT.

Results: The serum levels of Galectin-3 showed clear significant differences ($p < 0.001$) in our three study groups. The mean value in diabetes was 29.1 +8.54 ng/dl, in prediabetes was found to be 13.7 + 8.49 ng/dl and 21.7+ 3.3 ng/dl in healthy controls. A significant correlation between the Galectin-3 and CIMT was found by the AUC in the

ROC curve, which signifies a good relationship between the cardiovascular complications and the serum levels of Galectin-3.

Conclusion: Serum levels of Galectin-3 may be considered as surrogate marker for early atherosclerosis and can be used as tool to predict the same. This molecule, if combined with other atherosclerotic markers and CIMT, can improve the cardiovascular risk assessment.

Keywords: Galectin-3, CIMT, hs-CRP, IGF -1, HOMA-IR (Homeostatic Model Assessment for Insulin Resistance).

PP 06: CORRELATION BETWEEN HBA1C AND NEONATAL OUTCOMES AMONG NORMAL PREGNANCIES AND PREGNANCIES WITH GESTATIONAL DIABETES MELLITUS

Kongbrailatpam Jaishree Devi[1*], Jaspreet Kaur[1], Bhumika Upadhyay[1]

[1] Department of Biochemistry, HIMSR, New Delhi

[*] Email id: sisysharma@gmail.com

Abstract: Introduction: Gestational Diabetes Mellitus is defined as glucose intolerance seen in pregnant women with onset or first recognition during pregnancy. Besides having risk associated with atherosclerosis, frequently observed common neonatal complications of GDM include macrosomia, preterm birth, hypoglycaemia, jaundice and congenital malformations. This study aims to assess the clinical utility of HbA1c levels in predicting neonatal outcomes.

Materials and methods: A prospective study was conducted at HIMSR and HAHC Hospital, New Delhi in which a total 100 random samples comprising 50 normal and 50 GDM pregnancies were selected and their HbA1c levels were measured on two occasions during 30th to 32nd weeks and 34th to 36th weeks POG, from July to October of 2024. The data so collected were studied in relation with their neonatal outcomes like APGAR Score and birth weights.

Results: The study revealed that the means of HbA1c measured during both 30th to 32nd weeks POG and 34th to 36th weeks POG were significantly higher in GDM group. The mean of birth weights was also significantly higher in GDM group compared to normal pregnancies. There were no significant differences in the APGAR Scores. HbA1c levels during 30th to 32nd weeks were not related to the birth weight. However,

HbA1c levels in GDM during 34th to 36th weeks had significant negative correlations with the birth weights.

Conclusion: Although HbA1c levels are important in pregnancy to monitor the compliance of the treatment, the use of HbA1c level to predict the adverse maternal and neonatal outcomes remains questionable. Newer markers need to be explored and studied.

Keywords: Gestational diabetes, birth weight, foetal macrosomia, APGAR score, premature birth

PP 07: POCT A TRUSTABLE MODALITY TO ESTIMATE ELECTROLYTE LEVELS IN CRITICALLY ILL DIABETIC PATIENT – RISK FACTOR FOR ATHEROSCLEROSIS

Rukhsar khan[1*], Jaspreet kaur[2], Bhumika Upadhayay[3]

[1] Department of Biochemistry, HIMSR, New Delhi

[*] Email id: rk1768440@gmail.com

Introduction: The electrolyte levels in critically ill patient is to be reported accurately with minimum turnaround time. Hence Point of care testing (POCT) instrument are available in ICU for electrolytes estimations. However, in comparison with autoanalyzer the values differ. The acceptable limit of variation defined by Clinical Laboratories Improvement Amendment (CLIA) guidelines, is 4 mmol/L for Na+ and 0.5 mmol/L for K+. Studies have found that lower preoperative serum ALB concentration are associated with an increased risk of coronary disease and all-cause mortality. The goal of the study is

- To determine the difference in electrolytes level estimated by both analyzers.
- To determine the values of instrument in hypoalbuminemia.

Methodology: The sodium and potassium level of 30 ICU patient from HAHC hospital HIMSR where determine on arterial blood gas and Auto analyzer. 2ml of arterial blood (heparinized syringe) processed on GEM3500 as well as 2ml venous blood (yellow vacutainer) measured on Beckman coulter was collected for electrolyte and protein albumin estimation.

Results: the study revealed sodium in hypoalbuminemia patients, POCT value (126.7±10.6) with an excellent correlation of 0.971, while the auto analyzer reported

(132.6±9.8) with a weak correlation of 0.054. In normal patients, POCT measured a mean of 129.3 ±9.96) with a correlation of 0.68, compared to the auto analyzer's mean of (134.1±8.6) and a correlation of 0.5081. These findings highlight the superior reliability of POCT for electrolyte measurements, particularly in hypoalbuminemia patients, suggesting its utility for rapid clinical assessment

Conclusion: In critically ill patients with hypoalbuminemia, the measurement of electrolyte levels via arterial blood gas (ABG) analysis provides more accurate estimates. This suggests that ABG may be the preferred method for electrolyte assessment in this patient population, as it offers improved reliability in the context of low albumin levels.

Keywords: Arterial Blood Gas, Laboratory Auto-Analyzer, Sodium, Potassium, Intensive care unit.

PP 08: HARNESSING TGF-B AND PDGF SIGNALING TO DRIVE MSC DIFFERENTIATION INTO VASCULAR SMOOTH MUSCLE CELLS: A NOVEL APPROACH FOR CARDIOVASCULAR REGENERATION

Diksha Rani[1], Smaranjot Kaur[1], Pulkit Soni[1]*, Sushant Yadav[1], Vaibhav Kushwaha[1], Manish Kumar[1], Sanskriti Goswami[1], Sanjay Kumar Dey[1]

[1] Dr. B. R. Ambedkar Centre for Biomedical Research (ACBR), University of Delhi, New Delhi-11007, India

* Presenting Author: Pulkit Soni; Email id: pulkitsoni4446@gmail.com

Introduction: Atherosclerosis remains one of the major contributors to cardiovascular diseases, which results in dysfunction within vascular smooth muscle cells. Mesenchymal stem cells will be the promising cell sources in yielding vascular smooth muscle cells. In this respect, an efficient protocol for MSCs to differentiate into VSMCs using Transforming Growth Factor-β (TGF-β) and Platelet-Derived Growth Factor-BB (PDGF-BB) that is important in vascular repair related to atherosclerosis was aimed for in this study.

Materials and methods: Rat bone marrow-derived MSCs were cultured in DMEM medium containing the induction cocktail made of TGF-β (2–10 ng/mL) and PDGF-BB (20–50 ng/mL) for VSMC lineage differentiation. VSMC marker expression was analyzed by immunocytochemistry and Western blot, including α-SMA, calponin, and

smoothlin. Functional maturation of the cells was quantified by contractility assays, while vascular supporting capacity was quantified through the assessment of ECM production.

Results: TGF-β and PDGF-BB elicited a distinct morphological change in MSCs toward the VSMC differentiation pathway. Immunocytochemistry and Western blotting were performed for α-SMA, calponin, and smoothlin; all those markers were highly upregulated, proving successful transformation into VSMCs. The differentiated cell had better contractile function than the untreated control in the contractility assays. Moreover, a great increase of ECM production further showed the increased capability of vascular integrity maintenance.

Conclusion: The present study thus provided a dependable and reproducible method for the differentiation of MSC into VSMC using TGF-β and PDGF-BB. VSMCs thus expressed functional and molecular features appropriate for their use in studies on atherosclerosis and in future therapeutic use.

Keywords: Atherosclerosis, VSMCs, MSCs, TGF-β, PDGF-BB.

Reference:

1. D Rani, P Soni, SK Dey 2024. Harnessing TGF-β and PDGF Signaling to Drive MSC Differentiation into Vascular Smooth Muscle Cells: A Novel Approach for Cardiovascular Regeneration (Paper communicated).

PP 09: IMPACT OF PCSK9 RS505151 POLYMORPHISM ON SERUM LIPIDS LEVELS AND CARDIOVASCULAR RISK: A META-ANALYSIS

Khushboo[1]

[1] Department of Biochemistry, Lady Hardinge Medical College, New Delhi - 110001

Email id: drkhushboomodi@gmail.com

Introduction: Proprotein convertase subtilisin/kexin type 9 (PCSK9) increases low-density lipoprotein cholesterol (LDL-C) concentrations through interference with physiologic hepatic LDL receptor (LDLR) recycling. Inhibiting PCSK9 results in improved LDLR recycling, its increased availability on cell surfaces and reduced blood LDL-C levels, making PCSK9 inhibition a promising tool for managing hypercholesterolemia. Some missense mutations of PCSK9 have been associated with hypercholesterolemia and coronary heart disease and some mutations have the

opposite effect. PCSK9 rs505151 polymorphism is identified as gain- of-function mutation.

Methods: The current meta-analysis was performed according to the principles proposed by the Human Genome Epidemiology Network (HuGeNet) HuGE Review Handbook of Genetic Association Studies. The association of PCSK9 rs505151 polymorphisms with serum lipid levels and cardiovascular risk was calculated by standardized mean difference (SMD) and odds ratios (OR) with 95% confidence intervals (CI).

Results: Pooled results analyzed under a dominant genetic model indicated that the PCSK9 rs505151 G allele was related to higher levels of triglycerides (SMD: 0.14, 95% CI: 0.02 to 0.26, P = 0.021, I2 = 0) and low-density lipoproteins cholesterol (LDL-C) (SMD: 0.17, 95% CI: 0.00 to 0.35, P = 0.046, I2 = 75.9%) and increased cardiovascular risk (OR: 1.50, 95% CI: 1.19 to 1.89, P = 0.0006, I2 = 48%) in Caucasians

Conclusion: This study indicates that the variant G allele of PCSK9 rs505151 confers increased triglyceride (TG) and LDL-C levels, as well as increased cardiovascular risk in Caucasians. These findings provide useful information for researchers interested in the fields of PCSK9 genetics and cardiovascular risk prediction for clinical and public health applications.

Keywords- PCSK9, LDL-C

PP 10: ASSESSING THE IMPACT OF STRUCTURED STAFF TRAINING ON NABL ACCREDITATION OUTCOMES

Vidhi Patel[1], Ginni Bharti[1], Ashok Ahirwar[1], Sudip Datta[1]

[1] Department of Laboratory Medicine, AIIMS, New Delhi

Presenting Author: Dr. Vidhi Patel; vidzpatel.91@gmail.com

Background: NABL accreditation is a vital quality marker for clinical laboratories, representing ISO 15189 compliance and excellence in patient care. Achieving NABL standards requires stringent protocol adherence in pre-examination, examination, and post-examination stages. Structured training programs play a critical role in preparing laboratory staff, elevating their competency, and fostering compliance with accreditation standards. This study evaluates the effect of structured training on laboratory readiness, competency, and compliance for final NABL accreditation.

Objectives: The study aims to assess how structured training for laboratory staff impacts their competency and compliance across all process phases. It also evaluates training effectiveness using pre- and post-training assessments, audit performance, and nonconformity (NC) reduction.

Methods: Conducted in a clinical laboratory preparing for NABL, the study introduced structured training modules focused on sample handling, quality control, analytical procedures, documentation, and result reporting, per ISO 15189 standards. Staff competency was evaluated before and after training, while audit records, NABL assessments, and NC logs were reviewed to gauge compliance changes. Statistical analysis measured pre- and post-training competency, NC frequencies, and audit results.

Results: Post-training assessments showed a 40% improvement in staff competency. NCs dropped by 50%, 35%, and 40% in pre-examination, examination, and post-examination phases, respectively. Staff reported better understanding and confidence in ISO standards adherence, with marked reductions in pre-analytical errors and reporting accuracy improvements.

Conclusion: Structured training significantly enhances laboratory competency and compliance, supporting NABL accreditation success. This study underscores the role of targeted training in driving quality improvements and sustaining accreditation readiness.

Keywords: NABL Accreditation, ISO 15189, structured training, competency, compliance

PP 11: EVALUATING THE IMPACT OF NABL ACCREDITATION PREPAREDNESS, WITH A FOCUS ON TRAINING, ON THE ATTITUDES AND PERFORMANCE OF LAB TECHNICIANS

Anshul Jangra[1], Ginni Bharti[1], Ashok Ahirwar[1], Sudip Datta[1]

[1] Department of Laboratory Medicine, AIIMS, New Delhi

Presenting Author: anshul27jangra@gmail.com

Background: NABL accreditation signifies adherence to ISO 15189 standards and is critical in ensuring quality in clinical laboratories. Preparing for accreditation demands structured training to enhance both technical competency and adherence to quality standards. This study evaluates the effect of targeted training on lab technicians'

attitudes towards quality standards and their performance in handling pre-analytical, analytical, and post-analytical processes.

Methods: This observational study involved lab technicians from a clinical laboratory preparing for NABL accreditation. A structured training program was implemented, addressing sample handling, quality control, analytical procedures, and report validation. Pre- and post-training assessments were conducted, including surveys on technicians' attitudes toward quality compliance and job performance metrics. Audit results and nonconformity (NC) logs were also analyzed for changes in performance.

Results: Post-training assessments indicated improved attitudes, with 80% of technicians reporting increased confidence and motivation. Performance metrics showed a 35% decrease in NCs, particularly in pre-analytical errors, alongside a 30% improvement in TAT adherence. Technicians' feedback reflected a positive shift in quality-focused attitudes and better understanding of accreditation standards.

Conclusion: Structured training as part of NABL accreditation preparedness significantly enhances lab technicians' performance and fosters a positive attitude toward quality standards. The findings underscore the importance of targeted training in not only meeting accreditation requirements but also strengthening overall laboratory quality culture.

Keywords: NABL accreditation, audit, pre-analytical, analytical, post-analytical

PP 12: EVALUATING THE IMPORTANCE OF ACCURATE NON-HDL CHOLESTEROL AND TRIGLYCERIDE VALUES IN THE DIAGNOSIS OF ATHEROSCLEROSIS: A SIX SIGMA ANALYSIS.

Shahid Ali[1], Sana Alam[2], Jaspreet Kaur[3]

[1] Department of Biochemistry, HIMSR, New Delhi

Introduction: Accurate assessment of lipid profiles is crucial for diagnosing atherosclerosis, a major contributor to cardiovascular disease. Non-HDL cholesterol (non-HDL-C) and triglycerides are essential lipid parameters that provide insights into cardiovascular risk. This study emphasizes the importance of the accuracy of lab values in diagnosing atherosclerosis, utilizing the Six Sigma methodology to evaluate laboratory performance.

Materials and methods: A retrospective analysis was conducted on lipid profile data over four months at a tertiary care hospital in southeast New Delhi. The Six Sigma values for both non-HDL-C and triglycerides were calculated based on laboratory performance metrics, including precision and accuracy, to evaluate the reliability of the testing process

Results: The analysis revealed an average Six Sigma value of more than 6 for non-HDL-C and 5.0 for triglycerides, indicating a world-class quality control in laboratory testing. These values suggest that while the testing methods are reliable, there is potential for improvement in accuracy. Elevated non-HDL-C levels are significantly associated with the presence of atherosclerotic plaques ($p < 0.01$), underscoring the importance of accurate measurements in clinical practice.

Conclusion: The findings highlight the critical role of accurate non-HDL-C and triglyceride measurements in diagnosing atherosclerosis. The application of Six Sigma methodology demonstrates that enhancing laboratory practices can lead to improved diagnostic accuracy, ultimately aiding in better risk stratification and management of cardiovascular disease. This study advocates for the routine inclusion of non-HDL-C in lipid assessment to optimize patient care in cardiovascular health.

Keywords: Non-HDL Cholesterol, Triglycerides, Atherosclerosis, Accuracy, Six Sigma

PP 13: EXPLORING KICX, A NON-CANONICAL POTASSIUM CHANNEL AS A NOVEL BIOMARKER AND POTENTIAL THERAPEUTIC TARGET FOR ATHEROSCLEROSIS

Diksha Rani[1], Smaranjot Kaur[1], Vaibhav Kushwaha[1*], Manish Kumar[1], Pulkit Soni[1], Sushant Yadav[1], Sanskriti Goswami[1], and Sanjay Kumar Dey[1]

[1] Dr. B. R. Ambedkar Centre for Biomedical Research (ACBR), University of Delhi, New Delhi-11007, India

[*] Presenting Author email id: vkvaibhavkushwaha56@gmail.com

Introduction: Targeting potassium channels like KICX may offer promising therapeutic avenues for atherosclerosis. Our study examines the differential expression of KICX in the aorta and heart tissues of an atherosclerotic rat model as compared to known atherosclerosis-specific biomarkers.

Materials and methods: After the successful establishment of a high-fat-diet and Vitamin D3-induced atherosclerosis Wistar rat model via analysis of physical and biochemical parameters, including BMI, Atherogenic, and Lee Index, lipid profiling (LDL-C, HDL-C, TC, TG), liver and kidney function tests, and histological evaluations using Oil Red O, Sudan IV, and Masson's Trichrome staining, aortic and heart tissues were isolated to compare the differential expression of KICX with known atherosclerosis-specific markers using Western blot, RT-PCR, immunohistochemistry (IHC), and confocal microscopy.

Results: RT-PCR findings revealed that KICX was overexpressed in the aorta of atherosclerotic rats, while APOE and LDL-R, both involved in lipid metabolism, were downregulated. Western blot analysis confirmed overexpression of KICX in atherosclerotic aorta, alongside SREBP-2, indicating a reflex and protective mechanism against atherosclerosis. Concurrently, elevated CRP levels highlighted the involvement of KICX in inflammatory processes, plaque instability, and atherosclerosis progression. Additionally, histological and immunohistochemical investigations confirmed the overexpression of KICX in atherosclerotic aorta and heart tissues. A pronounced expression and localization of KICX was observed in the aortic sections of atherosclerotic rats as compared to controls via confocal microscopy indicating it's role in the vascular pathology.

Conclusion: These findings suggest that KICX may disrupt lipid homeostasis, contributing to plaque formation and disease progression indicating KICX as a novel biomarker and therapeutic target for atherosclerosis and related CVDs [1].

Keywords: Potassium Ion Channel, Atherosclerosis, Cardiovascular Diseases (CVDs), High-Fat-Diet, Cardioprotection

Reference:

1 D Rani, **V Kushwaha**, SK Dey, 2024. Exploring KICX, a Non-Canonical Potassium Channel as a Novel Biomarker and Potential Therapeutic Target for Atherosclerosis (Paper communicated).

PP 14: UNDERSTANDING COAGULATION PARAMETERS IN ATHEROSCLEROSIS: A COMPARATIVE STUDY

Cheteny[1*], Chillarige Sudha Ankita[1], Renu Sehrawat[1], Mehdi Gulam[2], Manushri Sharma[1], Bhawna Mahajan[1]

[1] Department of Biochemistry, GIPMER, New Delhi

[2] Central Molecular Lab, GIPMER, New Delhi

Presenting author email id: drchetenya@gmail.com

Introduction: Systemic thromboembolic events are major cause of morbidity and mortality in patients of atherosclerosis. Prognosis of these patients is poor and their quality of life and functional status are often more limited by neurological deficits than by the symptoms of atherosclerosis. Left atrial appendage (LAA) is the commonest site for thrombus formation[1]. Impairment of left atrial (LA) / LAA contractility leads to stasis of blood and activation of coagulation cascade. This acts as an independent predictor of thromboembolic events in patients of atherosclerosis[2]. The present study was aimed to study the role of coagulation factors between the patients of atherosclerosis and healthy controls.

Materials and methods: The present study was conducted in the department of Biochemistry at GIPMER, Delhi. This was a prospective observational study, done after taking consent from the patients. A total of 70 patients were enrolled for this study of which 35 were diagnosed with atherosclerosis and the other 35 were age and gender matched non atherosclerotic control population.

Both the groups underwent a detailed history taking, a full clinical examination, a 12-lead ECG, and laboratory investigations which included routine biochemical investigations and specific coagulation parameters such as d-Dimer, Prothrombin Fragments 1+2 (PF 1+2), Plasma activator inhibitor (PAI) by immunoturbidimetry and sandwich ELISA (PF1+2, PAI) methods respectively. Results were statistically analyzed.

Results and discussion: Mean age for atherosclerosis group was 32.24±7.44 and comprised 68.57% females, whereas mean age for the controls was 32.93±2.64 and comprised 66.67% females.

D-dimer (ng/mL) was 430 (285-655) in atherosclerosis group where as for the controls it was 240 (160-435) and the difference was statically significant ($p<0.05$)

PAI (ng/mL) was 15.11±6.74 amongst atherosclerosis group whereas for controls it was 8.63±3.45 and the difference was statically significant.

PF 1+2 (pg/mL) was 9017 (6228-10963.5) amongst atherosclerosis group and for the controls it was 1400 (774.62-1995.65) the difference being statically significant.

Correlation analysis was done which suggested higher levels of D-dimer, PAI and PF 1+2 correlated with the degree of atherosclerosis.

Conclusion: In conclusion the result indicates the patients of atherosclerosis have a higher systemic hypercoagulable state due to activation of coagulation cascade. These patients may have a prothrombotic milieu and may require oral anticoagulants till definitive therapy is given in order to reduce the local hypercoagulable state.

Keywords: Coagulation, Thrombus, Atherosclerosis, Anticoagulants

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PP 15: ANALYSING THE ROLE OF LIPID BIOMARKERS IN CORONARY ARTERY DISEASE: A DIVERSE POPULATION STUDY

Mohit Singh[1], Obianyido Ozioma Ebere[1], Vimal Mehta[2], Pradeep Kumar Dabla[1]

[1]Department of Biochemistry, GIPMER, New Delhi

[2] Professor, Department of Cardiology, GIPMER, New Delhi

Presenting author email id: Email: mohit99101@gmail.com

Introduction: Coronary artery disease (CAD) is the major cardiovascular disease affecting humans globally. CAD is one the major cause of premature deaths worldwide. Dyslipidaemia is one of the major causes of coronary artery disease. ApoB/ApoA1, Lipoprotein A ratios are considered better risk predictors of coronary artery disease rather than isolated parameters used independently, particularly LDL. The objective of

the present study was to investigate changes in lipid ratios in patients of Angiographically proven coronary artery disease

Materials and methods: The present study was a cross-sectional observation study conducted in the Department of Biochemistry, GIPMER, in association with the Department of Cardiology, New Delhi. A total of 120 patients including both young and old age groups underwent a detailed history taking, a full clinical examination, a 12-lead ECG, and laboratory investigations which included serum lipid profiles (Total Cholesterol, HDL, LDL, ApoA1, ApoB and lpA), by photometric, immunoturbidimetry methods., ApoB/ApoA1 were calculated and results were statistically analyzed.

Results and discussion: The mean age of 120 CAD patients was 56.7±10.84 years and comprised 77.7% male and 22.3% female. Mean for apo A(mg/dl) was 103.5±19.88, for apo B(mg/dl) was 81.97±24.89, lpA(mg/dl) was 104.2±93.35. Ratio for apoB: apoA1 was calculated and corelation analysis was done between apoB: apoA1 vs lpA with degree of severity of CAD.

Key Words: CAD, Lipid biomarkers

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PP 16: STUDIES ON CORRELATION OF CORTISOL WITH BODY MASS INDEX IN PATIENTS OF ESSENTIAL HYPERTENSION IN WESTERN U P.

Thuraya Abdulsalam A.A.AL-Azazi[1], Manoj Kumar Nandkeoliar[1], Dr. Suman Bala Sharma[1*]

[1] Department of Biochemistry, School of Medical Science and Research, Sharda University.

Presenting Author: Thuraya.abdulsalam@sharda.ac.in

*Corresponding Author: Dr. Suman Bala Sharma

Background: Hypertension is a chronic stress-related disease, accompanying the production of noradrenaline and adrenaline, chronic stress activates the hypothalamic-pituitary-adrenal axis, therefore elevating cortisol output. Cortisol is significantly involved in reacting to stress and becomes elevated among those with essential hypertension. The evaluation of cortisol levels might serve as an indicator for mitigating essential hypertension-related problems. The study sought to explore the association between cortisol levels and Body Mass Index (BMI) in essential hypertension.

Material and methods: Case-control study carried out in Department of Biochemistry and Department of Medicine Sharda Hospital, School of Medical Science and Research, Sharda University, Greater Noida, Western Uttar Pradesh. One hundred thirty-five essential hypertensive cases and 135 control subjects attending OPD participated in the study. BMI was measured by using Bioelectrical Impedance Analysis. The cortisol levels were assessed by using an Enzyme-Linked Immunosorbent test kit.

Results: The data was analyzed by using SPSS software. An unpaired Student's t-test and Pearson's correlation coefficient were applied. It was found that the serum cortisol levels were significantly higher in essential hypertensive subjects than control (p-value = 0.001). There was a positive correlation (p = 0.01) between the levels of cortisol and the BMI among the hypertensive subjects.

Conclusion: This study revealed elevated levels of cortisol among patients with essential hypertension. Elevated cortisol levels may suggest and serve as a predictor for underlying cardiovascular complications.

Keywords: Essential hypertension, Cortisol, BMI, Enzyme-Linked Immunosorbent Assay.

PP 17: CORRELATION BETWEEN ULTRASONOGRAPHIC SOFT MARKERS AND QUADRUPLE MARKERS

Mamta Rani[1], Subhash Chand Sylonia

[1] Department of Radio diagnosis, Saraswathi Institute of Medical Sciences, Hapur

Presenting author email id- mmtasingla97@gmail.com

Introduction: The genetic sonogram has been used for a long time now to diagnose genetic disorders like Down's syndrome. Increased nuchal fold thickness is the most powerful second trimester marker with specificity of 99%.

Aim: To review the correlation between ultrasonographic soft markers and quadruple markers.

Objective: 1. To determine the presence of ultrasonographic soft markers in a fetus.

2. To correlate ultrasonographic soft markers with quadruple markers.

Case Report: A 24-year-old pregnant female came for Level II ultrasound examination.

Machine used – Canon Xario 300

Following findings were noted-

1. Increased nuchal fold thickness.
2. Hypoplastic nasal bone.
3. Echogenic lungs as compared to liver.
4. Increased cardiac axis angle.
5. Mildly increased size of right atrium and right ventricle with chamber disproportion and non-visualization of left atrium due to its small size.
6. Mild tricuspid regurgitation.

Ventricular septal defect with thin rim of pericardial fluid and mild oligohydramnios (SDP 2cm).

On biochemistry evaluation, Quadruple markers were negative.

Discussion: Ultrasound screening at 16-20 weeks is one of the most common genetic screening tests used during pregnancy. On ultrasonography we can detect aneuploidies like Trisomy 13, Trisomy 18, Monosomy X. Most commonly used soft tissue markers of aneuploidy include Choroid Plexus Cyst, Thickened Nuchal Fold, Echogenic Intracardiac Focus and Echogenic bowel.

Conclusion: Sonography cannot be used to diagnose or exclude aneuploidy; it just provides a non-invasive method to screen the risk of aneuploidy on the basis of a variety of sonographic features. Although in this case we noted disparity between ultrasonographic soft markers and quadruple markers.

PP 18: Advances in Coronary Artery Disease (CAD) Assessment: Imaging Techniques and Risk Prediction

Akansh Kirodiwal, Neera Sharma, Parul Goyal, Ranjit Kumar Nath

Department of Biochemistry, Department of Cardiology, ABVIMS & DR RML Hospital, New Delhi

Presenting author email id: akanshkirodiwal@gmail.com

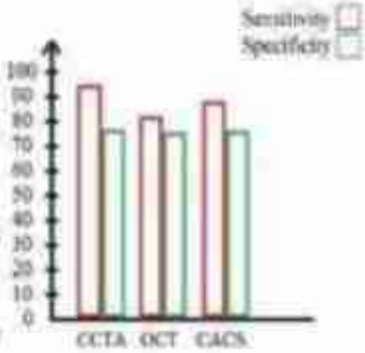
Background: Coronary artery disease (CAD), a leading cause of mortality, is characterized by the accumulation of atherosclerotic plaques in the coronary arteries. Early identification of these plaques is crucial for preventing major adverse cardiac events.

Methods: *Imaging Techniques*

1. Coronary Computed Tomography Angiography (CCTA): Effective in visualizing both obstructive and non- obstructive plaques. It offers a comprehensive assessment, including luminal stenosis and plaque composition.
2. Optical Coherence Tomography (OCT): Provides high-resolution imaging to identify plaque features such as fibroatheromas and calcium thickness.
3. Coronary Artery Calcium Score (CACS): A non-invasive measure to quantify calcified plaque burden, useful for risk stratification in asymptomatic patients.
4. Perivascular Fat Attenuation Index (pFAI): An emerging marker for coronary inflammation, useful in conjunction with CACS for enhanced risk prediction.

Risk Prediction Models

1. Machine Learning (ML) Enhancements: Improve traditional models (e.g., AHA-PREVENT) by integrating clinical, demographic, and imaging data for better prediction of cardiovascular events.
2. Age and Risk Factor Control: Age- related atheroma progression can be modulated by controlling factors such as LDL cholesterol and systolic blood pressure.



Clinical Implications: 1. Patients with thin-cap fibroatheromas have a higher risk of ischemia-driven revascularization.

2. High plaque burden (≥75th percentile) is predictive of myocardial infarction.

3. Greater calcium burden is associated with stable plaques, characterized by reduced inflammation.

Conclusion: Combining CCTA, CACS, and pFAI assessments with ML-driven risk models can improve CAD management, enabling personalized treatment strategies.

PP 19: IDENTIFICATION OF NOVEL PTX3 INHIBITORS AS THERAPEUTIC CANDIDATES FOR CARDIOVASCULAR DISEASES

Mayank Deep Singh[1*], Yatender Kumar[2], Kamna Srivastava[3]

[1] Dr B R Ambedkar Center for Biomedical Research, University of Delhi, New Delhi

[2] Department of Biological Sciences and Engineering, Netaji Subhas University of Technology, New Delhi

[3] Dr B R Ambedkar Center for Biomedical Research, University of Delhi, New Delhi

[*] Presenting author email id: mayankdeepsingh08@gmail.com

Introduction: Pentraxin 3 (PTX3), an acute phase protein, plays a pivotal role in inflammatory processes associated with cardiovascular disease (CVD), making it a promising therapeutic target. This study aims to identify novel small-molecule inhibitors of PTX3 through molecular docking simulation using AutoDock Vina and subsequent pharmacokinetic analysis. These compounds could potentially serve as potential therapeutics for CVD.

Materials and methods: Molecular docking simulations were performed using AutoDock Vina to screen compounds from the Maybridge HitDiscover library against the PTX3 protein structure. The top 100 compounds with the highest binding affinities were selected for further analysis. Drug-likeness and pharmacokinetic properties, such as bioavailability, solubility, and lipophilicity, were assessed using the SwissADME tool.

Results: Molecular docking simulation of the compounds identified 100 candidates with high affinity for PTX3. Among these, four compounds demonstrated optimal drug-like properties as evaluated by SwissADME. These compounds exhibited high bioavailability, appropriate lipophilicity, and good solubility, making them strong candidates for further experimental validation as PTX3 inhibitors.

Conclusions: The identification of novel PTX3 inhibitors through molecular docking and pharmacokinetic analysis represents a significant step towards the development of potential therapeutics for CVD. The four compounds identified in this study show

promising properties and warrant further investigation. Future studies will focus on in vitro and in vivo validation of these compounds as PTX3 inhibitors and their potential therapeutic efficacy in CVD models. Additionally, molecular dynamics simulations will be performed to gain deeper insights into the binding interactions and dynamic behaviour of the protein-ligand complexes.

Keywords: PTX3, Cardiovascular Diseases, Molecular docking simulation, Drug Discovery, Pharmacokinetics

PP 20: CORONARY ARTERY ANOMALIES ON CT CORONARY ANGIOGRAPHY

Shubham Kalra[1], Subhash Chand Sylonia[1]

[1] Department of Radiodiagnosis, Saraswathi Institute of Medical Sciences, Hapur)

Email ID- shubhamkalra080@gmail.com

Introduction: Incidence of coronary artery anomalies varies from 1.3% to 5.64% in coronary angiography cohorts and is detected as an incidental observation. Even though asymptomatic in many, it can be lethal and hemodynamically significant. There is a well-established link to the causation of sudden cardiac deaths even in healthy athletes with coronary artery anomalies. With the advent of ECG-gated multi-detector row computed tomography (MDCT) coronary angiography, coronary artery abnormalities can now be accurately and non-invasively depicted.

Materials and methods: Ninety patients who underwent 64-slice MDCT coronary angiography between January 2023 and December 2023 were included in this retrospective analysis. A 70 cc nonionic contrast agent (350 Omnipaque mg/ml) injection was used to acquire coronary angiographic images. The data reconstruction process was timed to coincide with the ECG signal using the retrospective gating technique. Axial scans were used to generate maximum intensity projection, multi-planar reformatted, and volume rendering images.

Results: Out of ninety patients who underwent 64-slice MDCT coronary angiography between January 2023 and December 2023; in 8 cases coronary artery anomalies were detected. Following coronary artery anomalies were detected: An anomalous origin of the left coronary artery from the right coronary sinus; Malignant course of RCA; Dual left anterior descending artery system; Tetrafurcation of LCA; Superdominant RCA; Myocardial bridging.

Conclusion: Accurate and non-invasive visualization of coronary artery anomalies can be done using ECG-gated multi-detector row computed tomography (MDCT) coronary angiography leading to improved clinical judgment on the part of the cardiologist as well as better patient management in cases when symptoms last for an extended period.

PP 21: COMPARISON OF INFLAMMATORY MARKERS (MCP-1, IFN Γ) AND PON-1 ENZYME LEVELS IN PATIENTS OF MYOCARDIAL INFARCTION (MI) WITH AND WITHOUT FAMILY HISTORY OF MI

Singh R[1], Bansal P[2], Meena MK, Chandra S, Dawar R, Goyal P, Bhattacharjee J, Tyagi S

[1] Director Professor and Head of Department Biochemistry, Lady Hardinge Medical College, New Delhi.

[2] Postgraduate resident, Department of Biochemistry, Lady Hardinge Medical College, New Delhi

Introduction: Coronary artery disease (CAD) is the leading cause of mortality worldwide with increasing prevalence in Indians in the last three decades. It is characterized by earlier age of onset and more extensive angiographic involvement caused by genetic, metabolic and conventional causes. Family history is a strong predictor of CAD even after adjustment for other conventional risk factors such as hypertension and dyslipidemia. Therefore, it is imperative to assess potential determinants of plaque instability in patients of myocardial infarction (MI). We evaluated markers of inflammation (MCP-1, IFN γ) and PON-1enzyme in patients of MI with and without family history of MI.

Methodology: 200 patients diagnosed with MI within the first 24 hours of the event were included. Cases were confirmed by a treating cardiologist and family history of MI in first degree relatives was taken. Serum levels of IFN γ, MCP-1 and PON-1enzyme were analysed by ELISA. The data obtained was analysed by SPSS version 21.0. A p-value <0.05 was considered as statistically significant.

Results: 50% of the patients had a family history of MI in their first-degree relatives. Patients with family history of MI showed higher levels of MCP-1 and PON-1 enzyme while patients without family history of MI had higher levels of IFN γ. However, only PON-1enzyme levels were found to be statistically significant in both the groups.

Conclusion: Proteomic markers provide substantial insight into plaque instability. Epigenetic studies reveal significant modifications affecting the development and progression of CAD.

Keywords: MCP-1, IFN γ, PON-1enzyme, myocardial infarction, epigenetics

PP 22: IMPACT OF LAPAROSCOPIC SLEEVE GASTRECTOMY ON FREE FATTY ACIDS IN PATIENTS WITH MORBID OBESITY

Hemant Khatri[1]

Department of Biochemistry, Lady Hardinge Medical college, New Delhi-110001

Presenting author email id: hemantkhatrihd7@gmail.com

Introduction: Obesity is a common health problem in the world with diverse comorbidities. Obesity is accepted as a risk factor for increased mortality and morbidity. Over 650 million persons globally are expected to be clinically obese (BMI > 30 kg/m2) by the World Health Organization in 2016. Over 4 million deaths worldwide in 2017 were attributed to obesity or being overweight, according to the global burden of disease.

Materials and methods: Prospective observational hospital-based study. All patients of morbid obesity aged 18 to 65 years undergoing laparoscopic sleeve gastrectomy.

The study included 31 patients with morbid obesity selected. Measured by using Human FFA ELISA kit. Serum levels free fatty acids of all patients included in the study are measured pre operatively with other routine investigations before bariatric surgery (Laparoscopic sleeve gastrectomy) and followed for 3 months and changes in the serum levels of free fatty acids were observed at 3 months after LSG

Results: Free fatty acids levels were measured preoperatively with minimum value of 101.65mmol/ltr to maximum value of 474.71mmol/ltr with mean+SD (202.57 ± 82.03) which decreased in the post op with minimum value of 59.89 to maximum value of 726.04 with mean+SD (168.23 ± 128.15) . P value of 0.00153

Conclusion: Preoperatively with mean+SD (202.57 ± 82.03) which decreased in the post op with mean+SD (168.23 ± 128.15 with a p value of 0.00153 There is negative correlation between free fatty acids with the percentage excess weight loss at 3 months after LSG which is significant.

Keywords: Obesity, BMI, ELISA, Free Fatty Acids, Laparoscopic sleeve gastrectomy

PP 23: ROLE OF LIPID RATIOS IN IN PEDIATRIC DENGUE PATIENTS

Ruby[1]

Department of Biochemistry, Lady Hardinge Medical college, New Delhi-110001

kulsum.r107gmail.com

Introduction: Dengue is an RNA virus transmitted by Aedes mosquito with incidence of 2.3 lakh cases & 3003 deaths in 2022 according to National centre for vector borne disease control. Given the high incidence of dengue cases and related deaths particularly in regions like West Bengal and Uttar Pradesh, understanding how lipids and lipoproteins may influence virus infectivity is crucial which could potentially lead to better biomarkers for identifying patients at risk of severe disease.

Materials and methods: A Retrospective observational study consisting of 70 Pediatric patients (6 month-18years) was conducted in KSCH, New Delhi. Data was retrieved from registers. The patients were classified into dengue without warning symptoms, dengue with warning symptoms and severe dengue. Lipid ratios such as Castelli's risk index-I (CRI-1) (<3.5 optimal), Castelli's risk index-2 (CRI-2) (<2.5 optimal), Atherogenic Index of Plasma (AIP) (0.11) are diagnostic alternatives which help in predicting risk of disease severity.

Results: TC, HDL, LDL and TG were 152.19 ±19, 33 ±3.91, 78.15±13.34, 186.9±50mg/dL in DNWS group, 91.17 ±15.8, 28.12±10.2, 51.78±1, 116.9±12.5mg/dL in DWWS and 61.77±21.89, 16.78±10, 32.78±11, 168.9±42.1mg/dL respectively in SD group. CRI-1, CRI-2 and AIP was estimated to be 4.03,2.08, 0.7 respectively in DNWS group, 3.25,1.88,0.62 in DWWS and 3.91,1.93 and 1.01 in SD group respectively.

Conclusion: Dengue virus disrupts lipid metabolism to support its replication. It down-regulates HMG CoA reductase, reducing cholesterol synthesis, and increases LDL receptor expression, enhancing viral entry and LDL uptake. It decreases Lecithin Cholesterol Acyl Transferase activity, lowering cholesterol esterification in HDL and impairing cholesterol transport. The resulting pro-inflammatory state limits cholesterol release, decreasing serum cholesterol levels, HDL-C, and LDL-C as dengue severity increases. Regular monitoring of lipid profiles can serve as a cost-effective marker of dengue severity.

Keywords: Lipid profile, Castelli risk index-1, Castelli risk index -2, Atherogenic index of plasma, Dengue.

PP 24: A CASE OF INTERVENTRICULAR MEMBRANOUS SEPTAL ANEURYSM: A RARE ENTITY

Anuj Upneja[1], Subhash Chand Sylonia[1]

Department of Radio diagnosis, Saraswathi Institute of Medical Sciences, Hapur

Introduction: A 62 years old female patient who is a known case of hypertension, presented to the cardiology outpatient department of SIMS hospital for evaluation of her retrosternal chest pain, breathlessness and palpitations which had been worsening for past 1 year. There was no history of orthopnea, fever, and vomiting. Patient also had prior history of MI. She described chest pain radiating to her left upper chest, as well as her left upper extremity and shoulder area which worsened on doing any physical activity.

Material and methods: This is a case study of a patient presenting to cardiology outpatient department of SIMS hospital, Hapur for retrosternal chest pain.

Results: • ECG- Right axis deviation and previous changes of myocardial infarction,

• On 2D echo- Poorly visualized abnormality was seen involving the interventricular septum, and a cardiac CT was arranged for further characterization,

• CT coronary angiography - Interventricular membranous septal aneurysm, severe occlusive coronary artery disease in left and right coronary system.

Conclusion: Radiological imaging is essential in the diagnosis. Interventricular membranous septum aneurysm is a rare condition. An important distinction is between anatomically based aneurysms and aneurysm-like structures that occur in and around the left ventricular outflow tract, such as the Valsalva sinus aneurysm and sub mitral aneurysm. Multislice CT is the most useful investigation in morphological and functional assessment of aneurysm.

PO 25: ASSOCIATION OF SERUM FETUIN-A AND ADIPONECTIN WITH CAROTID ATHEROSCLEROSIS IN PREDIABETES AND DIABETES

S Naveen Kumar[1], Parul Goyal[1], Ajay Chauhan[1], Sarita Jilowa[2]

[1] PG Resident, Department of Biochemistry, ABVIMS & RMLH, New Delhi

[2] Professor, Department of Radiodiagnosis, ABVIMS & RMLH, New Delhi

Presenting author email id: naveengvmc10@gmail.com

Introduction: Serum Fetuin-A is a multifunctional glycoprotein which is exclusively secreted from hepatocytes. Fetuin-A has been considered to play a crucial role in the protection from vascular calcification by solubilizing calcium and phosphorus in serum. Adiponectin, a 30 kDa hormone derived from adipocytes, plays an important role in regulating glucose metabolism and increases insulin sensitivity. It also has antidiabetic, anti-atherogenic and anti-inflammatory activities in various metabolic diseases. In this study we elucidated the role of Fetuin-A and Adiponectin in prediabetes and Diabetes correlating it with cardiovascular disease risk by assessing the carotid intima media thickness [CIMT].

Materials And methods: Three groups, patients with diabetes, prediabetics and healthy controls participated in the study and biochemical parameters such as FBS, HBA1c% lipid profile were performed. Fasting Insulin was estimated to calculate the insulin resistance by HOMA-IR. Fetuin-A and Adiponectin (both estimated by ELISA technique) were performed along with the carotid atherosclerosis evaluation by CIMT.

Results: The serum levels of CIMT showed clear significant differences ($p < 0.001$) in our three study groups. The mean value of Fetuin-A in diabetes was 209.52 ± 44.49 ng/mL, in prediabetes was found to be 171.53 ± 79.83 ng/mL and 100.44 ± 102.03 ng/mL in healthy controls. The mean value of Adiponectin in diabetes was 188.99 ± 166.52 ng/mL, in prediabetes was found to be 256.68 ± 137.77 ng/mL and 219.17 ± 136.60 ng/mL in healthy controls. A significant correlation between the Fetuin-A, Adiponectin and CIMT was found by the AUC in the ROC curve, which signifies a good relationship between the cardiovascular complications and the serum levels of Fetuin-A and Adiponectin.

Conclusion: Serum levels of Fetuin-A and Adiponectin may be considered as surrogate marker for early atherosclerosis and can be used as tool to predict the same.

This molecule, if combined with other atherosclerotic markers and CIMT, can improve the cardiovascular risk assessment.

Keywords: Fetuin-A, Adiponectin, CIMT, HOMA-IR (Homeostatic Model Assessment for Insulin Resistance).

PP 26: SERUM ELECTROPHORESIS SHOWING NEPHROTIC SYNDROME PATTERN

Rumani Dhull[1], Harnam Kaur[1], Sonam Bhatia[1], Priyank Udagani[1], Mehakpreet Singh[1]

[1] Department of Biochemistry, ESIC Medical college and Hospital, Faridabad, Haryana

Introduction: Nephrotic syndrome is a clinical disorder characterized by proteinuria (3.5g per day), minimal hematuria, hypoalbuminemia, hypercholesterolemia, edema and hypertension which results from altered permeability of glomerular filtration barrier for protein in glomerular filtration membrane.

Case Summary: A 65-year-old female presented with anemia, loss of appetite, abdominal pain, difficulty in breathing, joint pain severe swelling around her eyes, ankle and feet. On examination BP was 150/100 mmHg. On serum analysis Total protein – 5.1g/dl and Albumin is 2 g/dl and on urine examination 24 hours urine protein 16081 mg per day and albumin is1300 ml and on serum electrophoresis, patient has albumin fraction 34.0, alpha 1 – 5.5, alphas 28, beta 1- 23.1, beta 9.3, Gamma 8 %.

Objective: To diagnose Nephrotic syndrome on Serum Protein Electrophoresis

Methodology: Blood sample from subject visiting Nephrology OPD, ESIC Medical College & Hospital, Faridabad was included for study. Serum Total Protein and Albumin was done by colorimetric method on automated analyzer (Vitros XT 7600). Serum protein electrophoresis was done using Sebia k-20 Gel Electrophoresis.

Results: The patient presents with classical clinical features of edema, anemia, pleural effusion, hypoalbuminemia, and increased alpha 2 fraction 24.4% which is suggestive of Nephrotic Syndrome.

Conclusion: SPEP findings corelate clinically and Biochemically with Nephrotic syndrome

Invited Articles

CURRENT RECOMMENDATIONS FOR LIPID PROFILE REPORTING

Bhargava S, Sawhney JPS, Mehta A, Yadav A, Madan K, Manocha A, Kankra M, Sharma A, Saini R, Parmar K.

Despite the advances in science with increasing knowledge of mechanisms involved as well as newer therapeutic modalities identified, cardiovascular disease (CVD) still claims top position in the global listing of burden of morbidity and mortality due to degenerative diseases.[1]

At the same time, there has been an epidemiological transition of this burden from developed countries to the developing countries, India being amongst them. Data from studies in the last three decades reveals that not only do Indians have a higher prevalence of CVD, but the average age of these patients is 10 years less than in the western population, and the percentage of CVD amongst the younger population (under 40 years of age) is thrice as much as in other populations (5% vs 5%). Experimental evidence suggests that the causes of this preponderance of CVD in our population are varied, prime amongst them being a genetic predisposition and the atherogenic milieu in our blood vessels.[2-5]

Whatever the underlying cause, the major contributing factors to deposition of the intravascular atherosclerotic plaques are circulating lipids. To address this grave burden of disease, the Cardiology Society of India (CSI) collated data of over two decades from the Indian population to ascertain the trends in lipid profile biomarkers, the epidemiology of coronary artery disease (CAD), the characterization of CAD risk, and the evidence-based management especially of those at high risk with specific focus on the dyslipidemias relevant to India.

Whereas this consensus statement of CSI focuses on the management of dyslipidemias, it also emphasizes the importance of assessment of risk before management and then ascertaining response to treatment through specific individual goals for each lipid biomarker.

It suggests that while reporting lipid profiles, laboratory professionals could include comments with regard to risk assessment and the lipid goals for each risk category. The

aim is to empower the patient to understand his risk and what his lipid goals are with respect to his risk. This avoids complacence of patients and their consequent undertreatment, at the same time contributing to a reduced morbidity and mortality.

We, the Department of Biochemistry, Sir Ganga Ram Hospital, in collaboration with the Department of Cardiology, have included two simple descriptions – one is how to assess your own risk category, and the second is a table that gives risk-wise lipid goals (figure 1 below). In addition, lipoprotein(a) is measured for all patients who come for the first time so that risk assessment is appropriate. This is, of course, in addition to the global biological reference intervals which are an integral part of all reports.

Recommended Uniform reporting of Lipid profile for all the Laboratories in the country

PATIENT REPORT EXAMPLE

Lipid parameter*	Levels	Reference range
Total cholesterol	180	<190.00
LDL cholesterol	90	<100.00
Non-HDL cholesterol	130	<130.00
HDL cholesterol	50	>50.00
Triglycerides	180	<150.00

PLEASE ESTIMATE YOUR RISK FOR CVD AND LOOK FOR YOUR LIPID GOALS BELOW

[CVD – Cardio Vascular Disease (disease of arteries of heart, brain and limbs)]

Risk Categorization

Low Risk No CVD risk factor.

Moderate Risk Any one CVD risk factor [e.g. smoking, tobacco, hypertension [HT], diabetes mellitus (DM), dyslipidemia, central obesity, family history of young heart attacks [M<55 yrs; F<65 yrs].

High Risk DM with one or more risk factors, HT with one or more risk factors, chronic kidney disease, familial hypercholesterolemia without any other risk factor.

Very High Risk Clinical evidence of blocked arteries (angina, stroke, heart attack, limb vessel disease), DM>20 years, DM with complications, familial hypercholesterolemia with blockage of arteries.

Elevated Lp(a) above 50mg/dl is associated with high risk of CVD, Heart failure and aortic valve disease.

LIPID GOALS AS PER RISK (in mg/dL)

RISK	LOW	MODERATE	HIGH	VERY HIGH
*LDL-Chol	<100	<100	<70	<55
*Non HDL-Chol	<130	<130	<100	<85
HDL-Chol	M >40; F >50	M >40; F >50	M >40; F >50	M >40; F >50
Triglycerides	<150	<150	<150	<150
Lipoprotein(a)	<50	<50	<50	<50

At the end of these comments, the reference is stated. (Reference no 6 in this manuscript)

This sort of uniformity in country-wide reporting of the lipid profile will enable all general practitioners (especially those in far-flung areas where he has little access to the latest literature) to be aware of the latest guidelines of risk categorization and lipid goals assigned risk-wise. The ultimate aim is to reduce the burden of cardiovascular disease across the country.

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APPROACHES TO CVD PREVENTION IN WOMEN

Sharma Akash Mohan[1], Nandkeollar MK[2], Sharma Pooja[2], and Sharma SB[2*]

[1] Department of Orthopaedic, JNU Medical College & Hospital, Jaipur

[2] Department of Biochemistry, SMS&R, Sharda University, Greater Noida

* Corresponding author: Dr. S.B. Sharma

Abstract

Background: Cardiovascular disease (CVD) stands as the leading cause of death for women worldwide, despite often being perceived as predominantly affecting men. While the disease's biology shares similarities between genders, there are unique risk factors and circumstances specific to women that shape its course. It's crucial to take efforts in preventing and treating cardiovascular disease, especially in low- and middle-income nations, for both men and women. The rising rates of diabetes and obesity contribute to dyslipidaemia occurring earlier in women's lives, emphasizing the necessity for comprehensive interventions. Specific risk factors like hypertension during pregnancy or menopause, and adverse pregnancy outcomes, highlight the importance of tailored approaches to CVD prevention in women. Lifestyle adjustments, such as managing weight, dietary improvements, physical activity, and quitting smoking, play pivotal roles. Nevertheless, there's a persistent underestimation of risk and undertreatment in women, stressing the need to integrate gender-specific factors into formal risk assessment tools and guidelines.

Conclusion: Adopting a holistic approach with personalized interventions targeting diet and lifestyle factors is paramount in effectively reducing CHD risk in women.

Keywords: Cardiovascular Disease (CVD), Women's Health, Lifestyle Modifications, Dyslipidaemia

Introduction

Cardiovascular disease is a significant health concern affecting women globally [1,2]. Despite its prevalence, recognition of its impact on women has only gained traction in recent years. The American Heart Association (AHA) took notable steps in this regard, issuing its first statement on CVD in women in 1993 and subsequently releasing clinical guidelines focusing on CVD prevention in women, with updates in subsequent years. In 2022, the AHA further underscored the urgency of addressing CVD in women through a "Call to Action." [3].

While CVD epidemiology reveals a substantial burden, efforts to lower its impact face challenges, particularly concerning risk factors and preventive measures. Literature emphasizes the importance of lifestyle modifications, including physical activity, dietary changes, smoking cessation, and psychosocial support, in reducing CVD risks [4,5]. However, the implementation of these strategies remains variable, with disparities observed in risk perception and treatment approaches between genders.

This paper aims to explore the CVD risk considerations in women, examining epidemiological trends, prevalent risk factors, and preventive strategies. By elucidating the multifaceted nature of CVD in women and highlighting the importance of tailored interventions.

Literature Survey

CVD- 'Not just a man's disease'

Despite this, it is often perceived to be a man's disease. Although the biology of the disease is the same, some sex specific risk factors and conditions alter the course of the disease. Women experience a number of hormonal changes throughout their lives that impact lipoprotein metabolism and therefore risk of CVD. In primary prevention, treatments for cardiovascular disease are more prevalent among women than men, whereas in secondary prevention, the trend is reversed. Nevertheless, women consistently exhibit better outcomes than men, regardless of whether they have a history of cardiovascular disease. It is imperative to actively pursue improvements in cardiovascular disease prevention and treatment, particularly in low- and middle-income countries, for both genders. In addition, the increasing prevalence of diabetes and obesity leads to women getting dyslipidaemia earlier in life [6]. A misperception that a

heart attack is a man's disease, and unconscious biases in the delivery of healthcare, may lead to delayed treatment and poorer survival chances for women who suffer a heart attack [7]. Understanding and addressing any sex-specific differences in the area of dyslipidaemia and CVD is an important opportunity to improve healthcare. Even though CVD affects both women and men similarly, it's only in recent decades that medical guidelines have begun acknowledging its significance in women. The American Heart Association took a significant step in 1993 by publishing its first statement on CVD in women. Then, in 1999, they released the first clinical guidelines specifically addressing CVD prevention in women, with subsequent updates in 2004, 2007, and finally 2011. Just last year, in 2022, the American Heart Association issued a "Call to Action" aimed at reducing the burden and risks associated with CVD in women [3].

Effective prevention of CVD in women demands a comprehensive approach that includes raising awareness, ensuring effective communication, and accurately predicting risks.

Cardiovascular Disease Epidemiology

According to report by Lancet commission, in 2019, approximately 275.2 million cases of cardiovascular disease were estimated globally in women, with the prevalence estimated at 6403 cases per 100,000 women. Some regions experienced an increase, such as east Asia, western sub-Saharan Africa, and Oceania, including populous countries like China, Indonesia, and India. Although there was a decrease in global prevalence between 1990 and 2010, there has been a slight, albeit not statistically significant, increase since 2010. This stagnation underscores the need for increased efforts in prevention, diagnosis, and treatment of cardiovascular disease in women, particularly in highly populated and industrializing regions [8].

Cardiovascular Disease Epidemiology in India

According to the Global Burden of Disease (GBD) study in 2017, CVD caused 2.64 million deaths in India, with women accounting for 1.18 million and men for 1.45 million [9].

Risk Factors

The Nine key risk factors contribute to over 90% of CVDs, including factors like high apolipoprotein B, low apolipoprotein A1, high blood pressure, diabetes, high waist-hip

ratio, smoking or tobacco use, sedentary lifestyle, psychosocial stress, poor quality diet, and alcohol consumption. These risk factors are equally crucial for South Asian individuals. Among women, smoking holds a smaller population attributable risk due to its lower prevalence, whereas metabolic risk factors such as dyslipidemia, hypertension, diabetes, and high waist-hip ratio play a more significant role. Indian women commonly exhibit these risk factors [4].

Surveys like the Second and Third National Family Health Surveys (NFHS) highlighted high usage of smokeless tobacco among Indian women. NFHS data indicates a rising trend in smoking among women, particularly among those with low education and socioeconomic status. Obesity prevalence is notably higher among Indian women compared to men, with increasing rates of overweight and obesity observed [5].

Various studies across India underscore the prevalence of cardiometabolic risk factors in women, including hypertension, which tends to be more prevalent in middle-aged and older women compared to men. While hypercholesterolemia rates are similar between genders, low HDL cholesterol is more common in women. Reports also indicate a higher incidence of metabolic syndrome and diabetes in women compared to men, particularly after menopause when hormonal protection diminishes [5].

Studies concerning risk factors among children are limited, but obesity rates, especially among girls in urban schools and the middle class, are increasing. Childhood obesity is prevalent across various regions, particularly among urban schoolgirls. High blood pressure and type-2 diabetes are emerging concerns among adolescent children, with a higher prevalence noted in women. Tobacco use, while widespread among rural children and urban slum dwellers, tends to be lower among women compared to men [10,11].

Along with traditional risk factors, specific CHD risk factors in women include:

- High blood pressure or diabetes during pregnancy or menopause; [11]
- History of pre-eclampsia; [12]
- Adverse pregnancy outcomes (gestational diabetes, hypertensive disorders, low birth weight, high birth weight and pre-term delivery); [13,14] and
- Early menopause (age < 40) [13,14].

Menopause is well associated with a shift towards a less favourable blood lipid profile, with higher LDL and total cholesterol, and lower HDL cholesterol associated with post-menopausal women [14,15]. With menopause, women not only experience a worsening of their lipid profile, with transition to higher and more atherogenic dyslipidaemia but also tend to experience weight gain and increased blood pressure [14]. Increased prevalence of the metabolic syndrome occurs during the menopause transition, accompanied by increased subclinical atherosclerosis, weight gain, and redistribution of fat as abdominal obesity occurs in conjunction with increased visceral adipose tissue [13]. Certain other risk factors increase around the time of menopause including a decline in the cardio-protective hormone oestrogen, poor dietary habits and lifestyle factors such as reduced physical activity. Early menopause (age < 40) is a well-established CHD risk-enhancing factor and associated with mortality [14,16].

Approaches to prevention of CVD in women – *Diet and lifestyle factors should be considered*

Despite some improvements, there's still a problem with underestimating the risk of cardiovascular disease (CVD) and not treating it enough in women. There are differences in how doctors and public health experts recommend managing risk factors for men and women, such as diabetes, high blood pressure, obesity, not being active enough, smoking, and abnormal levels of lipids in the blood (dyslipidemia). Considering factors specific to women, like menopause, pregnancy history, and complications during pregnancy, is crucial when assessing the risk of CVD. It's important to include these factors in formal risk assessment tools.

The American Heart Association (AHA) published guidelines in 2011 that stress the importance of making lifestyle changes, quitting smoking, and improving diet to reduce the risk of CVD. These guidelines provide a basis for national strategies aimed at preventing CVD in women. Medical treatments should be tailored to each gender. For example, beta-blockers, a type of medication, have been shown to have a greater survival benefit for women during heart attacks.

Preventive measures to reduce the risk of coronary heart disease (CHD):

Physical activity: Being active is crucial, as people who are not active enough have a higher risk of CHD. Even small amounts of exercise can significantly lower this risk.

Diet: What you eat can affect your risk of CVD. Eating plenty of fruits, vegetables, fish, whole grains, and fiber can help lower the risk. It's also important to choose healthy fats like mono-saturated and polyunsaturated fats instead of saturated fats.

Plant-based diets: These diets, which focus on foods from plants while limiting red meat, processed meat, sweets, and oils, have gained attention for their potential to reduce the risk of CVD.

Managing obesity: Guidelines published in 2013 offer recommendations for managing obesity effectively, including lifestyle changes, dietary therapy, and sometimes considering bariatric surgery.

Cholesterol-lowering foods: Certain foods, like those containing plant stanols/sterols, can help lower cholesterol levels.

Quitting smoking: Smoking is a significant risk factor for heart disease and stroke, so efforts to reduce smoking rates are crucial for preventing CVD.

Addressing psychological factors: Stress and anxiety can also impact the risk of CVD, though guidelines don't always explicitly address these factors.

Managing blood pressure and diabetes: These are recognized as major risk factors for CVD, so it's important to manage them through lifestyle changes, medication, or a combination of both.

Lifestyle modifications, including proper nutrition and regular physical activity, play key roles in managing these conditions and reducing CVD risks. Dietary management, alongside pharmaceutical therapy, remains crucial for individuals with diabetes and those managing blood lipids. Overall, lifestyle interventions, including dietary modifications, physical activity, smoking cessation, and psychosocial support, form essential components of CVD prevention and management strategies.

For more information on dietary management of dyslipidemias, visit https://www.dietattheheart.com/.

Conclusion

In conclusion, CVD in women represents a significant global health concern that demands urgent attention. Despite strides made in recent years to recognize its impact and address prevention strategies, challenges persist. The multifaceted nature of CVD

in women, influenced by sex-specific risk factors and conditions, underscores the need for tailored interventions.

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SUDDEN CARDIAC DEATHS IN POST COVID19 PATIENTS-LATEST IN ETIOLOGY AND INVESTIGATIONS

Rajni Dawar[1], Huda Naaz[1], Snehal. S. Sawant[1]

[1] Department of Biochemistry, VMMC & Safdarjung Hospital, Delhi, India

In post covid era it has been found that sudden cardiac deaths have increased multifold, on trying to search for reasons before such increase it was found that after recovery, patients may be at a higher risk of a heart attack or heart failure. This is often because of inflammation from your body's response to the COVID-19 infection.

Excessive inflammation can harm cardiovascular system in many ways, including:

- **Arrhythmia**: Inflammation can alter your heart's electrical signals. As a result, your heart can lose its normal rhythm. If you already have arrhythmia, a cytokine storm can make it worse.
- **Blood clots:** When inflammation affects the lining of your blood vessels (the endothelium), you face a greater risk of blood clots, heart attack or stroke.
- **Myocarditis.** This is an inflammation of your heart muscle. People with COVID-19 face a higher risk of myocarditis compared with those who aren't sick.
- **Pericarditis**. This is inflammation in the membrane around your heart. It can cause chest pain and fluid buildup around your heart.
- **Heart failure**. This is a condition where excess fluid and swelling (edema) can build up in your lungs and your body.

Covid 19 patients with underlying CHF, CAD, CKD, Diabetes, obesity, smoking history, alcohol intake, history of stroke, hypertension, sickle cell anaemia and thallasemias have a higher risk of COVID-19 complications. This higher risk to patients hospitalized for COVID-19 have underlying heart issues. and increased risk in these patients can be attributed to cytokine storm. Inflammation is the main culprit, as it raises your risk of blood clots (microclots formation) and prevents your body from getting rid of clots on its own (thromoboysis).

Latest technology for diagnosing microclots is Thromboelastography:

THROMBOELASTOGRAPHY

Microclotting is a significant pathology observed in both acute and long Covid-19, leading to vascular damage not just in the lungs, but throughout the body. These micro

clots, often undetectable by standard laboratory tests pose significant challenge. The presence of the antibody ADAMTS13 can trap clotting factors and D-dimer, preventing their detection and masking inflammatory markers in lab results. Consequently, diagnosing Covid-related clotting and post-Covid thrombotic events through conventional tests becomes difficult. The solution lies in using a thromboelastogram (TEG), which offers a more accurate laboratory diagnosis by revealing clotting abnormalities that traditional methods might miss. This approach could also shed light on thrombotic events and sudden cardiac deaths (SCD) linked to Covid-19.

A. MINI REVIEW: REDEFINING CARDIOVASCULAR RISK: THE RISE OF NON-TRADITIONAL LIPID INDICES IN ATHEROSCLEROSIS MANAGEMENT"

Snehal S Sawant[1], Rajni Dawar[1]

[1]Department of Biochemistry, VMMC & Safdarjung Hospital, Delhi, India

Introduction

Atherosclerosis is a complex, chronic condition characterized by lipid accumulation, inflammation, and the formation of fibrous plaques in arterial walls, making it a leading cause of cardiovascular disease (CVD). The role of lipids in atherosclerosis is critical, as they participate in every stage of the disease process, from endothelial dysfunction to plaque rupture. Traditionally, the lipid profile—comprising total cholesterol, triglycerides, high-density lipoprotein (HDL), and low-density lipoprotein (LDL)—has served as a cornerstone in assessing cardiovascular risk and guiding prevention strategies. However, recent advances in lipid research have illuminated the potential of non-traditional lipid indices as valuable tools for predicting cardiometabolic risk and refining treatment approaches.

Pathophysiology of Atherosclerosis

The development of atherosclerosis begins with endothelial injury, often triggered by factors such as hypertension, smoking, and hyperlipidemia. This injury facilitates the infiltration of LDL particles into the arterial wall, where they undergo oxidation and become pro-inflammatory. Monocytes migrate into the intima, transforming into macrophages that engulf oxidized LDL, leading to the formation of foam cells. Over time, these foam cells accumulate, forming fatty streaks that develop into mature atherosclerotic plaques. The interaction between lipids, inflammatory cells, and vascular

smooth muscle cells creates a dynamic environment that can lead to plaque instability and rupture, resulting in acute cardiovascular events such as myocardial infarction or stroke [1].

Traditional Lipid Profile

The traditional lipid panel has been a fundamental tool in identifying individuals at risk for atherosclerosis for decades. Elevated levels of total cholesterol and LDL cholesterol are strongly associated with increased cardiovascular risk, while HDL cholesterol is recognized for its protective role against atherosclerosis. Clinical guidelines have consistently recommended the assessment of these lipid components to guide therapeutic interventions, particularly the use of statins, which aim to lower LDL cholesterol levels and reduce cardiovascular morbidity and mortality [2].

Despite its widespread use, the traditional lipid profile has limitations. It may not fully capture the nuanced interactions between various lipid fractions and their respective roles in atherosclerosis. As such, there is a growing recognition of the need for more comprehensive lipid assessments.

Emergence of Non-Traditional Lipid Indices

In recent years, non-traditional lipid indices have gained prominence as potential adjuncts to the standard lipid profile. These indices include the triglyceride-to-HDL cholesterol ratio, non-HDL cholesterol, and apolipoprotein levels. Research suggests that these measures may provide additional insights into cardiovascular risk by better reflecting the overall lipid environment [3].

For example, the triglyceride-to-HDL ratio has emerged as a promising predictor of cardiovascular risk, as it accounts for both hypertriglyceridemia and low HDL levels—two common features in individuals with metabolic syndrome. Studies have shown that this ratio may be more informative than traditional lipid measures in stratifying cardiovascular risk, particularly in populations with high triglyceride levels.

Apolipoprotein B (ApoB) has also garnered attention as a critical marker for atherogenic lipoproteins. Unlike traditional lipid measurements, ApoB quantifies the number of potentially atherogenic particles in circulation, offering a more accurate assessment of cardiovascular risk. Elevated levels of ApoB have been associated with an increased

likelihood of developing atherosclerosis, highlighting its potential role in risk stratification and treatment. [4]

Potential Clinical Applications

Incorporating non-traditional lipid indices into clinical practice could significantly enhance cardiovascular risk assessment, particularly among patients with hyperlipidemia. By identifying individuals at elevated risk more effectively, healthcare providers can implement targeted therapeutic interventions. For instance, patients exhibiting high triglyceride-to-HDL ratios or elevated ApoB levels may benefit from more aggressive management strategies, including lifestyle modifications, dietary interventions, and pharmacological therapies beyond standard statin treatment.

Additionally, these indices may inform the monitoring of treatment efficacy. For example, a reduction in triglyceride levels or an improvement in the triglyceride-to-HDL ratio could indicate a positive response to therapy and a potential decrease in cardiovascular risk.

Conclusion

As our understanding of atherosclerosis continues to evolve, the role of lipids—both traditional and non-traditional—becomes increasingly crucial. While the traditional lipid profile remains a foundational element in cardiovascular risk assessment, emerging non-traditional lipid indices offer promising avenues for enhancing risk stratification and guiding treatment. Continued research into these biomarkers will be essential for refining our approaches to managing cardiovascular disease and improving patient outcomes.

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B. DECODING ATHEROSCLEROSIS: THE DIAGNOSTIC INSIGHTS OF LIPIDS, APOLIPOPROTEINS, AND ADVANCED INDICES.

AK Singhal[1]

[1]Department of Biochemistry, Amrita School of Medicine, Faridabad, India

Atherosclerosis, a major contributor to cardiovascular diseases, is characterized by the accumulation of lipid plaques within arterial walls. Understanding the complex pathophysiology of atherosclerosis is crucial for developing effective diagnostic and therapeutic strategies. The interplay of various lipids, apolipoproteins, and advanced lipid indices provides valuable insights into the disease process and enhances diagnostic precision.

The Diagnostic Importance of Lipids and Apolipoproteins in Atherosclerosis

Accurate diagnosis and risk assessment of atherosclerosis are critical for the prevention and management of cardiovascular diseases. Lipids and apolipoproteins, along with indices like the Pentad and Tetrad, provide essential information that enhances the precision of diagnostics in atherosclerosis.

Role of Lipids in Diagnostic Assessment

1. **Low-Density Lipoprotein (LDL) Cholesterol**:
   - Elevated LDL cholesterol levels are a well-established risk factor for atherosclerosis. LDL cholesterol is routinely measured in clinical practice to assess cardiovascular risk and guide treatment decisions. Statins and other lipid-lowering therapies target LDL reduction, underscoring its importance in both diagnostics and therapeutics.
2. **High-Density Lipoprotein (HDL) Cholesterol**:
   - HDL cholesterol levels are inversely associated with cardiovascular risk. HDL is involved in reverse cholesterol transport, where cholesterol is removed from plaques and transported to the liver for excretion. Measuring HDL cholesterol provides insight into an individual's protective mechanisms against atherosclerosis, although HDL functionality is increasingly recognized as a critical factor.

Role of Apolipoproteins in Diagnostic Assessment

1. **Apolipoprotein B (ApoB)**:
   - ApoB is a more precise marker of atherogenic particle number than LDL cholesterol alone. Each atherogenic particle (LDL, VLDL, IDL) contains one ApoB molecule, making ApoB a direct measure of the number of potentially harmful lipoprotein particles. Measuring ApoB can identify individuals with elevated cardiovascular risk even if their LDL cholesterol levels appear normal, providing a more comprehensive risk assessment.
2. **Apolipoprotein A-I (ApoA-I)**:
   - ApoA-I levels reflect HDL particle number and functionality. Higher ApoA-I levels indicate better reverse cholesterol transport capacity and reduced atherosclerosis risk. ApoA-I measurements can complement HDL cholesterol levels to provide a more detailed picture of HDL-related cardiovascular protection.

Insights from the Pentad and Tetrad Indices

1. **Pentad Index**:
   - The Pentad Index incorporates total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides, and ApoB. This composite marker offers a nuanced evaluation of lipid-related cardiovascular risk. It can identify individuals with discordant LDL and ApoB levels—those who may have a higher number of small, dense LDL particles despite normal LDL cholesterol levels. This index helps in tailoring more personalized treatment strategies.
2. **Tetrad Index**:
   - The Tetrad Index combines total cholesterol, HDL cholesterol, triglycerides, and ApoA-I. Including ApoA-I in this index emphasizes the quality and functionality of HDL particles. The Tetrad Index can identify individuals who might benefit from interventions aimed at improving HDL function, even if their traditional lipid measures do not indicate high risk.

Clinical Implications of Lipids and Apolipoprotein Measurements

1. **Enhanced Risk Stratification**:
   - Traditional lipid measures, while useful, may not capture the full spectrum of cardiovascular risk. Incorporating apolipoprotein levels and indices like the Pentad

and Tetrad offers a more detailed risk stratification, identifying high-risk individuals who might otherwise be missed.

2. **Personalized Treatment Approaches**:
   - Measuring ApoB and ApoA-I allows for more personalized treatment strategies. For instance, individuals with high ApoB levels may benefit from more aggressive LDL-lowering therapies, while those with low ApoA-I levels might need interventions focused on improving HDL function.
3. **Monitoring Therapy Effectiveness**:
   - Apolipoprotein levels can be used to monitor the effectiveness of lipid-lowering therapies. For example, a significant reduction in ApoB levels indicates a successful decrease in atherogenic particles, while an increase in ApoA-I suggests enhanced HDL functionality and reverse cholesterol transport.
4. **Predictive Value for Cardiovascular Events**:
   - Studies have shown that ApoB and ApoA-I levels have a predictive value for cardiovascular events independent of traditional lipid measures. Incorporating these biomarkers into routine diagnostics can improve the prediction and prevention of adverse cardiovascular outcomes.

Conclusion

The measurement of lipids and apolipoproteins, along with the application of indices like the Pentad and Tetrad, plays a crucial role in the diagnosis and management of atherosclerosis. These parameters provide a more comprehensive assessment of cardiovascular risk, enabling personalized treatment approaches and more accurate monitoring of therapeutic efficacy. As the understanding of lipid metabolism and apolipoprotein function continues to evolve, their diagnostic importance in atherosclerosis is likely to increase, improving patient outcomes through better risk stratification and targeted interventions.

Table: Diagnostic Parameters and Their Roles in Atherosclerosis

Parameter	Role in Atherosclerosis	Diagnostic Importance
LDL Cholesterol	Major contributor to plaque formation	- Standard measure for cardiovascular risk - Target for lipid-lowering therapies (e.g., statins)

		- High levels indicate increased atherosclerosis risk
HDL Cholesterol	Protective, involved in reverse cholesterol transport	- Inversely associated with cardiovascular risk - Provides insight into protective mechanisms - Higher levels indicate reduced risk
Apolipoprotein B	Marker of atherogenic lipoprotein particle number	- More precise than LDL cholesterol for risk assessment - Identifies individuals with high cardiovascular risk despite normal LDL cholesterol - Direct measure of atherogenic particles
Apolipoprotein A-I	Main protein of HDL, enhances reverse cholesterol transport	- Reflects HDL particle number and functionality - Higher levels indicate better protection against atherosclerosis -Complements HDL cholesterol measurement
Pentad Index	Composite of total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides, and ApoB	- Provides nuanced evaluation of lipid-related risk - Identifies individuals with discordant LDL and ApoB levels - Aids in personalized treatment strategies
Tetrad Index	Composite of total cholesterol, HDL cholesterol, triglycerides, and ApoA-I	- Emphasizes HDL quality and functionality - Identifies those needing interventions to improve HDL function - Enhances traditional lipid measures for comprehensive risk assessment

C. NON-FASTING VS FASTING LIPID PROFILES: A SUPERIOR APPROACH TO CORONARY ARTERY DISEASE RISK ASSESSMENT- GOING BEYOND CONVENTIONS

Huda Naaz[1], Rajni Dawar[1], Amita Yadav[1]

[1]Department of Biochemistry, VMMC & Safdarjung Hospital, Delhi, India

The measurement of lipid profiles has been a fundamental component in determining the risk of cardiovascular disease (CVD). The accepted method for determining serum lipid levels, such as total cholesterol, triglycerides, low-density lipoprotein cholesterol

(LDL-C), and high-density lipoprotein cholesterol (HDL-C), has conventionally been fasting lipid profiles. However, recent evidence suggests that non-fasting lipid profiles may offer a practical alternative with potentially equivalent or superior diagnostic value. This review explores why non-fasting lipid profiles may offer advantages over fasting profiles in the context of CAD assessment, drawing on recent research and clinical evidence.

The conventional method of fasting lipid profile, to assure reliable assessment of lipid levels, fasting lipid profiles requires individuals to fast for 9–12 hours prior to blood collection. The foundation of this approach is the idea that fasting stabilizes triglyceride levels, which are influenced by recent meal consumption. For many years, fasting lipid measurements have been the gold standard. Research shows that fasting triglycerides offer a clear window into cardiovascular risk, with higher-than-normal levels linked to a higher chance of coronary artery disease (CAD)[1]. However, Non-fasting lipid profiles have become a potentially more effective way to assess CAD because of their enhanced or similar prediction accuracy and practical advantages. Lipid profiles obtained without fasting offer a more precise depiction of a person's average lipid levels throughout the course of a day. Measuring lipids in a non-fasting state better captures a person's usual lipid levels, which may be more important for estimating long-term cardiovascular risk, as daily fluctuations in lipid levels can considerably alter risk estimations [2]. Moreover, Fasting might be a barrier to lipid testing, which could result in lower compliance and lost chances for early intervention. Non-fasting lipid tests are easier to use and more convenient, which increases the possibility of timely management and routine monitoring [3].

Recent research indicates that the ability to predict cardiovascular events using non-fasting triglycerides and other lipid measurements is equivalent to that of fasting. According to a thorough meta-analysis, non-fasting triglyceride levels and fasting triglyceride levels are both substantially linked to cardiovascular risk [4]. Non-fasting lipid profiles can be more cost-effective by reducing the need for extended fasting periods and streamlining the testing process. This efficiency can contribute to more widespread screening and timely intervention [5]. The effect of postprandial lipid levels on cardiovascular risk may be more accurately captured by non-fasting profiles.

Research has indicated that postprandial hypertriglyceridemia is linked to a higher risk of coronary heart disease (CAD), and non-fasting measures could offer a more comprehensive view of this risk [6].

Non-fasting lipid profiles present several advantages over fasting profiles for CAD assessment. They provide a more accurate reflection of daily lipid levels, improve patient compliance, offer comparable predictive value for cardiovascular events, and enhance efficiency and cost-effectiveness. As evidence continues to support the utility of non-fasting measurements, they are becoming an increasingly viable alternative for cardiovascular risk assessment. However, it is essential to consider individual patient factors and specific clinical scenarios when choosing between fasting and non-fasting lipid profiles.

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CAN HEART DISEASES BE PREVENTED?

Dr. Rajni Dawar[1]

[1]Department of Biochemistry, VMMC & Safdarjung Hospital, New Delhi, India

As we celebrate world health day on 29th september 2024, coronary heart disease (CHD) still is a leading cause of death and accounts for many deaths across the globe. The timely identification the probability of CHD can help to reduce the morbidity & mortality of CHD.

Various controlled clinical trials of fat-modified diets and drugs have yielded mixed results, but some of the key CHD risk factors when controlled in adults may reduce CHD.

Lipids and Lipoproteins

The extent of fatty streaks and raised lesions in both the right coronary artery and the abdominal aorta, have been positively associated with non-HDL cholesterol concentration and inversely associated with HDL cholesterol concentration.

Hypertension

Hypertension is associated with raised lesions in the right coronary artery. Hypertension is also associated with larger diameters of the right coronary artery and LAD

Hyperglycemia

Hyperglycemia is associated with extent of fatty streaks and raised lesions in both the right coronary artery and the abdominal aorta and with advanced microscopic lesions in the LAD

Obesity

In men, obesity is strongly associated with more extensive fatty streaks and raised lesions in the right coronary artery and with advanced microscopic lesions in the LAD. The effect of obesity on right coronary artery raised lesions is stronger among young men with a thick panniculus adiposus. Rare associations of obesity with atherosclerotic lesions existed in women; however, a trend was present for extent of right coronary artery fatty streaks to increase with increasing body mass index in women with a thick panniculus adiposus.

Smoking

Smoking has a little effect on gross lesions of the right coronary artery, but smokers had a higher microscopic grade of atherosclerosis in the LAD. Smoking is associated with a much greater extent of fatty streaks and raised lesions in the dorsolateral aspect of the abdominal aorta, the site prone to atherosclerotic aortic aneurysms in older adults.

Nonlipid Risk Factors Without Dyslipidemia

Nonlipid risk factors are associated with atherosclerosis even in the presence of a favorable lipoprotein profile, a relationship that indicated that a poor lipoprotein profile is not a necessary condition for atherosclerosis. There is further scope to study the possibility that a lipoprotein profile exists in which the other major risk factors have no effect. A threshold for CHD risk associated with LDL cholesterol may not exist, relative risk of CHD has a log-linear relation with LDL cholesterol even at low levels, and the target level of LDL cholesterol should be lower when other risk factors are present

Atherosclerosis: News & Events

STUDY LINKS METAL EXPOSURE TO INCREASED RISK OF ATHEROSCLEROSIS

Metal exposure from environmental pollution is associated with increased calcium buildup in the coronary arteries at a level comparable to traditional risk factors like smoking and diabetes, according to a study published today in *JACC*, the flagship journal of the American College of Cardiology. The findings support that metals in the body are associated with the progression of plaque buildup in the arteries and potentially provide a new strategy for managing and preventing atherosclerosis.

"This groundbreaking study underscores the critical associations of metal exposure from environmental pollution to cardiovascular health," said Harlan M. Krumholz, the Harold H. Hines, Jr. Professor at Yale and Editor-in-Chief of JACC. "It challenges us to broaden our approach to CVD prevention beyond traditional risk factors and to advocate for stronger environmental regulations, and it underscores the need for continued research in this critical area."

Exposure to environmental pollutants like metals is a newly recognized risk factor for CVD, but there isn't a lot of research on its association with CAC. Researchers in this study sought to determine how urinary metal levels, biomarkers of metal exposure and internal doses of metals impact CAC.

Researchers used data from the Multi-Ethnic Study of Atherosclerosis (MESA) prospective cohort, tracking 6,418 men and women aged 45-84 from diverse racial backgrounds free from clinical CVD, to measure urinary metal levels at the beginning of the study in 2000-2002. They examined non-essential (cadmium, tungsten, uranium) and essential (cobalt, copper, zinc) metals, both common in U.S. populations and associated with CVD. Widespread cadmium, tungsten, uranium, cobalt, copper, and zinc pollution occurs from agricultural and industrial uses such as fertilizers, batteries,

oil production, welding, mining, and nuclear energy production. Tobacco smoke is the main source of cadmium exposure.

Results provided evidence that metal exposure may be associated with atherosclerosis over 10 years by increasing coronary calcification.

LATE-LIFE SMOKING CESSATION CAN SIGNIFICANTLY EXTEND LIFE EXPECTANCY

Elsevier Oct 8 2024

Quitting smoking even as late as at 75 years of age can meaningfully increase a person's life expectancy, according to a new study in the *American Journal of Preventive Medicine*, published by Elsevier. The research measures the impact of smoking on life expectancy at 10-year intervals from 35-75 years of age to determine the potential benefits of smoking cessation. The results show that although the benefits of quitting smoking diminish with age, there are still substantial gains for older individuals.

Thuy T.T. Le, PhD, who conducted the study with co-investigators David Mendez, PhD, and Kenneth E. Warner, PhD, all affiliated with the Department of Health Management and Policy at the University of Michigan School of Public Health, explains, *"We have seen a remarkable decline in young adult smoking over the past decade. However, rates among older adults who smoke have remained stagnant and to our knowledge, no research had established the benefits for them of quitting. We wanted to show that stopping smoking is beneficial at any age and provide an incentive for older people who smoke to quit."*

Cigarette smoke contains thousands of toxic chemicals that harm almost all organs in the body and are linked to numerous cancers, stroke, heart disease, and lung disease. In the United States cigarette smoking has long been the leading cause of premature preventable death, with an estimated 480,000 smoking-related deaths annually.

Previous studies have consistently demonstrated that quitting smoking at any age yields health benefits.

This is the first study to quantify the impact of quitting smoking for individuals older than 65. The investigators used all-cause mortality relative risks due to smoking to build life tables that show the benefits of quitting smoking at different ages. They report the expected life years lost to individuals who smoke at various ages compared to those who never smoked. Compared to people who never smoked, those who smoke currently, aged 35, 45, 55, 65, or 75 years and who have smoked throughout adulthood until that age, will lose on average, 9.1, 8.3, 7.3, 5.9, and 4.4 years of life, respectively, if they continue to smoke for the rest of their lives. However, if they quit smoking at each of these ages, they will avoid an average loss of 8.0, 5.6, 3.4,1.7, and 0.7 years, respectively. The chances of gaining at least one year of life among those who quit at age 65 are 23.4% and 14.2%.at age 75.

This study adds to the body of knowledge supporting the profoundly important assessment that quitting smoking is the single best thing people can do to enhance their life expectancy. Results showed that nearly 10% of individuals who quit at age 65 gain at least 8 years of life compared to those who do not. Additionally, 8% of those who quit by age 75 gain at least 4 years of life compared to those who continue smoking. Life expectancy for a 75-year-old person who smokes is 9 years. If that person quits, he/she will regain (on average) 0.7 years (7.8% of the life expectancy), and about 8% of those individuals who quit will regain at least 4 years of life (45% of the life expectancy).

NEWS RELEASE 7-OCT-2024

A NEW STUDY REVEALS A KEY MECHANISM DRIVING ATHEROSCLEROSIS IN HUTCHINSON-GILFORD PROGERIA SYNDROME

A team of scientists from the CNIC and the CSIC has identified a key mechanism in the development of atherosclerosis in patients with the rare genetic disease Hutchinson-Gilford progeria syndrome.

A team of researchers from the *Centro Nacional de Investigaciones Cardiovasculares Carlos III* (CNIC), the *Centro de Investigaciones Biológicas Margarita Salas* (CIB-CSIC), and the *Instituto de Ciencias de Materiales de Madrid* (ICMM-CSIC)

has made a significant breakthrough in understanding the underlying causes of cardiovascular disease in patients with Hutchinson-Gilford progeria syndrome (HGPS), an ultra-rare genetic disorder that accelerates the aging process. The most serious consequence of HGPS is the early onset of cardiovascular disease, leading to premature death at an average age of 14.5 years.

The study was led by **Dr. Vicente Andrés**, leader of the Molecular and Genetic Cardiovascular Pathophysiology group at the CNIC and principal investigator in the Spanish cardiovascular research network (CIBERCV), and Dr. Ignacio Benedicto, leader of the Vascular Aging group at CIB-CSIC and a visiting scientist at the CNIC.

In the study, the researchers identify the activation of the YAP/TAZ pathway in endothelial cells as a major contributor to the development of atherosclerosis in HGPS. The discovery, published in **The Journal of Clinical** *Investigation*, sheds light on the vascular problems faced by HGPS patients and opens up potential new avenues for treatment.

HGPS is caused by a mutation in the *LMNA* gene that leads to the synthesis of a toxic protein called progerin. This mutant protein disrupts normal cell function and accelerates cell aging. Children with HGPS typically show signs of rapid aging in the first two years of life, and by the time they reach their early teens most patients develop severe atherosclerosis—a condition in which the arteries stiffen and narrow—leading to heart attack, stroke, or heart failure, the main causes of premature death in HGPS patients. Despite the severity of this disease, the precise mechanisms underlying the cardiovascular problems in HGPS patients have remained poorly understood.

The authors explored how endothelial cells—the cells that line blood vessels—are affected in HGPS. Using advanced single-cell RNA-sequencing technology, they analyzed gene expression in the multiple cell types present in the arterial wall in a mouse model of HGPS and in healthy control mice. This approach allowed the researchers to examine the behavior of individual endothelial cells in unprecedented detail.

The results show that endothelial cells in HGPS undergo significant changes in gene expression related to inflammation, immune-cell recruitment, and the stiffening of the surrounding extracellular matrix. One of the most striking findings was the activation of the YAP/TAZ signaling pathway, a critical regulator of how cells respond to mechanical forces such as blood flow and the stiffness of their environment. In HGPS mice, this pathway was found to be abnormally active in endothelial cells from the aorta, the main artery carrying blood from the heart to the rest of the body.

NEWS RELEASE 17-JUL-2024

PALEOLITHIC DIETS ARE NOT WITHOUT RISKS

A UNIGE STUDY HIGHLIGHTS THE TOXICITY RISKS OF HIGH-PROTEIN DIETS, WHICH CAN LEAD TO SEVERE NEUROLOGICAL DISORDERS.

UNIVERSITÉ DE GENÈVE

High-protein diets, known as "Paleolithic diets", are popular. Using mouse models, scientists at the University of Geneva (UNIGE) have studied their impact. While effective in regulating weight and stabilizing diabetes, these diets are not without risks. Excess protein greatly increases ammonium production, overwhelming the liver. Excess ammonium can cause neurological disorders and, in severe cases, lead to coma. These results,

published in the ***Journal of Biological Chemistry***, suggest caution when following these diets.

"Diets rich in animal and/or plant proteins, known as Paleolithic diets, can be used to stabilize type 2 diabetes and regulate weight," explains Pierre Maechler, full professor at the Department of Cell Physiology and Metabolism at the UNIGE Faculty of Medicine, who led this research. These diets are inspired by the meat-based diets of pre-agricultural time. "But what impact do they have on the body? Are they harmless? That's what we set out to find out."

Liver under Pressure

Ammonium is a normal waste product of protein breakdown, essentially eliminated in the liver by the enzyme glutamate dehydrogenase (GDH). In the event of protein overload, the GDH enzyme comes under pressure. To study the impact of high-protein diets, Pierre Maechler's team fed healthy mice and mice lacking the GDH enzyme in their liver a diet with a protein content mimicking the so-called Paleolithic diet.

Scientists observed that in healthy mice, although excess protein increased ammonium production, the liver managed this excess due to the action of the GDH enzyme, which detoxifies ammonium before it can cause damage. "In contrast, in mice lacking the GDH enzyme, the liver is unable to eliminate the excess of toxic ammonium derived from proteins. No need to wait for weeks or months; a change of diet lasting a few days is enough to observe major consequences," explains Karolina Luczkowska, a former PhD student at the Department of Cell Physiology and Metabolism at the UNIGE Faculty of Medicine, and the study's first author.

Caution is Advised

These results suggest that in case of dysfunctional GDH enzyme, high-protein diets may cause a harmful excess of ammonium. Ammonium not eliminated by the liver can cause severe disorders, particularly neurological ones. A blood test could assess GDH activity to avoid overloading the metabolism with proteins in people whose GDH enzyme is deficient. "It is therefore important to be well informed before following a high-protein diet," concludes Pierre Maechler.

STUDY FINDS NATTO CONSUMPTION INHIBITS ARTERIOSCLEROSIS BY ALTERING INTESTINAL MICROFLORA, SUPPRESSING INFLAMMATION

Natto is widely recognized for inhibiting arteriosclerosis, yet its underlying mechanism remains elusive. Researchers led by the University of Tsukuba studied the effects of natto on arteriosclerosis in mice. The findings, published in *Scientific Reports* showed that consuming natto induced changes in the intestinal microflora, suppressing inflammation and preventing arteriosclerosis.

Atherosclerosis, a chronic condition characterized by the accumulation of lipid and inflammatory cells within the blood vessel walls, causes cardiovascular diseases, such as heart disease and stroke. Natto, a food rich in vitamin K2, has shown promise in mitigating cardiovascular diseases by enhancing arterial flexibility and modulating inflammatory responses. However, the way natto suppresses arteriosclerosis had remained elusive.

This study employed three varieties of natto distinguished by their vitamin K2 content—namely, high vitamin K2, normal, and low vitamin K2 natto. The research team systematically assessed the impact of natto on atherosclerosis in a mouse model over time. The findings revealed a significant reduction in atherosclerotic lesions across all natto consumption groups. Furthermore, the intake of natto altered the composition of intestinal microflora, regulating the production of cytokines and chemokines associated with arteriosclerosis.

This suggests that incorporating natto into the diet may have a therapeutic effect on arteriosclerosis. Additionally, the study uncovered that adding Bacillus subtilis natto to macrophages, a cell type implicated in promoting arteriosclerosis, decreased pro-inflammatory cytokines and chemokines. The effect was particularly significant with high

vitamin K2 natto consumption group. Moreover, both regular and low vitamin K2 natto increased the production of the anti-inflammatory cytokine IL-10.

These findings indicate that Bacillus subtilis natto, aside from its role as an intestinal bacterium, may inhibit atherosclerosis by altering the intestinal microflora and suppressing the activation of immune cells.

Atherosclerosis: Recent Advances & Updates

nature cardiovascular research

Article

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Endothelial γ-protocadherins inhibit KLF2 and KLF4 to promote atherosclerosis

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Check for updates

Divyesh Joshi[1], Brian G. Coon[1], Raja Chakraborty[1], Hanqiang Deng[1], Ziyu Yang[2,3], Muhammad Usman Babar[2,3], Pablo Fernandez-Tussy[2], Emily Meredith[1], John Attanasio[4], Nikhil Joshi[4], James G. Traylor Jr.[5], Anthony Wayne Orr[5], Carlos Fernandez-Hernando[2], Stephania Libreros[2,3] & Martin A. Schwartz[1,6,7]

Atherosclerotic cardiovascular disease (ASCVD) is the leading cause of mortality worldwide. Laminar shear stress from blood flow, sensed by vascular endothelial cells, protects from ASCVD by upregulating the transcription factors KLF2 and KLF4, which induces an anti-inflammatory program that promotes vascular resilience. Here we identify clustered γ-protocadherins as therapeutically targetable, potent KLF2 and KLF4 suppressors whose upregulation contributes to ASCVD. Mechanistic studies show that γ-protocadherin cleavage results in translocation of the conserved intracellular domain to the nucleus where it physically associates with and suppresses signaling by the Notch intracellular domain. γ-Protocadherins are elevated in human ASCVD endothelium; their genetic deletion or antibody blockade protects from ASCVD in mice without detectably compromising host defense against bacterial or viral infection. These results elucidate a fundamental mechanism of vascular inflammation and reveal a method to target the endothelium rather than the immune system as a protective strategy in ASCVD.

Circulation

ORIGINAL RESEARCH ARTICLE

Atherosclerosis Is a Smooth Muscle Cell–Driven Tumor-Like Disease

Huize Pan, PhD; Sebastian E. Ho, BS*; Chenyi Xue, MS*; Jian Cui, PhD; Quinlan S. Johanson, BS; Nadja Sachs, PhD; Leila S. Ross, PhD; Fang Li, PhD; Robert A. Solomon, MD; E. Sander Connolly Jr, MD; Virendra I. Patel, MD, MPH; Lars Maegdefessel, MD, PhD; Hanrui Zhang, MB, PhD; Muredach P. Reilly, MBBCh, MSCE

BACKGROUND: Atherosclerosis, a leading cause of cardiovascular disease, involves the pathological activation of various cell types, including immunocytes (eg, macrophages and T cells), smooth muscle cells (SMCs), and endothelial cells. Accumulating evidence suggests that transition of SMCs to other cell types, known as phenotypic switching, plays a central role in atherosclerosis development and complications. However, the characteristics of SMC-derived cells and the underlying mechanisms of SMC transition in disease pathogenesis remain poorly understood. Our objective is to characterize tumor cell–like behaviors of SMC-derived cells in atherosclerosis, with the ultimate goal of developing interventions targeting SMC transition for the prevention and treatment of atherosclerosis.

METHODS: We used SMC lineage tracing mice and human tissues and applied a range of methods, including molecular, cellular, histological, computational, human genetics, and pharmacological approaches, to investigate the features of SMC-derived cells in atherosclerosis.

RESULTS: SMC-derived cells in mouse and human atherosclerosis exhibit multiple tumor cell–like characteristics, including genomic instability, evasion of senescence, hyperproliferation, resistance to cell death, invasiveness, and activation of comprehensive cancer-associated gene regulatory networks. Specific expression of the oncogenic mutant $Kras^{G12D}$ in SMCs accelerates phenotypic switching and exacerbates atherosclerosis. Furthermore, we provide proof of concept that niraparib, an anticancer drug targeting DNA damage repair, attenuates atherosclerosis progression and induces regression of lesions in advanced disease in mouse models.

CONCLUSIONS: Our findings demonstrate that atherosclerosis is an SMC-driven tumor-like disease, advancing our understanding of its pathogenesis and opening prospects for innovative precision molecular strategies aimed at preventing and treating atherosclerotic cardiovascular disease.

Key Words: atherosclerosis ■ cardiovascular disease ■ smooth muscle cell

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Long-term ambient air pollution and coronary atherosclerosis: Results from the Swedish SCAPIS study*

Karl Kilbo Edlund [a,b,*], Eva M. Andersson [c,d], Christian Asker [e], Lars Barregard [a,b], Göran Bergström [d,f], Kristina Eneroth [g], Tomas Jernberg [h], Stefan Ljunggren [i], Peter Molnár [a,b], Johan Nilsson Sommar [j], Anna Oudin [k,l], Göran Pershagen [m], Åsa Persson [n], Andrei Pyko [o,p], Mårten Spanne [q], Martin Tondel [r,s], Mikael Ögren [t], Petter Ljungman [u,v], Leo Stockfelt [a,b]

[a] Occupational and Environmental Medicine, School of Public Health and Community Medicine, Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Sweden
[b] Department of Occupational and Environmental Medicine, Sahlgrenska University Hospital, Gothenburg, Sweden
[c] Swedish Meteorological & Hydrological Institute, Norrköping, Sweden
[d] Department of Molecular and Clinical Medicine, Institute of Medicine, Sahlgrenska Academy, University of Gothenburg, Sweden
[e] Department of Clinical Physiology, Sahlgrenska University Hospital, Göteborg, Sweden
[f] SLB-analys, Environment and Health Administration, Stockholm, Sweden
[g] Department of Clinical Sciences, Danderyd University Hospital, Karolinska Institutet, Stockholm, Sweden
[h] Occupational and Environmental Medicine Center, Department of Clinical and Experimental Medicine, Linköping University, Linköping, Sweden
[i] Department of Public Health and Clinical Medicine, Faculty of Medicine, Umeå University, Umeå, Sweden
[j] Division of Occupational and Environmental Medicine, Department of Laboratory Medicine, Faculty of Medicine, Lund University, Sweden
[k] Institute of Environmental Medicine, Karolinska Institute, Stockholm, Sweden
[l] Centre for Occupational and Environmental Medicine, Region Stockholm, Stockholm, Sweden
[m] Environmental Department, City of Malmö, Malmö, Sweden
[n] Occupational and Environmental Medicine, Department of Medical Sciences, Medical Faculty, Uppsala University, Sweden
[o] Occupational and Environmental Medicine, Uppsala University Hospital, Uppsala, Sweden
[p] Department of Cardiology, Danderyd Hospital, Stockholm, Sweden

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ABSTRACT

Background and aims: Despite firm evidence for an association between long-term ambient air pollution exposure and cardiovascular morbidity and mortality, results from epidemiological studies on the association between air pollution exposure and atherosclerosis have not been consistent. We investigated associations between long-term low-level air pollution exposure and coronary atherosclerosis.

Methods: We performed a cross-sectional analysis in the large Swedish CArdioPulmonary bioImaging Study (SCAPIS, n = 30 154), a random general population sample. Concentrations of total and locally emitted particulate matter <2.5 μm ($PM_{2.5}$), <10 μm (PM_{10}), and nitrogen oxides (NO_x) at the residential address were modelled using high-resolution dispersion models. We estimated associations between air pollution exposure and segment involvement score (SIS), coronary artery calcification score (CACS), number of non-calcified plaques (NCP), and number of significant stenoses, using ordinal regression models extensively adjusted for potential confounders.

Results: Median 10-year average $PM_{2.5}$ exposure was 6.2 μg/m^3 (range: 3.5–13.4 μg/m^3). 31 % of participants were women and 51 % were never smokers. None of the assessed pollutants were associated with a higher SIS or CACS. Exposure to $PM_{2.5}$ was associated with NCP (adjusted OR 1.16, 95 % CI 1.13, 1.18, per 2.05 μg/m^3). Associations with significant stenoses were inconsistent.

Conclusions: In this large, middle-aged general population sample with low exposure levels, air pollution was not associated with measures of total burden of coronary atherosclerosis. However, $PM_{2.5}$ appeared to be associated

Hypokalaemia in patients with type 2 diabetes and chronic kidney disease: the effect of finerenone – a FIDELITY analysis

Bertram Pitt ✉, Rajiv Agarwal, Stefan D Anker, Peter Rossing, Luis Ruilope, Charles A Herzog, Barry Greenberg, Roberto Pecoits-Filho, Marc Lambelet, Robert Lawatscheck ... Show more

European Heart Journal - Cardiovascular Pharmacotherapy, pvae074, https://doi.org/10.1093/ehjcvp/pvae074

Published: 08 October 2024

Aims

Hypokalaemia is associated with cardiovascular events and mortality in patients with chronic kidney disease (CKD). This exploratory FIDELITY analysis, a prespecified pooled patient-dataset from FIDELIO-DKD and FIGARO-DKD, investigated the incidence and effect of hypokalaemia in patients with CKD and type 2 diabetes (T2D) treated with finerenone vs. placebo.

Methods

Outcomes include the incidence of treatment-emergent hypokalaemia (serum potassium < 4.0 or < 3.5 mmol/L) and the effect of finerenone on cardiovascular composite outcome (cardiovascular death, non-fatal myocardial infarction, non-fatal stroke, or hospitalization for heart failure) and arrhythmia composite outcome (new diagnosis of atrial fibrillation/atrial flutter, hospitalization due to arrhythmia, or sudden cardiac death) by baseline serum potassium subgroups.

Results

In the FIDELITY population, treatment-emergent hypokalaemia with serum potassium < 4.0 and < 3.5 mmol/L occurred in 41.1% and 7.5%, respectively. Hazards of cardiovascular and arrhythmia composite outcomes were higher in patients with baseline serum potassium < 4.0 vs. 4.0–4.5 mmol/L (hazard ratio [HR] 1.16; 95% confidence interval [CI] 1.02–1.32, $P = 0.022$ and HR 1.20; 95% CI 1.00–1.44, $P = 0.055$, respectively). Finerenone reduced the incidence of hypokalaemia with serum potassium < 4.0 mmol/L (HR 0.63; 95% CI 0.60–0.66) and < 3.5 mmol/L (HR 0.46; 95% CI 0.40–0.53) vs. placebo. Finerenone lessened the hazard of cardiovascular and arrhythmia events vs. placebo, irrespective of baseline serum potassium.

Conclusion

A substantial proportion of patients with CKD and T2D experienced hypokalaemia, which was associated with an increased hazard of adverse cardiovascular outcomes. Finerenone reduced the incidence of hypokalaemia. Finerenone reduced the hazard of cardiovascular and arrhythmia outcomes irrespective of serum potassium subgroups.

Refining the stratification of sudden cardiac death risk after myocardial infarction—beyond ejection fraction

Ezimamaka C Ajufo, Usha B Tedrow ✉ Author Notes

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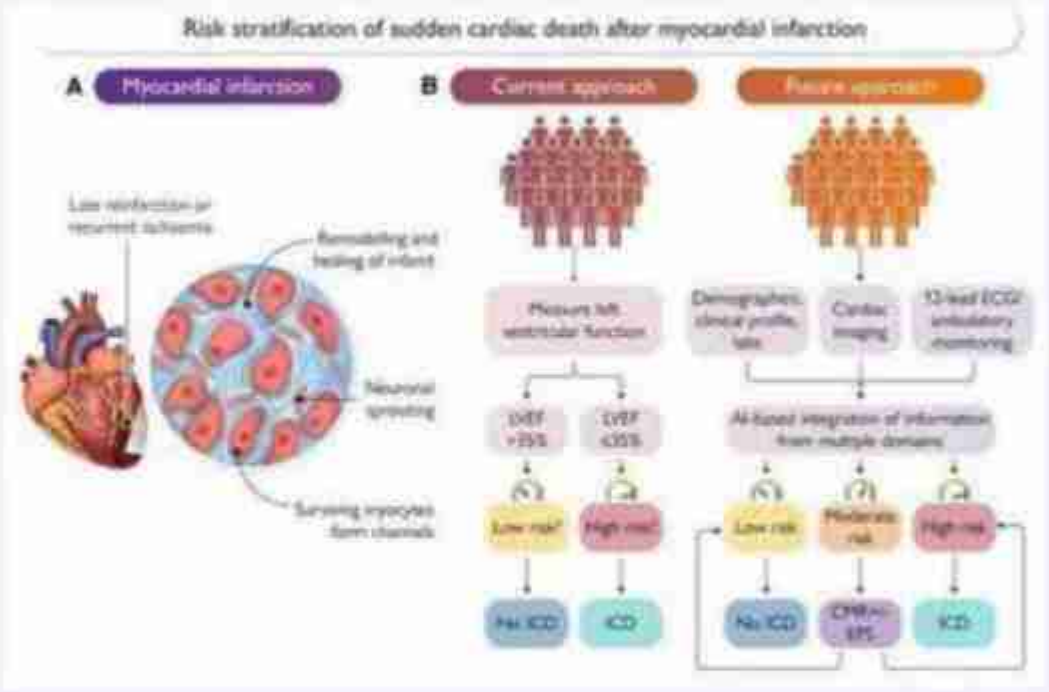

Graphical Abstract Pathophysiology and stratification of arrhythmic risk post-myocardial infarction. (*A*) Formation of scar substrate post-myocardial infarction and possible factors contributing to future arrhythmogenicity. (*B*) Current and proposed future approach to sudden cardiac death risk stratification post-myocardial infarction. Abbreviations: AI, artificial intelligence; CMR, cardiac magnetic resonance imaging; EPS, electrophysiological study. Figure created with BioRender.com and Adobe Illustrator

Upcoming Events

1. 20th International Symposium on Atherosclerosis (ISA 2024): This conference will be held from December 4–6, 2024 at the Oman Convention & Exhibition Centre in Muscat, Oman. The conference will focus on the use of precision medicine to prevent, detect, and manage cardiometabolic diseases, including atherosclerosis

2. Atherosclerosis Gordon Research Conference (GRC) : Genetics, Pathophysiology, and Translation, June 22 - 27, 2025, Barcelona, Spain

3. Biomechanics in Vascular Biology and Disease (GRS) Gordon Research Seminar: Vascular Biomechanics and Disease July 19 - 20, 2025, California, United States

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