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Development in Critical Health Since Indian Independence

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OF INDIAN MEDICAL ASSOCIATION
HEADQUARTERS (KOLKATA)
Sir Nilratan Sircar IMA House, 53 Sir Nilratan Sarkar Sarani (Creek Row),
Kolkata-700014, West Bengal, Ph: 033-22364200/9123674412,
Email: yourhealthofima@gmail.com,yourhealthoffice@gmail.com

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Development in Medical Field since Indian Independence

Editorial

India has made significant strides in medical advancements, particularly in the last decade, with notable progress in areas like technology integration, infrastructure development, and government initiatives. These advancements are enhancing healthcare accessibility, affordability, and quality across the country.

Here's a more detailed look at the key areas:

1. Technological Innovations:

- **Electronic Health Records (EHRs):** The adoption of EHRs is streamlining healthcare data management, improving efficiency, and facilitating better patient care.
- **Telemedicine:** Platforms like eSanjeevani are providing remote consultations, especially beneficial in bridging geographical barriers and reaching remote areas.
- **Mobile Health (mHealth):** Apps like Aarogya Setu and NIKSHAY are playing a crucial role in disease tracking, public health awareness, and patient engagement.
- **Digital Diagnostics:** Advancements in digital diagnostics are improving accuracy and speed of disease detection.
- **AI and Big Data:** AI and big data analytics are being used to improve diagnostics, personalize treatment plans, and enhance overall healthcare delivery.
- **3D Printing:** Companies like Anatomiz3D LLP and Osteo 3D are utilizing 3D printing for medical applications like creating customized prosthetics and surgical models.
- **Robotic Surgery:** India has developed indigenous surgical robotic technology, like the SSI Mantra by SS Innovations, for telesurgery and teleproctoring.

2. Infrastructure Development:

- **Expansion of Healthcare Facilities:** New hospitals, medical colleges, and research institutions are being established, particularly in rural areas, improving access to care.
- **Specialized Centers:** The growth of specialized centers like cancer institutes and cardiac hospitals is enhancing disease-specific care.

3. Government Initiatives:

Dr. Khwaja Alim Ahmed
Hony. Editor, Your Health

- **Ayushman Bharat:** This flagship program provides free healthcare to millions of low-income families, making it the world's largest government-funded healthcare program.
- **National Health Mission (NHM):** NHM focuses on strengthening healthcare infrastructure, improving disease surveillance, and promoting public health initiatives.
- **National Digital Health Mission (NDHM):** NDHM aims to create a digital health ecosystem, providing unique health IDs to citizens and facilitating data-driven healthcare solutions.

4. Notable Medical Breakthroughs and Innovations:

- **Nafithromycin:** Wockhardt Limited developed this drug to treat drug-resistant pneumonia in adults.
- **PresVu Eye Drops:** Entod Pharmaceuticals created eye drops for presbyopia, potentially eliminating the need for glasses.
- **Malaria Vaccine Candidate:** Scientists at Jawaharlal Nehru University identified a potential vaccine candidate for malaria.
- **Gene Therapy for Hemophilia A:** Christian Medical College, Vellore used gene therapy to eliminate bleeding episodes in people with Hemophilia A.

A national strategy focused on digital health, nutrition, and other high-impact interventions has dramatically improved health outcomes across India—but more work remains to be done.

India has entered a new era in public health during the past ten years. Thanks to improvements across the spectrum of health and development, average life expectancy has risen steadily from 64 to 68 years between 2005 and 2015.

But we must continue to build on this progress. India still ranks 154th out of 195 countries in terms of quality and accessibility of health care, according to a recent Lancet study.

India's average life expectancy has risen steadily from 64 to 68 years between 2005 and 2015.

While plenty of work remains ahead of us, together we have achieved tremendous positive change.

We shares seven major trends over the last decade that have brought us this far:

1. A downtrend in communicable diseases

India has been polio-free since 2014. In a country of 1.2 billion people, this is a big deal. We have also been free of tetanus since 2015 and have set strict targets for the elimination of malaria, tuberculosis (TB), and lymphatic filariasis in the coming years. While we still represent a large percentage of the global burden for these diseases, we've made significant progress.

The *Swachh Bharat Abhiyan*, or Clean India Movement, has provided a big push in the right direction to reduce the spread of communicable diseases. As recently as 2014, 65 percent of our population defecated in the open—and now that number is down to 20 percent. This shows how quickly progress can take root when communities and government leaders work together and how it will have a huge impact on health going forward.

With its last case of polio in 2014 and tetanus in 2015, India has set its sights on eliminating malaria, tuberculosis, and lymphatic filariasis. Photo: PATH/Gabe Bienczycki.

2. A focus on prevention

As communicable diseases trend downward, we've seen new challenges emerge around

Prof. (Dr.) Sankar Sengupta
Hony. Secretary, Your Health

noncommunicable diseases like hypertension, diabetes, cardiovascular diseases, stroke, and cancer. These diseases impact the rich in India as much as they impact the poor, but most poor people don't have the resources to combat diseases like cancer. Our public health system isn't geared toward noncommunicable diseases. So for India as a country, the challenge going forward is to focus on prevention, support, and awareness.

In an encouraging sign of progress, we've seen a big increase in health and wellness centers in the past decade. We are now starting to think beyond primary health and toward universal health coverage. Coupled with an emphasis on preventive care, this shift will increase all-around wellness. The National Health Mission (NHM)—the result of a 2013 merger between the National Urban Health Mission and the National Rural Health Mission—is a prominent example. The program's primary focus is on disease control, prevention, and surveillance, and it has already made a huge impact on our health care system.

Widespread improvements in sanitation, immunization coverage, and institutional birthing have led to more infants surviving across India. Photo: PATH/Tom Furtwangler.

3. Reduced neonatal mortality rates

Neonatal mortality rates have improved markedly, dropping from 57 deaths per 1,000 live births to 37 between 2005 and 2015. In the past decade, India has saved a huge number of infants through multiple interventions—including an increase in institutional birthing, immunization coverage, and improved sanitation.

Is it enough? Absolutely not. Have we done well? Yes. Do we still have work to do? Absolutely.

4. Tackling antimicrobial resistance

Like several other low- and middle-income countries, India has room to improve in how we handle antibiotics. Production and distribution are not regulated, and retailers sell antibiotics to pretty much anyone—no prescription needed. Most people don't complete their full course of antibiotic doses, so while they may feel better, the remaining bacteria can develop resistance and make them sick again. Many new kinds of resistance are cropping up, and drugs aren't working quite as well as they used to.

The 2017 National Action Plan on Antimicrobial Resistance and Red Line campaign—which demands that prescription-only antibiotics be marked with a red line to discourage the over-the-counter sale of antibiotics—are both steps in the right direction. But these efforts need firm legal backing and sustained financial support. Growing antimicrobial resistance is a challenge that India and the world will increasingly face in the coming decade.

Cooking micronutrient-fortified rice for a school lunch program in India. 70 percent of India's population now has access to subsidized food. Photo: PATH/Satvir Malhotra.

5. Improved nutrition

After significant progress in the last few years, 70 percent of India's population now has access to subsidized food. PATH has been looking into the massive potential offered by rice fortification and is currently working with the state government to reach 450,000 schoolchildren each day in Karnataka State. Over the coming decade, India plans to introduce fortified food to two-thirds of the country via the National Food Security Act, which will dramatically reduce anemia and childhood stunting.

6. Using digital health and artificial intelligence for social impact

India's government and our health minister led the conversation around digital health at the recent World Health Assembly in May. India is a digital powerhouse that still faces challenges with our health infrastructure, and it was exciting and inspiring to see India leading strategic discussions around how to best leverage digital health and artificial intelligence (AI) to improve public health.

In the past decade, India has implemented a digital health program called eVIN to track immunization. The program is critically important for the country because of the size of our population. ANMOL is another important digital health tool, providing better health care services to pregnant women, mothers, and newborns. India continues to struggle with high maternal and neonatal mortality rates, so tracking and providing services to new moms is important—especially for the country's poorest and most vulnerable people.

India is taking the lead on using AI to drive social impact. We are concentrating our efforts where the need is greatest, starting with a focus on some of the most infectious diseases—especially TB. By using AI to improve diagnostics and ensure higher treatment adherence rates, we can accelerate the elimination of TB in every state.

India is taking the lead on using AI to drive social impact.

7. Stronger government accountability

As a country, India allocates only 1.15 percent of our gross domestic product (GDP) to health care—one of the world's lowest rates considering the size of our population. Much of the funding that *is* allocated to health care is not being used, and a major lack of staff further leads to the underutilization of budgets. Indian health care organizations often have trouble recruiting, as we don't have enough trained professionals who want to work in rural villages or health centers. Without reliable health services, people living outside of major cities suffer from a growing economic disadvantage.

Recently, largely due to pressure from the public and the media, the Indian government is beginning to vocalize firm timelines and budgets for new health programs. The government has committed to dedicate 2.5 percent of our GDP to health care by 2025. More

and more programs are using 100 percent of their health care budgets. New programs are bringing medical insurance to the poor, allowing access to both government facilities and private facilities.

When you look at India's history, this is a great place to be. Of course, as we drive to fully utilize health budgets, we need to keep working with the government to increase funding—but we are moving by leaps and bounds in the right direction.

Moving forward

So where do we go from here? In the next ten years, a lot still needs to change in India. The public must come to trust the public health system if it is to serve them. Seventy percent of the Indian population still chooses to see a private and likely unqualified health care provider for their health needs. Indians also face some of the highest out-of-pocket costs for health services, driving many struggling households back into poverty and debt.

But perceptions have started to shift. People are demanding better public services, and they expect that health services are going to improve in the coming years. In the next decade, however, it's not just the public health care system that needs to be strengthened to solve this problem of public perception. We must also strengthen the link between health insurance, private health care providers, and the public, whether they live in cities or far beyond them.

As these forces come together, we're going to see real progress in health for all Indians—especially those who need it most. That means a healthier, happier world, where people can live up to their full potential.

That's where we are headed, and you can help to get us there.

Key Aspects of Current Critical Care and Common Misconceptions:

Guest Editorial

DR. Basabbijay Sarkar
MD
Consultant Internist & HOD,
Dept. of Internal Medicine,
Fortis Hospitals, Kolkata,

The current era of critical care is defined by advanced technology, precision medicine, and a focus on multidisciplinary teamwork. However, misconceptions about critical care persist, such as the belief that it's only for the very sick, that recovery is unlikely, and that it's a solitary, isolated environment. In reality, critical care units manage a wide range of conditions, offer a good chance of recovery, and operate with a collaborative, team-based approach.

Advanced Technology and Precision Medicine:
Modern critical care utilizes sophisticated monitoring equipment, life support systems (like ventilators), and advanced diagnostic tools. Precision medicine tailors treatments based on individual patient characteristics, including genetic information and biomarkers.

Multidisciplinary Teamwork:
Critical care is not a solo endeavor. Doctors, nurses, respiratory therapists, pharmacists, and other specialists work together to provide comprehensive care. This team-based approach ensures that all aspects of a patient's condition are addressed, from ventilation strategies to infection control.

Misconception: ICU is only for the severely ill:
While critical care units handle severe cases, they also manage patients with less acute but potentially serious conditions that require close monitoring and specialized care.

Misconception: Recovery is unlikely in the ICU:
Many patients admitted to the ICU recover and are discharged to return home, according to the Aga Khan University Hospital and KD Hospital. Advancements in technology and treatment protocols have significantly improved survival rates.

Misconception: ICU doctors work in isolation:
Critical care doctors lead and coordinate the care team, but they rely on the expertise and collaboration of other healthcare professionals.

Misconception: Ventilators always indicate a terminal condition:
Many patients are successfully weaned off ventilators after their condition stabilizes.

Misconception: ICU stays are always long-term:
The length of stay varies depending on the patient's condition, with some requiring only a short period of intensive care before moving to a regular hospital ward.

Misconception: ICU care is impersonal:
Patients in the ICU receive continuous monitoring and individualized care from a dedicated team of healthcare professionals.

Misconception: Visiting the ICU is harmful:
Family visits are generally encouraged, as emotional support can aid recovery, although visitation policies may vary.

Misconception : If You Are in the ICU, Death Is Assured
This is probably one of the most damaging myths out there. The common idea is if you go to the ICU, you will be dead for sure. In reality ICU is best practiced for very intensive care and the best chance of survival for any patient. Making it past an ICU stay is often a full recovery for many. The purpose of an ICU doctor is to safely get patients through the hardest phase of their

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Sepsis and Acute Kidney Injury (AKI)

Dr Manik Kataruka
Senior consultant, Nephrology,
Fortis Hospital, Kolkata
DM (Nephrology, PGIMER, Chandigarh, India)

Sepsis is a life-threatening condition that arises when the body's response to an infection causes injury to its own tissues and organs. It's not the infection itself that causes the most harm, but rather the body's overwhelming and dysregulated immune response to it. This can lead to widespread inflammation, damage to blood vessels, and ultimately, multiple organ dysfunction syndrome (MODS). If not recognized and treated promptly, sepsis can rapidly progress to septic shock, a severe form of sepsis characterized by persistent hypotension requiring vasopressors to maintain mean arterial pressure (MAP), despite adequate fluid resuscitation. Septic shock carries a very high mortality rate.

Acute Kidney Injury (AKI)

Acute Kidney Injury (AKI), formerly known as acute renal failure, is a sudden decrease in kidney function over hours or days. This decline leads to a buildup of waste products in the blood, such as creatinine and urea, which the kidneys normally filter out. AKI can range from a mild impairment in kidney function to complete kidney failure requiring renal replacement therapy (dialysis).

The Link Between Sepsis and AKI (Sepsis-Associated AKI)

Sepsis is the leading cause of AKI in critically ill patients, accounting for approximately 50% of all AKI cases in the intensive care unit (ICU). This specific type of kidney injury is termed sepsis-associated AKI (SA-AKI). The kidneys are highly susceptible to damage during sepsis due to their high blood flow and metabolic rate, making them vulnerable to systemic inflammatory and hemodynamic disturbances. The development of SA-AKI significantly worsens patient outcomes, increasing ICU stay, healthcare costs, and the risk of chronic kidney disease.

Pathophysiology

The pathophysiology of SA-AKI is complex and multifactorial, involving a combination of systemic and renal-specific factors. Key mechanisms include:

- Systemic Inflammation: The uncontrolled release of pro-inflammatory cytokines (e.g., TNF-α, IL-6) during sepsis leads to widespread endothelial dysfunction, microvascular thrombosis, and increased vascular permeability. This causes fluid to leak out of vessels, reducing effective circulating volume and impairing blood flow to the kidneys.
- Renal Microcirculatory Dysfunction: There is often significant dysfunction at the microvascular level within the kidneys. This includes impaired autoregulation, shunting of blood, and microthrombosis, leading to localized areas of ischemia and hypoxia within the renal tubules and glomeruli.
- Mitochondrial Dysfunction: Sepsis disrupts mitochondrial function in renal tubular cells, impairing energy production and leading to cellular injury and death.
- Oxidative Stress: An imbalance between pro-oxidants and antioxidants during sepsis contributes to cellular damage.
- Direct Bacterial/Toxin Effects: While less common than the inflammatory response, some infections (e.g., pyelonephritis) or bacterial toxins can directly injure kidney cells.
- Hemodynamic Instability: Hypotension due to septic shock, directly reduces renal perfusion pressure.
-

Diagnosis and Management

Diagnosing SA-AKI involves monitoring serum creatinine and urine output. Early recognition is crucial. Management of SA-AKI is primarily supportive and focuses on:

- Treating the Underlying Sepsis: This is paramount and involves early administration of broad-spectrum antibiotics, source control (e.g., draining an abscess, removing an infected catheter), and fluid resuscitation.
- Optimizing Hemodynamics: Maintaining adequate blood pressure and perfusion to the kidneys is vital, often requiring intravenous fluids and vasopressors guided by hemodynamic monitoring.
- Avoiding Nephrotoxic Agents: Discontinuing or avoiding medications that can harm the kidneys (e.g., NSAIDs, certain antibiotics, contrast dyes).
- Fluid Management: While fluid resuscitation is critical initially, avoiding fluid overload is equally important as it can worsen outcomes in AKI.
- Renal Replacement Therapy (RRT): In severe cases, RRT (e.g., continuous veno-venous hemofiltration) may be necessary to remove waste products, manage fluid balance, and correct electrolyte imbalances.

Prognosis

SA-AKI is a major determinant of outcome in septic patients. Patients who develop SA-AKI have significantly higher mortality rates compared to those with sepsis alone but without AKI. Even among survivors, SA-AKI increases the risk of developing chronic kidney disease (CKD) and progression to end-stage renal disease (ESRD), highlighting the long-term consequences of this severe complication. Therefore, preventing, recognizing, and aggressively managing SA-AKI is a critical component of modern sepsis care.

Guest Editorial

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Key Aspects of Current Critical Care and Common Misconceptions:

DR. Basabbijay Sarkar

illness and onto recovery. Due to the advancements in technology and care, survival rates from an ICU stay have certainly reached much higher than in times past.

Misconception : ICU Doctors Only Treat the Elderly or Terminally Ill

People think that only older patients or those with end-of-life conditions get admitted into the ICU.

Many are treated by ICU doctors across all ages of life-from young adults with life-threatening infections to middle-aged persons recovering from surgery or after traumatic events. While some have terminal illness, fewer than that come in as sudden health events from trauma, sepsis, heart attacks, or complications arising after surgery. The idea is to treat to maximize recovery and not just to do end-of-life care.

Conclusion:

The very essence of trust and comfort lies in knowing and accepting the truth behind these myths during uneasy and difficult hours. ICU and critical care doctors do have special training for managing life-threatening conditions. However, they are compassionate persons who respect the life and dignity of their patients.

Widal Test Revisited.

Dr Arun Kumar Kedia
MD, FICP
Consultant Physician
Lifeworth Hospital, Raipur

Introduction

The Widal test, a serological test for detecting typhoid fever, was developed in 1896 by French physician Georges-Fernand Widal. It is an indirect tube agglutination test that identifies antibodies (agglutinins) against Salmonella Typhi and Salmonella Paratyphi bacteria in a patient's blood sample. The test was named after its inventor and has been a widely used diagnostic tool for typhoid fever for over a century, particularly in resource-limited settings, where advanced diagnostic methods are not readily available. While newer, more accurate tests have emerged, this test remains in use due to its affordability and accessibility, particularly in developing countries. The simplicity of the test, low cost, wide availability and a quick result within a few hours are the major advantages.

Key aspects of the Widal test:

- Principle: The test detects agglutinating antibodies (agglutinins) against the O and H antigens of Salmonella Typhi and Paratyphi. While the O antigen is a component of the bacterial cell wall, the H antigen is found in the bacterial flagella.
- Since the test requires serial dilutions of the patient's serum, it requires interpretation by a trained healthcare professional. The results may vary from lab to lab, and often the interpretation can be very subjective. The test may also have a variable sensitivity and specificity.
- Alternatives: Blood cultures, urine cultures, and stool cultures are also used to diagnose enteric fever. While newer modern rapid tests like Typhidot and the Tubex test exist, the Widal test remains a popular diagnostic tool in India.

Limitations in the Interpretation of Widal Test:

- The timing of the test is critical, as antibodies begin to arise at the end of the first week. The titre increases subsequently upto the fourth week, after which it gradually declines. So, the test may be negative in the early part of the first week.
- A Single test is usually not of much value. A rise in titre between two serum specimens is more meaningful than a single test. However, if the first sample is taken very late in the disease, a rise in titre may not be demonstrable. Instead, there may be a fall in titre.
- Baseline titre of the population must be known before attaching significance to the titres. The antibody levels of individuals in a population of a given area give the baseline titre. Generally, a titre of 100 or more for O antigen is considered significant and a titre above 200 for H antigens is considered significant in India.
- Patients already treated with antibiotics may not show any rise in titre; instead, there may be a fall in titre. Thus, patients treated with antibiotics in the early stages may not give positive results. Similarly, false negative results are also possible in the carrier state.
- Patients who have received vaccines against Salmonella may give false positive reactions due to anamnestic response. This can be differentiated from true infection by repeating the test after a week. True untreated infection results in a rise in titre, whereas vaccinated individuals don't demonstrate any rise in titre.
- Those individuals with a past history of Salmonella infection sometimes develop anti-Salmonella antibodies during an unrelated or closely related infection due to anamnestic response and can be differentiated from true infection by lack of any rise in titre on repetition after a week.
- Antigen suspensions with fimbrial antigens may sometimes give false positive reactions due to the

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Increasing Drug – Resistant Bugs in India

Dr. Amitabha Saha
MBBS, MD, MRCP (UK), EDICM
MRCP (SCE) – Endocrinology and Diabetes
MRCP (SCE) - Rheumatology
Director – Critical Care Medicine
Senior Consultant – Internal Medicine
Desun Hospital, Kolkata

Antimicrobial resistance (AMR) is an escalating concern in India, compromising the effectiveness of standard treatments and burdening both patients and healthcare systems. Here's a concise, practical overview based on recent Indian evidence—aimed at streamlining your clinical decisions.

1. Why It Matters

India has witnessed alarming increases in resistance among common bacterial pathogens. The Indian Council of Medical Research (ICMR) reported in 2023 that *Escherichia coli*—frequently isolated from OPDs, wards, and ICUs—now shows susceptibility rates below 20% to cephalosporins and fluoroquinolones, and declining sensitivity to carbapenems too. For example, imipenem susceptibility dropped from 81% in 2017 to 63% in 2023, and meropenem from 73% to 66%.

Klebsiella pneumoniae is similarly concerning: piperacillin-tazobactam susceptibility has decreased to 26%, imipenem to 36%, and meropenem to 38%. Moreover, *Acinetobacter baumannii*—a notorious ICU pathogen—showed 88% resistance to carbapenems in 2023.

Recent data from AIIMS Bhopal (Jan–Jun 2025) suggest only 39% of *E. coli* remain sensitive to ciprofloxacin, with ~60% resistance in UTI isolates; *Klebsiella* shows reduced response to meropenem around 52%.

2. Notable Examples

- **Typhoid (Salmonella Typhi)**: A study from Gujarat (Ahmedabad, Vadodara) found over 90% resistance to key drugs—ceftriaxone, ciprofloxacin, gentamicin, and others. Some XDR typhoid cases responded to β-lactam plus β-lactamase inhibitor combinations.
- **Hospital Impact**: In Kolkata, 10–15% of secondary bacterial infections (e.g. streptococcal pneumonia complicating viral illness) show resistance to penicillins, cephalosporins, and fluoroquinolones—leading to longer hospital stays and reliance on broad-spectrum antibiotics.

3. What's Driving Resistance?

- **Misuse and Overuse**: High antibiotic self-medication and OTC access remain widespread. Surveys show self-medication rates of 50–90% in some regions; fluoroquinolones and second-line drugs are freely available without prescription.
- **Public & Private Practices**: In private clinics, over-prescription is often driven by patient expectations or pharmaceutical influence. In public hospitals, high patient load and resource constraints limit microbiological testing and rational antibiotic use
- **Environmental Spillover**: Antibiotic residues from pharmaceutical manufacturing (e.g., fluoroquinolones detected in rivers) and inadequate hospital waste treatment foster environmental AMR reservoirs.
- **Agricultural Use**: Use of antibiotics in livestock for growth and disease prevention contributes to resistant bacteria entering the food chain.

4. What's Being Done?

- **National Action Plan on AMR (NAP-AMR, 2017)**: Coordinated by NCDC, this plan supports surveillance across ~50 labs in 27 states and 6 UTs, promotes awareness, and supports antimicrobial

stewardship programs (AMSP).
- **Surveillance Networks**: NARS-Net monitors key pathogens; ICMR's AMRSN continues annual data gathering and trends analysis.
- **Regulatory Steps**: In 2024, 156 fixed-dose combinations were banned. States like Kerala outlawed OTC antibiotic sales; Schedule H1 rules require prescription retention for critical drugs.
- **One Health & Innovation**: Initiatives like the One Health surveillance network link human and animal AMR tracking. The C-CAMP India AMR Challenge funds innovators; campaigns like the "Red Line" mark antibiotics that require prescriptions.

5. Practical Tips for General Physicians

- Culture First: Whenever feasible, use culture and sensitivity to guide antibiotic selection—especially for typhoid, UTIs, pneumonia, sepsis. Empirical therapy should be based on local resistance patterns.
- Reserve Last-Resort Drugs: Use carbapenems or colistin only when absolutely needed; rely instead on effective older agents where susceptibility permits (e.g., nitrofurantoin or fosfomycin for uncomplicated UTIs)
- Stewardship Mindset: Adhere to proper drug choice, dose, duration, and IV-to-oral conversion. Watch for drug-bug mismatches and avoid redundant therapy.
- Patient Education: Emphasize completing full antibiotic courses, discourage self-medication, and reinforce that antibiotics do not treat viral illnesses.
- Advocate for Stewardship: Encourage adoption of AMSP and infection control committees in hospitals—even in smaller facilities.
- Environmental & Community Awareness: Promote safe pharmaceutical disposal,

References (Indian Publications & Reports):

1. ICMR AMR Surveillance Network 2023 report on resistance trends among *E. coli*, *Klebsiella*, *Acinetobacter*, etc.

Widal Test Revisited.

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Dr Arun Kumar Kedia

sharing of fimbrial antigens by some Enterobacteriaceae members. Therefore, antigen suspension must be devoid of fimbrial antigens.
- A very high false-positive result due to cross-reactivity with other non-typhoid diseases occurs. Malaria, Dengue, Miliary tuberculosis, brucellosis, chronic liver disease and many other conditions can give positive results, esp in endemic areas. Thus, the result needs to be interpreted in the context of the patient's history.

Conclusion:

Even after 125 years since the discovery of the Widal test, it remains an important diagnostic tool among general physicians for evaluating any febrile illness. However, its time to upgrade and move to better diagnostic methods for enteric fever. Interpretation of the Widal test must always be done in the clinical context, and titres must be noted in the context of the population.

Early diagnosis of Sepsis

Dr Saswati Sinha
MD (Medicine), IDCCM, EDIC
Senior Consultant Critical Care
Manipal Hospitals, Dhakuria.

Sepsis is a clinical syndrome that has physiologic, biologic, and biochemical abnormalities caused by a dysregulated host response to infection. The Global Burden of Disease Study reported that in 2017, an estimated 48.9 million incident cases of sepsis were reported. Approximately 11 million deaths were reported, representing 19.7 percent of all global deaths.
Reasons for a possible increased rate of sepsis include advancing age, immunosuppression, and multidrug-resistant infection.

Early prediction of sepsis is crucial in preventing mortality, given that sepsis management is highly time sensitive, and mortality increases significantly with each hour of delay in antimicrobials administration.

Pathogens - Although bacteria are the predominant pathogens worldwide, viruses, fungi and parasites also have a substantial contribution to sepsis varying with geographical location, seasonal outbreaks, availability of diagnostic modalities. However, in close to 50% cases, the culprit organism may not be identified.

Definitions – The definition of sepsis has evolved since early 1990s. The term sepsis is a continuum of severity ranging from infection and bacteremia to sepsis and septic shock associated with organ dysfunction and death.

Sepsis -3 definition (ESICM/SCCM task force,2016) has defined sepsis as **life-threatening organ dysfunction** caused by a dysregulated host response to **infection.**

Organ dysfunction - Organ dysfunction is defined as a SOFA score of ≥2 or a SOFA score increase of ≥2 from a chronic baseline. Predictive value of the SOFA score was found to be superior to the previously used SIRS (Systemic Inflammatory Response Syndrome) in predicting mortality and was easier to calculate than the LODS (Logistic Organ Dysfunction Score) which formed the basis of recommendation.

Infection - There are no clear guidelines to help the clinician identify the presence of infection or to causally link an identified organism with sepsis. It is the clinical suspicion based on signs and symptoms in combination with radiological and microbiological data as well as response to therapy which drives the diagnosis.

Why is early diagnosis important?
As sepsis management is often based on a standardized management approach,' early sidentification may be practically challenging and operational constraints in healthcare delivery can lead to unacceptably high mortality rates.
Reliable tools to expedite sepsis diagnosis are crucial as overdiagnosis, and treatment contribute to irrational antimicrobial prescriptions contributing to the menace of antimicrobial resistance.

Scores

qSOFA - It is a readily available bedside tool without laboratory tests and has better performance in non-intensive care unit (ICU) than ICU settings. It is a simplified version of the SOFA score that comprises only three variables, and patients with a qSOFA score of ≥2 should be considered for the possibility of sepsis. However, its performance in diagnosing sepsis is limited due to its low sensitivity in diagnosis organ

dysfunction in comparison with SIRS ≥ 2 although it is more specific.

Early warning scores (MEWS, EWSS, NEWS)

Clinical evidence indicates that patients with acute deterioration or sepsis manifest clinical signs or symptoms several hours before the condition worsens. These scores were developed to screen patients at high risk of deterioration and have shown a trend toward improved outcomes and, when coupled with an outreach service (i.e., rapid response teams or medical emergency teams), they facilitate timely initiation of the optimal treatments.

Role of AI in early sepsis diagnosis - From a diagnostic perspective, AI has demonstrated advantages over traditional scoring systems, such as SIRS, SOFA, and qSOFA, by identifying sepsis more quickly and accurately. In fact, with the ability to detect complex, nonlinear patterns, these algorithms achieve higher AUROCs, positioning themselves as promising tools for sepsis diagnosis and risk stratification.

"Get ahead of Sepsis" - an educational effort by CDC to optimize healthcare quality and patient safety by raising awareness and knowledge and motivating behavior change related to prevention of infections that can lead to sepsis and early recognition of and appropriate treatment for sepsis among consumer and healthcare provider target audiences.

Study of Dilated cardiomyopathy in rural areas of bastar by transthoracic 2D echocardiography

Abstract

Background: Dilated cardiomyopathy (DCM) is a leading cause of heart failure, with variations in risk factors and outcomes across populations. Data from tribal-dominant regions of India remain limited.

Objectives: To evaluate the clinical and echocardiographic profile of patients with DCM in Bastar region and to analyze correlations between risk factors, clinical features, and echocardiographic parameters along with disease severity.

Methods: Sixty-four patients (18–80 years) diagnosed with DCM were evaluated. Clinical history, comorbidities, risk factors, laboratory parameters, and echocardiographic indices were studied. Associations between risk factors and severity of left ventricular dysfunction were analyzed.

Results: Among 64 patients, 34 were male and 30 female. Alcoholism (54.6%), anaemia (46.9%), hypertension (31.2%), and diabetes mellitus (31.2%) were major comorbidities. Smoking was reported in 28.1%, thyroid dysfunction in 3.1%, and pregnancy in 6.2%. Overlapping risk factors were frequent: alcoholism with smoking (15 patients), alcoholism with anaemia (20 patients), and alcoholism with diabetes (12 patients). All patients demonstrated moderate to severe left ventricular dysfunction. LVEF <35% and LVDD >50 mm correlated with advanced heart failure symptoms and recurrent hospital admissions.

Conclusion: DCM in Bastar region is strongly linked to chronic alcoholism, smoking, anaemia, and hypertension, compounded by nutritional deficiencies. Female anaemia and primi pregnancies were significant contributors. Echocardiographic markers, particularly LVEF <35% and LVDD >50 mm, predicted poor prognosis.

Dr. John Masih
MBBS & MD Medicine from
Pt JNM Medical Collage Raipur
Associate Prof. at BRK Memorial
GMC Jagdalpur

Introduction

Dilated cardiomyopathy (DCM) is characterized by ventricular dilatation and impaired systolic function, leading to progressive heart failure [1]. It accounts for nearly one-third of heart failure cases worldwide [2]. Causes include genetic predisposition, infections, toxins, alcohol abuse, metabolic and nutritional deficiencies [3].

In India, the burden of DCM is compounded by widespread alcohol consumption, nutritional deficiencies, and delayed access to healthcare [4]. The Bastar region, predominantly inhabited by tribal populations, has unique dietary patterns (low-protein, high-carbohydrate diet) and high prevalence of chronic alcoholism. However, little is known about the clinical and echocardiographic profile of DCM in this region.

This study aimed to evaluate the clinical and echocardiographic characteristics of DCM in Bastar and to identify prognostic indicators relevant to this population.

Methods

This was a retrospective observational study conducted at a tertiary care center in Bastar, SMKM Hospital and GMC jagdalpur. A total of 64 patients aged 18–80 years diagnosed with DCM based on clinical

findings and echocardiography were included. Patients with congenital, valvular, or ischemic heart disease were excluded.

Clinical evaluation included demographic data, alcohol and smoking history, comorbidities, obstetric history, and physical examination. Laboratory tests included hemoglobin, renal and liver function, and thyroid profile. Echocardiography assessed left ventricular ejection fraction (LVEF) , left ventricular end-diastolic dimension (LVDD) along with other parameters

Descriptive statistics were used. Associations between risk factors and echocardiographic severity were analyzed.

Results

Demographics: Of 64 patients, 34 (53.1%) were male and 30 (46.9%) female.

Risk factors and comorbidities:

- Alcoholism: 35 (54.6%)
- Anaemia: 30 (46.9%)
- Hypertension: 20 (31.2%)
- Diabetes mellitus: 20 (31.2%)
- Smoking: 18 (28.1%)
- Thyroid disorder: 2 (3.1%)
- Pregnancy (primi): 4 (6.2%)

Overlap of risk factors:

- Alcoholism + smoking: 15 patients
- Alcoholism + anaemia: 20 patients
- Alcoholism + diabetes: 12 patients

Echocardiographic findings:

All patients had moderate-to-severe LV dysfunction. Severe symptoms and recurrent admissions were significantly associated with LVEF <35% and LVDD >50 mm.

Discussion

This study highlights that alcoholism, anaemia, smoking, and hypertension are the predominant risk factors for DCM in Bastar. Chronic alcohol intake is a recognized cause of DCM, accounting for up to 30–40% of cases in some series [5]. The tribal population's nutritional deficiencies may amplify the cardiotoxic effects of alcohol, leading to earlier and more severe disease.

Anaemia, particularly among women, further reduced myocardial oxygen delivery and correlated with severity of LV dysfunction. Interestingly, all four pregnant women included were primi and anaemic, suggesting pregnancy may unmask subclinical cardiomyopathy in predisposed women.

Echocardiography remains central in prognostication. Our findings that LVEF <35% and LVDD >50 mm predict adverse outcomes are consistent with international literature [6].

Limitations: This was a single-center study with a small sample size. Follow-up data were limited, restricting assessment of long-term outcomes.

Conclusion

DCM in Bastar region is strongly associated with alcoholism, anaemia, smoking, and hypertension, with compounding effects of nutritional deficiencies. Anaemia in women, especially during primi pregnancies, is an important contributor. Echocardiographic markers, particularly LVEF <35% and LVDD >50 mm, are reliable predictors of severity and prognosis. Early screening and targeted interventions addressing alcohol intake, nutrition, and comorbidities may improve outcomes in this vulnerable population.

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Your Health
Sir Nilratan Sarcar IMA House
53, Sir Nil Ratan Sircar Sarani,
(Creek Row), Kolkata -700 014
Tel:(033)2236-4200,
Email:yourhealthofima@gmail.com,
yourhealthoffice@gmail.com

If undelivered please return to:
Your Health
Sir Nilratan Sircar IMA House
53, Sir Nilratan Sircar Sarani,
(Creek Row), Kolkata-700014, INDIA

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