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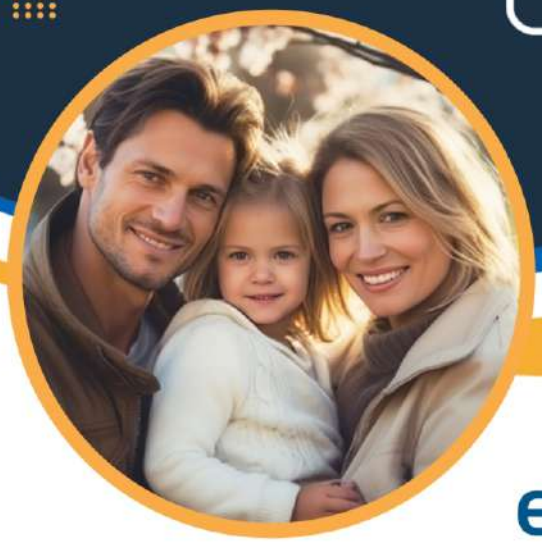

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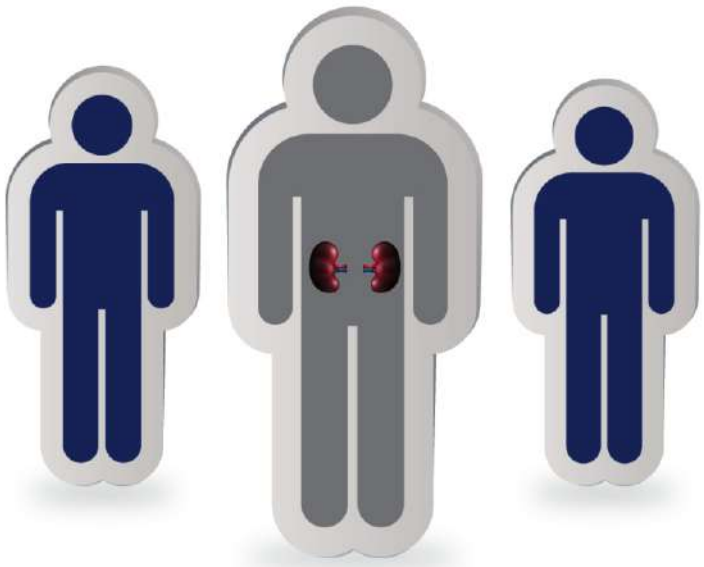

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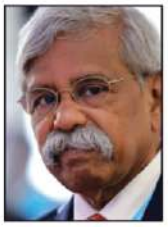

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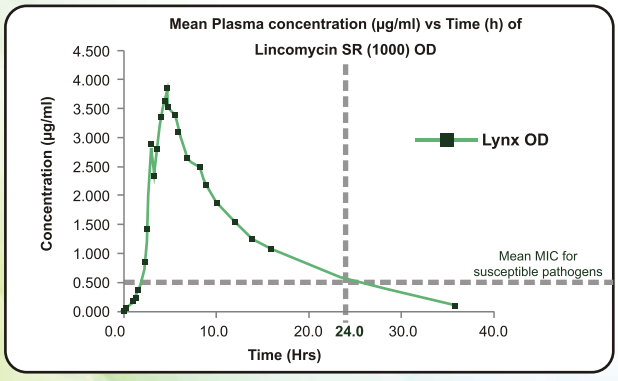

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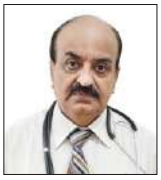
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Editorial

Recent Advancements in Blood Disorders

In recent years, the field of hematology has experienced transformative advancements that have significantly improved the diagnosis and treatment of various Blood Disorders. Innovations in gene therapy, the development of novel therapeutic agents and breakthroughs in hematology diagnostics have collectively reshaped patient care, offering new hope to individuals affected by conditions such as sickle cell disease, β-thalassemia, hemophilia and immune thrombocytopenia. This editorial delves into these recent developments, highlighting their impact and the future directions they suggest for hematologic care.

Gene Therapy Breakthroughs :

Gene therapy has emerged as a groundbreaking approach for treating hereditary blood disorders, offering potential cures by addressing the underlying genetic causes.

Exagamglogene Autotemcel (Casgevy) for Sickle Cell Disease and β-Thalassemia :

One of the most notable advancements is the development and approval of exagamglogene autotemcel, marketed as Casgevy. This therapy utilizes CRISPR/Cas gene-editing technology to modify patients' hematopoietic stem cells, enabling the production of functional hemoglobin. In clinical trials, Casgevy demonstrated remarkable efficacy, with 93% of patients with transfusion-dependent β-thalassemia becoming transfusion-independent for at least a year post-treatment. Similarly, patients with sickle cell disease experienced significant reductions in vaso-occlusive crises. These promising results led to regulatory approvals in the United Kingdom and the United States, marking a significant milestone in gene therapy for hematologic conditions.

Hympavzi (Marstacimab-hncq) for Hemophilia A and B :

In October, 2024, the US Food and Drug Administration (FDA) approved Pfizer's Hympavzi (marstacimab-hncq) for routine prophylaxis to prevent or reduce bleeding episodes in adults and adolescents with hemophilia A or B without inhibitors. Hympavzi is the first anti-tissue factor pathway inhibitor approved in the US for hemophilia and the first to be administered via a pre-filled auto-injector pen, offering a convenient once-weekly subcutaneous dosing schedule. This approval was based on Phase 3 study results demonstrating substantial bleed reduction compared to routine prophylaxis and on-demand treatment.

Advancements in Hematology Diagnostics :

The integration of advanced laboratory technologies has revolutionized hematology diagnostics, leading to more accurate diagnoses and personalized treatment plans.

Lab-Grown Blood Stem Cells :

Researchers at the Murdoch Children's Research Institute (MCRI) in Melbourne achieved a groundbreaking development by creating lab-grown blood stem cells that closely resemble those in the human body. This innovation holds significant promise for bone marrow transplants, particularly for children with blood diseases who lack matched donors. These lab-engineered stem cells have the potential to prevent complications arising from mismatched donor cells and address donor shortages. Clinical trials are anticipated to commence within five years, aiming to translate this discovery into clinical practice.

Emerging Therapeutic Agents :

The therapeutic landscape for rare blood disorders has expanded with the introduction of novel agents targeting specific pathways involved in disease pathophysiology.

Fostamatinib for Immune Thrombocytopenia (ITP):

Fostamatinib, a Spleen Tyrosine Kinase (SYK) inhibitor, has been approved for the treatment of adult patients with chronic immune thrombocytopenia who have had an insufficient response to previous therapy. By inhibiting SYK, fostamatinib reduces the immune system's destruction of platelets, thereby increasing platelet counts and reducing bleeding risk. Common side effects include diarrhea, hypertension, nausea, and respiratory infections.

Hetrombopag for Thrombocytopenia and Anemia:

Hetrombopag, also known as rafutrombopag, is a non-peptide small-molecule thrombopoietin receptor agonist approved in China for the treatment of primary Immune Thrombocytopenic Purpura (ITP) and Severe Aplastic Anemia (SAA) in adults. Clinical trials have demonstrated its efficacy in increasing platelet counts and improving anemia, offering a new therapeutic option for patients with these conditions.

Conclusion :

The recent advancements in the diagnosis and treatment of blood disorders represent a paradigm shift in hematologic care. Gene therapies like exagamglogene autotemcel offer potential cures for hereditary conditions such as sickle cell disease and â-thalassemia, while novel agents like marstacimab-hncq provide innovative treatment options for hemophilia. Additionally, breakthroughs in diagnostics, such as lab-grown blood stem cells, pave the way for more effective and personalized interventions. Collectively, these developments herald a new era of optimism and improved quality of life for patients affected by hematologic diseases

Hony Editor, JIMA **Kakali Sen**

Special Article

NTEP : A Historical Overview and Vision for the Future of Tuberculosis Elimination

Sanjay Rajpal[1], Kamal Kishore Chopra[2], Ankita Anand[3], Vijay Kumar Arora[4]

Abstract

Background : In 1962, the Government of India launched the National TB Programme (NTP), initially focusing on District TB Centres with BCG vaccination and treatment. The elimination of Tuberculosis (TB) in India is hindered by deep-rooted and persistent challenges. Decades of unchecked transmission have left a large proportion of the population with latent TB infection, which can reactivate at any point. A staggering percentage of the population is undernourished - 35% of adults and nearly half of children - compromising their immune systems and increasing the risk of TB reactivation. Additionally, a host of risk factors, including diabetes, indoor air pollution from cooking stoves and smoking, exacerbate the problem.

Key words : Tuberculosis, India, TB Control Programme, TB Infection, Latent TB Infection.

In 1962, the Government of India launched the National TB Programme (NTP), initially focusing on District TB Centres with BCG vaccination and treatment.In 1993, the Revised National Tuberculosis Control Programme (RNTCP) was first tested in a population of 2.4 million in Delhi, Gujarat, Kerala, Maharashtra and West Bengal. By 1995, it reached 13 million people and by 1996, 20 million[1]. The programme followed the DOTS strategy, which is a globally accepted method for controlling Tuberculosis. This approach focuses on diagnosing TB using sputum smear microscopy, directly observing treatment, using standard treatment regimens, carefully recording and reporting cases and evaluating treatment results, all with strong political support. In 1997, RNTCP became a nationwide programme with plans for gradual expansion, incorporating the internationally recognized DOTS strategy and expanding nationwide by 2006[2]. In 2007, the Programmatic Management of Drug-Resistant TB (PMDT) was launched to address drug resistance, achieving full coverage by 2013. RNTCP aligns with the National Health Policy 2017, WHO's End TB Strategy, and the UN's SDGs[2].

Recently, the focus has shifted to a patient-centric approach, offering comprehensive care and support.

[1]MBBS, Director Interim, STDC, New Delhi Tuberculosis Centre, New Delhi 110002 and Corresponding Author
[2]MD, Consultant, New Delhi Tuberculosis Centre, New Delhi 110002
[3]MD (Microbiology), Bacteriologist, New Delhi Tuberculosis Centre, New Delhi 110002
[4]MD, Chairman, TB Association of India, New Delhi 110001

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Editor's Comment :

- India has made significant progress in its fight against TB by improving diagnostic tools and treatment strategies.
- Challenges such as drug resistance, the complexity of diagnosis, and the need for more community involvement remain critical obstacles to achieving the goal of TB elimination.

The Ministry of Health and Family Welfare (MoHFW) launched the National Strategic Plan for Tuberculosis Elimination (2017-2025), aiming to eliminate TB five years ahead of the global target[3].

This plan outlines transformative actions to reduce TB incidence, prevalence and mortality, building on past efforts. India's trajectory in TB control illustrates both the progress made and the ongoing challenges in combatting TB, especially in the face of drug resistance and the need for more advanced technologies to reach underserved populations. The NTEP's focus on a holistic and patient-centred approach shows promise in achieving the ambitious goal of eliminating TB by 2025.

The NSP 2017-2025 objectives include[3] :

- Expanding early detection of Tuberculosis and testing for drug resistance.
- Ensuring effective treatment to prevent drug resistance and interrupt transmission.
- Strengthening surveillance and monitoring of TB trends.
- Preventing TB onset and the progression of Latent Tuberculosis Infection (LTBI).
- Achieving full Tuberculosis elimination in India.

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By 2020, it became clear that the NSP 2017-2025 would not meet these ambitious targets. As a result, the revised NSP India 2025 was introduced to address these gaps and accelerate progress toward TB elimination. This updated plan focuses on urgent actions needed to speed up the national response to Tuberculosis.

The Government of India launched NIKSHAY in June 2012 to monitor and track Tuberculosis (TB) patient data across the country. NIKSHAY, a web-based platform developed by the Central TB Division and the National Informatics Centre (NIC), ensures universal access to TB patient data for all stakeholders. It was mandated that all private healthcare institutions report details of TB patients to the NIKSHAY database through a gazette notification issued by the Government of India[4].

The TB Mukt Bharat Abhiyaan, launched by the Government of India, is a bold and unwavering initiative aimed at eradicating Tuberculosis (TB) from the country by 2025 - five years ahead of the WHO's global target. India, with its large population, has long been burdened with the highest TB incidence in the world, significantly contributing to global TB cases. Despite decades of efforts, the disease remains a major public health issue, particularly affecting the most vulnerable, worsening poverty and hindering progress. The TB Mukt Bharat Abhiyaan is a call to action for every citizen, healthcare provider and organization to unite and combat this threat with urgency and determination.

The Abhiyaan focuses on several key pillars to achieve its goal. First, it prioritizes increasing awareness and early detection, particularly in rural and underserved areas, to dispel misconceptions about TB and encourage timely testing and treatment. The program also ensures universal access to free, high-quality treatment for all TB patients, regardless of financial constraints. Technological advancements are incorporated to improve diagnosis, treatment and monitoring, while research and drug development are emphasized to ensure new tools and therapies are available. Additionally, the campaign relies heavily on community engagement, empowering local health workers, volunteers and communities to raise awareness, identify patients, and provide support to those in need, ensuring sustainable and inclusive progress in the fight against TB.

The battle against TB requires unyielding commitment, uncompromising resolve and the mobilization of resources at all levels. The TB Mukt Bharat Abhiyaan is a clarion call to fight this war on all fronts: through awareness, early detection, quality treatment, innovation and grassroots engagement[5].

The elimination of Tuberculosis (TB) in India is hindered by deep-rooted and persistent challenges. Decades of unchecked transmission have left a large proportion of the population with latent TB infection, which can reactivate at any point. A staggering percentage of the population is undernourishe - 35% of adults and nearly half of children - compromising their immune systems and increasing the risk of TB reactivation. Additionally, a host of risk factors, including diabetes, indoor air pollution from cooking stoves, and smoking, exacerbate the problem. Many individuals who have received subpar TB treatment, particularly from private providers with limited capacity, are at high risk of relapse. While public sector treatment offers a better chance of success, a significant proportion of patients - one-third - are lost to follow-up before achieving a cure.

Urban overcrowding further accelerates TB transmission, with densely packed populations acting as hotspots for the spread of the disease. Infectious TB cases easily transmit the disease to family members and the wider community, perpetuating an unrelenting cycle. Despite these barriers, other nations have demonstrated that TB can be controlled with early diagnosis and proper treatment. However, India faces a critical challenge in timely diagnosis, plagued by inadequate diagnostic services and a shortage of trained medical professionals. The burden of multi-drug-resistant (MDR-TB) and extensively drug-resistant TB (XDR-TB) remains a major issue, with many cases undiagnosed and continuing to spread the disease. When diagnosed, patients are often subjected to lengthy, toxic and expensive treatments with low success rates and many fail to complete their regimens, worsening the situation.

Advancements in Tuberculosis Diagnosis : A Comprehensive Evolution in India's Diagnostic Paradigm

India's TB program has made significant strides in improving diagnostic services, with a focus on expanding free laboratory services for both public and private sector patients. By 2021, 80 laboratories were equipped with liquid culture systems, enhancing the capacity for First-Line and Second-Line Drug Susceptibility Testing (DST)[6]. The program has also adapted to emerging drug-resistant strains by

incorporating new drugs like Linezolid and Clofazimine into the testing process. The adoption of the Line Probe Assay (LPA), a critical molecular diagnostic tool. It is a rapid diagnostic method based on Polymerase Chain Reaction (PCR), utilized to detect Mycobacterium Tuberculosis (MTB) complex and assess drug resistance to Rifampicin (RPM) and Isoniazid (INH)[6].

Innovations like Machine Learning-based Annotation Tools for LPA interpretation and the expansion of National Accreditation Board for Testing and Calibration Laboratories (NABL) accredited labs underline the program's commitment to enhancing diagnostic precision and integration within the national health infrastructure.

The Active Case Finding (ACF) strategy, launched nationwide in 2017, plays a crucial role in identifying individuals with active TB, especially in high-risk groups such as those with diabetes or chronic diseases. The National Tuberculosis Elimination Programme (NTEP) has also deployed 81 Mobile TB Diagnostic Vans to facilitate TB detection in remote areas, ensuring that geographical barriers do not impede timely diagnosis and treatment[6].

The TrueNat™ testing system (Molbio Diagnostics, Goa, India) is a rapid, portable, and battery-operated diagnostic tool designed for the quick detection of Mycobacterium Tuberculosis Complex (MTBC) and rifampicin resistance. It is particularly valuable in peripheral laboratories with limited infrastructure. According to WHO recommendations, TrueNat MTB or MTB Plus should be used as the initial diagnostic test for Tuberculosis on sputum samples, replacing smear microscopy or culture for both adults and children[7].

The Cartridge-based Nucleic Acid Amplification Test (CB-NAAT/GeneXpert)[8] is an automated molecular diagnostic method that detects Mycobacterium Tuberculosis and rifampicin resistance in just two hours using a cartridge system. The WHO has endorsed CB-NAAT as the preferred diagnostic test for TB, especially in children, including those with pulmonary and specific extra-pulmonary forms of the disease, as well as in adults and children with HIV or suspected multidrug-resistant TB (MDR-TB). CB-NAAT has also expanded its use to cover all types of extra-pulmonary samples in paediatric patients.

The Line Probe Assay (LPA) is a fast diagnostic method that utilizes Polymerase Chain Reaction (PCR) to detect MTB Complex and evaluate resistance to Rifampicin (RPM) and Isoniazid (INH). This is used to diagnose drug-resistant Tuberculosis in a programmatic setting. LPA testing is performed exclusively on sputum samples that are smear-positive for Acid-fast Bacilli (AFB)[9].

Emerging Diagnostic Technologies in Tuberculosis : Advancements in Accuracy and Precision

(1) Whole Genome Sequencing (WGS) :

Whole Genome Sequencing (WGS) has emerged as a groundbreaking tool in the diagnosis of Tuberculosis (TB). This technology provides an in-depth analysis of the Mycobacterium Tuberculosis (MTB) genome, offering valuable insights into its genetic structure. With a remarkable concordance with traditional culture-based Drug Susceptibility Testing (DST), WGS significantly enhances the accuracy of detecting resistance, especially for Multidrug-resistant Tuberculosis (MDR-TB). It allows for the identification of genetic resistance to a broad range of TB medications, enabling doctors to tailor treatment plans based on the pathogen's specific genetic characteristics. WGS improves diagnostic precision and is crucial for managing more complex and resistant forms of TB[10].

(2) Computer-Aided Detection for Chest Radiographs (CAD):

In high-burden areas where time, cost, and infrastructure are often limiting factors, new and scalable diagnostic tools are needed to enhance TB detection. One such advancement is the use of Computer-Aided Detection (CAD) software to analyze Chest Radiographs (CXR), a key method for TB screening. In resource-limited settings, the ability to digitally assess Chest X-rays and assign a likelihood score for TB is invaluable. CAD4TB, the most widely studied and deployed software, now in its sixth version, analyzes radiographic images to produce a risk score that indicates the probability of TB[11].

In conclusion, the strides made in diagnostic technologies and methodologies, combined with a robust and multi-pronged strategy for active case finding, mark a significant advancement in India's battle against Tuberculosis. These innovations reinforce the nation's determination to not only eradicate TB by 2025 but also to relentlessly enhance diagnostic capabilities to tackle the ever-evolving challenges posed by the disease.

Diagnosing Tuberculosis (TB) presents significant challenges despite technological advancements in tools like CB-NAAT and LPA. These tools, while valuable, are often costly, prone to errors, and lack the sensitivity or accuracy required for reliable results, particularly in remote, underserved areas where such tools are most needed. Existing diagnostic methods - combining molecular detection, culture and microscopy - are limited, especially for detecting latent TB or in children unable to produce sufficient sputum. Additionally, many of these methods rely on a stable power supply and skilled technicians, resources scarce in low-income settings. Diagnosing Extra-pulmonary TB (EPTB) adds another layer of complexity, requiring invasive biopsies and facing challenges like low bacillary load and varying clinical presentations. The WHO emphasizes early and accurate diagnosis as essential to TB control, underscoring the need for more affordable, rapid and accurate diagnostics, particularly in rural regions.

Tuberculosis is a reportable disease in India and since May 2012, it has been mandatory to notify TB cases at the time of diagnosis. This means that whenever a person is diagnosed with TB or begins treatment, the relevant public health authority must be informed.

Programmatic management of Drug-resistant Tuberculosis (DR-TB) in India (PMDT) - The growing threat of Drug-resistant Tuberculosis (DR-TB) has led to the swift expansion of the Programmatic Management of Drug-Resistant Tuberculosis (PMDT) services in India. Initially endorsed by the WHO in 2002, India adopted PMDT in 2007, achieving nationwide coverage by 2013. Since then, PMDT has been regularly updated to address the evolving needs of DR-TB diagnosis and treatment. The WHO has recently redefined extensively Drug-resistant Tuberculosis (XDR-TB) and introduced the concept of pre-XDR-TB, emphasizing the severity of these TB forms. This reclassification is based on resistance to key drugs and was supported by the WHO's 2019 interim guidance, which categorized anti-DR-TB drugs into three groups (A, B and C), with Group-A drugs forming the backbone of new PMDT regimens. In response, India's PMDT-2021 update has incorporated these changes, removing the emphasis on Second-line Injectable Drugs (SLIDs) and redefining Pre-XDR and XDR-TB. Pre-XDR-TB is now characterized as MDR/RR-TB with Fluoroquinolone (FQ) resistance, while XDR-TB includes resistance to Bdq and/or linezolid. These new definitions aim to improve reporting, monitoring, and surveillance of DR-TB and push for the development of better treatment strategies. PMDT-2021 also highlights ongoing challenges with current DR-TB diagnostic tools in India.

All samples that test positive in TrueNat are subsequently tested with TrueNat MTB-Rif Dx to check for rifampicin resistance. To detect isoniazid or fluoroquinolone resistance, second-line LPA (SL-LPA) is used, which currently takes at least two to three days for results. The advanced version of CBNAAT, Xpert-Mtb/XDR, can detect resistance to isoniazid, fluoroquinolones, SLIDs, and ethionamide, and is set to be progressively introduced across India. This will not only reduce turnaround times but also ease the burden on centres performing SL-LPA for large areas.

Treatment :

(1) Drug Sensitive TB – 6-month 2HRZE / 4HRE

(2) Drug Resistant TB[12]

(A) H Mono Regimen – (6-9 month) Lfx REZ

(B) B PaL M Regimen – (26 – 39 weeks) B PaL M

Recent trials of new oral treatments for drug-resistant Tuberculosis (TB) have shown promising outcomes, though challenges like toxicity and cost still exist. The NIX-TB trial demonstrated a 90% success rate with a combination of Bedaquiline (Bdq), Pretomanid (Pa), and Linezolid (Lzd) [BPaL] in patients with Pre-XDR-TB and MDR-TB who were either intolerant to or not responsive to standard treatments. Despite the high success rate, Lzd (1200 mg) caused considerable toxicity, with 81% of patients experiencing peripheral neuropathy and 48% suffering myelosuppression, often requiring dose adjustments or treatment pauses. Trials like TB Practecal and ZeNix further supported BPaL's effectiveness, recommending a reduced daily Lzd dose of 600 mg for a 91% success rate with fewer toxic effects. The BPaLM regimen (Bdq, Pa, Lzd 600 mg, Moxifloxacin) achieved an 88.7% success rate, with fewer adverse events (19.4%) compared to the WHO standard. The modified BPaL (mBPaL) trial also showed similar efficacy and manageable toxicity, including anemia and peripheral neuropathy. Cost-effectiveness studies indicate that BPaL-based regimens save costs, improve clinical outcomes for MDR-TB patients, and reduce the burden on healthcare systems. The Indian Council of Medical Research (ICMR) suggests these regimens could

enhance treatment adherence and success rates. Data from South Africa further support replacing Eto with Lzd in MDR/RR-TB treatment, showing comparable efficacy and safety. In children, Bdq has been confirmed to be safe, with no specific cardiac safety concerns for those under six. WHO reviews also affirm that Delamanid (Dlm) carries no significant cardiac safety risks in children, recommending its use for those under three with appropriate dosing.

For MDR/RR-TB patients aged 14 years or older, the 26-39 weeks BPaLM regimen is the preferred first-line treatment. For those under 14, the shorter 9-11 month oral MDR/RR-TB regimen should be prioritized, subject to the eligibility criteria for both the BPaLM and the 9-11 month shorter oral regimens.

(C) 9-month shorter oral MDR/RR-TB regimen

(2) Lzd (4-6) LfxCfz Z E H^h (6-9) Bdq (5) LfxCfz Z E

(4-6) LfxCfz Eto Z E H^h (6-9) Bdq (5) LfxCfz Z E

(D) Longer Oral M/ XDR- TB regimen

Bdq (6 or 9 month) + LfxLzdCfz Cs (18-20)

Advancements in treating drug-susceptible Tuberculosis (TB) have been significant, but the rise of multidrug-resistant (MDR-TB) and extensively drug-resistant TB (XDR-TB) has led to more difficult, often fatal cases. Surgery is being reconsidered, especially for cavitary MDR/XDR-TB with chemotherapy failure. Surgical options are categorized as emergency, urgent and elective and are considered when the disease is localized, surrounding tissue is TB-free and the patient can tolerate surgery. Pulmonary resection, combined with pre- and postoperative anti-TB treatment, has shown success rates of 88-92%, even in challenging cases[13].

Treatment Adherence Initiatives, Incentives and Support Systems :

To encourage adherence to TB treatment, various financial incentives have been put in place. The Government of India, through the Ministry of Health and Family Welfare, has launched the “Nikshay Poshan Yojana” (NPY) to offer nutritional support to all diagnosed TB patients. Under this scheme, Rs 1000 per month is directly transferred to each notified TB patient for the duration of their treatment, ensuring they receive the required nutrition during their recovery. All TB patients will now receive a nutritional support of Rs 3,000 to Rs 6,000 under NPY. Government has introduced Energy Dense Nutrition Supplementation (EDNS) for all underweight patients with BMI below 18.5 kg/m^2 at the time diagnosis for initial 2 months of treatment[14].

In addition to Tuberculosis (TB) patients, Nikshay Mitras will also adopt the household contacts of TB patients for the distribution of food baskets, aiming to enhance the immunity of the family members of those affected by TB.

Future Vision for Tuberculosis Control in India

India faces the highest Tuberculosis burden in the world, with a significant number of new cases each year and a large number of related deaths. The economic toll in terms of lost productivity and workdays is significant. In response, the Ministry of Health and Family Welfare (MoHFW) has launched the National Strategic Plan to meet the 2025 Sustainable Development Goal (SDG) target of ending TB. The scale of this challenge requires a comprehensive, district-specific approach, coordinated with local authorities, addressing the social factors contributing to TB.

In addition to existing initiatives like the National Tuberculosis Elimination Programme (NTEP), which provides free diagnostics, medication and nutritional support (Nikshay Poshan Yojana), there is a pressing need for increased community engagement. This includes improving living and working conditions and expanding access to treatment and diagnostic services. While the government’s progress is significant, societal involvement is critical to addressing the social determinants of TB. Greater collaboration with corporate bodies, NGOs, political representatives, and other stakeholders is essential to complement government efforts and accelerate progress toward TB elimination in India.

Conclusion

India has been a leader in the fight against Tuberculosis (TB) for over 50 years, but TB continues to be one of its most serious health challenges. Despite this, India is now better equipped than ever to tackle the disease with advanced diagnostic, treatment and care technologies. The National Strategic Plan (NSP) for 2020-2025 aims to make transformative changes in TB care, building on previous successes.

Significant achievements have been made under earlier NSP phases, including mandatory TB case

notifications, integration of TB services with general health services, expanded diagnostic capabilities, and improved management of drug-resistant TB. The introduction of services for TB-HIV co-infected patients and the establishment of national drug resistance surveillance have also strengthened the program. However, there is still a need for more extensive efforts to reduce TB incidence significantly. The NSP 2017-2025 outlines bold steps to eliminate TB by 2025. Despite progress, continued commitment, innovation, and multi-sectoral collaboration are essential to achieving a TB-free India.

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Original Article

Correlation of Computed Tomography Scan and Autopsy Findings in Fatal Open Cranio-cerebral Trauma

Jerine S Das[1], Gautham Narayana Swami[2], Selvaraj T[3], Jiya Michael[4], Arun Pinchu Xavier[5], Austoria A J[6]

Abstract

Background : The gold standard for the post-mortem Forensic assessment of neuro-traumatologic and neuro-pathological findings is Autopsy. The goal of the present study was to evaluate the value of CT imaging as a diagnostic tool in head injury and to investigate the potential benefits and limitations of it in comparison with autopsy.

Aims and Objectives : The present study has been attempted to correlate Postmortem examination findings with 128 Slice Dual source Computed Tomography findings in fatal open head injury cases.

Materials and Methods : The present study group comprised of 60 cases of fatal open cranio-cerebral injuries, admitted at AJ Institute of Medical Sciences & Research Centre Hospital /AJ Hospital & Research Centre, Mangaluru, Karnataka in which CT Scans and Autopsy findings were correlated.

Results : Fifty eight cases had fractures, of which 49 were detected at CT Scan. Thirty seven cases had lacerations, of which 13 were detected at CT Scan. Among the Skull fractures the sensitivity of CT Scan was highest for detecting Skull Vault fractures (83%) and lowest for detecting of Middle Cranial Fossa fractures (65%).

Conclusions : This study emphasises that Autopsy is the gold standard in observing the various lesions amongst fatal cases.

Key words : Autopsy, Correlate, Craniocerebral Injuries, CT Scan, Imaging.

Incidence of head injury is rapidly increasing in the world, especially in the developing countries like India, basically due to increased vehicular traffic and poor maintenance of the roads. This is reflected in the statistics that show traumatic head injury to be the cause of death or severe disablement for thousands of persons each year[1.2]. While clinical assessment and judgment are important, emphasis has, in the past, been placed on radiological investigation as an adjunct to effective and safe treatment. The CT scan of head is indispensable in the diagnosis of the various traumatic lesions and their management and it also carries an important prognostic value. The goal of this study was to evaluate the value of CT imaging as a diagnostic tool in cases of open head injury and to investigate the potential benefits and limitations of it in comparison with Autopsy.

Editor's Comment :

- Autopsy is the gold standard to identify head injuries.
- In any case of death due to head injury, autopsy is likely to reveal injuries undetected by CT scans.
- CT scan remains as good standard in cases of trauma management but the accuracy is limited due to the structure of the skull and the views possible in CT.
- The data obtained from this study may be used to improve CT technology for future.

Aims and Objectives

To correlate postmortem examination findings with 128 Slice Dual source Computed Tomography findings in fatal open head injury cases.

To identify the lesions caused by open head injuries, that rare most likely to be missed or may remain undetected by 128 Slice Dual source Computed

[1]MBBS, MD, Assistant Professor, Department of Forensic Medicine and Toxicology, Sree Mookambika Institute of Medical Sciences, Tamil Nadu 629161
[2]MBBS, MD, Assistant Professor, Department of Forensic Medicine and Toxicology, Sree Uthradom Thirunal Academy of Medical Sciences, Thiruvananthapuram, Kerala 695028 and Corresponding Author
[3]MBBS, MD, Professor and Head, Department of Forensic Medicine and Toxicology, Sree Mookambika Institute of Medical Sciences, Tamil Nadu 629161
[4]MBBS, MD, Associate Professor, Department of Physiology, Believers Church Medical College Hospital, Thiruvalla, Kerala 689103
[5]MBBS, MD, Associate Professor, Department of Forensic Medicine and Toxicology, Trichy SRM Medical College Hospital & Research Centre, Tamil Nadu 621105
[6]MBBS, MD, Associate Professor, Department of Community Medicine, Trichy SRM Medical College Hospital & Research Centre, Tamil Nadu 621105

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Tomography but are appreciated at Autopsy or vice versa.

To correlate our study with other national and Global studies.

To recommend means to minimize the discrepancies between CT Scan and Postmortem examination.

Materials and Methods

Source of Data :

Materials for the present study consists of 60 victims of fatal head injury admitted at A J Institute of Medical Sciences & Research Centre Hospital / A J Hospital & Research Centre, Mangaluru, Karnataka succumbed while on treatment and autopsied at the mortuary of A J Institute of Medical Sciences & Research Centre, between December, 2016 and April, 2018.

Sampling Technique :

Universal Sampling Method of Collection of Data.

Ethical Clearance :

It obtained from Institutional Ethical Committee before conducting the study. Written informed consent were taken from the legal heirs after detailed information given to them regarding the study of the deceased victims prior to the recording of various findings. Permission was obtained from the Dean to access the Hospital records of the victim for recording of various findings. The Postmortem findings of fatal head injuries were correlated with the antemortem 128 Slice Dual source Computed Tomography findings as described by the radiologist which were documented in a proforma. Finally, a comparison of CT findings and Postmortem findings of fatal head injuries were carried out, with the findings documented in the Postmortem protocols.

Time Interval :

1½ years (December, 2016 to April, 2018).

Inclusion Criteria :

Materials for the present study consists of all victims of fatal head injury admitted at A J Institute of Medical Sciences & Research Centre Hospital / AJ Hospital & Research Centre, Mangaluru, Karnataka who succumbed while on treatment and autopsied at the mortuary of AJ Institute of Medical Sciences & Research Centre, between December 2016 and April 2018.

Exclusion Criteria :

Any fatal injury case wherein there is complete distortion of structure of contents of head are excluded from the study.

Plan for data analysis: Statistical analysis was carried out using IBM SPSS Statistics (IBM Inc, version 17 for Windows) software package. The findings of the Multi Slice Computed Tomography and Postmortem of fatal head injuries were quantified and analyzed statistically using IBM SPSS Statistics (IBM 45 Inc, version 17 for Windows) software package for sensitivity of the imaging methods for each diagnostic criterion. A radiologist from the Radio-diagnosis unit reviewed the MDCT and certified the neuro-imaging findings.

Results

Ninety six cases of fatal cranio-cerebral injuries were admitted at A J Institute of Medical Sciences & Research Centre Hospital / A J Hospital & Research Centre, Mangaluru, Karnataka during the study period of around $1^1/_2$ years between December, 2016 and April, 2018. Among these 96 cases, Computed Tomography Scan was done in 60 cases, which formed our present study group. The latest Computed Tomography Scans of these cases were taken into consideration for correlation with the Autopsy findings in the present study.

Lacerations :

Thirty Four lesions of cerebral lacerations were found, of which 21 were of frontal lobe, 19 were of temporal

Table 1 — *Correlation of Lacerations at Autopsy with Computed Tomography Scan*

Lacerations	Revealed at Autopsy	Revealed at CT Scan	Not Revealed at CT Scan
Cerebrum	34	0	34 (100%)
Cerebellum	2	0	2 (100%)
Brainstem	2	0	2 (100%)

Table 2 — *Correlation of Lacerations at Autopsy with Computed Tomography Scan*

Cerebral Lacerations	Detected at Autopsy	Detected at CT Scan	Not Detected at CT Scan
Frontal Lobes	21	3 (14.29%)	18 (85.71%)
Temporal Lobes	19	1 (5.26%)	18 (94.74%)
Parietal	5	1 (20%)	4 (80%)
Occipital	7	0	7 (100%)

lobe, 5 were of parietal lobe and 7 were of occipital, of these none were revealed at Computed Tomography, as depicted in Tables 1 & 2.

There were 18 false negative and 3 true positive cases of frontal lobe lacerations. The sensitivity of CT Scan to detect frontal lobe lacerations in the present study was 14.29%.

There were 18 false negative and one true positive cases of temporal lobe lacerations. The sensitivity of CT Scan to detect temporal lobe lacerations in the present study was 5.26%.

Skull Fractures :

Fifty eight skull fractures were found on Postmortem examination, of which 58 were that of vault and 48 were of base, of these 48 vault fractures and 36 base fractures were detected at Computed Tomography Scan.

The involvement of the bones fractured in the vault included 20 frontal, 23 temporal, 4 of parietal and 11 involved occipital bone, of which 4 parietal bone, 19 temporal bone and all the fractures of frontal bone and occipital bones were detected at CT Scan, as depicted in Table 3.

Among the 48 skull base fractures, 22 were of Anterior Cranial Fossa, 17 of Middle Cranial Fossa and 9 of Posterior Cranial Fossa. Five fractures of Anterior Cranial Fossa, 6 of the Middle Cranial Fossa and one of the Posterior Cranial Fossa were not detected at CT Scan, as depicted in Table 4.

There were 10 false negative and 48 true positive cases of skull vault fractures.The sensitivity of CT Scan to detect skull vault fractures in the present study was 82.76%.

Table 3 — *Correlation of Skull Vault Fractures at Autopsy with Computed Tomography Scan*

Skull Vault Fractures	Revealed at Autopsy	Revealed at CT Scan	Not Revealed at CT Scan
Frontal Bone	20	20 (100%)	0
Temporal Bones	23	19 (82.61%)	4 (17.39%)
Parietal Bones	4	4 (100%)	0
Occipital Bone	11	11 (100%)	0

Table 4 — *Correlation of Skull Base Fractures at Autopsy with Computed Tomography Scan*

Skull Base Fractures	Detected at Autopsy	Detected at CT Scan	Not Detected at CT Scan
Anterior Cranial Fossa	22	17 (77.27%)	5 (22.73%)
Middle Cranial Fossa	17	11 (64.71%)	6 (35.29%)
Posterior Cranial Fossa	9	8 (88.89%)	1 (11.11%)

There were 5 false negative cases and 17 true positive cases of Anterior Cranial Fossa (ACF) fractures. The sensitivity of CT Scan to detect ACF fractures in the present study was 77.27%.

There were 6 false negative and 11 true positive cases of Middle Cranial Fossa (MCF) fractures. The sensitivity of CT Scan to detect MCF fractures in the present study was 64.71%.

There were 1 false negative and 8 true positive cases of Posterior Cranial Fossa (PCF) fractures. The sensitivity of CT Scan to detect PCF fractures in the present study was 88.89%.

Among the 58 skull vault fractures, 12 were of Comminuted, 24 of Fissure/Linear, 8 of Sutural/ Diastasis, 9 of Depressed, one of Ring and 5 of Hinge fracture. Four Comminuted Fractures, 16 Fissure/ Linear Fractures, 7 Sutural/Diastasis Fracture, one Ring Fracture and 5 Hinge Fracture were not detected at CT Scan.

There were 4 false negative and 8 true positive cases of comminuted fracture. The sensitivity of CT Scan to detect comminuted fracture in the present study was 66.67%.

There were 16 false negative and 8 true positive cases of Fissure/Linear fracture. The sensitivity of CT Scan to detect Fissure/Linear fracture in the present study was 33.33%.

There were 7 false negative and 1 true positive cases of Sutural Diastasis. The sensitivity of CT Scan to detect Sutural Diastasis in the present study was 12.5%.

There were 9 true positive cases and none false negative case of Depressed Fracture. The sensitivity of CT Scan to detect Depressed fracture in the present study was 100%.

There were 1 false negative and none true positive case of Ring Fracture. The sensitivity of CT Scan to detect Ring fracture in the present study was 0%.

Discussion

CT Scan is a widely used diagnostic tool for head injury as it is rapid, readily available and cost effective. The intracranial lesions included in our study were lacerations and fractures. The commonest intracranial lesion found was fractures followed by lacerations[3].

In the present study, the sensitivity of CT Scan for

Skull fractures was highest for fractures of Posterior Cranial Fossa fractures (88.89%) followed by Skull Vault fractures (82.76%) and lowest for Middle Cranial Fossa fractures (64.71%). While the study conducted by Menon revealed less sensitivity for Skull Vault fracture (56%) and Skull Base fractures (21%). Poulsen, *et al* detected skull fractures in 35 patients at CT scans among the 44 cases at autopsy, while Pathak, *et al* opined that the linear fractures of the skull are difficult to detect[4,5].

The correlation of skull fractures in the present study revealed 10 false negative cases of Skull Vault fractures, 5 false negative cases of Anterior Cranial Fossa fractures, 6 false negative cases of Middle Cranial Fossa fractures and one false negative case of Middle Cranial Fossa fractures. During routine CT examination of the head as many as 30 to 40 percent of fractures are not seen[6]. Non-displaced hairline fractures of mastoid process and petrous part of temporal bone are usually missed at CT Scan. False-negatives may occur with subtle fractures or when suboptimal technique is utilized[7]. Linear fractures especially that run parallel in the axial plane and the basal fractures are easily missed on CT Scans[5,7-9].

Conclusion

The present study group comprised of 60 cases of fatal cranio-cerebral injuries in which CT Scans and Autopsy findings were correlated.

Fifty eight cases had fractures, of which 49 were detected at CT Scan.

Thirty seven cases had lacerations, of which 13 were detected at CT Scan.

Statistical Analysis of the various lesions are as follows :

Among the lacerations the sensitivity of CT Scan for detecting Frontal lobe lacerations was 14% and the sensitivity of CT Scan for detecting Temporal lobe lacerations was 5%.

Among the Skull fractures the sensitivity of CT Scan was highest for detecting Skull Vault fractures (83%) and lowest for detecting of Middle Cranial Fossa fractures (65%).

Suggestions and Recommendations :

CT Scan with special zoom cuts for Posterior Cranial Fossa to reduce beam artefacts.

CT Scan with thin slices (less than 3 mm thickness) along various planes for detecting lesions like hairline fractures.

Contrast enhanced CT Scan for delineating lesions over Posterior Cranial Fossa. Large sample size and repeat CT Scan at different intervals.

Strong Points : This study emphasises that Autopsy is the gold standard in observing the various lesions amongst fatal cases and that virtopsy (imaging techniques) can be an adjuvant only as the proper description and appreciation of these injuries form a very vital cog in medico legal cases for the administration of justice.

Limitations : In this study correlation was done between autopsy and CT scan findings in fatal head injury cases. Only CT scan reports were used to analyze and compare. It would be more significant if a Radiologist is also involved in the study and more number of CT Scan shall be performed at regular intervals to accommodate evolving/developing lesions.

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Conflict of Interest : None

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Original Article

Prevalence of Vaginitis in Preterm Labour and Its Effect on Fetomaternal Outcome

Vaishali Verma[1], Sunaina Singla[2], Banashree Das[3], Anita Chakravarty[4]

Abstract

Background : Preterm Labour (PTL) complicates about 10% to 15% of all pregnancies and is the most common cause of perinatal morbidity and mortality. Genital Tract Infection is one of the most common causes which is responsible for Preterm labour. physiological changes such as pH values during pregnancy affect the vaginal mucosa leading to congestion and hypertrophy. Deranged pH value helps in growth of anaerobic bacteria and other pathogenic microorganism. Vaginitis is thought to be associated with various pregnancy related complications, particularly an increased risk of preterm birth. Thus, this study aims to evaluate the prevalence of Vaginitis in Preterm Labour and its effect on fetomaternal outcome.

Materials and Methods : This prospective case control observational study included 40 patients in Study Group (Preterm labour) and 40 patients in Control Group (Term labour) who admitted in LR in established labour. Complete workup was done. Two Vaginal swabs were taken, first for Gram staining and wet mount preparation for detection of clue cells and KOH test (Whiff test) while the second swab was for culture. Outcome of the pregnancy was assessed, and patient was managed as per standard protocol.

Result : The prevalence of Vaginitis was 37.5% and 27.5% in study (Preterm) and control (Term) group respectively. In the study group 15 women had Vaginitis, out of which Candida (33.33%), Aerobic Vaginitis (33.33%), followed by Bacterial Vaginosis (26.67%) and group B-streptococcus (6.67%). BV and GBS was not present in the control group. Thus more complications were seen preterm group. In preterm group, 26.66% of neonatal mortality occurred in neonates born vaginitis positive mothers.

Conclusion : Prevalence of Vaginitis in both the groups is similar but the type of Vaginitis differs in both the groups. Diagnosing the type of Vaginitis and prompt treatment has more significance in prevention of preterm labour.

Key words : Preterm Labour, Vaginitis, Group-B Streptococcus, Chorioamnionitis.

Preterm Labour (PTL) is defined as the onset of the labour before the 37th completed weeks of gestation. It complicates about 10% to 15% of all pregnancies and is the most common cause of perinatal morbidity and mortality. Preterm delivery affects 1 in 10 births (11%) in USA and even greater births in developing countries and causes 40% to 75% neonatal deaths[1].

The causes of PTL could be maternal, fetal, placental or idiopathic. These can be categorized into four groups. (a) Medical and Obstetric complication like hypertension in pregnancy, multiple pregnancy, placental haemorrhage, uterine anomalies. They are responsible for about one third cases of all PTL (b) Fetal factors like intrauterine growth restriction, congenital anomaly of fetus. (c) Amniotic fluid infection leading to Chorioamnionitis by a variety of microorganism located in the genital tract. Approximately one third of preterm births are associated with chorioamniotic infection and (d) Idiopathic.

Editor's Comment :

- Pregnant women are more prone to vaginal microorganism colonization due to hormonal changes. Vaginitis affects maternal and perinatal outcomes.
- Pregnant women should be screened for early detection and treatment.

Out of the several causes, Genital Tract Infection is one of the most common causes which is responsible for Preterm labour. During pregnancy there is alteration in oestrogen and progesterone levels which is responsible for physiological changes such as change of pH values in the lower genital tract. Such changes affect the vaginal mucosa leading to congestion and hypertrophy. Deranged pH value helps

Department of Obstetrics and Gynecology, Faculty of Medical and Health Sciences, SGT University, Gurugram, Haryana 122505
[1]MBBS, MS, Senior Resident and Corresponding Author
[2]MBBS, MS, Senior Resident
[3]MBBS, MS, Professor
[4]MBBS, MS, Professor, Department of Microbiology
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in growth of anaerobic bacteria and other pathogenic microorganism within the vagina. Vaginitis is thought to be associated with various complications of pregnancy, particularly an increased risk of Preterm birth[2].

The most common vaginal infection in pregnancy is Bacterial Vaginosis (BV), Candidiasis and Trichomoniasis.

In the normal vaginal flora, the anaerobe to aerobe ratio is between 2:1 and 5:1. In the presence of Bacterial Vaginosis, the quantity and quality of H_2O_2 producing lactobacilli decrease, the vaginal pH increases and there is a subsequent shift in the anaerobe to aerobe ratio to between 100:1 and 1000:1.

Various studies have implicated Vaginitis during pregnancy as the cause of spontaneous abortion, Preterm labour, Premature rupture of membrane, Chorioamnionitis.

Keeping these facts in mind this study was proposed to assess the prevalence of Vaginitis in women presenting with Preterm labour in this Institute which is in Rural Haryana and also to find out the effect of Vaginitis in maternal and fetal outcome.

Material and Methods

This prospective case control observational study was conducted in the Department of Obstetrics and Gynaecology, in Medical College in rural Haryana after Ethical Committee permission.

The present study aimed to assess prevalence of Vaginitis in the Preterm labour and Term labour, compare it and to evaluate the fetomaternal outcomes. We included 40 patients in Study Group (Preterm labour) and 40 patients in Control Group (Term labour) who were admitted to the labour room of the Department of Obstetrics & Gynaecology and fulfilled the inclusion criteria and willing to participate in the study.

Inclusion criteria: All pregnant women established in labor before 36+6 weeks were included in “Study Group” and all the pregnant women with established labor in gestational age more than 37 weeks were included in “Control group”.

Exclusion criteria: pregnant women with Multiple Gestation, Polyhydromnios, Structural Uterine Abnormalities, Antepartum Haemorrhage, Pregnant Women with Intrauterine death, Pregnancies complicated with medical disorders like Hypertension, Diabetes Mellitus, Chronic Renal Disorders, Gastrointestinal Disorders, Severe Cardiac Disorders etc, and those who were not willing to participate in the study.

Complete workup was done including history, thorough physical examination and all antenatal investigations and other relevant investigations were reviewed and recorded as per standard protocol. After complete obstetrical examination, specimens were collected for diagnosis of Vaginitis.

Two Vaginal swabs was taken and sent to the Laboratory of Department of Microbiology. The first vaginal swab was used to prepare a smear on a slide for Gram staining and also used for wet mount preparation for the detection of clue cells and KOH test (Whiff test) while the second vaginal swab was used specifically for culture and results were noted. After taking specimen for diagnosis of Vaginitis patient were managed as per standard protocol for management of Preterm and Term labour. Following delivery patients and neonates were observed for at least 72 hours. Mother was monitored for detection of puerperal infection after 24 hours. All data were recorded in pre-set Performa and analysed.

BV diagnosis was done by means of microscopic examination of Gram-stained vaginal smear slides. The Gram-stained slides were then examined microscopically by a qualified laboratory personnel for BV diagnosis, using the Nugent’s criteria scoring system.

Wet mount was examined under a high power for the presence of epithelial cells, clue cells, pus cells, Trichomonas vaginalis and Candida.

Whiff test was performed by adding 2 to 3 drops of 10% KOH to the vaginal discharge on the speculum and sniffing the mixture. The test is interpreted as positive if a fishy aroma is noted.

The second swab which was placed in the transport medium was inoculated on blood agar, Chocolate agar and Sabouraud dextrose agar and incubated at a temperature range of 35-37^{o}C for 18 to 24 hours. Organisms that grew on the culture media were identified using their colonial morphology, Gram stain and biochemical reactions.

After taking specimen for diagnosis of Vaginitis patient were managed as per standard protocol for

management of Preterm and Term labour.

Outcome of the pregnancy was assessed for obstetric and fetal outcome.

Obstetric outcome : Assessed for mode of delivery, Associated obstetric complications, Intrapartum complications, Postpartum complications.

Neonatal outcome : recorded live/still birth, APGAR at 1 and 5 min, Birth weight, neonatal complications, Neonatal Intensive Care Unit (NICU) admissions, Neonatal mortality.

Statistical Analysis :

Association of infection diagnosed using each criterion in Preterm and Term delivery were estimated by Fisher's exact t-test and qualitative data were compared using chi-square test. Statistical significance was considered when p value was less than 0.05.

Result

In present study majority of the patients were between 21 to 25 years. The mean age in both Study and Control group was not statistically significant with p value of 0.084. The mean age was comparable in both the groups.

Majority of the patients in Study Group (52.5%) delivered between 34 to 36 completed weeks of gestation and only (7.5%) delivered before 28 weeks of gestation. In Control group, Majority of the patients (62.5%) were delivered between 37 to 38 weeks+6 days of gestation and (37.5%) were delivered 39 to 40 weeks+6 days of gestation.

The prevalence of Vaginitis was 37.5% and 27.5% in Study (preterm) and Control (term) group respectively.

Out of the 15 women who had Vaginitis in the Study group, six (40%) delivered between 34 to 36 completed weeks, five (33.33%) delivered between 32 to 34 completed weeks, two (13.33%) delivered between 28 to 32 completed weeks and the remaining two (13.33%) delivered in the gestational period below 28 weeks. In Control group 11 women who had vaginitis, nine (81.81%) delivered between 37 to 40 weeks and two (18.18%) delivered after 40 weeks.

The commonest infections found in this study were Candida (33.33%), Aerobic Vaginitis (33.33%), followed by Bacterial Vaginosis (26.67%) and group B-streptococcus (6.67%) in Preterm group and Candida 18.18% followed by Aerobic Vaginitis 81.82% in Term group.

On analysing the type of Vaginitis in Study and Control group it was observed that Bacterial Vaginosis (26.67%) and Group B streptococcus (6.67%) was present only in study group but not in the Control group.

In the Study group, 50% women with BV had Prelabour Preterm Rupture of Membrane (PPROM) whereas 20% with Candida had PPROM. The frequency of Preterm Premature rupture of Membranes was significantly higher in Study group with p-value 0.005 as compared to Control group (Table 1).

All women with Group-B Streptococcus positive had Chorioamnionitis infection and puerperal pyrexia and neonatal septicaemia as compared to other types of Vaginitis.

25% of women with BV had Chorioamnionitis, puerperal pyrexia and atonic PPH postpartum complications. 20% patients with Candida Vaginitis had Chorioamnionitis. One patient who had Group-B streptococcus also had Chorioamnionitis.

In Present study (Preterm group) 26.66% of neonatal mortality occurred were born to vaginitis positive mothers compared to 4% of neonatal mortality born to Vaginitis negative mothers and there was no neonatal mortality in Control group.

In Preterm Group 86.66% of neonates born to mother with Vaginitis had low birth weight as compared to 48% of neonates born to mother without Vaginitis. This difference was statistically significant (p=0.014). There was no low-birth-weight baby born in Control group with Positive Vaginitis mothers (Tables 2&3).

Table 1 — *Maternal outcome in Relation to Type of Vaginitis in Study Group*

Outcome	No Pathogen n=25 (%)	Bacterial Vaginosis N=4* (%)	Candida N=5 (%)	Group-B Strepto-coocus N=1 (%)	Trichomonas N=0 (%)	Aerobic Vaginitis N=5 (%)	X^2	p- value
PPROM	6(24%)	2(50%)	1(20%)	0(0%)	0(0%)	0(0%)	14.77	0.005(S)
Chorioamin otis	2(8%)	1(25%)	1(20%)	1(100%)	0(0%)	1(25%)	15.69	0.003(S)
Puerpural pyrexia	0(0%)	1(25%)	0(0%)	1(100%)	0(0%)	1(25%)	30.08	0.001 (S)
Atonic PPH	1(4%)	1(25%)	1(20%)	0(0%)	0(0%)	0(0%)	9.64	0.05(S)

Table 2 — *Neonatal outcomes in Relation to Vaginitis in Study and Control the Groups*

Outcome	Study Group Vaginitis positive n=15%	Control Group Vaginitis positive n=11%
LBW	86.66	-
Still birth	-	-
Neonatal death	26.66	-
NICU Admission	86.46	27.27
Neonatal Jaundice	33.33	-
RDS	20	-
PDA	6.66	-
Hypoglycemia	6.66	-
Septicemia	13.33	9.09
Hypocalcemia	6.66	-

Discussion

Pregnant women have a twofold increase in the prevalence of vaginal microorganisms' colonization compared to non-pregnant women. Increased levels of circulating oestrogen and deposition of glycogen and other substrates in the vagina during pregnancy influence this association[3].

In the present study the mean maternal age in both the groups was comparable (23.5 years and 24.6 years in Study group and Control group respectively). Study done by Kavya K, *et al* had a mean maternal age of 25.6 and 25.3 years respectively[4]. This can be explained by the fact that age of marriage is comparatively low in North India.

In our study prevalence of Vaginitis was 37.5% in the Study (Preterm) group and 27.5% in Control (Term) group. Though prevalence was higher in the study group, but this difference was not statistically significant. According to a study by Rathod S, *et al* in 2016 from Karnataka, who conducted the study on 920 pregnant women, only 80 (8.7%) had Vaginitis which is much less than the present study. Study population in that study was much higher than the present study. Yarlagogadda S, *et al* (2018) from Andhra Pradesh India, reported incidence of vaginal infections to be 33.62%.[5] Their finding is similar to our result.

In the present study total number of patients with Vaginitis was slightly more in Study (Preterm) group then in Control (Term) group (37.5% and 27.5%).%. Kavya K, *et al* (2019) from Karnataka reported prevalence of Vaginitis to be much higher in preterm group as compared to Term group (22% and 6% respectively)[3].

The commonest infections found in this Study group were Candida (33.33%), Aerobic Vaginitis (33.33%), Bacterial vaginosis (26.67%) and Group B-streptococcus (6.67%) whereas in the Control group most common infection found was Aerobic Vaginitis (81.82%) followed by Candida (18.18%). Benchetrit, *et al* reported a very high incidence of GBS in their study (26%) as compared to present study[6].

On analysing type of Vaginitis in study and control group it was observed that Bacterial Vaginosis (26.67%) and Group B streptococcus (6.67%) was present only in Study group but not present in the Control group. Similar to the present study, Kiran CK, *et al* (2017) also reported that Group B Streptococcus was only present in the Preterm labour but not present with Term labour. This shows that Group B streptococcus infection may be a cause of preterm labour[7].

In present study prevalence of Candida vaginitis was higher (33.33%) in Preterm group than the Control group (18.18%) but it was not statistically significant (p value of 0.66). Kiran CK, *et al* (2017) also reported a greater number of cases of Candida positive (8.0%) in Preterm group as compared to (6.0%) in Term group.

Table 3 — *Neonatal outcomes in relation to different types of Vaginitis in Study group and Control group*

Outcome	No pathogen		Candida		Bacterial Vaginosis		Group B strepto- coccus		Trichomonas		Aerobic Vaginitis	
	Study group	Control group	Study group	Control group	Study group	Control group	Study group	Control group	Study group	Control group	Study group	Control group
LBW	12	3	4	nil	4	nil	1	nil	nil	nil	4	nil
Still birth	1	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
Neonatal death	nil	nil	1	nil	1	nil	1	nil	nil	nil	1	nil
NICUAdmission	16	6	4	nil	3	nil	1	nil	nil	nil	4	3
Neonatal Jaundice	12	3	3	nil	1	nil	nil	nil	nil	nil	1	nil
RDS	5	nil	1	nil	1	nil	nil	nil	nil	nil	1	nil
PDA	1	nil	1	nil	nil	nil	nil	nil	nil	nil	0	nil
Hypoglycemia	1	nil	nil	nil	nil	nil	nil	nil	nil	nil	1	nil
Septicemia	1	nil	1	nil	nil	nil	1	nil	nil	nil	nil	1
Hypocalcemia	2	nil	nil	nil	1	nil	nil	nil	nil	nil	nil	nil

In present study prevalence of Aerobic Vaginitis (81.82%) was much higher in the Control group as compared to the Study group and this was statistically significant. On contrary study published by Sima Gity, *et al* (2011) only E coli infection was significantly higher (11.20% *versus* 1.61% with p value 0.002) in the pre-term group as compared to term group[8].

On analysing it was found that type of Vaginitis and earlier the Vaginitis in gestational age had significant adverse maternal and perinatal outcome. Kurki, *et al* in their study observed that Bacterial Vaginosis in early pregnancy was associated with a 2.6-fold risk (95% CI 1.3-49) for Preterm labour, a 6.9-fold risk (95% CI 2.5 -18.8) for Preterm birth[9].

In the present study, 50% of patients who had BV had PPROM which was highest as compared to other Vaginitis in the study group. Kurki, *et al* in their study found that Bacterial Vaginosis in early pregnancy was associated with a 7.3-fold risk for Preterm premature rupture of membranes (95% CI 1.8-29.4)[9].

Bacterial Vaginosis mostly remains asymptomatic during pregnancy but it is often associated with Preterm labor, PPROM, PROM and subsequent maternal and fetal morbidity (Chorioamnionitis, Puerperal Sepsis, Endometritis, Low Birth Weight, Low Apgar Score in Neonate and Neonate Jaundice). In present study, 25% of women who had BV positive had Chorioamnionitis, Puerperal pyrexia and atonic PPH.

In the present study (Preterm group) 26.66% of neonatal mortality occurred in the neonate born to mothers' with Vaginitis as compared to 4% of neonatal mortality in women without Vaginitis and there were no neonatal mortality in the Control group. Rathod S, *et al* (2016) reported no significant correlation between neonatal mortality and Vaginitis (value less than 0.446)[10].

In the Present study, in Preterm Group 86.66% of neonates born to Vaginitis positive mothers had low birth weight as compared to 48% of neonates born to Vaginitis negative mothers.

This difference was statistically significant (p=0.014). There were no low-birth-weight babies in Control group born to mothers with Vaginitis.

Greater number of neonates in Preterm group with Vaginitis needed NICU admission as compared to Term group with Vaginitis. This finding was statistically significant. (p=0.002).

From the present study it was observed that type of bacteria is more important for both maternal and perinatal complications. BV, GBS probably cause more Preterm labour and other complications than aerobic Vaginitis and Candidiasis.

Conclusion

In our study we found that, among rural pregnant women, prevalence of Vaginitis in both groups was similar but the type of Vaginitis differs in both the groups. Type of vaginitis and vaginal infection in earlier gestational age had significant adverse maternal and perinatal outcome. Bacterial Vaginosis and Group B streptococcus infection was present only in the preterm labour women and was significantly associated with Preterm delivery. Diagnosing the type of Vaginitis and prompt treatment has more significance in prevention of Preterm labour.

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Conflict of Interest : None

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Original Article

Relationship between Ankle-Brachial Index with Coronary Angiography Outcomes in Patients with Risk of Coronary Artery Disease

Akanksha Tandon[1], Narsingh Verma[2], Shibu S Awasthi[1], Rishi Sethi[3]

Abstract

Background : The Ankle-Brachial Index (ABI) is a non-invasive diagnostic method that compares the Blood Pressure of the lower limbs with that of the arms. This may indicate Peripheral Artery Disease (PAD).

Aims and Objectives : This study examined the relationship between the ABI and coronary angiographic outcomes.

Materials and Methods : This hospital-based observational study included 210 patients with CAD from the Department of Cardiology at King George's Medical University in Lucknow. Patients with Coronary Angiography were divided into three groups based on their ABI values: ABI>0.9<1.2 (intermediate risk of developing vessel disease, n = 49), ABI<0.9 (high risk of developing CAD, n = 45) and ABI>1.2 (normal range, n = 116). We recorded the lipid profile and covariates including age, gender, smoking status, Body Mass Index (BMI), Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Vessel occlusion and Calcification.

Results : The ABI<0.9 category was primarily populated by older individuals, resulting in significant age disparities across the ABI groups (p<0.0001). The ABI <0.9 group was significantly more prevalent among males and smokers (p=0.010 and p<0.0001, respectively). Hypertension and Diabetes Mellitus were most prevalent in the group with an ABI of <0.9 (p<0.0001). A significant correlation was observed between lower ABI values and family history of cardiovascular disease (p<0.0001). Vessel occlusion was primarily observed in the ABI <0.9 group, with significant differences in calcification rates (p<0.0001). A positive correlation was found between ABI values and vessel disease severity ie, extent of vessel involvement. Angiography revealed a significant association between lower ABI and the presence of CAD.

Conclusion : ABI measurements significantly correlated with CAD severity in patients without prior PAD, suggesting their potential use as a non-invasive screening tool in clinical settings.

Key words : Ankle-Brachial Index (ABI), CAD, PAD, Vessel Occlusion, Lipid Profile.

Cardiovascular Diseases (CVDs) cause over 17 million (32%) deaths worldwide, with approximately 80% in middle- and low-income nations[1]. Coronary Heart Disease (CHD) is a major cause of mortality and functional disability among the elderly. The main risk factors included hyper-cholesterolemia, hypertension, diabetes mellitus and smoking. Peripheral Arterial Disease (PAD) and coronary involvement are positively correlated with atherosclerosis, a generalized process affecting the coronary, cerebral and peripheral arteries[2].

Department of Physiology, Dr Ram Manohar Lohia Institute of Medical Sciences, Lucknow, Uttar Pradesh 226010
[1]MD, Senior Resident
[2]MD, Former Professor and Head, Department of Physiology, King Georges Medical University, Lucknow, Uttar Pradesh 226003 and Corresponding Author
[3]MD, Professor, Department of Cardiology, King Georges Medical University, Lucknow, Uttar Pradesh 226003
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Editor's Comment :
- Ankle-Brachial Index (ABI) is a simple non invasive test which can help in making diagnosis of atherosclerosis of vessels.
- This test has not been utilized in day to day medicine.

Detecting subclinical atherosclerosis is crucial for the early intervention and prevention of cardiovascular disease. However, the widespread use of carotid Ultrasound and coronary Computed Tomography/ Magnetic Resonance Imaging can be costly, potentially leading to delays in the diagnosis and rationing of healthcare resources, progression of the disease and increased morbidity. Therefore, it is essential to consider both economic and clinical aspects. The ABI has emerged as a non-invasive and cost-effective CVD diagnostic method. Lower ABI values mean a two- to three-fold higher risk of cardiovascular and cerebrovascular morbidity and mortality. ABI utility extends beyond the detection of PAD and indicates systemic atherosclerosis and cardiovascular risks. The ABI is calculated by

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comparing the Blood Pressure readings at the ankle with those at the arm, and lower values are indicative of increased risk of cardiovascular events.

Studies have demonstrated that an ABI<0.90 is strongly associated with a higher incidence of CHD and cerebrovascular events. Furthermore, primary and secondary cardiovascular prevention strategies recognize ABI for its predictive value in assessing the CAD severity, making it a valuable method[3,4]. By incorporating ABI into routine evaluations, healthcare providers can classify high-risk individuals and implement appropriate interventions to mitigate the risk of adverse cardiovascular outcomes. This approach is particularly beneficial in resource-limited settings where more expensive diagnostic modalities are not feasible. ABI values are related to angiographic findings and support their use as a substitute for CAD markers. This makes it cost-effective to determine whether the disease is aggressive and make treatment plans specific to each patient. Based on the above background, the present study investigated the relationship between ABI and angiographic findings in patients suspected of or at risk for CAD.

Materials and Methods

Study Design and Setting :

This hospital-based observational study, subjects (n=210) were recruited from the Department of Cardiology, both Outpatient (OPD) and Inpatient (IPD) services, at King George's Medical University (KGMU), Lucknow from October, 2019 to September, 2020. These subjects were identified as having a risk of developing CAD with diabetes, hypertension, history of smoking, and dyslipidaemia. Exclusion criteria included patients with lower limb gangrene, limb deformities, non-consenting individuals, valvular or congenital heart or vascular diseases, proven malignancies or severe pulmonary, renal or hepatic comorbidities. The Institutional Ethics Committee (ref.no 886/ Ethics/2020 of KGMU, Lucknow) approved the study protocol.

The ABI measurement was calculated using a standardized protocol described by D¹browski, *et al*[5]. Measurements were taken using an automated oscillometric device, with patients in a supine position to ensure that the arms and legs were at the level of the heart. Blood Pressure cuffs, adequately sized to exceed the limb diameter by 20%, were used to completely encircle the upper and lower extremities. The cuffs were positioned above the malleoli at the calf muscle for recording ankle blood pressure and the 2.5 cm above antecubital fossa at the arm, ensuring obliteration of the brachial artery. Systolic Blood Pressure (SPB) was measured in both arms, and an average of three readings was recorded. The higher value between the two arms was recorded as the Brachial Systolic Blood Pressure (BSBP) for ABI calculation.

Ankle Brachial Pressure Index (ABPI) Calculation:

The ABPI was calculated by dividing the ankle and BSBP (Fig 1). Both right and left-sided ABPIs were calculated and in instances where the values differed, a lower value was documented. ABI was measured and recorded at two decimal places. The patients were divided into three groups: ABI group I (ABI ≤0.9) and ABI group II (ABI>0.9) and ABI group III (ABI; 0.9-1.2). For coronary involvement, all patients had underwent diagnostic coronary angiography via either the femoral or radial route using a 5F or 6F catheter. The lesions identified during the coronary angiography were then classified. These angiographic findings divided the outcomes into mild and severe CAD group. The vessels studied included the Left Coronary Artery (LCA), Right Coronary Artery (RCA), Left Anterior Descending artery (LAD), first and second diagonal branches (D1, D2), Obtuse Marginal artery (OM), and Left Circumflex artery (LCX). Vessel occlusion was categorized as no occlusion, <50% occlusion or >50% occlusion. Vessel calcification was noted as either present or absent.

Covariant analysis: The association between ABI categories and the extent and severity of CAD, including age, sex, smoking status, SBP, DBP, total serum cholesterol (TC), Low-density Lipoprotein (LDL) cholesterol, High-density Lipoprotein (HDL) cholesterol, triglycerides and angiographic findings, was analyzed. Angiographic findings were subsequently compared with the ABI values. CAD was defined as a >50% stenosis in the major coronary vessels. CAD was assessed and classified as mild to moderate and severe occlusion, corresponding to ≤50% occlusions in diameter and >50% stenosis in major vessels, respectively. The relationship between ABI and angiographic findings was analyzed to determine the potential of ABI as a screening tool in individuals suspected of having cardiovascular dieases with no previous history of PAD and to predict the severity of CAD in the future.

Statistical analysis : All statistical analyses were performed using SPSS software (IBM version 22). The Kolmogorov-Smirnov test was used to determine normality. Fisher's exact or the chi-square test was used for categorical data. ANOVA was used to evaluate differences among the groups. Pearson's correlation coefficient analysis was used to establish relationships between variables. Multiple regression analysis was applied to the ABI and vessel occlusion groups. Statistical significance was set at p<0.05.

Results

Association of Age, Smoking Hypertension, Diabetes, Cardiology Vascular History, Vessel Occlusion and Calcification with ABI :

Participants with ABI <0.9 (indicative of PAD) had a mean age of 60.73 (SD=5.64) years, which was significantly higher than those in the ABI 0.9-1.2 (normal range) and ABI>1.2 (potentially non-compressible arteries) groups, with mean ages of 55.08 (SD=8.80) and 52.60 (SD=7.73) years (p<0.0001), respectively. Male participants predominated in the ABI<0.9 group (95.9%), compared to 79.3% in the ABI 0.9-1.2 group and 91.1% in the ABI>1.2 group (p=0.01). Smoking prevalence was markedly higher in the ABI <0.9 group at 95.9%, compared to 51.7% in the ABI 0.9-1.2 group and 51.1% in the ABI >1.2 group (p<0.0001). A similar trend was noted for tobacco use, with 95.9% in the ABI <0.9 group, 35.4% in the ABI 0.9-1.2 group and 31.1% in the ABI>1.2 group reporting usage (p<0.0001). Hypertension was universally present in the ABI <0.9 group (100%), while it was reported in 47.4% of the ABI 0.9-1.2 group and 33.3% of the ABI>1.2 group (p<0.0001). Diabetes Mellitus was also significantly associated with lower ABI, with 77.5% in the ABI <0.9, 44.0% in the ABI 0.9-1.2 group and 51.1% in the ABI>1.2 group (p<0.0001). A family history of cardiovascular issues was more common in the ABI<0.9 group (71.4%) compared to the ABI 0.9-1.2 (26.7%) and ABI>1.2 (22.2%) groups (p<0.0001). Complete vessel occlusion was observed exclusively in the ABI <0.9 group. Calcification was present in 46.9% of the ABI <0.9 group, which was significantly higher than the 13.8% in the ABI 0.9-1.2 group but comparable to the 42.2% in the ABI >1.2 group (p<0.0001) (Table 1).

Table 1 — *Demographical characteristics of the study population*

Variables	ABI (<0.9) (n=49)N(%)	ABI (0.9-1.2) (n=116)N(%)	ABI (>1.2) (n=45)N(%)	p-value
Age (years)				
mean±SD	60.73±5.64	55.08±8.80	52.60±7.73	<0.0001*
Gender				
Male	47(95.9)	92(79.3)	41(91.1)	
Female	02(4.08)	24(20.7)	04(8.9)	0.010*
Smoking				
Yes	47(95.9)	60(51.7)	23(51.1)	
No	02(4.08)	56(48.3)	22(48.9)	<0.0001*
Tobacco				
Yes	47(95.9)	41(35.4)	14(31.1)	
No	02(4.08)	75(64.6)	31(68.9)	<0.0001*
Hypertension				
Yes	49(100.0)	55(47.4)	15(33.3)	
No	0	61(52.6)	30(66.7)	<0.0001*
DM				
Yes	38(77.5)	51(44.0)	23(51.1)	
No	11(22.5)	65(56.0)	22(48.9)	<0.0001*
Family history				
Yes	35(71.4)	31(26.7)	10(22.2)	
No	14(28.6)	85(73.3)	35(77.8)	<0.0001*
Vessel ocullation				
No	0	13(11.3)	0	
<50%	0	27(23.4)	0	
>50%	49(100.0)	76(65.5)	45(100.0)	<0.0001*
Calcification				
No	26(53.1)	100(86.2)	26(57.8)	
Yes	23(46.9)	16(13.8)	19(42.2)	<0.0001*

The chi-square test and ANOVA test were used to compare the groups. *p<0.05 was considered as statistically significant.

Variations in lipid profiles and heart rate among the ABI Group :

The assessment of lipid profiles across different ABI categories, TG levels were significantly higher in the ABI<0.9 group (200.69±31.23) compared to the ABI 0.9-1.2 (150.27±67.08) and ABI>1.2 groups (172.29±68.04 mg/dL), (p<0.0001). LDL levels decreased with increasing ABI and were higher in the ABI<0.9 group (72.71±31.54) and lower in the ABI >1.2 group (51.06±20.15 mg/dL, p=0.002). Similarly, VLDL levels were elevated in the ABI<0.9 group (48.65±12.54) compared to both ABI 0.9-1.2 (37.59±19.89) and ABI>1.2 (37.68±17.52 mg/dL, p = 0.001). The TC/HDL and HDL/LDL ratios were significant (p=0.003 and p=0.001, respectively), indicating potential cardiovascular risk among the ABI groups. Furthermore, Heart Rate (HR) was significantly elevated in the ABI <0.9 group 90.42±10.0 beats/min (p=0.001), suggesting a correlation with more severe arterial disease (Table 2).

Correlation between ABI and Lipid Profiles :

ABI was negatively correlated with TG levels (r=-0.267,

Table 2 — *Comparison of CAD markers based on ABI categories*

Variables	ABI (<0.9) (n=49)	ABI (0.9-1.2) (n=116)	ABI (>1.2) (n=45)	p-value
TC (mg/dL)	153.58±36.53	149.09±42.18	152.49±13.90	0.731
TG (mg/dL)	200.69±31.23	150.27±67.08	172.29±68.04	<0.0001*
HDL (mg/dL)	48.63±8.04	46.38±9.54	46.34±10.89	0.349
LDL (mg/dL)	72.71±31.54	68.25±36.08	51.06±20.15	0.002*
VLDL (mg/dL)	48.65±12.54	37.59±19.89	37.68±17.52	0.001*
TC/HDL	2.66±0.92	3.14±1.00	3.23±0.65	0.003*
HDL/LDL	1.09±0.50	1.53±0.80	1.58±0.64	0.001*
RBS (mg/dL)	209.33±86.91	162.73±62.32	171.76±60.01	<0.0001*
HR (per min)	90.42±10.0	88.11±12.19	81.79±11.10	0.001*

Abbreviations : TC: Total Cholesterol, TG: Triglyceride, HDL: High-density Lipoprotein, LDL: Low-density Lipoprotein, VLDL: Very Low-density Lipoprotein, TC/HDL: Ratio of Total Cholesterol and High-density Lipoprotein, HDL/LDL: Ratio of High-density Lipoprotein and Low-density Lipoprotein, RBS: Random Blood Sugar, HR: Heart Rate. The ANOVA test was used to compare the groups. *p<0.05 was considered as statistically significant.

p= 0.015). The TC/HDL and LDL/HDL ratios positively correlated with ABI (r=0.311, p=0.002, and r=0.339, p=0.0001, respectively), while the ABI was significantly negatively correlated with VLDL levels (r =-0.307, p= 0.003).

LDL was positively correlated (r=0.354, p<0.0001) with ABI. ABI was significantly negatively correlated with VLDL levels (r=-0.307, p=0.003). TC and LDL levels showed a positive correlation (r=0.731, p<0.0001); similarly, TG and VLDL showed a positive correlation (r=0.735, p<0.0001). In contrast, VLDL levels were negatively correlated with HDL levels (r=-0.390, p<0.0001). The TC/HDL ratio was positively associated with the LDL/HDL ratio (r=0.565, p<0.0001)(Table 3).

Relationship between Affected Vessels and CAD Severity :

With low ABI patients, the prevalence of vessel disease was as follows: Single Vessel Disease (SVD) in 24.48%, Double Vessel Disease (DVD) in 51.02%, and Triple Vessel Disease (TVD) in 24.48%. Regression analysis revealed a positive correlation between the number of affected vessels and the severity of CAD, with increasing beta coefficients indicating greater severity: SVD (β=0.84, p<0.0001), DVD (β=0.849, p<0.0001), and TVD (β=0.86, p<0.0001) (Table 4).

Discussion

In clinical practice and epidemiological studies, ABI serves as a crucial indicator of PAD[5-8]. Our study investigated the correlation between ABI values, the

Table 4 — *Vessel Disease Involvement of subjects with low ABI (<0.9)*

Variables	β-Coefficient	SE	t-value	p-value
Vessel disease (1)	0.84	0.003	250.97	<0.0001
Vessel disease (2)	0.85	0.002	366.21	<0.0001
Vessel disease (3)	0.86	0.003	256.94	<0.0001
ABI (vessel disease =2)	0.23	0.28	0.80	0.43
ABI (vessel disease =3)	0.76	0.28	2.67	0.02

Table 3 — *Correlation of CAD markers with ABI index*

Variables	TC(mg/dL)	TG(mg/dL)	HDL(mg/dL)	LDL(mg/dL)	VLDL(mg/dL)	TC/HDL	LDL/HDL	HR/Minutes	ABI
TC (mg/dL)	1	r=0.322 p<0.0001*	r=0.262 p<0.0001*	r=0.731 p<0.0001*	r=0.184 p=0.007*	r=0.446 p<0.0001*	r=0.558 p<0.0001*	r=-0.171 p=0.013*	r=0.056 p=0.422
TG (mg/dL)		1	r=0.027 p=0.701	r=-0.151 p=0.029*	r=0.735 p<0.0001*	r=0.286 p<0.0001*	r=-0.161 p=0.019*	r=0.119 p=0.087	r=-0.267 p=0.015*
HDL (mg/dL)			1	r=0.024 p=0.726	r=0.012 p=0.866	r=-0.390 p<0.0001*	r=-0.343 p<0.0001*	r=-0.025 p=0.717	r=-0.043 p=0.539
LDL (mg/dL)				1	r=-0.210 p=0.002*	r=0.406 p<0.0001*	r=0.904 p<0.0001*	r=-0.125 p=0.071	r=0.354 p<0.0001*
VLDL(mg/dL)					1	r=0.093 p=0.181	r=-0.223 p=0.001*	r=0.083 p=0.232	r=-0.307 p=0.003*
TC/HDL						1	r=0.565 p<0.0001*	r=0.157 p=0.023*	r=0.311 p=0.002*
LDL/HDL							1	r=-0.088 p=0.203	r=0.339 p<0.0001*
HR (/minutes)								1	r=0.292 p=0.005*

Abbreviations: TC: Total Cholesterol, TG: Triglyceride, HDL: High-density Lipoprotein, LDL: Low-density Lipoprotein, VLDL: Very Low-density Lipoprotein, TC/HDL: Ratio of Total Cholesterol and High-density Lipoprotein, HDL/LDL: Ratio of High-density Lipoprotein and Low-density Lipoprotein, RBS: Random Blood Sugar, HR: Heart Rate. The Pearson correlation coefficient was used to see the association between the two variables. *p<0.05 was considered as statistically significant.

extent and severity of CAD and the confounding factors influencing cardiovascular risk.

Our findings underscore a significant association between ABI and the severity of CAD, reflecting a complex interplay of cardiovascular risk factors. Previous studies have consistently demonstrated that lower ABI values are indicative of more extensive and severe CAD. Criqui, *et al* (2012)[9] and McDermott, *et al* (2005)[10] reported a higher incidence of multi-vessel CAD in individuals with lower ABI values, highlighting the role of ABI in predicting CAD severity.

The observed gender disparity, with a higher percentage of males in the lower ABI groups, aligns with previous research indicating a higher risk of PAD in males. The presence of calcification in both the lowest and highest ABI groups suggests different underlying pathophysiological mechanisms affecting arterial stiffness, which warrants further investigation[9,10].

This study highlights the multifactorial nature of PAD, with ABI significantly associated with Age, Smoking, Hypertension, Diabetes and Cardiovascular history. These factors contribute to the progression of PAD and underscore the importance of comprehensive risk factor management in patients with low ABI[11-13]. Similar to previous studies, our findings show a higher prevalence of smoking and hypertension in the ABI<0.9 group, which correlates with severe arterial occlusion and underscores the utility of ABI in assessing arterial blockages[14].

Our study identified a significant positive correlation between ABI and TC and LDL levels, which are established contributors to atherosclerosis and cardiovascular risk[15,16]. The relationship between TG and VLDL underscores their joint influence on lipid metabolism and cardiovascular risk[17]. Additionally, the negative correlation between ABI and random blood sugar levels highlights the detrimental impact of impaired glycemic control on vascular health, contributing to endothelial dysfunction and atherosclerosis[18].

In our cohort of patients with a low ABI, we observed a significant prevalence of multi-vessel CAD: SVD in 24.48%, DVD in 51.02% and TVD in 24.48%. These findings emphasize the significant burden of CAD in individuals with impaired peripheral arterial circulation, underscoring the need for comprehensive cardiovascular assessment and therapy in this population[19,20].

Regression analysis further supported our findings, revealing a significant correlation between the number of affected vessels and the severity of CAD, as indicated by increasing beta coefficients: SVD (β=0.84, p<0.0001), DVD (β=0.849, p<0.0001) and TVD (β=0.86, p<0.0001). These results suggest that lower ABI values, reflective of more severe PAD, are associated with a higher prevalence of multi-vessel CAD and increased CAD severity. This is consistent with prior research linking PAD severity to heightened cardiovascular risk and poorer clinical outcomes[21]. Studies by McDermott, *et al* (2005)[10] and a meta-analysis by Fowkes, *et al* (2008)[22] have similarly identified ABI as a robust predictor of CAD severity and mortality, emphasizing the clinical relevance of ABI assessment in cardiovascular risk stratification[10,22].

However, the relatively small sample size and specific demographic characteristics of the study population may restrict the generalizability of findings to broader populations. Future research should explore longitudinal outcomes and mechanistic insights further to understand the predictive value of ABI in CAD progression and guide personalized treatment approaches, including larger, more diverse cohorts to validate current findings.

Conclusion

The study reveals a strong correlation between ABI values and the severity of CAD. ABI values ≤0.9 are linked to increasing severity of CAD, with a higher prevalence of TVD, followed by DVD and SVD. This suggests that ABI ≤0.9 is a robust predictor of CAD severity, indicating extensive arterial involvement and heightened cardiovascular risk in these individuals. Individuals with ABI values >0.9 and <1.2 also show a correlation with TVD, indicating an intermediate risk profile. The study emphasizes the importance of ABI assessment in clinical practice for identifying individuals at heightened cardiovascular risk.

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Original Article

Unveiling Usage Patterns : Nikshay Poshan Yojana Scheme among Tuberculosis Patients at Vijayapura District Hospital — A Cross-Sectional Study

Kavimalar T[1], M R Gudadinni[2], M C Yadavannavar[3]

Abstract

Background : Tuberculosis (TB) remains a global health concern with significant morbidity and mortality impacting populations worldwide. Tuberculosis and nutrition are intricately linked, To address this, GOI has initiated a program known as "Nikshay Poshan Yojana" to enhance the nutritional practice of tuberculosis patients, April, 2018, to offer a monthly financial incentive of INR 500 to all TB patients throughout the course of their treatment. This study seeks to evaluate the number of patients who have received benefits from the scheme and also to assess the utilization of the incentive.

Materials and Methods : A descriptive study was conducted from October 2023 to January 2024, involving 320 Tuberculosis patients registered in the Nikshay portal between July and September 2023. Following institutional ethical clearance, data collection was carried out using the interview method during home visits. by a semi-structured questionnaire. Data was analyzed using SPSSV26.

Results : Of 266 Participants, most were male (68.7%), primarily aged 26-40 years (45.8%). Among participants, 20% received full financial incentives, and 28% received partial incentives, with diverse utilization patterns observed. Reasons for not receiving incentives included lack of awareness (16%), no bank account (50%), and perceived lack of necessity (34%).

Conclusion : The study reveals challenges in participant dynamics and incentive distribution, emphasizing the need for proactive outreach and tailored strategies to address barriers effectively.

Key words : Tuberculosis Patients, Nikshay Poshan Yojana, Nutritional Demand.

Tuberculosis remains a global health concern, with significant morbidity and mortality impacting populations worldwide[1]. In 2022, an alarming 1.3 million lives were lost to TB, among which 1,67,000 deaths occurred among individuals co-infected with HIV. The burden of TB was particularly pronounced in the World Health Organization's (WHO) South-east Asian Region, where 46% of new cases were reported. Notably, more than two-thirds of this global total was concentrated in a group of eight countries, and India is one among these nations[2].

Tuberculosis and nutrition are intricately linked, with each influencing the other in a bi-directional relationship. Malnutrition has long been recognized as a risk factor for the development of tuberculosis, as it can weaken the immune system and make individuals more susceptible to infection. Conversely, tuberculosis can contribute to malnutrition through various mechanisms, including increased metabolic demands, reduced appetite and nutrient absorption issues[3,4].

Editor's Comment :

- The study highlights the need for improved awareness and banking access to enhance the utilization of Nikshay Poshan Yojana benefits among TB patients.
- Strengthening outreach efforts and financial inclusion can optimize the scheme's impact on nutritional support.

The intersection of tuberculosis, unemployment and lack of income creates a challenging scenario, particularly in terms of affording proper nutrition. Individuals affected by tuberculosis often face financial strain due to treatment costs, loss of income, and the inability to work during illness. This can lead to a compromised ability to afford nutritious food, further exacerbating health challenges[5].

To address this, Indian Government has initiated a program known as "Nikshay Poshan Yojana" (NPY) to enhance the nutritional practice of tuberculosis patients. Launched in April 2018, the scheme aims to offer a monthly financial incentive of INR 500 (approximately 7 USD) to all TB patients throughout the course of their treatment. This incentive is directly

Department of Community Medicine, BLDE(DU) Shri B M Patil Medical College, Hospital and Research Center, Karnataka 586103
[1]MBBS, Postgraduate Trainee and Corresponding Author
[2]MBBS, MD, Professor
[3]MBBS, MD, Professor and Head
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credited to their bank accounts linked to Aadhar, using the Direct Benefit Transfer (DBT) mechanism[6,7].

In a bid to achieve the ambitious goal of eliminating tuberculosis in India by 2025, two years ahead of the set target, it is crucial to address the financial repercussions faced by individuals, particularly those in the reproductive age group, who are predominantly affected by tuberculosis. The average recovery period of three to four months poses a significant financial burden, making it challenging for economically disadvantaged individuals to meet their nutritional needs during this critical phase. Recognizing this challenge, the Government has introduced the Nikshay Poshan Yojana (NPY) scheme.

Aims and Objectives

(1) To Determine the number of patients who have received benefits from the scheme.

(2) To assess the utilization of the nutritional support program by individuals.

Material and Methods

A descriptive study was conducted from October, 2023 to January, 2024, involving 320 Tuberculosis patients registered in the Nikshay portal between July and September 2023. Secondary data were obtained from the District Tuberculosis Officer (DTO) in Vijayapura. Following institutional ethical clearance, data collection was carried out using the interview method during home visits. After obtaining consent from the participants, a semi-structured questionnaire was used for data collection.

The pre-tested questionnaire for patients comprised three sections. The initial section encompassed nine questions, focusing on socio-demographic characteristics, rest of the information like Nikshay ID, age, gender, clinical details like type of TB, and treatment start date was cross-checked from the secondary data available. The second section comprised six questions probing into the reasons for either receiving or not receiving benefits under NPY through DBT. The third section contained questions related to the utilization of nutrition incentives and patients' perceptions of NPY.

All Tuberculosis patients registered in the Nikshay portal within the Vijayapura district from July to September, 2023, who were willing to participate, are included in the study. The study excludes patients who did not provide consent and those who were not reachable even after two home visits.

Statistical Analysis :

Data was collected and entered in MS Excel. Data was analyzed using SPSS software V26. Data was presented using Tables, Charts, Figures in numbers, and Percentages.

Results

Table 1 presents important demographic findings of the study population. The majority of participants were male (68.7%) with females comprising 31.3%. Regarding age distribution, the highest proportion fell within the 26-40 age range (45.8%), followed by 15-25 years (34.4 Socio-economic status, as per the Modified BG Prasad Classification, demonstrated the highest representation from the lower class (26.3%), followed by the upper middle class (24.4%) and middle class (22.5%). Education levels varied, with primary education being the most prevalent (29%), followed by PUC (27.8%) and high school (19.1%).

Fig 1 illustrates the flow of study participants, with 137 completing treatment, 90 still undergoing treatment, and 14 deceased. Additionally, 40 participants were untraceable. Consequently, those deceased and untraceable were excluded from the study. The distribution of incentives among study participants: 54 (20%) received the incentive, 137 (52%) did not receive any incentive, and 75 (28%) received a partial incentive. The 129 participants who received financial incentives, the utilization patterns varied significantly. Notably, 26.1% directed the incentives towards nutritional needs, while 41.8% allocated the funds for family-related expenses. Additionally, 29.4% utilized the incentives for personal purposes, and a smaller

Table 1 — Socio-demographic details of the study Participants

	Gender distribution	n (%)
Sex	Male	183 (68.7%)
	Female	83 (31.3%)
Age	<15	42 (15.7%)
	15-25	91 (34.4%)
	26-40	122 (45.8%)
	>40	11 (4.1%)
Socio-economic Status (According to Modified BG Prasad Classification)		
	Upper Class	46 (17.3%)
	Upper Middle Class	65 (24.4%)
	Middle Class	60 (22.5%)
	Lower Middle Class	25 (9.4%)
	Lower Class	70 (26.3%)
Education status	Illiterate	37 (14%)
	Primary Education	77 (29%)
	High School	51 (19.1%)
	PUC	74 (27.8%)
	Graduate	27 (10.1%)

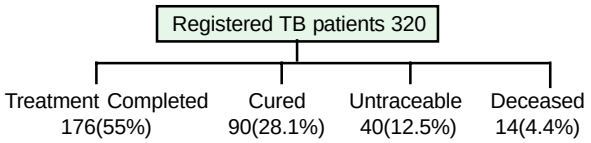

Fig 1 — Flow of Study Participants

percentage, 8.5%, applied the funds for other unspecified needs. The 137 participants who did not receive financial incentives, reasons include 16% (22 participants) being unaware, 50% (69 participants) lacking a bank account, 11%(15) did not know whom to enquire regarding this, and 23% (31 participants) indicating that they did not need the incentive.

Discussion

Tuberculosis remains a critical public health challenge in India, with the nation committing to its eradication by 2025, ahead of the global Sustainable Development Goals target of 2030[8]. This study revealed a higher prevalence of tuberculosis among males 68.7%, aligning with findings from studies by Katherine C. Horton, *et al*[9] and Jarina Begum, *et al*[4] which reported 63.8% of males were affected. The majority of patients were from the lower class (26.3%) and upper-middle class (24.4%), according to the modified BG Prasad classification. Corroborating research by M Muniyandi, *et al*[10] highlighted significantly higher TB prevalence in lower socio-economic groups, emphasizing the disproportionate impact on the poor This underscores tuberculosis as a persistent concern among the underserved.

As per the findings of this study, 129 participants (48%) received either full or partial incentives, similar to Rajesh Kumar, *et al*, who reported that 52.6% received the Nikshay Poshan Yojana (NPY) for two months [6]. In this study, a majority of beneficiaries 69(50%) lacked a bank account, and 11% did not know whom to enquire , mirroring findings from studies by Rajesh Kumar, *et al*[6] and Suraj Prakash, *et al*[11], where 21 individuals did not enroll due to lack of information, time, or a bank account. This highlights the significance of raising awareness among TB patients about the financial benefits before enrolling in the program.

Conclusion

The study highlights the complexities of participant dynamics and incentive distribution within our research framework. Many participants did not receive financial incentives due to reasons like lack of awareness or banking access. This underscores the need for proactive outreach and financial inclusion efforts to ensure fair participation. Moving ahead, improving participant engagement and administrative processes is vital to address such barriers effectively. Regular assessments of participant needs can guide more tailored incentive distribution, optimizing resource allocation and improving participant satisfaction.

Limitations :

(1) The reliance on self-reported data introduces potential bias in the study's findings.

(2) Generalizability may be limited as the research focuses on a specific district and time frame.

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Conflict of Interest : None

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Original Article

Aerobic Bacteriological Profile and their Antibiogram : A Study on Surgical Site Infection in a Tertiary Care Hospital in West Bengal

Suparno Paul[1], Maitreyi Bandyopadhyay[2], Bipasa Chakraborty[3]

Abstract

Background : This study is done to determine the Aerobic bacteriological profile of Surgical Site Infection and the antibiogram of different isolates in a Tertiary Care Hospital.

Materials and Methods : A retrospective review of 357 wound swab samples tested for antibiotic identification and susceptibility in the Microbiology Department of R G Kar Medical College & Hospital, Kolkata were included in this study during the period January, 2021 to December, 2022. Culture isolates were identified upto species level and subjected to in vitro antibiotic sensitivity testing following standard protocol.

Results : Out of 357 samples collected 88.2% samples were culture positive. The majority of isolates found as Klebsiella pneumoniae followed by Acinetobacter baumannii, MRSA, Pseudomonus aeruginosa, Enterococcus spp, Escherichia coli, Proteus mirabilis & MSSA. Antibiotic Susceptibility testing revealed that 54.3% samples showed wide resistance pattern requiring 2nd line antibacterial drugs for sensitivity testing, among which majority were Gram negative isolates. Among the Gram negative isolates shown wide resistance to commonly used antimicrobials like Piperacillin-tazobactum, 3rd generation cephalosporin, other BL-BLI combinations, Aminoglycosides, Monobactams, Macrolides, Fluoroquinolones and even carbapenems. Few isolates shown resistance to Polymyxin B also. Among the Gram positive isolates, No MRSA & MSSA isolates showed resistance to Vancomycin & Linezolid, Among the other MRSA major resistance found to Clindamycin, Roxithromycin, Ciprofloxacin and 100% are resistant to Cefuroxime and Ticarcillin-clavulenic acid. All MSSA isolates sensitive to Cefuroxime, Ticarcillin-clavulenic acid, Roxithromycin, Clindamycin, Van-comycin and Linezolide. No Enterococcus spp. isolates are resistant to Vancomycin, Linezolide & Ofloxacin, but resistance found against Netilmycin and Cefalexin.

Discussion : Surgical Site Infections are now an increasing entity as nosocomial infections. Majority of the isolates are Gram negative organisms showing wide range of antibiotic resistance. Comparatively, Gram positive isolates are more susceptible to antibacterial drugs.

Conclusion : The increasing resistance pattern to many regularly used antibiotics necessitates regular surveillance and monitoring of laboratory data and judicious use of antibiotics accordingly.

Key words : Surgical Site Infection (SSI), Bacteriological Profile, Antimicrobial Susceptibility, Tertiary Care Hospital.

Surgery has made great advances in the last century and postoperative wound infection is the most common complication faced by surgeon since the advent of surgery. A number of local factors such as haematomas, presence of foreign bodies like suture material or gauze thread, poor surgical technique, degree of contamination and also age, nutrition, hygiene and presence of other associated diseases play an important role in the etiology of postoperative wound infection. The incidence of Surgical Site Infection (SSI) differs widely between surgical procedures, hospitals, patients and between surgeons[1,2].

A Surgical Site Infection is an infection that develops as a direct result of an operative procedure. This is one of the most common causes of nosocomial infections associated with surgery, reported incidence rates of surgical site infection is around 2-20%[3].

Editor's Comment :

- The study gives insight into bacterial pathogens and their antibiotic susceptibility patterns isolated from Surgical Site Infection in a Tertiary Care Hospital.
- Gram-negative bacteria are commonly associated with postoperative SSIs, with a predominance of Klebsiella pneumonia.
- It is also observed from the study that microorganisms, both Gram positive and Gram negatives, show moderate to high level of resistance to different commonly used antimicrobials.

[1]MD, Technical Officer, Department of SPSRC, Swasthya Bhavan, Kolkata 700091 and Corresponding Author
[2]MD (Microbiology), Professor and Head, Department of Microbiology, R G Kar Medical College and Hospital, Kolkata 700004
[3]MD (Microbiology), Assistant Professor, Department of Microbiology, R G Kar Medical College and Hospital, Kolkata 700004
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Surgical Site Infections are commonly responsible for increasing treatment cost along with lengthening of the hospital stay and associated with significant morbidity and mortality. Despite the technical advances in infection control and surgical practices, SSI still continues to be a major problem, even in hospitals with most modern facilities[4]. These infections are occurred either during the surgery (primary infection) or after the surgery (secondary infection) and usually caused by exogenous and/or endogenous micro organisms[2]. Majority of SSIs are uncomplicated and involving only skin and subcutaneous tissue but sometimes the infection can progress to deeper tissues leading to necrotizing infections. The usual presentation of infected surgical wound can be characterized by pain, redness, swelling, tenderness, and pus formation[5,6]. Incidence of SSIs are significantly depending on numbers of some important factors influencing the occurrence of the infection like invasiveness and virulence of the organism involved, physiological status of the wound tissue and the immunological status of the host etc.

The most commonly isolated bacterial pathogens in SSI are *Staphylococcus aureus*, Enterobacteriaceae, Coagulase Negative Staphylococcus (CoNS), Enterococcus and *Pseudomonas aeruginosa*[8]. Although, in the recent years, growing prevalence of gram negative organisms has been observed over the gram positive organisms as a cause of serious surgical site infections in many hospitals. The irrational and indiscriminate use of broad spectrum antibiotics which is resulting increasing incidence of Anti Microbial Resistance (AMR) has further deteriorated the condition in this regard. The problem gets more complicated in developing countries due to poor infection control practices, patient congestion in the hospital beds and inappropriate over the counter use of antimicrobials[9]. In such scenario, a working knowledge of the prevalence of organisms along with the prevailing antibiotic resistance/susceptibility pattern will be of great help. The present study was undertaken to determine the bacteriological profile and antibiogram of surgical site infections.

This study aimed to determine the incidence of SSIs and the prevalence of aerobic bacterial pathogens involved with their antibiogram.

Aims and Objectives

This study aimed to determine the Aerobic bacteriological profile of Surgical Site Infection and the antibiogram of different isolates in a tertiary care hospital in West Bengal during 2 years of observation; to analyse the trend in species distribution; and to examine in vitro susceptibility to common antimicrobial drugs.

Materials and Methods

A retrospective review of 357 wound swab samples collected from infected surgical sites and presented in the Microbiology department of R G Kar Medical College & Hospital, were included in this study during the period January, 2021 to December, 2022. Culture isolates were identified upto species level and subjected to in vitro antibiotic sensitivity testing following standard protocol.

SSIs are defined as infections occurring up to 30 days after surgery (or up to one year after surgery in patients receiving implants) and affecting either the incision or deep tissue at the operation site.

Samples were collected into sterile swabs, and growths were identified by different microbiological and biochemical methods and isolations were confirmed by: automated culture identification method by VITEC. Positive growths were diagnosed by isolation of different pathogenic gram positive or gram negative species. Drug sensitivity test was employed to determine the sensitivity of1st and 2nd line of antibiotics designated for Gram negative and gram positive isolates as per CLSI guidelines and hospital antibiotic susceptibility policy.

Results

Out of 357 samples collected 315 (88.2%) samples were culture positive. Among which 73.3% (231/315) caused by Gram negative organism and 26.6% (84/315) are caused by Gram positive organisms.

Majority of the culture positive isolates were identified as *Klebsiella pneumonia* ie, 24.8% (78/315) followed by *Acinetobacter baumannii* 21.9% (69/315), MRSA & *Pseudomonus aeruginosa*13.3% (42/315 each), *Enterococcus* spp. 11.4% (36/315), *Escherichia coli* 7.6% (24/315), *Proteus mirabilis* 5.7% (18/315) & MSSA 1.9% (6/315).

Among the gram negative isolates, 33.8% (78/231) are *Klebsiella pneumoniae*, 29.9% (69/231) are *Acinetobacter baumannii*, 18.2% (42/231) are Pseudomonus aerugenosa, 10.4% (24/231) are

Escherichia coli and 7.8% (18/231) are Proteus mirabelis isolates.

Among the Gram positive isolates, 57.1% (48/84) are *Staphylococcus aureus* and 42.9% (36/84) are *Enterococcus* isolates. Among the *Staphylococcus aureus* isolates 87.5% (42/48) are Methicillin resistant.

Among the all isolates, susceptibility of 54.3% (171/315) positive isolates were determined by 2nd line of antimicrobial drugs. Among the Gram negative isolates 71.4% (165/231) were determined by 2nd line of antimicrobial drugs, whereas only 7.2% (6/84) of total gram positive isolates were determined by 2nd line of antimicrobial drugs.

Among the Gram negative isolates 35.0% (81/231) are resistant to both Meropenem & Imepenem; separately 51.9% (120/231) are resistant to Imipenem and 69.1% (114/165, as second line drug) are resistant to Meropenem. 57.6% of gram negative isolates are resistant to aminoglycosides (133/231), 79.2% (183/231) are resistant to ceftriaxone, 53.7% (124/231) are resistant to Piperacillin-tazobactam, 83.6% (138/165) are resistant to cefoperazone-sulbactam and Ticarcillin-clavulenic acid, 66.2% (153/231) are resistant to Levofloxacin, 56.3% (130/231) are resistant to Tigecycline, 89.1% (147/165) are resistant to Lomefloxacin and Aztreonam, 96.4% (159/165) resistant to Azithromycin and 12 out of 147 isolates even showed resistant to Polymyxin B and all are *Acinetobacter baumannii*. isolates (Table 1).

Among the all Gram positive isolates no Vancomycin resistant *Enterococcus* (VRE) and Staphylococcus isolates (VRSA) were found. All Staphylococcus isolates are susceptible to Linezolids. Majority of resistance shown against Cefuroxime and Roxithromycin, both 87.5% (42/48), 100% gram positive isolates resistant to Ciprofloxacin, 62.5% gram positive isolates resistant to Clindamycin. 50% *Enterococcus* isolates are shown resistance to Netilmycin.

Among the individual antimicrobials and isolates, resistance to Imipenem shown among 73.9% (51/69) *Acinetobacter baumannii* isolates, 75.0% (18/24) *Escherichia coli* isolates, 38.5% (30/78) *Klebsiella pneumonia* isolates, 50.0% (9/18) *Proteus mirabilis* isolates and 28.6% (12/42) *Pseudomonus aeruginosa* isolates. Similarly 91.3% (63/69) *Acinetobacterbaumannii* isolates, 41.7% (10/24) *Escherichia coli* isolates, 53.8% (42/78) *Klebsiella pneumoniae* isolates, 66.7% (12/18) *Proteus mirabilis* isolates and 14.3% (6/42) *Pseudomonus aeruginosa* isolates shown resistant to aminoglycosides; 100% isolates of *Acinetobacter baumannii* and *Klebsiella pneumonia* isolates shown resistant to Ceftriaxone, whereas 50.0% (12/24) *Escherichia coli* isolates, 33.3% (6/18) *Proteus mirabilis* isolates and 42.9% (18/42) *Pseudomonus aeruginosa* isolates shown resistant to Ceftriaxone. 73.9% (63/69) *Acinetobacter baumannii* isolates, 33.3% (8/24) *Escherichia coli* isolates, 61.5% (48/78) *Klebsiella pneumonia* isolates, 61.1% (11/18) *Proteus mirabilis* isolates and 14.3% (6/42) *Pseudomonus aeruginosa isolates* shown resistant to Piperacillin-tazobactam; 82.6% (57/69) *Acinetobacter baumannii isolates*, 100.0% (24/24) *Escherichia coli* isolates, 69.2% (54/78) *Klebsiella pneumoniae isolates*, 66.7% (12/18) *Proteus mirabilis* isolates and 14.3% (6/42) *Pseudomonus aeruginosa isolates* shown resistant to Levofloxacin; 60.9% (42/69) *Acinetobacter baumannii isolates*, 41.7% (10/24) *Escherichia coli* isolates, 38.5% (30/78) *Klebsiellapneumoniae isolates*, 66.7% (12/18) *Proteus mirabilis* isolates and 85.7% (36/42) *Pseudomonus aeruginosa isolates* shown resistant to Tigecycline (Table 2).

Table 1 — *Distribution of resistance among Gram negative Isolates*

Name of Antimicrobials	Proportion of resistant among Gram negative isolates
Imipenem	51.9% (120/231)
Aminoglycoside	57.6% (133/231)
Ceftriaxone	79.2% (183/231)
Piperacillin-tazobactam	53.7% (124/231)
Levofloxacin	66.2% (153/231)
Tigecycline	56.3% (130/231)
Meropenem	69.1% (114/165)
Cefoperazone-sulbactam	83.6% (138/165)
Ticarcillin-clavulenic acid	83.6% (138/165)
Aztreonam	89.1% (147/165)
Azithromycin	96.4% (159/165)
Lomefloxacin	89.1% (147/165)
Polymyxin B	8.2% (12/147)

Among the second lines of antimicrobials, 81.0% (51/63) *Acinetobacter baumannii isolates*, 80.0% (48/60) *Klebsiella pneumoniae isolates*, 50.0% (9/18) *Proteus mirabilis* isolates and 25.0% (6/24) *Pseudomonus aeruginosa isolates* shown resistant to Meropenem; 100.0% (63/63) *Acinetobacter baumannii isolates*, 90.0% (54/60) *Klebsiella pneumoniae isolates*, 50.0% (9/18) *Proteus mirabilis* isolates and 50.0% (12/24) *Pseudomonus aeruginosa isolates* shown resistant to Cefoperazone-sulbactum; 90.5% (57/63) *Acinetobacter baumannii isolates*, 100.0% (60/60) *Klebsiella pneumoniae isolates*, 50.0% (9/18) *Proteus*

mirabilis isolates and 50.0% (12/24) *Pseudomonus aeruginosa isolates* shown resistant to Ticarcillin-clavulenic acid; 100.0% *Acinetobacter baumannii isolates* and *Klebsiella pneumonia*isolates, 66.7% (12/18) *Proteus mirabilis* isolates and 50.0% (12/24) *Pseudomonus aeruginosa isolates* shown resistant to Aztreonum; 100.0% *Acinetobacter baumannii isolates, Klebsiella pneumoniae isolates* and *Proteus mirabilis* isolates shown resistant to Azithromycin alongwith 75.0% (18/24) *Pseudomonus aeruginosa isolates*; 100.0% *Acinetobacter baumannii isolates* and *Klebsiella pneumoniae isolates*, 66.7% (12/18) *Proteus mirabilis* isolates and 50.0% (12/24) *Pseudomonus aeruginosa isolates* shown resistant to Lomefloxacin; 19.0% (12/63) *Acinetobactar baumannii* isolates shown resistance to Polymyxin B, all other isolates (except *Proteus mirabilis* isolates, which are intrinsically resistant) are sensitive to this drug (Table 3).

Among the Gram positive isolates, 100.0% Methicillin resistant *Staphyloccucs aureus* shown resistant to Cefuroxime and Ticarcillin-clavulenic acid; 88.1% (37/42) MRSA isolates resistant to Roxithromycin, 71.4% resistant to Clindamycin, 95.2% (40/42) resistant to Ciprofloxacin. All MRSA isolates sensitive to Vancomycin and Linezolide. All MSSA isolates sensitive to Cefuroxime, Ticarcillin-clavulenic acid, Roxithromycin, Clindamycin, Vancomycin and Linezolide, 66.7% (4/6) MSSA isolates resistant to Ciprofloxacin.

Among the *Enterococcus* isolates, all are sensitive to Vancomycin, Linezolide and Ofloxacin, 86.1% (31/36) resistant to Cefalexin, 58.3% (21/36) resistant to Netilmycin, 36.1% (13/36) resistant to Co-trimoxazole (Table 4).

Discussion

SSIs are defined as infections occurring up to 30 days after surgery (or up to one year after surgery in patients receiving implants) and affecting either the incision or deep tissue at the operation site. Despite improvements in prevention and invasion of newer antimicrobials, SSIs remain a significant clinical problem associated with substantial mortality and morbidity and impose burden on healthcare resources. Numerous patient-related and procedure-related factors influence the risk of SSI. The incidence of SSIs may be as high as 20%, depending on the surgical procedure. In SSIs, the responsible pathogens either exogenous from hospital environment or from healthcare workers or originate from the patient's endogenous flora. In this study 88.2% of samples tested are positive for any type of bacterial isolate. The current findings showed that approximately 73.3% of isolates detected as Gram-negative isolates, with a predominance of *Klebsiella pneumoniae*, paralleling a previous study[10] and study done by Kanwalpreet Kaur, Loveena Oberoi[11] and study done by Kameran M. Ali, *et al* in 2021[12]. Study by Pradeep MSS, Rao KVV, *et al*[13] also showed gram

Table 2 — *Distribution of resistance of Gram negative isolates to 1st line Antimicrobials*

Name of antimicrobials	Proportion of resistance among									
	Acinetobacter baumannii (n = 69)		*Escherichia coli* (n = 24)		*Klebsiella pneumoniae* (n = 78)		Proteus mirabelis (n = 18)		*Pseudomonus aeruginosa* (n = 42)	
Imipenem	73.9%	51	75.0%	18	38.5%	30	50.0%	9	28.6%	12
Aminoglycoside	91.3%	63	41.7%	10	53.8%	42	66.7%	12	14.3%	6
Ceftriaxone	100.0%	69	50.0%	12	100.0%	78	33.3%	6	42.9%	18
Piperacillin-tazobactam	73.9%	51	33.3%	8	61.5%	48	61.1%	11	14.3%	6
Levofloxacin	82.6%	57	100.0%	24	69.2%	54	66.7%	12	14.3%	6
Tigecycline	60.9%	42	41.7%	10	38.5%	30	66.7%	12	85.7%	36

Table 3 — *Distribution of resistance of Gram negative isolates to 2nd line Antimicrobials*

Name of antimicrobials	Proportion of resistance among							
	Acinetobacter baumannii (n = 63)		*Klebsiella pneumoniae* (n = 60)		*Proteus mirabelis* (n = 18)		*Pseudomonus aeruginosa* (n = 24)	
Meropenem	81.0%	51	80.0%	48	50.0%	9	25.0%	6
Cefoperazone-sulbactam	100.0%	63	90.0%	54	50.0%	9	50.0%	12
Ticarcillin-clavulenic acid	90.5%	57	100.0%	60	50.0%	9	50.0%	12
Aztreonam	100.0%	63	100.0%	60	66.7%	12	50.0%	12
Azithromycin	100.0%	63	100.0%	60	100.0%	18	75.0%	18
Lomefloxacin	100.0%	63	100.0%	60	66.7%	12	50.0%	12
Polymyxin B	19.0%	12	0.0%	0	x	x	0.0%	0

Table 4 — *Distribution of resistance of among Gram positive isolates*

Name of antimicrobials	Proportion of resistance among					
	MRSA n=42		MSSA n=6		Enterococcus n=36	
Cefuroxime	100.0%	42	0.0%	0	x	x
Ticarcillin-clavulenic acid	100.0%	42	0.0%	0	x	x
Roxithromycin	88.1%	37	0.0%	0	x	x
Clindamycin	71.4%	30	0.0%	0	x	x
Ciprofloxacin	95.2%	40	66.7%	4	x	x
Vancomycin	0.0%	0	0.0%	0	0.0%	0
Linezolide	0.0%	0	0.0%	0	0.0%	0
Cefalexin	x	x	x	x	86.1%	31
Ofoxacin	x	x	x	x	0.0%	0
Netilmycin	x	x	x	x	58.3%	21
Co-trimoxazole	x	x	x	x	36.1%	13

negative isolate as predominant isolates. Findings of our study regarding proportion of *Klebsiella pneumonia*, *Pseudomonus aeruginosa*, *Escherichia coli* and *Proteus mirabilis* is consistent with another study in 2020 by Narula H, Chikara G, *et al*[14]; although findings of *Staphylococcus aureus* as the most common organism isolated, accounting for 35.16% isolates in this study is not line of our majority isolate findings of our study. In any case, the variation in the distribution of SSI bacteria may be due to variations in the population studied (eg, co-morbidities, age, sex), predominance of nosocomial pathogens inhabiting in the operation theatres or post-operative wards, surgical procedures, asepsis maintained during surgical procedure, pre-operative, intra-operative & post-operative infection control measures taken and infection prevention policies alongwith geographical distribution, resistance patterns of the bacterial isolates in question; moreover, post-procedural contamination due to poor personal hygiene and localized outbreaks may be possible reasons for the differences reported[10,15,16].

Antibiotic profile results revealed that a high degree of resistance was found for the majority of Gram-negative bacterial isolates in this study and that commonly used drugs faced greater resistance; like Antibiotic profile results revealed that a high degree of resistance was found for the majority of Gram-negative bacterial isolates in this study and that commonly used drugs like Carbapenems, Aminoglycoside, Ceftriaxone, Piperacillin-tazobactam, Levofloxacin, Tigecycline, Cefoperazone-sulbactam, Ticarcillin-clavulenic acid, Aztreonam, Azithromycin, Lomefloxacin all showing greater than 50% of resistance. Among them Carbapenems, Aminoglycoside, Tigecycline, Cefoperazone-sulbactam were found to be the comperatively more effective antimicrobial agents. Polymyxin B was found to be the most effective antimicrobial agent. Others showing very high level of resistance. These findings are in consistent with the findings of a previous study conducted by Manyahi in 2012[17].

Among the individual bacteria *Acinetobacter baumannii* showed very high level of resistance against almost all types of drugs except Polymyxin B; making these pan drug resistant organism. *Klebsiella pneumoniae isolates* showed very high resistance to Meropenems, Ceftriaxone, Piperacillin-tazobactam, Levofloxacin, Cefoperazone-sulbactam, Ticarcillin-clavulenic acid, Aztreonam, Azithromycin, Lomefloxacin, Whereas Polymyxin B, Imipenem, Aminoglycoside and Tigecycline were found to be the most effective antimicrobial agent. *Pseudomonus aeruginosa isolates* showed comperatively lower resistance to Carbapenems, Aminoglycosides, Piperacillin-tazobactam, Levofloxacin. Whereas these showed higher resistance to Tigecycline, Azithromycin. Isolates of Escherichia coli and Proteus mirabilis also showed varied resistance to commonly used antimicrobials.

A possible explanation for the high levels of resistance recorded could be the occurrence of extended spectrum beta-lactamase (ESBL) and carbapenemase production in these strains[17] and due to increased rates of inappropriate and injudicious use of third generation cephalosporins and even carbapenems and aminoglycosides as surgical antimicrobial prophylaxis. Accordingly, in this study, the use of these prophylaxis for the prevention of SSI may have hampered the detection of third generation cephalosporins, carbapenems and aminoglycosides -susceptible Gram-negative bacteria.

Among the Gram positive isolates majority are Methicillin resistant *Staphylococcus aureus* (50%) followed by Enterococcus. These findings of prevalence of MRSA in SSIs are also in agreement with those of a previous study conducted by Baker AW, *et al*[18] and Pal S, *et al*[19]. In another study done by Bhatta DR, Adhikari A, *et al*[20] revealed 57.4% Gram positive isolates, among which *Staphylococcus aureus* was the most common organism with 65.3% were methicillin resistant *Staphylococcus aureus* isolates which was also in line of the findings of our study findings. Similar to the antibiogram profile of

the gram negative isolates found in this study; gram positive isolates shown severe resistance to commonly used antibiotics. MRSA isolates shown more resistant to Cefuroxime, Ticarcillin-clavulenic acid, Roxithromycin, Clindamycin and Ciprofloxacin; whereas MSSA isolates are susceptible to these. Both MRSA & MSSA isolates are susceptible to Vancomycin and Linezolides. These finding is in line with the findings shown in the study by Pradeep MSS, Rao KVV, *et al*[13], Budhani D, Kumar S, *et al*[20] and Bhatta, DR, Adhikari A, *et al*[18]. *Enterococcus* isolates shown high resistance to Cephalexin, Ofloxacin, Netilmycin, whereas comperatively low resistant to Co-trimoxazole. *Enterococcus* isolates are all susceptible to Vancomycin and Linezolides. A possible explanation for the high levels of resistance recorded could be the occurrence of Extended Spectrum Beta-Lactamase (ESBL) production in these strains and inducible resistance produced by macrolides on lincosamides and increased rates of inappropriate and injudicious use of prescription of third generation cephalosporins and ciprofloxacins as surgical antimicrobial prophylaxis. Comparatively high susceptibility to Co-trimoxazole may be explained by the comparatively lower use of this drug today.

More broadly, the observed resistance to antibiotics in this study is an early warning sign since fluoroquinolones and third-generation cephalosporins are so far considered effective agents for the treatment of Gram-negative bacterial infections and Cefuroximes, macrolides and lincosamides for the treatment of Gram-positive bacterial infections. The development and spread of antimicrobial resistant bacterial strains have now emerged as global problems. The appearance of multidrug resistant strains over the past few decades has been regarded as an inevitable genetic response to the strong selective pressure imposed by antimicrobial chemotherapy, which plays a crucial role in the evolution of antibiotic-resistant bacteria[21].

Meanwhile, *Klebsiella pneumonia*, *Acinetobacter baumannii* and *Pseudomonus aeruginosa* strains isolated in the present study were found to be highly resistant against the commonly used antibacterials. This finding is consistent with the findings of the studies by Bansal D, Singh RR, *et al*[22], Walelign Dessie, *et al*[15], Kameran M, *et al*[12] and Kalina, *et al*[23], which also reported a predominance of multidrug resistance *Klebsiella pneumonia*, *Acinetobacter baumannii* and *Pseudomonus aeruginosa* strains following SSIs.

Conclusion

The study gives insight into bacterial pathogens and their antibiotic susceptibility patterns isolated from SSI in a tertiary care hospital. Gram-negative bacteria were commonly associated with SSIs, with a predominance of *Klebsiella pneumonia*. The rate of SSIs caused by GNB was high and the organisms were sourced mostly from the operation theatre, surgical wards or hospital environments rather than the patients themselves.

Surveillance of SSI along with feedback from surgeons will help to reduce the SSI rate and this surveillance system shall be developed in all hospitals alongwith development of perioperative antibiotics usage guidelines. From the present study it was observed that microorganisms, both gram positive and gram negatives became resistant to more commonly used drugs like fluoroquinolones, third generation cephalosporins even carbapenems. There are now left with very few reserve drugs for gram negative and gram positive organisms, which warrants the judicious use of these drugs and other drugs which are still shown less resistance like aminoglycosides and carbapenems; without which, these reserved drugs will also be resistant beyond use. Rational antimicrobial use and continuing surveillance of antimicrobial sensitivity tests at local level are very much necessary to reduce emergence and spread of resistant bacterial isolates. The practice of aseptic technique and maintenance of strict asepsis during and after surgery and adhere to effective methods of sterilisation and patient management should be the primary aspect rather than over reliance on antibiotics to reduce emergence and spread of antimicrobial resistance and multi drug resistant pathogens. It is also recommended that low or intermediate level antimicrobials like gentamicin and ciprofloxacin should be used in preference to second or third generation cephalosporins, carbapenems or higher aminoglycosides like amikacin or netilmycins for treatment of non-complicated postoperative surgical site infections alongwith avoidance of unnecessary use of pre-operative antibiotic prophylaxis with higher antibiotics. Moreover, specific timings of antibiotic administration, calculated drug dose in obese patients, role of anti MRSA prophylaxis etc. shall be followed judiciously. To conclude there is still much to learn about pathophysiology, prevention and surveillance of SSI and regular surveillance and monitoring of laboratory data and judicious use of

antibiotics accordingly will be the mainstay to prevent SSI.

Limitation :

Limitations of the present study are mainly related to its retrospective nature with limited follow-up data.

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Conflict of Interest : None

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Original Article

Impact of Social Media on Cosmetic and Aesthetic Treatment Trends

Avinash Jadhav[1], Yash Abhay Buccha[2], Rohit Sanjay Kothari[3], Ashwini Mundhe[3]

Abstract

Background : Prior research extensively investigated the impact of traditional media formats, including advertisements and television programs, on young women's perceptions and considerations of Cosmetic Surgery. However, in light of the surge in Social Media platforms, it is imperative to scrutinize how these newer forms of media shape individuals' inclination towards Cosmetic Treatment.

Materials and Methods : This study investigates the impact of Social Media on perceptions of Cosmetic Treatment in Pune. With 357 participants, the research aims to identify influential post types, assess their self-confidence impact, and understand factors guiding Cosmetic Surgery choices. The study uses descriptive statistical methods to analyze qualitative responses, identifying recurrent patterns and insights. The study uses a structured questionnaire to collect data on Social Media usage patterns, Cosmetic Surgery preferences, and their impact on self-confidence.

Results : The findings may not be entirely generalizable due to the surge of Social Media, but they provide insights for interventions promoting a positive body image. The study's relevance may also be influenced by the ever-evolving nature of Social Media platforms.

Discussion : We discovered a significant association between the internet environment and individual decisions about beauty improvement in our survey-based study studying the influence of Social Media on Cosmetic and Aesthetic Treatment trends. According to the replies of our broad participant pool, social media plays an important role in determining treatment choices and developing a culture of self-improvement. The attraction of beautiful photographs and influencer endorsements has a big impact on these decisions.

Conclusions : This highlights the need of carefully considering the digital landscape's influence on body image and decision-making. Understanding the influence of Social Media on aesthetic trends is becoming increasingly important for encouraging healthy self-perception as it evolves.

Key words : Social Media, Cosmetic Treatment.

Social & Evolutionary Psychologists have broadly investigated the significance of attractiveness in Western society[1-3]. A meta-analysis conducted by Langlois, *et al*[4] offers additional evidence that individuals are subject to differential treatment based on level of physical attractiveness that they perceive. Considering the significant impact of physical attractiveness on our daily lives, individuals strive to modify their look to align with cultural standards of beauty.

Cosmetic surgery focuses on utilizing surgical and medical treatments to maintain, restore, or enhance one's physical appearance[5]. The advancements in Cosmetic Surgery technology have enhanced safety and reduced invasiveness, resulting in quicker recovery times and decreased procedure costs. Consequently, individuals have experienced a decrease in anxiety and an increased openness to contemplate and embrace Cosmetic Surgery as a viable choice for modifying their physical features[6].

In addition to passive Social Media consumption, Social Media platforms encourage consumers to actively engage as producers by uploading and sharing photographs and videos, which can be modified prior to posting[7]. The practice of editing,

Editor's Comment :

- This study emphasizes the importance of Social Media in altering opinions of physical appearance and generating interest in cosmetic and aesthetic operations.
- Exposure to idealized and altered content on these sites was linked to lower self-esteem and higher pressure to reach current beauty standards.
- The findings highlight the tremendous influence of digital media on customer behavior in the beauty business and the need for increased public awareness and critical interaction with online information in order to support educated and healthy aesthetic choices.

Department of Dermatology, Dr D Y Patil Medical College, Hospital & Research Centre, Pune, Maharashtra 411018
[1]MD, Associate Professor
[2]MBBS, Senior Resident and Corresponding Author
[3]MD, Assistant Professor
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primarily applied to photos, has been demonstrated to reduce satisfaction of body, perceptions of physical attractiveness and self-assurance, while simultaneously elevating levels of social anxiety[8,9]. Furthermore, the act of sharing and modifying images has a favourable impact on individuals' perspectives toward Cosmetic Treatment and might potentially amplify inclination to under-go such processes[10-13].

The current study seeks to clarify the relationship among Social Media practices & factors influencing decisions regarding cosmetic procedures.

Types of Cosmetic and Aesthetic Surgery :

Aesthetic Surgery is a fundamental aspect of Plastic Surgery, encompassing procedures that enhance the appearance of both the face and body[14].

Cosmetic Surgery refers to a non-compulsory surgical procedure conducted on healthy body parts, primarily aimed at enhancing an individual's physical appearance and/or eliminating indications of aging. Certain aesthetic procedures, like breast reduction, can provide a practical purpose by alleviating discomfort symptoms such as back or neck pain. Cosmetic procedures are performed after Breast Cancer and Mastectomy to restore the original breast shape that has been lost during the cancer removal procedure.

The United States alone witnessed the performance of almost 16 million cosmetic treatments in 2014[15]. In 2014, 92% of Cosmetic Treatments were carried out on women, which is an increase from 88% in 2001 in USA[16]. Since 2006, breast augmentation has consistently been among the top 5 Cosmetic Surgery procedures.

In 2020, silicone implants were utilized in 84% of breast augmentations, while saline implants were used in the remaining 16%[17]. "The American Society for Aesthetic Plastic Surgery" examines the data for 34 distinct Cosmetic Treatments. The noninvasive treatments encompass Botox injections and laser hair removal. Their assessment conducted in 2010 unveiled a total of 9 million procedures performed in the USA[18].

Significance :

Our study provides valuable insights into the influence of Social Media on individuals' self-confidence and desire to conform to aesthetic standards in the cosmetic industry. The findings underscore the need for further research and awareness regarding the impact of Social Media on consumer behaviour and self-perception. By understanding these dynamics, stakeholders in the cosmetic industry can develop strategies to promote healthier beauty standards and empower consumers to make informed choices.

Aims and Objectives

To investigate the effect of Social Media on individuals' self-confidence and the factors that drive their choice of Cosmetic Surgery.

To examine the influence of Social Media on individuals' desire for Cosmetic Surgery.

Effect of gender and age on preference to Cosmetic Surgery.

Materials and Methods

Research Design :

The mixed-methods approach in this study involved collecting both qualitative and quantitative data. Qualitative data was obtained through the use of a cross sectional survey questionnaire being filled by patients visiting for Aesthetic Treatments in a Tertiary-Care Hospital in Pune, which allowed participants to share their opinions and experiences with cosmetic surgical procedures. This qualitative data was then analysed using thematic analysis to identify common themes and patterns. Duration of 1.5 months was set to collect data. The quantitative data was collected through the analysis of secondary data sources such as review papers, research papers, blogs, articles, and statistical data from various institutions. The quantitative data was analysed using statistical methods to determine the relationship between variables such as gender and age with Cosmetic and Aesthetic Surgery trends.

Sample Size :

We used a convenience sampling method to select a total of 357 individuals in Pune for the study. Convenience sampling involves selecting participants based on their convenient availability and willingness to participate. While this method can provide quick access to participants, it may introduce biases and limit the generalizability of the findings. To address this limitation, to ensure a more diverse and representative sample of the population future researcher could consider using a more

representative sampling method, such as random sampling.

Statistical Analysis :

We used descriptive statistics and comparative studies method which include percentage distribution and frequency of the responses that were obtained from the survey for examining the relationship between Social Media and increasing trends in cosmetic and Aesthetic Surgery affected by gender and age

Results

132 participants were female (32.9%) and 224 participants (62.7%) were male and 1 participant (3.57%) was of other gender. In male, 135 participants while in female, 93 participants were of age >40 years. In the age group of 20-40 years, 80 participants were male, while 24 participants were female and 1 participant of the other gender. 9 males and 15 females were of age group <20 years.

Out of the 357 participants observed, a significant majority of 227 participants (63.5%) were motivated by social media to consider a Cosmetic Treatment or product. Among these participants, 3.52% (8 people) were below the age of 20, while the majority of 66.5% were between the ages of 20-40. The remaining 26.8% were above the age of 40. Among the 227 individuals surveyed, 42.7% of females and 56.8% of males responded affirmatively based on their gender.

When discussing the purchase of the cosmetic product, it is noteworthy that 240 participants, accounting for 67.2% of the total, made a purchase based on the influence of Social Media content. Among these participants, 3.75% were below the age of 20, while 59.1% fell within the age range of 20-40 years. Only 37.0% of individuals above the age of 40 purchased the product. Of the total participants who said yes, 37.5% were females and 62.5% were males.

Dermatologists serve a crucial role in skin care. However, our survey revealed that out of the total participants, 176 persons (52.2%) responded affirmatively. Among individuals under the age of 20, only 5.68% expressed certainty about the products they use. In contrast, 62.5% of individuals between the ages of 20 and 40 confirmed their willingness to discuss the product with a skin specialist. For individuals above the age of 40, this percentage was 31.8%. When considering gender, out of the total population who agreed to discuss the product, 38% were females and 61.9% were males.

256 of them, accounting for 71.7% of the total, agreed that Social Media has resulted in decreased self-confidence and greater pressure to adhere to specific aesthetic standards. Among these participants, 4.68% were below the age of 20, 64.0% were in their 20s and 30s and 31.25% were above the age of 40. Among the 256 participants, 33.9% were female and 69.5% were male.

With obstacles or regrets with cosmetic procedures or items affected by Social Media material or suggestions owing to incomplete understanding, 52.1% of respondents said affirmatively. Among them, 5.37% were under 20 years old, 63.5% were between 20 & 40 years old, & 20.1% were over 40 years old. Among the 186 participants, 35.4% were females and 67.2% were males.

When considering the overall gender population of males and females, Out of the 131 females and 224 males, 74% of the females and 57.5% of the males stated their interest in the product or therapy. Among those who expressed interest, 66% of the females and 68% of the males ended up purchasing the product. 38% of females and 61.9% of males consulted with a Dermatologist on the matter. 79.4% of males acknowledged that Social Media has resulted in decreased self-confidence or heightened pressure to adhere to specific aesthetic standards, while females reported a somewhat lower percentage of 66.4%. 55.8% of males and 55.6% of females experienced feelings of remorse and encountered difficulties. 64.12% females and 62.5% of males considered social media present an overly positive portrayal of treatment outcomes.

The study found that individuals aged 20-40 are more easily influenced by Social [m]edia, with 66.2% of them being influenced. The study also found that those aged 20-40 faced a higher percentage of regrets or challenges, with 51.7% of them facing these issues. Additionally, those aged 40 and above had higher levels of low self-confidence. The study also found that those aged 20-40 were more likely to purchase products and discuss with Dermatologists, with a higher percentage of these individuals facing these challenges. Overall, Social Media plays a significant role in shaping individuals' perceptions and behaviours.

According to the survey, 66.7% of participants believe that Social Media presents an overly positive portrayal of treatment outcomes, out of which 61.7% are male and 37.35% are female, while 33.3% believe it presents a realistic portrayal. Additionally, 121 participants (33.8%) found educational posts to be the most informative and persuasive regarding Aesthetic Treatments/products. 18.9% of participants (68 individuals) trust before and after photos and 161 participants (45.0%) trust reels or short videos. 7% did not answer this question (Table 1).

Table 1 — *Questions asked and their results*

	Questions	Respondents
1	Have you ever been **influenced** by social media content to consider a cosmetic treatment/product for your skin?	357/357
2	Have you ever **purchased** any cosmetic product by being influenced by social media content?	357/357
3	What type of social media content do you find most informative and persuasive regarding aesthetic treatments/products?	350/357
4	Do you feel that use of social-media has led to lower self-confidence or an increased pressure to conform to certain beauty standards?	351/357
5	In your opinion, does social media present	355/357
6	Have you ever discussed or shared information about cosmetic treatments that you found on social media with your dermatologist?	356/357
7	Have you encountered any challenges or regrets related to aesthetic treatments or products that were influenced by social media content or recommendations due to lack of complete knowledge?	356/357

Discussion

In this study, we examined the gender differences in interest, purchasing behaviour, consultation with a Dermatologist and the impact of Social Media on self-confidence and aesthetic standards. Out of the total population, 132 were females and 224 were males. Among the females, 74% expressed interest in the product or therapy, while among the males, 57.5% expressed interest. Among those who expressed interest, 66% of females and 68% of males ended up purchasing the product. Additionally, 38% of females and 61.9% of males consulted with a dermatologist. Furthermore, 79.4% of males reported that social media has resulted in decreased self-confidence or heightened pressure to adhere to specific aesthetic standards, while females reported a somewhat lower percentage of 66.4%. Lastly, 55.8% of males and 55.6% of females experienced feelings of remorse and encountered difficulties.

Overall, the data shows that participants between the ages of 20-40 are more easily influenced by social media, while those above 40 are more likely to purchase products and discuss with Dermatologists. Additionally, participants in the 20-40 age group face more challenges and regrets, while those above 40 tend to have lower self-confidence.

These findings suggest that Social Media could be a powerful tool for targeting and influencing consumers in the 20-40 age group. On the other hand, the higher percentage of product purchases and Dermatologist discussions among those above 40 indicates a potential market for skincare products and services targeted at this age group. Additionally, the differences in challenges faced and self-confidence levels between the two age groups could inform the development of tailored interventions and support systems.

66.7% of total population believe that Social Media present treatment outcome that are not realistic in which males were higher as compared to males by 2.12%.

The finding that a significant majority of participants (63.5%) were motivated by Social Media to consider a Cosmetic Treatment or product is significant because it highlights the influential role that social media plays in shaping beauty standards and consumer behaviour. This suggests that Social Media has a powerful impact on individuals' self-perception and desire to conform to specific aesthetic standards. Understanding the extent of this influence is crucial for both consumers and marketers in the cosmetic industry.

Conclusion

By our study we conclude that Social Media do influence trends in Cosmetic or Aesthetic Surgery as individuals purchasing behaviours, influencing ability, consulting with Dermatologist is higher based on Social Media videos, post etc. Overall, our study found that females expressed more interest in the product or therapy compared to males. In terms of the impact of social media, a larger percentage of males reported

decreased self-confidence or pressure to adhere to aesthetic standards compared to females. Lastly, both males and females experienced feelings of remorse and encountered difficulties to a similar extent.

It is important to note that our study only examined gender differences in interest, purchasing behaviour, consultation with a Dermatologist and the impact of social media on self-confidence and aesthetic standards. Also the data presented may not be representative of the entire population due to the specific age groups included and the sample size. Future research should aim to include a more diverse range of participants and consider additional variables to obtain a comprehensive understanding of the topic. Future research could explore other factors that may influence these outcomes, such as age, Socio-economic status and cultural background. Additionally, it would be valuable to investigate the long-term effects of social media on individuals' self-perception and beauty standards, as well as the effectiveness of interventions aimed at mitigating the negative impact of Social Media on self-confidence.

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Original Article

Prioritizing Physician Well-being : A Survey of Modern Medicine Doctors

Anamika Chakravorty Samant[1], Hemali Jha[2], Vinayak Hingane[3]

Abstract

Background : The health and well being of doctors are paramount not only for their own sake but also for the welfare of their patients and the effectiveness of healthcare system. Lifestyle-related diseases are increasing Globally, affecting Clinicians as well. This study identified their health risks, stressing self-care and timely interventions.

Materials and Methods : A cross-sectional online survey was conducted including 494 Clinicians, gathering data on demographics, work habits, lifestyle choices, and health metrics like BMI, neck and waist circumferences and Blood Pressure. We also assessed their daily activities, sleep duration and symptoms indicating potential health concerns.

Results : The survey demographics showed a distribution of ages from 30-60 years with a male predominance (67.2%). Educational backgrounds varied, with Postgraduate degrees being prevalent (50.6% medical, 36.6% surgical). Work patterns indicated varied hours, with 31.4% working 6 to 8 hours daily. Physical activity was moderate, with 70.9% exercising daily. Sleep patterns were adequate (72.9% slept 6 to 8 hours), and dietary habits leaned towards Vegetarian choices (41.1%), with a high rate of eating out (81.6%). Common health issues included Hypertension (47.5%) and knee pain (86%). Lifestyle factors showed low smoking rates (92.3% never smoked) and occasional Alcohol consumption (71.7%). Increased BMI was associated with longer sitting and acanthosis nigricans was found to be associated with higher BMI.

Conclusion : The survey found concerning health trends among Clinicians: longer sitting hours linked to higher BMI, especially in those with Acanthosis Nigricans. A significant number led sedentary lifestyles, lacked sufficient sleep and showed symptoms of obstructive sleep apnea.

Key words : IMA, Doctors, Lifestyle Disorders, Obesity.

In recent years, there has been a concerning rise in the incidence of sudden cardiac deaths among doctors, which sheds light on the distinct health challenges faced by those in the medical profession[1]. The dedication to caring for others often overshadows the necessity of self-care among healthcare practitioners. On the contrary, disregarding and neglecting cardiovascular well-being can result in severe fatal consequences.

Because of the demanding nature of the medical profession, doctors are exposed to cardiovascular disease and sudden cardiac events. Doctors frequently endure extended working hours, high-stress levels, irregular eating habits and limited opportunities for engaging in physical activity, which contribute to conditions such as Hypertension, Obesity, and Diabetes, all of which elevate the risk of Heart Disease[2].

Editor's Comment :

- Most of the clinicians have prolonged sitting time and sedentary lifestyle resulting in high BMI and related health issues.
- Setting self-care as a top priority through regular physical activity, a balanced diet and adequate sleep is essential for their personal well-being and also serves as a useful model for the patients they counsel and care for.

Aims and Objectives

The objective of this study was to examine the health metrics and lifestyles of doctors to identify potential risks to their health, thereby highlighting the criticality of timely interventions and self-care.

[1]DNB (Internal Medicine), Diploma in Obesity and Weight Management (University of South Wales), FDI, FICP; Consultant Physician, Diabetologist, Bariatrician, Chaitanya Hospital and Obesity Clinic, Virar, Maharashtra 401305 and Corresponding Author
[2]DNB (Internal Medicine), D Diabetology, FGID (CMC Vellore), FISH; FDI, Associate Professor, Department of Internal Medicine, Integral Institute of Medical Science and Research, Lucknow, Uttar Pradesh 226026
[3]DNB (Internal Medicine), Consultant Physician, Hingane Hospital, Buldhana, Maharashtra 443001

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Materials And Methods

Study Design : An online cross-sectional survey was conducted in September-October, 2023 among 494 random IMA doctors from multiple specialties spread over different Indian states. The data collected was regarding their work habits, lifestyle choices and diet, along with health metrics and anthropometric measurements, using a Google form that was circulated via WhatsApp, SMS and mail.

Inclusion Criteria : IMA member doctors who consented to the survey.

Exclusion Criteria : Non IMA doctors or those not consenting to the survey.

Data Collection : The Google form and its web link with the description were sent to the participants via WhatsApp, SMS and mail. Participation in the study was voluntary. Participants provided informed consent and their responses were kept anonymous and confidential throughout the study. This was ensured by excluding personal identifiable information and deselecting the "collect email addresses" option in the Google Forms settings.

The participants were asked to get their Blood Pressure measured in the right arm using the mercury sphygmomanometer with a standard cuff size in a sitting position after about 5 minutes of rest. Elevated Blood Pressure was defined as Systolic more than 140 and Diastolic more than 90mmHg.

Waist Circumference (WC) was measured at a point midway between the lowest rib and the iliac crest. Abdominal obesity was defined as WC>90cm in Males and 80cm in Females[4]. Participants were asked to measure their height and weight using a standard stadiometer and weighing scale. Body Mass Index (BMI) was calculated from the Weight and Height and expressed as kg/m^2. BMI of between 25-29.9 kg/m^2 was categorized as overweight and $\leq$30 kg/m^2 was categorized as Obese[5].

Neck circumference was measured at mid-neck, between the mid-cervical spine and the mid anterior neck, on subjects standing upright and facing forwards, with shoulders relaxed. In men with a laryngeal prominence (Adam's apple), it is measured just below the prominence[6,7].

Study Questionnaire : The Google form contained a structured, validated questionnaire that was developed through literature review[3] and comprised 26 questions that took about 10-15 minutes to complete, along with anthropometric data in the form of Height, Weight, BMI, Waist and Neck circumference and recent Blood Pressure.

The parts of the questionnaire were :

(a) Personal background in the form of age group, gender and profession.

(b) Total working hours are divided into sitting and standing hours.

(c) Physical activity in the form of exercise or sports.

(d) Sleep quality and quantity.

(e) Menstrual status in women.

(f) Dietary choices and practices.

(g) Addictions like Tea, Coffee, Smoking and Alcohol.

(h) Major medical Co-morbidities.

(i) Symptoms related to poor lifestyle and physical activity.

(j) Blood pressure and anthropometric measurements.

(k) Recent workup related to lifestyle disorders.

Statistical analysis : Data analysis was conducted statistically using Statistical Package for the Social Sciences (SPSS), Version 25 (IBM Corporation, Armonk, New York, USA).

Results

Demographics and Education : Among the surveyed Clinicians, the majority fell within the age group of 40 to 50 years, comprising 36.8% of the total. In terms of gender distribution, Males constituted the larger proportion at 67.2%. Regarding education, Postgraduates accounted for the highest percentage, with 50.6% holding Postgraduate degrees (Table 1).

Table 1 — *Demographics and Education*

Variable	Characteristics	N (%)
Age	>30 years	23 (4.5%)
	31 to 40 years	123 (25.1%)
	41 to 50 years	182 (36.8%)
	51 to 60 years	89 (18%)
	above 60 years	77 (15.6%)
Gender	Male	332 (67.2%)
	Female	162 (32.6%)
Education	General practitioners (MBBS)	63 (12.6%)
	Non-Surgical Clinicians	250 (50.6%)
	Surgical Clinicians	181 (36.6%)

Work and Physical Activity : A significant portion of participants reported varying working hours, with 31.4% working for 6 to 8 hours per day, 41.3% working for 8 to 10 hours per day and 27.3% working for more than 10 hours per day. In terms of physical activity, 70.9% exercised daily, with preferences for Cardio exercises (31.1%), Yoga (18.8%) and strength training (16%). Only 17.4% engaged in regular sports activities (Table 2).

Sleep and Dietary Habits : Sleep patterns indicated that 72.9% of participants slept regularly for 6 to 8 hours per day, while 21.3% slept less than six hours per day. Regarding dietary habits, 41.1% were pure Vegetarians, and a majority ate Salads (55.3%) and fruits (57.9%) daily. However, a significant portion (81.6%) reported eating out regularly (Table 3).

Health Conditions and BMI : The study revealed prevalent health conditions among clinicians, including Hypertension (47.5%), Diabetes (27.5%), and Dyslipidemia (60%). Common complaints included Backache (58.3%), Knee pain (86%) and acanthosis nigricans (91.1%). The mean BMI varied across sitting hours, with higher BMI observed in participants with longer sitting hours. Those with acanthosis nigricans had significantly higher BMI levels.

Health Markers and Lifestyle Factors : Among lifestyle factors, smoking was rare (92.3% never smoked), while alcohol consumption was occasional (71.7% consumed alcohol occasionally). Physical activity levels varied, with 70.9% exercising daily, but only 13.1% exceeding 400 minutes per week. Preferred exercises included Cardio (31.1%) and Yoga (18.8%). Dietary habits showed a mix of Vegetarian and Non-vegetarian choices, with a significant portion eating outside regularly (81.6%).

Association between BMI and sitting hours, as well as the presence of Acanthosis Nigricans : The mean BMI increased with longer daily sitting hours, with statistically significant differences observed (p=0.0026). Participants with acanthosis nigricans had a significantly higher mean BMI compared to those without (p<0.0001)(Table 4).

Table 2 — *Work and Physical Activity*

Variable	Characteristics	N	(%)
Working Hours	6 to 8 hours/day	155	31.4
	8 to 10 hours/day	204	41.3
	More than 10 hours/day	135	27.3
Physical Activity	Exercising daily	350	70.9
	Cardio exercises	154	31.1
	Yoga	93	18.8
	Strength training	79	16
	Regular sports	86	17.4

Table 3 — *Sleep and Dietary Habits*

Variable	Characteristics	N	(%)
Sleep Patterns :			
Sleep Duration	6 to 8 hours per day	361	72.9
	Less than 6 hours	105	21.3
Eating Habit :			
Pure Vegetarians	Yes	203	41.49
	No	286	58.51
Salads Daily	Yes	273	55.27
	No	221	44.73
Fruits Daily	Yes	286	57.89
	No	208	42.11
Reported Eating out Regularly	Yes	203	49.63
	No	206	50.37

Discussion

Doctors play a pivotal role in determining the health outcomes of any nation. The demanding workload in an overpopulated country like India with limited resources leads to Clinicians adopting unhealthy lifestyles. Despite their medical expertise, they often fail to heed the advice they dispense to their patients[8].

A lack of proactive health-seeking behavior, prioritizing patients' well-being over their own, compounded by the competitive environment of the profession, long work hours, sleep deprivation and the emotional strain of patient care, including exposure to traumatic events and ethical quandaries, can escalate stress levels and cardiovascular risk factors among Physicians[9-13]. Also, many doctors may underestimate their own risk of Cardiovascular Disease or fail to recognize warning signs until it's too late, leading to delayed diagnosis and intervention.

Addressing the Issue : To address the deteriorating health conditions and the rising incidence of sudden cardiac deaths amongst doctors, proactive measures need to be highly recommended. These include

Table 4 — *Association between BMI and sitting hours, as well as the presence of Acanthosis Nigricans*

Parameter	Mean BMI	Standard Deviation (SD)	p-value
Daily Sitting Hours: <2	26.3	±3	0.0026
Daily Sitting Hours: 2-4	25.5	±3.1	
Daily Sitting Hours: 4-6	26.6	±3.8	
Daily Sitting Hours: >6	27.2	±4.4	
Acanthosis Nigricans (Present)	30.6	±4.9	<0.0001
Acanthosis Nigricans (Absent)	26.1	±3.5	

prioritizing their own health by adopting healthy lifestyle habits and scheduling regular check-ups for physical and mental well-being. Promoting regular exercise, healthy eating habits and adequate sleep among physicians can improve their physical health, boost immunity and enhance resilience to stress. Educating doctors about the signs and symptoms of Burnout, Depression and Anxiety can help in early intervention and treatment.

Conclusion

The health and well-being of doctors are indispensable components of a robust and effective healthcare system. Doctors serve as role models for their patients and communities. By prioritizing their own health, clinicians demonstrate the importance of self-care and wellness practices to their patients. Doctors who are physically and mentally well are better equipped to make sound medical decisions, communicate effectively with patients, and exhibit empathy and compassion. Conversely, when doctors neglect their health, they may experience burnout, fatigue and decreased cognitive function, all of which can compromise patient safety and quality of care.The recent increase in sudden deaths among doctors serves as a stark reminder of the importance of prioritizing self-health within the medical profession.

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Original Article

Vitamin D3 Insufficiency and Its Correlation with Disease Severity and Diagnostic Biomarkers in Rheumatoid Arthritis : A Case-Control Study

Mimoh Sharma[1], Kumar Vivek Anand[2], Ajai Kumar[3], Vidya Sagar Ram[4], Pradeep Sharma[5], Kalbe Jawad[6]

Abstract

Background : This study aimed to identify Vitamin D3 insufficiency in patients with Rheumatoid Arthritis (RA) and investigate the correlation between Vitamin D3 and anti-cyclic Citrullinated Peptide (anti-CCP) antibodies and disease severity. The diagnostic value of Anti-CCP, RF, ESR, and hs-CRP was also evaluated.

Methods: Selectra (Pro-XL) was used to estimate the lipid profile using commercially available kits. Anti-CCP and 25-(OH) Vitamin D (Vitamin D3) levels were measured using an immunoassay (ARCHITECT System, Abbott, Japan). The ESR was estimated using the Wintrobe's tube method. RA factor and hs-CRP levels were measured using the immunoturbidity method. Disease activity/severity was estimated using the Clinical Disease Activity Index (CDAI) scoring.

Results : The RA factor, hs-CRP and anti-CCP levels were significantly higher in patients than controls ($p<0.0001$), while Vitamin D3 levels were significantly lower ($p<0.0001$). A significant correlation was found between the RA factor and anti-CCP ($r=0.678$, $p<0.0001$), ESR and anti-CCP ($r=0.469$, $p<0.0001$) and a negative correlation between Vitamin D3 and anti-CCP ($r=-0.224$, $p=0.046$). Vitamin D3 levels were significantly correlated with the RA factor ($r=-0.481$, $p=0.028$). In patients with severe disease, Vitamin D3 level was associated with anti-CCP ($\beta=0.409$, $p=0.018$). The RA factor and anti-CCP demonstrated high specificity and sensitivity, with a PPV of 66% and 68% and NPV of 99.9% each. The AUC was significantly higher for anti-CCP (0.879, $p<0.0001$) and RA factor (0.813, $p<0.0001$) than for hs-CRP and ESR, indicating superior diagnostic performance.

Conclusion : The study concludes that Vitamin D3 levels may determine the severity of RA and also suggests that the endorsed criteria should include the RA factor due to its diagnostic value equivalent to that of anti-CCP.

Key words : Vitamin D3, Anti-CCP Antibodies, Rheumatoid Factor, Rheumatoid Arthritis, CDAI Scoring.

Rheumatoid Arthritis (RA) is a chronic inflammatory disease affecting 1% of the global population, with a threefold higher prevalence in females[1,2]. It manifests with articular and extra-articular features, and its onset can be either gradual or abrupt. Key biomarkers for RA include the erythrocyte sedimentation rate, C-reactive protein level, plasma viscosity, Rheumatoid Factor (RF) and anti-cyclic Citrullinated Peptide (anti-CCP) antibody[3].

Editor's Comment :

- Low Vitamin D3 levels are linked to higher RA severity, highlighting its role in disease progression. Anti-CCP and RA factor offer excellent diagnostic value for RA, with high sensitivity and specificity. These factors also suggest Vitamin D3 may influence immune response and RA severity.

Radiological characteristics of RA include soft tissue swelling, periarticular osteoporosis, juxta-articular erosions and joint space constriction. Patients with RA have an increased risk of osteoporosis, potentially linked to Vitamin D levels. However, the relationship between RA and blood levels of 25(OH)D and 1,25(OH)2D is inconsistent[4].

Vitamin D plays a pivotal role in both innate and adaptive immunity by regulating immune cell subsets. The inflammation observed in RA shares similarities with that seen in unstable atherosclerotic plaques. Both conditions involve the expression of pro-inflammatory cytokines and increased inflammatory

[1]MD, Assistant Professor, Department of Biochemistry, Autonomous State Medical College, Shahjahanpur, Uttar Pradesh 242226
[2]MD, Assistant Professor, Department of Biochemistry, Autonomous State Medical College, Basti, Uttar Pradesh 272124
[3]MD, Associate Professor, Department of Biochemistry, Uttar Pradesh University of Medical Sciences, Saifai, Etawah, Uttar Pradesh 206130
[4]MD, Professor, Department of General Medicine, Uttar Pradesh University of Medical Sciences, Saifai, Etawah, Uttar Pradesh 206130
[5]PhD, Professor, Department of Biochemistry, Uttar Pradesh University of Medical Sciences, Saifai, Etawah, Uttar Pradesh 206130
[6]PhD, Professor, Department of Biochemistry, Uttar Pradesh University of Medical Sciences, Saifai, Etawah, Uttar Pradesh 206130 and Corresponding Author
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markers like CRP and fibrinogen. These molecules may promote proatherogenic activation and endothelial dysfunction[5-7]. In active or untreated Rheumatoid Arthritis (RA), the lipid profile typically exhibits certain characteristic changes. These include decreased serum levels of High-density Lipoprotein Cholesterol (HDL-C). Concurrently, there is an increase in the ratio of Total Cholesterol (TC) to HDL-C (TC/HDL-C ratio). These lipid profile alterations indicate an elevated risk of atherosclerosis, a condition characterized by the hardening and narrowing of arteries due to plaque buildup. This underscores the importance of regularly monitoring and managing lipid levels in individuals with RA to mitigate potential cardiovascular risks[8-10]. This study aims to estimate serum Vitamin D3 and lipid profiles in RA patients to correlate these parameters with disease severity for improved diagnosis and prognosis assessment.

Material and Methods

Study Population :

This case-control study, conducted from November, 2019 to October, 2021, was a collaborative effort between the Department of Biochemistry and the Department of General Medicine at Uttar Pradesh University of Medical Sciences, Saifai, Etawah. The study encompassed 220 subjects, comprising 120 RA patients and 100 controls who were matched for age and sex, all from the same ethnic group.

The diagnosis of RA was established based on the Revised American College of Rheumatology's 2010 clinical criteria. Patients were accommodated in the rheumatology clinic's Inpatient Wards and Outpatient Departments within the Department of Medicine. A comprehensive oral questionnaire was administered to each participant after obtaining their consent. This questionnaire included a detailed history and a clinical examination based on the Clinical Disease Activity Index (CDAI). This rigorous approach ensured a thorough evaluation of each participant's condition.

Subject Selection Criteria :

The study included patients who met the 2010 Revised American College of Rheumatology/ European League Against Rheumatism (ACR/ EULAR) criteria for Rheumatoid Arthritis[11]. However, individuals taking Vitamin D supplements or the hypolipidemic drug Highly Active Anti-retroviral Therapy (HAART) were excluded. Additionally, subjects with chronic conditions such as Diabetes, Hypertension, Familial Hypercholesterolemia, Chronic Kidney Disease and Tuberculosis were not considered for the study. The Institutional Human Ethics Committee of Uttar Pradesh University of Medical Sciences, Saifai, Etawah (IEC-82/2019-20) duly approved the study protocol.

Clinical Assessment :

This study assessed disease activity and severity using the Clinical Disease Activity Index (CDAI) scoring. CDAI = SJC (28) + TJC (28) + PGA + EGA[12].

SJC (28) — Swollen 28-Joint Count (shoulders, elbows, wrists, MCPs (metacarpophalangeal joints (MCPs), PIPs (proximal interphalangeal joints and knees).

TJC (28) — Tender 28-Joint Count (shoulders, elbows, wrists, MCPs, PIPs, knees)

PGA — Patient Global Disease Activity (patient's self-assessment of overall RA disease activity on a scale of 1-10 where 10 is the maximal activity)

EGA — Evaluator's Global Disease Activity (evaluator's assessment of overall RA disease activity on a scale of 1-10 where 10 is maximal activity)

Interpretation —

Mild Disease Activity CDAI > 2.8 and $\leq$10

Moderate Disease Activity CDAI > 10 and $\leq$22

Severe Disease Activity CDAI > 22

Sample Collection :

Blood samples were collected by venipuncture into labelled plain and EDTA vials. Plain vials were centrifuged at 5000 rpm for 10 min and the serum was stored at -20^{o}C. An EDTA sample was used to estimate the Erythrocyte Sedimentation Rate (ESR).

Estimation of Biochemical and Rheumatoid-associated Markers :

Lipid profiles were estimated using a fully automated analyzer, Selectra (Pro-XL), with commercially available kits. Anti-CCP and 25-(OH) Vitamin D (Vitamin D3) levels were measured using an immuno-chemiluminescence kit (ARCHITECT System, Abbott, Japan). The immunoturbidity method measured RA factor and hs-CRP, while ESR was estimated using Wintrobe's tube method.

Data Analysis :

Data were analyzed using SPSS version 21 (Chicago, Inc. USA). Data are presented as mean ± SD. The Student's t-test was used to compare the groups for parametric data, whereas the chi-square test was used to compare the groups for non-parametric data. Receiver Operating Characteristic (ROC) curve analysis was used to determine the sensitivity and specificity of the markers. Pearson's correlation coefficient was calculated to determine the correlation between blood markers. Univariate and multivariate linear regression analyses were used to determine independent markers of Rheumatoid Arthritis (RA). Statistical significance was set at p<0.05.

Results

Clinical and Biochemicals findings of Study Population :

Table 1 shows the demographic characteristics of the study groups, including age, sex, and disease severity. The study groups' male-to-female ratio (M:F) was 1:2, indicating that the disease was more prominent in females. No significant differences were found in age (p=0.797) or sex (p=0.225), indicating an adequate matching between the case and control groups. The severity of rheumatoid arthritis was mild in 16 (13.3%), moderate in 69 (57.5%) and severe in 35 (29.2%) enlisted patients.

Elevation of Rheumatoid-associated Markers with Declining Vitamin D patients :

Lipid profiles (TC, TG, LDL-C and VLDL-C) were significantly higher in patients than in controls (p<0.0001) (Table 2). The rheumatoid-associated markers, RA factor, hs-CRP, and anti-CCP, were 9.54-fold (mean±SD; 44.46±14.97 *versus* 4.66±1.02 mg/L), 2.10-fold (3.48±3.41 *versus* 1.66±1.48 U/mL) and 8.69-fold (95.98±46.27 *versus* 11.04±3.98 U/mL), respectively, which were significantly higher than the control (p<0.0001). The ESR was also significantly (p<0.0001) higher in the patients (37.67±17.40 mm/1Hr) group as compared control (13.93±4.69 mm/1Hr). In contrast, Vitamin D was significantly decreased in rheumatoid patients (18.14±4.43 ng/mL *versus* 22.28±14.72 ng/mL) than in control (p<0.0001) (Table 2a).

Rheumatoid-associated Markers Differentiate the Disease Severity :

The lipid profile was not significantly associated with disease severity. RA factor (RF) only showed a significant difference from mild (50.38±10.13 U/mL) to moderate (43.06±16.51 U/mL,p=0.003) and severe groups (44.51±13.18 U/mL, p=0.024), while moderate and severe groups did not show a significant difference in RF levels (p=0.20). Anti-CCP mean levels were significantly 1.49-fold (78.35±30.80 *versus* 62.51±8.73 U/mL, p=0.59) in the moderate group and 2.58-fold (146.03±42.74 *versus* 62.51±8.73 U/mL, p<0.0001) higher in the severe group as compared to the mild group (62.51±8.73 U/mL). Similarly, Vitamin D only showed a significant difference from the mild (17.38 ±3.25) to moderate (18.34±3.67) and severe groups (18.06±6.05, p=0.02). In contrast, the moderate and severe groups did not significantly differ in 25-(OH) Vitamin D levels (p=0.49) (Table 2b).

Table 1 — *Demographical Characteristics of the Study Groups*

Variables		Case (n=120)	Control (n=100)	p-value
Age (Years)	Young (18-35)	17(14.2%)	15(15.0%)	0.797
	Middle (36-55)	63(52.5%)	48(48.0%)	
	Older (>55)	40(33.3%)	37(37.0%)	
	Mean±SD	49.97±11.44	50.7±12.58	0.250
Sex	Male	42(35.0%)	43(43.0%)	0.225
	Female	78(65.0%)	57(57.0%)	
Severity(CDAI)	Mild	16(13.3%)	-	
	Moderate	69(57.5%)	-	
	Severe	35(29.2%)	-	

The Chi-Square test and student t-test were used to compare the study group. p-value <0.05 was considered as statistically significant.

Table 2a — *Status of Biomarkers in Rheumatoid Arthritis*

Variables	Case (n=120) (Mean±SD)	Control (n=100) (Mean±SD)	p-value
Vitamin D3 (ng/mL)	18.14 ± 4.43	22.28 ± 14.72	<0.0001*
TC (mg/dL)	165.76 ± 19.42	156.7 ± 40.05	<0.0001*
TG (mg/dL)	151.09 ± 25.83	135.59 ± 65.01	<0.0001*
HDL-C (mg/dL)	46.91 ± 10.89	42.38 ± 10.13	0.621
LDL-C (mg/dL)	89.84 ± 19.98	96.29 ± 34.57	<0.0001*
VLDL-C (mg/dL)	30.21 ± 5.25	27.11 ± 13.0	<0.0001*
RA Factor (U/mL)	44.46 ± 14.97	4.66 ± 1.02	<0.0001*
hs-CRP (mg/L)	3.48 ± 3.41	1.66 ± 1.48	<0.0001*
Anti-CCP(U/mL)	95.98 ± 46.27	11.04 ± 3.98	<0.0001*
ESR (mm/1Hr)	37.67 ± 17.40	13.93 ± 4.69	<0.0001*

Abbreviations : TC-Total Cholesterol, TG- Triglyceride, HDL-C-High-Density Lipoprotein-Cholesterol, LDL-C- Low-Density Lipoprotein-Cholesterol, VLDL- Very-low-density Lipoprotein, RA Factor- Rheumatoid Factor, hs-CRP- High-sensitivity C-reactive protein, Anti-CCP- Anti-cyclic citrullinated peptide, ESR- Erythrocyte Sedimentation Rate. Student T-test was used to compare the group. *p-value <0.05 was considered as statistically significant.

Table 2b — *Stratification of Biomarkers according to the disease severity*

Variables	Case (n=120)			p-value		
	(A) Mildn=16	(B) Moderaten=69	(C) Severen=35	A *versus* B	B *versus* C	A *versus* C
	Mean ± SD					
Vitamin D3(ng/mL)	17.38 ± 3.25	18.34 ± 3.67	18.06 ± 6.05	0.497	0.002*	0.028*
TC (mg/dL)	172.31 ± 22.61	162.49 ± 16.86	169.22 ± 21.72	0.415	0.297	0.996
TG (mg/dL)	158.31 ± 26.72	148.46 ± 25.56	152.9714 ± 25.91	0.716	0.823	0.85
HDL-C (mg/dL)	46.56 ± 7.64	48.82 ± 11.69	43.31 ± 9.77	0.128	0.124	0.749
LDL-C (mg/dL)	94.11 ± 21.65	85.39 ± 18.82	96.64 ± 19.65	0.927	0.829	0.839
VLDL (mg/dL)	31.65 ± 5.37	29.66 ± 5.23	30.64 ± 5.20	0.79	0.944	0.835
RA Factor (U/mL)	50.38 ± 10.13	43.06 ± 16.51	44.51 ± 13.18	0.003*	0.024*	0.209
hs-CRP (mg/L)	3.08 ± 2.83	3.44 ± 3.77	3.74 ± 2.92	0.508	0.405	0.939
Anti-CCP(U/mL)	62.51 ± 8.73	78.35 ± 30.80	146.03 ± 42.74	0.059	<0.0001*	<0.0001*
ESR (mm/1Hr)	41.56 ± 19.81	38.27 ± 17.01	34.71 ± 17.05	0.992	0.323	0.584

Abbreviations: *TC-Total Cholesterol, TG- Triglyceride, HDL-C- High-Density Lipoprotein-Cholesterol, LDL-C- Low-Density Lipoprotein-Cholesterol, VLDL- Very-low-density Lipoprotein, RA Factor- Rheumatoid Factor, hs-CRP- High-sensitivity C-reactive protein, Anti-CCP- Anti-cyclic citrullinated peptide, ESR- Erythrocyte Sedimentation Rate. Student T-test was used to compare the group.*

*p-value <0.05 is considered as statistically significant.

Association among the Total Cholesterol and Rheumatoid-associated Markers in Patients :

In the univariate regression analysis, Vitamin D levels were positively associated with anti-CCP (b=0.475, p=0.004) in patients with severe Rheumatoid Arthritis. RA was also positively associated with anti-CCP in patients with severe (b=0.295, p= 0.047) and mild (b=0.373, p=0.033) rheumatoid arthritis. In contrast, hs-CRP was negatively associated with anti-CCP (b=-0.229, p=0.049) in the severe group. In the multi-regression analysis, the 25-(OH) Vitamin D level was positively associated with anti-CCP (b=0.409, p=0.018) in the severe group (Table 3).

Diagnostic Utility of Rheumatoid-associated Markers :

Elevated RF and anti-CCP titers had a specificity and sensitivity of 93% and 47%, respectively, with a positive predictive value of 66% and a negative predictive value of 99.9%. Similarly, for Anti CCP, specificity and sensitivity were 95% and 34%, respectively, with a positive predictive value of 68% and a negative predictive value of 99.9%. To further compare the diagnostic utility of each test, we constructed an ROC curve and calculated the AUC. The ROC curves of RF and Anti CCP were closer to the upper left corner than those of the other markers (hs-CRP and ESR), indicating that it can serve as a specific diagnostic marker (Fig 1). The AUC was significantly higher for anti-CCP (0.879, p<0.0001) and RF (0.813, p<0.0001) than for hs-CRP and ESR indicated a higher diagnostic performance (Table 4).

Discussion

This study was based on clinical and biochemical features with special reference to Vitamin D and lipid profiles of 120 Rheumatoid Arthritis patients and 100 controls. RA is characterized by chronic inflammation of the synovium, leading to progressive joint destruction. Periarticular bone erosion is the most specific hallmark of the disease, causing deformation, laxity, and functional disability. Inflammation plays a key role in the chronicity and progression of Rheumatoid Arthritis despite its unknown source.

Our study showed that the prevalence of RA in females was two-fold higher than in males. A previous study demonstrated that RA is twice as frequent in women than men. There is strong evidence that RA is an autoimmune disease that is under genetic control, and genes in the sex chromosome can play a role in supporting female prevalence[13]. On the other hand, it is widely accepted that sex hormones, particularly estrogens, may regulate the immune response by favoring the survival of forbidden autoreactive clones and, ultimately, the prevalence of autoimmunity in women[14].

The present study found low serum 25(OH) Vitamin D levels in the RA group and more prominent levels in the severity groups. Previous studies have reported that serum 25(OH) Vitamin D deficiency and inadequacy were observed in 34-84% of RA patients and 12-52% of RA patients[15]. However, some studies, inconsistent with our data, suggest that the number of patients with 25(OH) Vitamin D deficiency and inadequacy may vary depending on race, area, diet, sample size, age, sex, BMI and other community characteristics[16,17].

Table 3 — *Univariate and Multivariate Linear Regression model as Anti-CCP dependent variables*

Severity Groups	Univariate		Multivariate	
	Beta co-efficient	p-value	Beta co-efficient	p-value
Vitamin D3 (ng/mL)				
Mild	-0.012	0.965	-	-
Moderate	-0.148	0.224	-	-
Severe	0.475	0.004*	0.409	0.018*
TC (mg/dL)				
Mild	-0.607	0.013*	0.945	0.049*
Moderate	0.032	0.792	-	-
Severe	0.035	0.841	-	-
TG (mg/dL)				
Mild	-0.297	0.263	-	-
Moderate	-0.217	0.053	-	-
Severe	0.120	0.491	-	-
HDL-C (mg/Dl)				
Mild	-0.361	0.049*	-0.916	0.008*
Moderate	0.051	0.678	-	-
Severe	-0.284	0.048*	0.099	0.699
LDL-C (mg/dL)				
Mild	-0.431	0.033*	-0.685	0.006*
Moderate	0.030	0.808	-	-
Severe	-0.226	0.043*	0.774	0.047*
VLDL (mg/dL)				
Mild	-0.302	0.255	-	-
Moderate	-0.332	0.005*	-1.453	<0.0001*
Severe	0.115	0.510	-	-
RA Factor (U/mL)				
Mild	0.373	0.033*	0.184	0.649
Moderate	-0.273	0.051	-	-
Severe	0.295	0.047*	0.201	0.241
hs-CRP (mg/L)				
Mild	-0.226	0.053	-	-
Moderate	-0.217	0.061	-	-
Severe	-0.229	0.049*	0.109	0.511
ESR (mm/1Hr)				
Mild	0.065	0.812	-	-
Moderate	-0.123	0.312	-	-
Severe	0.062	0.724	-	-

Abbreviations : r-Pearson correlation, TC-Total Cholesterol, TG-Triglyceride, HDL-C- High-Density Lipoprotein-Cholesterol, LDL-C-Low-Density Lipoprotein-Cholesterol, VLDL- Very-low-density Lipoprotein, RA Factor- Rheumatoid Factor, hs-CRP- High-sensitivity C-reactive protein, Anti-CCP- Anti-cyclic citrullinated peptide, ESR-Erythrocyte Sedimentation Rate. Linear Regression was used to calculate Univariate and Multivariate.

*p-value <0.05 is considered as statistically significant.

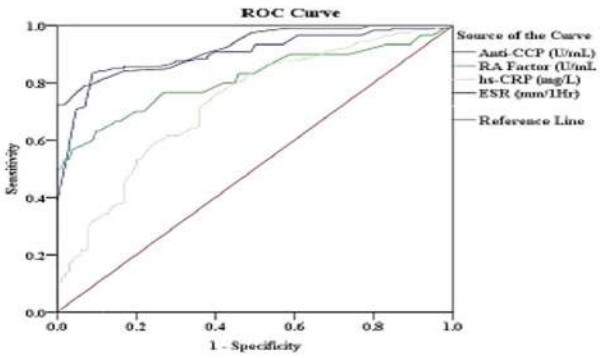

Fig 1 — ROC curve of anti-CCP, RA factors hs-CRP and ESR

Lower serum 25 (OH) Vitamin D levels may be a risk factor for the pathogenesis of Rheumatoid Arthritis, which typically affects the peripheral joints in a symmetrical pattern. Lipids play a role in RA synovitis via the arachidonic acid pathway in the joint space[18]. Various inflammatory disorders, including RA, are linked to changes in lipid levels, such as atherosclerosis and Cardiovascular Disease (CVD), which are more common in patients with RA than in the general population. Chronic inflammation has emerged as a critical component of RA development[19]. The mean C-reactive Protein (CRP) level 3 measures the chronic inflammatory burden[3].

Chronic inflammation in patients with active RA causes oxidative alterations that alter the HDL structure and lower apolipoprotein-A-1 levels[20]. As a result of inflammation, the usual anti-inflammatory, antioxidative and cardioprotective functions of triglyceride, VLDL and LDL levels are impaired, and they become pro-inflammatory. Furthermore, patients with RA have Total Cholesterol, HDL cholesterol, and LDL cholesterol levels due to a pro-inflammatory state[21]. This finding parallels the statement above[22-25]. Our results demonstrated that serum anti-CCP, RA factors and ESR were significantly elevated (three to ten-fold) in patients with RA compared to those in controls.

RF is widely used as a diagnostic indicator for RA.

Table 4 — *Analysis of Sensitivity and specificity*

Tests	Cut-off value	Area (LB-UB)	p-value	Sensitivity (%)	Specificity (%)	PPV	NNV
Anti-CCP (U/mL)	22.00	0.879 (0.833-0.926)	<0.0001*	34	95	0.68	99.93
RA Factor (U/mL)	15.00	0.813 (0.756-0.870)	<0.0001*	47	93	0.66	99.94
hs-CRP (mg/L)	0.83	0.730 (0.663-0.796)	<0.0001*	13	46	0.02	99.81
ESR (mm/1Hr)	24.50	0.924 (0.891-0.957)	<0.0001*	72	96	2	99

Abbreviations : Anti-CCP- Anti-cyclic citrullinated peptide, RA Factor- Rheumatoid Factor, hs-CRP- High-sensitivity C-reactive protein, ESR- Erythrocyte Sedimentation Rate. The Cut-off was calculated by ROC curve analysis.
*p-value <0.05 is considered as statistically significant.

However, RA factor can manifest in various autoimmune and infectious diseases and its specificity is restricted to a few percent of healthy individuals. Therefore, the pursuance of identifying indices with significant diagnostic potential or the simultaneous identification of pre-existing indices is crucial. Anti-CCP is a highly specific marker for the early detection of RA and has significant clinical diagnostic utility. It was included in the American College of Rheumatology/European League Against Rheumatism (ACR/EULAR) diagnostic criteria[12,26-28].

Anti-CCP levels were statistically elevated in individuals with RA compared to individuals without RA and healthy individuals. This study's findings suggest that anti-CCP antibodies may play a role in the clinical classification of Rheumatoid Arthritis (RA).

The study conducted a comparative analysis of the AUCs of anti-CCP and 25-(OH) Vitamin D. The results indicated that the AUC of anti-CCP demonstrated the highest magnitude, indicating its superior diagnostic efficacy. The study's results suggest that the anti-CCP test exhibited a considerable degree of sensitivity (34%) and specificity (95.0%). The findings presented herein align with earlier investigations carried out by Cui, *et al*[29] and Lin, *et al*[30]. The results of the diagnostic performance assessment indicate that the anti-CCP had the highest Positive Predictive Value (PPV) compared to other indicators. The statement above suggests that anti-CCP has the potential to function as a principal serological indicator in the differentiation of RA from alternative medical conditions. Upon isolation, the anti-CCP demonstrated the highest Youden index, measuring 0.879. Among the variables that were examined, authenticity emerged as the most robust predictor, demonstrating superior discriminatory power in distinguishing between individuals diagnosed with Rheumatoid Arthritis and those who were classified as healthy. According to Lee, *et al*[33] study, the diagnostic effectiveness of anti-CCP was superior to that of RA factors[31]. The study findings indicate that the RA factors exhibited a sensitivity of 47% and a specificity of 93%. This study underscores the significant role of certain parameters, including 25-(OH) Vitamin D, anti-CCP, hs-CRP and ESR, in the progression of RA. When assessed in serum, these parameters could potentially serve as reliable markers for RA. However, the identified correlation between 25-(OH) Vitamin D and RA factors warrants further validation due to the limited sample size of our study. Moreover, the influence of various factors such as geographic location, familial ancestry and gender on an individual's Vitamin D3 levels necessitates future research with cross-regional and larger sample sizes for a comprehensive understanding of the correlation between 25(OH) Vitamin D and RA.

Conclusion

Our findings also highlight the superior diagnostic performance of Anti-CCP and RF in RA. Furthermore, 25-(OH) Vitamin D levels may be indicative of RA severity. These insights pave the way for personalized prevention and treatment strategies for RA, underscoring the need for continued research in this area.

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— Hony Editor

Case Report

Atropine-induced Psychosis in Organophosphate (OP) Poisoning Treatment : A Case Report

Ragiri Venkata Ramudu[1], Somanaboina Padmakar[2], Yadla Harini[3], Pabbati Sandhya Shakilamai[3], Dudekula Ruksana[3], Mude Harish Naik[4]

Abstract

Background : Atropine is a naturally occurring alkaloid belonging to the Solanaceae family. Atropine blocks acetylcholine's muscarinic-like effects on the central and peripheral nervous systems. The most common side effects of atropine are xerostomia, photophobia, impaired vision, and tachycardia, typically manifesting at or below the therapeutic dose. In this case study, a 45-year-old male patient received atropine for Organophosphate (OP) poisoning and experienced psychosis symptoms like agitation, visual and auditory hallucinations and anxiety.

Key words : Atropine, Psychosis, Proximal delusions, Agitation, Organophosphate poisoning.

Atropine, a naturally occurring alkaloid derived from plants such as deadly nightshade (Atropa belladonna) and other members of the Solanaceae family, serves as a muscarinic acetylcholine receptor blocker at the postganglionic parasympathetic neuroeffector junction[1,2]. Taking long-term doses of atropine can lead to a number of adverse effects including dry mouth, blurred vision, tachycardia and photophobia. Moreover, atropine usage will also cause psychotic symptoms such as hallucinations, restlessness, delirium and excitement[3]. There are several adverse effects associated with atropine, including xerostomia, photophobia, impaired vision, and tachycardia, that often appear at or below therapeutic dosages[4].

Editor's Comment :

- This case report demonstrates that while atropine is essential in managing organophosphate poisoning, sometimes its high doses may trigger psychotic symptoms.
- Clinicians should be aware of this potential adverse effect and adjust treatment protocols accordingly.

Case Report

A 45-year-old male patient was admitted to the male medical ward 1 with the primary concern of suspected consumption of an organophosphate compound in combination with alcohol as an attempted suicide. The patient exhibited symptoms of vomiting and excessive sweating. The quantity of organophosphate consumed was undisclosed. The patient's medical history was devoid of prior illnesses or known allergies. On initial evaluation, the patient was alert and oriented, presenting with vital signs such as Blood Pressure of 140/90 mmHg, Pulse rate of 106 beats per minute, oxygen saturation of 96% in room air, and random blood glucose of 160 mg/dl. Cardiovascular examination revealed normal heart sounds, while respiratory assessment showed bilateral air entry. The neurological evaluation demonstrated an E4 L4 M6 consciousness scale with bilateral equal-sized pupils that reacted to light.

Laboratory investigations revealed a haemoglobin level of 14.9 g/dl, a Total Leukocyte Count of 17,600 cells/mm^3, with a differential count of neutrophils (63%), lymphocytes (13%), monocytes (3%) and eosinophils (1%). The electrocardiogram displayed sinus tachycardia. The Poisoning Severity Score (POP) indicated mild poisoning based on factors such as pupil size, respiration rate, heart rate, and level of consciousness.

Immediate interventions comprised gastric lavage with normal saline, followed by intravenous administration of atropine (10 ml in 100 ml normal saline) at a slow rate over 8 hours thrice daily. Additionally, Pralidoxime (PAM) 2 gm in 100 ml normal saline IV was administered thrice daily, along with Optineuron 1 amp in 100 ml normal saline IV twice daily. The patient was catheterized and received Pantoprazole IV 40 mg once daily and continuous monitoring of Blood Pressure, Heart Rate, Oxygen Saturation and Pupil size was implemented.

After three days, the patient exhibited agitation, visual and auditory hallucinations, anxiety and dry mouth symptoms. This constellation of symptoms was diagnosed as atropine-induced psychosis. To reduce these adverse symptoms, the dose of atropine was progressively reduced to 3 ml in 100 ml of normal saline and eventually

[1]MBBS, MD, Professor, Department of Psychiatry, Institute of Mental Health (IMH), Government General Hospital, Kadapa, Andhra Pradesh 516003
[2]Pharm D, Associate Professor, Department of Pharmacy Practice, Narayana Pharmacy College, Chinthareddy Palem, Nellore, Andhra Pradesh 524004
[3]Pharm D, Intern, P Rami Reddy Memorial College of Pharmacy, Kadapa, Andhra Pradesh 516003
[4]Pharm D, Intern, P Rami Reddy Memorial College of Pharmacy, Kadapa, Andhra Pradesh 516003 and Corresponding Author
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discontinued after 3 hours. Treatment for psychosis encompassed Haloperidol 15 mg, Clonazepam 0.2 mg, and Escitalopram 10 mg, with resolution of the ADR. Subsequently, the patient was discharged with a prescription for Pantoprazole 40 mg once daily.

Causality assessment employing the Naranjo Causality Assessment Scale and the World Health Organization (WHO) - Uppsala Monitoring Center (UMC) scale indicated a probable association between psychosis and atropine, categorized as possible. Severity evaluation via Hartwig's Scale revealed a moderate severity level. The preventability assessment, following the Schumock and Thornton scale, classified the case as not preventable.

Discussion

For an extended period, atropine has been utilized for the treatment of organophosphate poisoning and poisoning from insecticides. Most adverse effects are attributed to its antimuscarinic impact and typically reverse upon treatment discontinuation. The severity and frequency of these side effects are dose-dependent. Severe outcomes often stem from an excessive dosage of atropine, whether administered through single or multiple injections.[4] Adverse reactions associated with atropine encompass cardiac dysrhythmias, tachyarrhythmias, dry skin, constipation, xerostomia, hypersensitivity responses, drowsiness, impaired vision, sensitivity to light, restlessness, irritability, confusion, hallucinations, and heightened excitement[5]. Atropine's anticholinergic effect triggers a toxic response with various peripheral and cerebral symptoms. This reaction is correlated with the significant variation in individual susceptibility to atropine (idiosyncrasy), potentially leading to hazardous consequences even at recommended doses[6]. It's important to note that atropine demonstrates heightened sensitivity in individuals with Down syndrome[7].

The criteria for diagnosing drug-induced psychosis, as outlined in the Diagnostic and Manual of Mental Disorders (DSM-IV) , consist of four key factors:

(1) Presence of proximal delusions

(2) Corroboration from historical records, physical assessments, or laboratory results must meet conditions (a) or (b). (a) The symptom mentioned in Criteria 1 manifests during substance intoxication or withdrawal within a month. (b) The disturbance is causally linked to medication use.

(3) The disorder cannot be primarily attributed to a non-substance-related psychotic disorder.

(4) The occurrence of the disturbance coincides with a state of delirium[4].

Atropine is an anticholinergic drug that blocks the action of acetylcholine, a neurotransmitter that regulates various functions in the central and peripheral nervous system. Acetylcholine is involved in memory, learning, attention, arousal, and mood[8]. Atropine crosses the blood-brain barrier and affects the cholinergic receptors in the brain, primarily the muscarinic receptors. Muscarinic receptors are responsible for modulating the activity of other neurotransmitters, such as dopamine, serotonin, glutamate and Gamma-aminobutyric Acid (GABA). Atropine disrupts the balance between these neurotransmitters and causes an imbalance in the brain's chemical signaling. This can lead to altered perception, cognition, emotion, and behaviour[9,10]. Atropine also affects the autonomic nervous system, which controls involuntary functions such as Heart Rate, Blood Pressure, Respiration, Digestion and Temperature Regulation. Atropine can cause Tachycardia, Hypertension, Hyperthermia, Dry Mouth, Blurred Vision, Urinary Retention and Constipation[8]. These physical symptoms can worsen the psychological distress and contribute to the psychosis[10]. Atropine-induced psychosis can be influenced by genetic factors, such as variations in the genes that encode for the enzymes that metabolize atropine or the receptors that bind to it. Some people may be more susceptible or resistant to atropine's effects than others[9,10]. Atropine-induced psychosis can also be triggered or exacerbated by environmental factors, such as stress, trauma, infection, or drug interactions. These factors can increase the brain's sensitivity to atropine or alter its pharmacokinetics[9,10].

Atropine-induced psychosis is a severe condition that requires prompt medical attention and treatment. The treatment usually involves stopping or reducing the dose of atropine and administering antipsychotic drugs or benzodiazepines to counteract its effects[8,10]. In some cases, Physostigmine, a cholinesterase inhibitor that increases acetylcholine levels in the brain, may be used as an antidote. Physostigmine has risks and side effects and should be used cautiously[8,10].

Tom, *et al* found that atropine-induced psychosis was 31.3% in medicine wards. The length of the hospital was increased due to ADR. A patient who is taking higher doses causes more incidences of psychotic symptoms than others. So, physicians should be vigilant while prescribing the doses[11]. Sowmya, *et al* observed complaints of salivation, vomiting, non-cooperation, and irritability, and the patient became unresponsive to the atropine therapy in OP poisoning. Antipsychotics and antidepressants can be used as a treatment for atropine-induced psychosis. Atropine is used to treat OP poisoning. It is imperative that emergency care is provided, especially intravenous administration, and that the offending drug is withdrawn as soon as possible in order to prevent further complications[12].

Conclusion

This case report provides a comprehensive overview of atropine-induced psychosis in the context of organophosphate poisoning, emphasizing the need for vigilance among healthcare providers. Recognizing and

managing such adverse reactions promptly is crucial for ensuring the best possible outcomes for patients. This case report also contributes valuable insights into the assessment and management of rare adverse drug reactions, ultimately benefiting healthcare professionals and researchers in the field of Toxicology and Emergency Medicine.

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Letters to the Editor

[The Editor is not responsible for the views expressed by the correspondents]

Know Your Risk, be Proactive and Don't be the Victim

Sir, — We have read with great interest and would like to take the opportunity to comment on the recently published article by Devendra Prasad Singh, *et al*[1] ie, 'Cardiovascular Diseases Risk Assessment of Healthcare Professionals' published in issue of June 2023. Few literature is available regarding the health issues of doctors and we are also not focusing to resolve the same.

This present study aimed at assessing the cardiovascular risk factors among Healthcare Professionals mainly in Bihar/Jharkhand states of India using a questionnaire electronically pertaining to their demographic characteristics, personal and medical history. It was found that 33% Hypertensive, 24% had Diabetic and 15% combination of both Hypertension and Diabetes and 30% of all diabetics had their HbA1c above optimal levels. 16% of Doctors were smokers and 17% had Dyslipidemia. 70% of Doctors were doing exercise for >150 minutes/week, however only 15% were sleeping for 7 hours or more. Risk assessment and assessing risk factors are related but distinct concepts in the field of risk management. *I wanted to make comments on title of the article. In this study the authors were assessed the risk factor not the risk assessment. But in title it is highlighted as "Cardiovascular Diseases Risk Assessment of Healthcare Professionals".* Risk assessment is systematic process for evaluating prospective risks, their likelihood, and potential repercussions and evaluation of risk factors entails locating and examining the underlying elements or variables that influence a risk's incidence or seriousness and useful in understanding the underlying causes and patterns of potential problems[2]. Various tools and scoring systems are available to calculate an individual's cardiovascular disease risk based on their risk factors. Like Framingham Risk Score, this estimates the 10-year risk of developing coronary heart disease[3] and it is useful to provide personalized recommendations for lifestyle modifications and preventive interventions to manage cardiovascular risk. We also did study entitled as "Study of Prevalence of prediabetes in faculty of medical college" and we found 50% prediabetic medical staff and they were are not aware about that.

In summary, risk assessment is a broader aspect in which we assess various risk factors so that we can determine an individual's overall risk profile.

Doctors save millions of lives through their medical knowledge and dedication to helping others, but they also need to be reminded from time to time to take care of their own overall well-being. They put their patients' needs before their own also work long hours and in stressful environments, and frequently neglect their own health. Hence there is a need of such type of studies.

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Dr DY Patil Medical College, Hospital and Research Cente, Pune

Sarita A Shinde[1]
Pradnya Jay Phalak[2]
Umesh K More[3]

[1]PhD, Professor, Department of Biochemistry
[2]MD, Professor and Head, Department of Biochemistry
[3]PhD, Professor, Department of Biochemistry

Over-Treating the Clavicle Fracture: A Critical Analysis

Sir, — The clavicle, a crucial component of the shoulder girdle, is a commonly fractured bone, accounting for approximately 2-5% of all fractures. While the majority of clavicle fractures can be managed conservatively, there is a growing concern over the potential for over-treatment, particularly in cases of minimally displaced or stable fractures.

Traditionally, most clavicle fractures have been treated conservatively, with immobilization and early rehabilitation being the standard approach. However, with the advent of new surgical techniques and a better understanding of the potential complications associated with non-operative management, the treatment of clavicle fractures has become increasingly complex.

Recent studies have highlighted that not all clavicle fractures require surgical intervention. In fact, a significant proportion of these injuries, particularly in the elderly population, can be successfully managed without the need for surgery. The decision to pursue surgical treatment should be based on a comprehensive assessment of the fracture pattern, displacement, and the patient's functional expectations and comorbidities.

One of the key considerations in the management of clavicle fractures is the risk of non-union. While non-union rates have been reported to be higher in conservatively treated clavicle fractures, the clinical significance of this finding has been debated.

Proponents of surgical treatment argue that it can provide a more reliable and predictable union, as well as improved functional outcomes.

Furthermore, the literature suggests that the majority of clavicle fractures, even those with significant displacement, can heal with satisfactory outcomes when treated conservatively. Conversely, over-treating these injuries with unnecessary surgical intervention can lead to a cascade of complications, including infection, nerve or blood vessel damage, and hardware-related issues. The risks associated with these procedures, coupled with the potential for delayed healing and the economic burden of unnecessary healthcare costs, underscore the importance of a conservative approach when appropriate.

Careful patient selection and shared decision-making between the patient and the healthcare provider are crucial in determining the appropriate treatment approach. Factors such as the patient's age, activity level, and overall health status should be taken into consideration, as well as the specific characteristics of the fracture. The management of clavicle fractures requires a nuanced and personalized approach that balances the unique needs and circumstances of each individual patient with the potential risks and benefits of available treatment options, ensuring the best possible outcome.

MS (Ortho), DNB Ortho, MCh Ortho (UK), Research Scholar, Department of Orthopaedics, Meenakshi Medical College Hospital & Research Institute (MMCHRI), Meenakshi Academy of Higher Education and Research (MAHER), India

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To
The Honorary Secretaries
All State and Local Branches, IMA

Subject: - Revision in HFC from 6th April, 2025

Dear Doctor,

This is to draw your kind attention to the decision of the amendment approved at the 220th meeting of the Central Working Committee of IMA held at Indore on 17-18 November 2018 duly ratified by the Central Council Meeting at its 79th annual meeting held at Bangalore on 27-28 December, 2018, to increase 15% of the current HFC on every fourth year. The last HFC hike was on 1st April 2022.

Due to the extension of the Membership Drive (25% fee reduction) until 5th April, 2025, **the revision of HFC will be effective from 6th April, 2025.**

You are hereby informed that the HFC shall be as under **w.e.f. 6th April, 2025: -**

Particular's	SLM	CLM	HCM
Membership Fee (H.F.C. w.e.f. 06-04-2025)	**11,155.00**	**16,722.00**	**5,567.00**
Less : State share deducted by State	**2,465.00**	**3,696.00**	**1,230.00**
IMA Hqrs Share LM Fee	**8,690.00**	**13,026.00**	**4,337.00**
IMA HQs Share LM Fee	**8,690.00**	**13,026.00**	**4,337.00**
If State does not have GST no., then membership + GST amount (Single LM-8690+2008=10698) and Couple LM (13026+3010=16036) and Half Couple LM (4337+1002=5339)	**10,698.00**	**16,036.00**	**5,339.00**
If State paid GST on Hqrs Share then membership fee (SLM-8690+1564=10254) and Couple LM Fee (13026+2345=15371) and Half Couple LM (4337+781=5118)	**10,254.00**	**15,371.00**	**5,118.00**

Next revision of HFC will be effective from 1st April, 2028

All State and Local Branch Secretaries may kindly take note of **the revision of HFC will be effective from 6th April, 2025.** and the same should be remitted to IMA Hqrs. as per the revised rates.

With kind regards, Yours
Sincerely

Dr. Sarbari Dutta
Hony. Secretary General, IMA

Dr. Piyush Jain
Hony. Finance Secretary, IMA

Copy to :-

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- Chairman, IMA Finance Standing Committee
- Members of the Working Committee, IMA
- President, All State Branches, IMA
- Honorary Editors, JIMA, Honorary Editors Your Health of IMA / Honorary Editors, Apka Swasthaya of IMA

DECISIONS OF THE CWC MEETING HELD ON 5TH & 6TH APRIL, 2025 AT DEHRADUN

To,
The Presidents and Hony. Secretaries
All State Branches of IMA

Dear Sir,

Greetings from IMA HQs!

This has reference to the successful conduction of our **233rd meeting of the Central Working Committee held on 5th & 6th April, 2025 at Dehradun.** Following are the decisions taken by the above CWC :

1. The efforts for Central Act on violence will be continued by IMA HQs. In the meantime all the state branches are directed to work with their State Governments to incorporate the amendments of Epidemic Diseases Act 2020 into their State Acts.
2. The efforts to exempt medical professionals from Criminal prosecution will be continued.
3. Repeal of PCPNDT Act in its present form and re-enacting the same with mandatory detection of sex of the foetus and tagging as well as safeguarding all unborn children irrespective of sex to delivery is the demand of IMA. Both female foeticide and infanticide are heinous crimes. IMA stands for the safety of the girl child from the moment of conception.
4. Mixopathy is acknowledged as the biggest threat to the profession of modern medicine. No effort will be spared to stop this catastrophic Initiative.
5. IMA reiterates is opposition to NExT.
6. All efforts to expedite the construction of IMA HQs Building will be taken on war footing basis.
7. IMA will work towards exemption of medical professionals from the ambit of CPA.
8. IMA demands to abolish GST on drugs, medical equipments, hospital beds and Health Insurance.
9. IMA HQs will work with the MoH to exempt hospitals less than 50 beds from Central CEA. The state branches are directed to work with their respective State Governments to do the same in their state legislations.
10. IMA ethical branding of Clinical Establishments will be implemented by IMA HBI.

In addition to the above, you are requested to send us the names of members from your State to educate 50,000 members under HPV Vaccination Programme in collaboration between FOGSI & IMA.

Please write to your State Governments requesting them to exempt clinics and nursing homes and hospitals less than 50 beds from the ambit of CEA. We have successful examples of Haryana and Bihar (copies attached), where such exemptions were granted.

Please make necessary efforts to strengthen your State Acts against violence towards medical professionals. This includes advocating for the declaration of hospitals as “safe zones” and ensuring that acts of violence are made a non-bailable offense with a minimum of 7 years of punishment. Please write to your State Governments requesting them to incorporate amendments to the Epidemic Disease Act 2020 into your respective State Acts concerning violence against doctors.

This is for your information and necessary action.

With kind regards,

Yours sincerely,

Dr. Dilip Bhanushali
National President, IMA Hqs

Dr. Sarbari Dutta
Hony. Secretary General, IMA

Copy to : All Office Bearers of IMA Hqs

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