



SACTEM TIMES

ABOUT SACTEM SOCIETY

EVERY SECOND COUNTS. EVERY SKILL SAVES

The Society for Acute Care, Trauma & Emergency Medicine (SACTEM) is a national foundation dedicated to transforming India's emergency-care landscape. With a commitment to saving lives, strengthening systems, and empowering responders, SACTEM works to enhance preparedness, skill development, and public awareness.

"When knowledge meets action, lives are saved." - Core philosophy of SACTEM



OUR MISSION

To improve the quality of acute care, trauma, and emergency medical services in India through education, advocacy, and collaboration, ultimately saving lives and reducing suffering.



OUR VISION

A Country where every person in India has access to high-quality, timely, and affordable acute care, trauma, and emergency medical services delivered by well-trained and dedicated professionals.



OUR IMPACT

Stronger skills, safer communities

Thousands of professionals have been trained through SACTEM's workshops, academic programs, and outreach activities. Communities have become more aware, more responsive, and more prepared to act when it matters most.



JOIN US IN SAVING LIVES

Be the reason someone survives today

Whether you are a doctor, nurse, student, paramedic, volunteer, or institution, SACTEM welcomes you to be part of a mission that creates real-world impact. Together, we can build a safer, stronger, and better-prepared India.

WHO WE ARE?

UNITING EXPERTISE, ELEVATING EMERGENCY CARE

SACTEM is a multidisciplinary body of emergency physicians, trauma specialists, paramedics, nurses, first responders, educators, and public-health professionals. We strive to create a unified, collaborative platform that promotes excellence, innovation, and ethical practice in emergency and trauma care across India.

WHY WE ARE?

IN EMERGENCIES, PREPAREDNESS IS THE STRONGEST MEDICINE

India faces a rising burden of road-traffic trauma, cardiac arrests, medical emergencies, and disaster-related crises.

Delays in skill, awareness, and coordination often cost lives that could be saved.

SACTEM was established to bridge this life-critical gap by:

- Standardizing training & protocols
- Enhancing emergency-response systems
- Empowering communities with life-saving skills
- Supporting research & innovation
- Giving emergency-care professionals a unified voice

WHAT WE DO?

TRAINING TODAY FOR THE EMERGENCIES OF TOMORROW

Conduct hands-on workshops, training programs, and certifications (BLS, ACLS, trauma care, disaster response). Publish research, newsletters, and educational resources to keep professionals updated. Host national conferences, CME programs, expert panels, and symposiums. Run community outreach campaigns on CPR, first aid, road safety, and disaster preparedness. Build bridges between healthcare institutions, first-responders, and academic bodies to strengthen emergency-care networks.



Dr. Avinav Luthra
Editor in Chief
SACTEM Newsletter



Know The **President** & **Founder**

DR LOKENDRA GUPTA — VISIONARY BEHIND SACTEM

Since childhood, I've understood the importance of the pace of time and the significance of immediate response. The inception of the Society for Acute Care, Trauma, and Emergency Medicine was inspired by that ethos, where timely, thorough, and compassionate responses are paramount in every situation. I embarked on founding this organization with the purpose of enabling people worldwide to be vigilant in their responses, ensuring better care in critical situations. It is aligned with the vision of the institution, committed to achieving new heights in responsiveness, education, and research in modern healthcare. We embark on this journey with the belief that with each individual, we are ushering in a new era, where diversity in narratives and prosperity are being woven into the fabric of healthcare.

Dr. Lokendra Gupta is the founder and current President of SACTEM. With deep commitment and foresight, he launched the foundation to transform emergency medical care across India — striving to ensure timely, accessible, and high-quality trauma and emergency services for all.

- Dr Gupta serves as Director and Head of Emergency Medicine & Trauma Care at a major tertiary-care hospital.
- Under his leadership, SACTEM has initiated and driven multiple training, outreach, and public-health programs — with a special focus on equipping medical professionals and communities to act decisively in critical scenarios.



Why He Started **SACTEM**?

From early in his career, Dr Lokendra Gupta recognized the critical importance of “time and response” in emergencies — knowing that “every second counts” when lives hang in the balance. He founded SACTEM to bring this sense of urgency into organised training, education, and public-awareness campaigns. He envisioned a society where emergency care is not just reactive, but proactive — where physicians, paramedics, and even ordinary citizens are empowered with knowledge and skills to act when medical crises strike.

Leadership & Major Contributions

Under Dr Gupta's stewardship, SACTEM has:

- Conducted large-scale hands-on workshops, including mechanical ventilation training for 80+ doctors, strengthening ICU and emergency care capacity.
- Trained over 500 government doctors free of cost in life-saving emergency skills, especially benefiting district and rural hospitals. Partnered with state departments to deliver BLS, first-aid training, public safety awareness, and disaster preparedness initiatives.
- Led the launch of flagship national events such as COMET 2025, uniting experts from India and abroad to advance trauma and emergency care standards.

MESSAGE FROM THE FOUNDER & PRESIDENT

“In an emergency, what matters isn't just the equipment — it's the readiness, the training, and the will to act. Through SACTEM, I envision a future where every hospital, every bystander, every paramedic is empowered — where we don't wait for emergencies to happen but prepare to save lives when they do.”

Lokendra Gupta

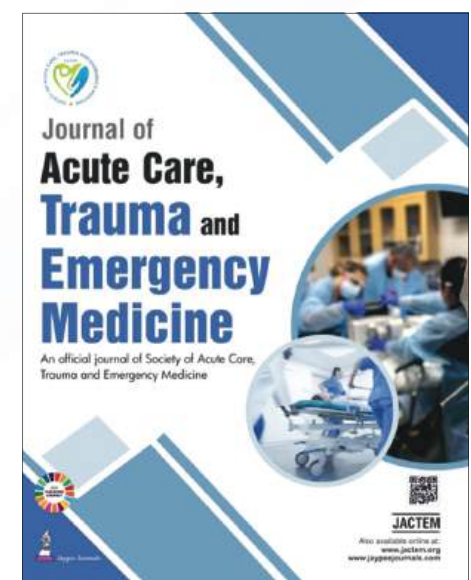
Dr Lokendra Gupta

Introducing **JACTEM** (Journal of Acute Care, Trauma & Emergency Medicine)

The New Academic Voice for Emergency Medicine & Trauma Care

JACTEM is more than a new journal — it marks a meaningful step toward strengthening the academic backbone of emergency and trauma care. Its launch reflects SACTEM's dedication to advancing emergency medical education, supporting high-quality research, and empowering the frontline professionals who save lives every day. It creates a unified space for sharing clinical insights, innovative ideas and real-world experiences. With JACTEM, SACTEM aims to inspire continuous learning and raise the standard of care across the emergency medicine community.

We at SACTEM are excited to unveil JACTEM, our newly launched peer-reviewed journal dedicated to advancing Emergency, Trauma and Acute Care Medicine — nationally and globally. This dynamic platform aims to bring together cutting-edge research, case reports, clinical protocols, simulation & education innovations, public-health and systems-based research, and expert commentary.



What **JACTEM** Offers

- Covers a wide range of acute-care specialties including trauma, EMS, resuscitation, neurocritical care, disaster response and more.
- Ensures high academic standards through a rigorous double-blind peer review process.
- Supports young researchers with mentorship, simplified submissions and first-publication opportunities.
- Accepts multiple article types, including research papers, reviews, case reports, guidelines and educational innovations.

A Vision to Strengthen **Emergency Medicine**

Emergency and trauma care require rapid, evidence-based decision-making. JACTEM supports this by offering a reliable space for clinical research, scientific discussion and continuous learning. Its mission focuses on promoting academic exchange, encouraging young researchers and strengthening evidence-based practice across acute care specialties.

Why **JACTEM** Matters

In emergency medicine, timely knowledge saves lives. JACTEM aims to disseminate best practices, share innovative training approaches, highlight real-world cases and strengthen system-level thinking. The journal contributes to a safer, more prepared healthcare environment.

Invitation for Contributions

JACTEM invites submissions from emergency physicians, trauma surgeons, anaesthesiologists, intensivists, EMS professionals, nurses, paramedics, educators, students and public-health experts. Whether research, case insights or educational models — your work can help advance emergency care.

Submission details: sactem.com/jactem



Therapeutic Momentum in Clinical Practice: Implications for Patient Care and Health Systems

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January 2025 —

In clinical practice, physicians frequently confront the challenge of deciding whether to continue, modify, or discontinue a patient’s treatment. Emerging research has highlighted a cognitive phenomenon known as therapeutic momentum, a subtle but powerful factor influencing these decisions.

What Is Therapeutic Momentum?

Therapeutic momentum describes the tendency for a medical treatment plan to remain unchanged—even when new clinical information suggests that therapy should be adjusted. Rooted in behavioral science, this concept represents a form of clinical “inertia”: once a treatment path is initiated, both clinicians and patients may be reluctant to alter it.

Momentum can be positive, supporting continuity of effective therapy, or negative, contributing to delayed treatment adjustments when clinical targets are unmet.

Why It Matters

Therapeutic momentum has significant implications for patients and the healthcare system. Persistent suboptimal treatment can contribute to emotional strain and reduced quality of life. Delays in therapy adjustment may also lead to increased complications, higher healthcare utilization, and preventable costs.

At the same time, therapeutic momentum reflects the realities of clinical practice—including time pressure, cognitive load, and fragmented workflows—which can make timely reassessment challenging, even when clinicians act with the best intentions. Recognizing these factors is essential for developing interventions that promote both patient-centered care and sustainable clinical practice.

Positive vs. Negative Therapeutic Momentum

Feature	Positive Therapeutic Momentum	Negative Therapeutic Momentum
Definition	Timely continuation or intensification of therapy aligned with guidelines and patient needs	Continuation of therapy without appropriate adjustment despite suboptimal control or changing needs
Clinical Impact	Maintains disease control, reinforces adherence, improves outcomes	Prolongs suboptimal treatment, increases risk of complications, worsens outcomes
Example	Escalating diabetes therapy when glycemic targets are unmet	Continuing the same antihypertensive regimen despite persistent uncontrolled blood pressure

Clinical Risks and Consequences of Negative Momentum

When negative therapeutic momentum persists, patients may experience:

- Prolonged periods of uncontrolled disease activity
- Delayed initiation of evidence-based therapies
- Increased risk of long-term complications
- Higher healthcare utilization and costs

For example, in diabetes care, failure to intensify medication when HbA1c levels remain above target is a well-documented instance of therapeutic inertia leading to preventable complications.

Strategies to Counteract Negative Therapeutic Momentum

- Decision-support tools: Real-time alerts when guideline-based treatment changes are indicated.
- Pre-visit planning: Review labs and recent clinical data before appointments to identify gaps in care.
- Shared decision-making: Engage patients in discussions to reduce hesitation and improve readiness for therapy changes.
- Standardized treatment algorithms: Use evidence-based pathways to limit variability and promote timely escalation.
- Cognitive-bias training: Help clinicians recognize biases (e.g., status quo bias) that may delay treatment modification.

Early studies suggest that structured interventions can significantly reduce delays in therapy intensification.

A Shift Toward More Intentional Care

Therapeutic momentum should not be interpreted as poor clinical judgment. Rather, it highlights the complexity of real-world practice, where emotional, cognitive, and systemic pressures interact.

“Recognizing therapeutic momentum allows us to design better systems and supports,” one researcher noted. “It brings attention to the micro barriers that can accumulate and quietly influence patient trajectories.”

As healthcare increasingly prioritizes proactive, personalized care, understanding and addressing therapeutic momentum may become an essential strategy for improving outcomes in chronic disease management.

False Localising Signs in Neurological Emergencies: Why They Matter in the Emergency Department

WHEN SIGNS MISLEAD, AWARENESS SAVES LIVES

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Introduction

Neurological examination has always been central to localising lesions within the nervous system. However, not all clinical signs point directly to the true site of pathology. Some signs, known as false localising signs, mislead the clinician by suggesting a lesion at a site distant from the actual pathology. In the emergency department (ED), where time-sensitive decisions are critical, such signs may delay appropriate diagnosis and treatment if not recognised promptly. Awareness of these signs is essential for emergency physicians, intensivists and anaesthesiologists managing acute neurological conditions.

Common False Localising Signs

False localising signs are particularly seen in the context of raised intracranial pressure (ICP), space-occupying lesions, and herniation syndromes. Some important examples include:

- **Sixth Nerve Palsy:** The abducens nerve has a long intracranial course, making it vulnerable to stretching from raised ICP. Patients cannot move the eye outward and present with diplopia and impaired lateral gaze, which may misleadingly suggest a pontine lesion.
- **Kernohan's Notch Phenomenon:** In cases of large unilateral supratentorial mass lesions, transtentorial herniation can compress the contralateral cerebral peduncle against the tentorial edge. This produces ipsilateral motor weakness (hemiparesis) — falsely suggesting a lesion on the same side as weakness.
- **Parinaud's Syndrome:** Upward gaze palsy secondary to obstructive hydrocephalus or midbrain pressure from posterior fossa masses, it can mimic midbrain pathology.
- **Cranial Nerve Palsies and Pupillary Changes:** These may occur due to traction or displacement rather than direct compression at their nucleus of origin.
- **Altered Mental Status:** The severity of consciousness impairment may be disproportionate to the apparent focal lesion, often reflecting diffuse ICP elevation rather than local brainstem dysfunction.

Relevance in the Emergency Department

For the emergency physician, recognising false localising signs is not merely an academic exercise—it has direct clinical impact:

Avoiding Misdiagnosis: Diplopia due to sixth nerve palsy should not immediately be equated with brainstem infarction. Similarly, ipsilateral weakness in a patient with a mass lesion should raise suspicion of Kernohan's notch rather than stroke.

Guiding Early Management: False localising signs are often a marker of dangerously raised ICP and impending herniation. Identifying them should prompt urgent interventions—airway protection, osmotherapy, hyperventilation (as a temporising measure), and rapid neurosurgical consultation.

Appropriate Use of Imaging: Neuroimaging is indispensable in suspected neurological emergencies. When signs do not correlate anatomically, a CT or MRI should be obtained without delay to clarify the diagnosis.

Conclusion

False localising signs remind us that the nervous system does not always present in textbook fashion. In the chaos of the emergency room, recognising them can prevent dangerous misdiagnoses and speed up life-saving treatment. The take-home message is simple: When the signs don't match the story, think of raised ICP and false localisation.

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Steroid Use and the Hidden Risk of Mucormycosis in India

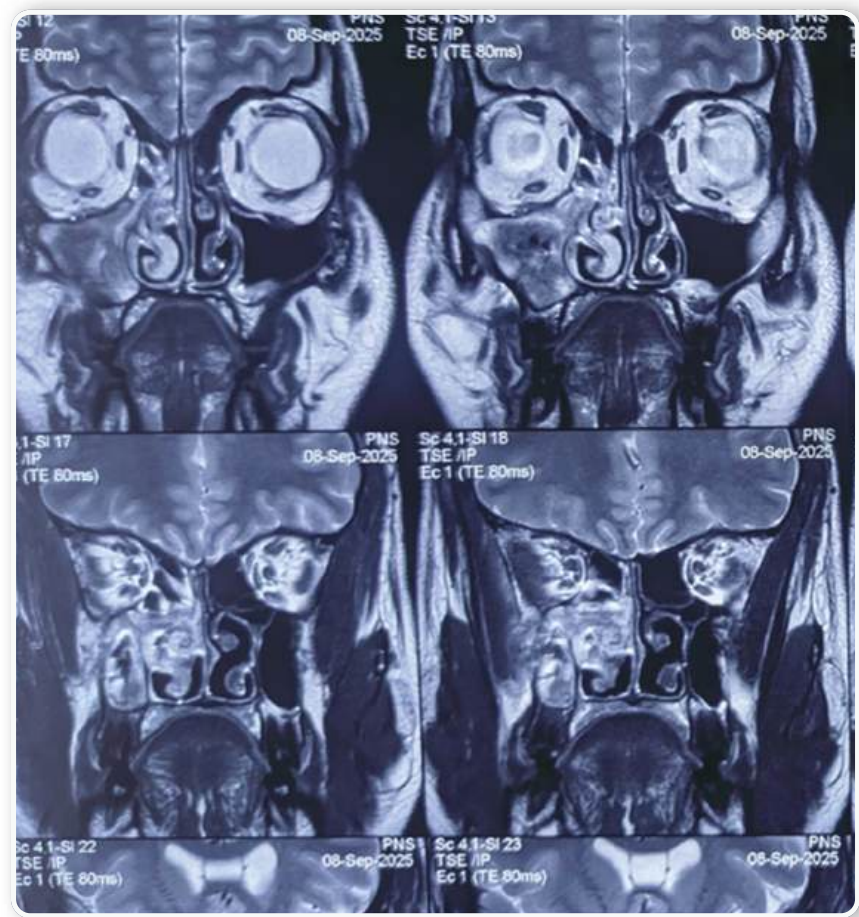
LOW-DOSE STEROIDS, HIGH-RISK REALITY: THE HIDDEN PATH TO

DR. PANKAJ PARMAR

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We report the case of a 32-year-old male with no known comorbidities who was prescribed oral methylprednisolone 4 mg daily for 3 months for a dermatological condition. He did not undergo baseline glyceimic evaluation (RBS or HbA1c) before starting therapy. The patient later presented with features of sinusitis and was diagnosed with rhino-sinus mucormycosis.

Mucormycosis is classically associated with uncontrolled diabetes or high-dose steroid therapy, but this case illustrates that even low-dose, prolonged corticosteroid use can predispose to invasive fungal infections, especially in regions like India where the prevalence of undiagnosed diabetes remains high. Importantly, the absence of simple baseline investigations such as RBS and HbA1c meant that potential latent hyperglycemia could not be ruled out.



This case highlights two important practice points:

1. Steroid safety is not only about dose and duration but also about host vulnerability.
2. Baseline and periodic screening of blood glucose (RBS, HbA1c) should be standard before initiating steroids in all patients in India.

By integrating this simple step into routine practice, clinicians can potentially prevent devastating infections such as mucormycosis in patients who appear immunocompetent at the

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SACTEM EVENTS

POCT SUMMIT 2025



MECHANICAL VENTILATION WORKSHOP



Recognizing Emergency Symptoms: When to Seek Immediate Help

DR. INDRESH VERMA



Most of the time, emergencies happen all of a sudden and need quick help to stop bad effects or even save lives. Knowing the usual signs that need immediate attention is very important for acting on time. Here are some main emergency symptoms and signals that show you should get urgent medical assistance right away:

Pain or Pressure in the Chest

This heart pain, pressure or burning that stays or is very strong, and particularly if it goes to the arm, jaw or back is most likely a heart attack or some other emergency with the heart. Immediate medical attention care.

Sudden Neurological Changes

Sudden weakness or numbness or drooping of one side of the face, slurred speech, or accompanying confusion. Loss of consciousness or reporting a headache "the worst ever" can be indicative of a stroke, brain bleed, or other neurological emergencies.

Uncontrolled or Heavy Bleeding

Any Uncontrolled bleeding. Large or deep wounds. Bleeding accompanied by dizziness or fainting.

Severe Pain or Injury

Any new severe pain anywhere in the body if associated with trauma or deformity, loss of movement, or inability to bear weight is an emergency.

Severe Allergic Reaction

Difficulty breathing, swelling of the face or throat, hives, or sudden onset of swelling with breathing difficulty are signs of anaphylaxis needing emergency intervention.

High Fever with Warning Signs

High fever persisting despite medication, accompanied by neck stiffness, severe headache, confusion, or seizures may indicate serious infections like meningitis.

Other Signs

Persistent vomiting or diarrhea that leads to dehydration, seizures without a previous history, poisoning or overdose, severe burns, suspected spinal injuries, or suicidal thoughts are all medical emergencies.

Conclusion

When these symptoms appear, it's best to be cautious and seek emergency care right away. Early recognition and treatment can reduce complications and save lives. If you're unsure, visiting an emergency department or calling emergency services is the safest option.

SACTEM EVENTS

SACTEM EM FINALE 2025



2nd Annual Comprehensive Infectious Diseases (CID) & Critical Skills Update (CSU)

**2nd Annual
Comprehensive Infectious
Diseases (CID) &
Critical Skills Update (CSU)**

Date : 6th - 7th DEC 2025
Venue : SGPGIMS, Auditorium
Complex Lucknow
For more detail Please Contact :
Dr. Utsav Anand Mani,
Mob.: +91 99206 11314

This CME + Hands on Workshop would be held on 6th and 7th Dec 2025. The CME on infectious diseases will take place at SGPGIMS Auditorium complex on 6th Dec from 9 am to 2 pm. This will be followed by workshop lectures on Mechanical Ventilation and PULSE in Hall A and Hall B till 7 PM. On 7th December the lectures and hands on station of Mechanical Ventilation will take place at SGPGIMS and PULSE at Medanta hospital.

Prof. R.K. Sharma Professor, SGPGIMS	Prof. R.K. Singh Jawahar Lal Institute of Postgraduate Medical Education and Research (JIPMER)	Prof. (Dr.) Suresh Mishra Senior Lecturer	Dr. Subandya Gupta Senior Lecturer, SGPGIMS	Prof. S.J. Tripathi JIPMER, Lucknow	Dr. Anshu Verma Senior Lecturer, JIPMER, Lucknow	Dr. Subashish Paul Senior Lecturer, JIPMER, Lucknow
Dr. J.R. Kumar Senior Lecturer, JIPMER, Lucknow	Dr. Shiva Srivastava Senior Lecturer, JIPMER, Lucknow	Dr. Anshu Kumar Senior Lecturer, JIPMER, Lucknow	Dr. G.P. Sengupta Senior Lecturer, JIPMER, Lucknow	Dr. Parag Singh Senior Lecturer, JIPMER, Lucknow	Dr. Utsav Anand Mani Senior Lecturer, JIPMER, Lucknow	

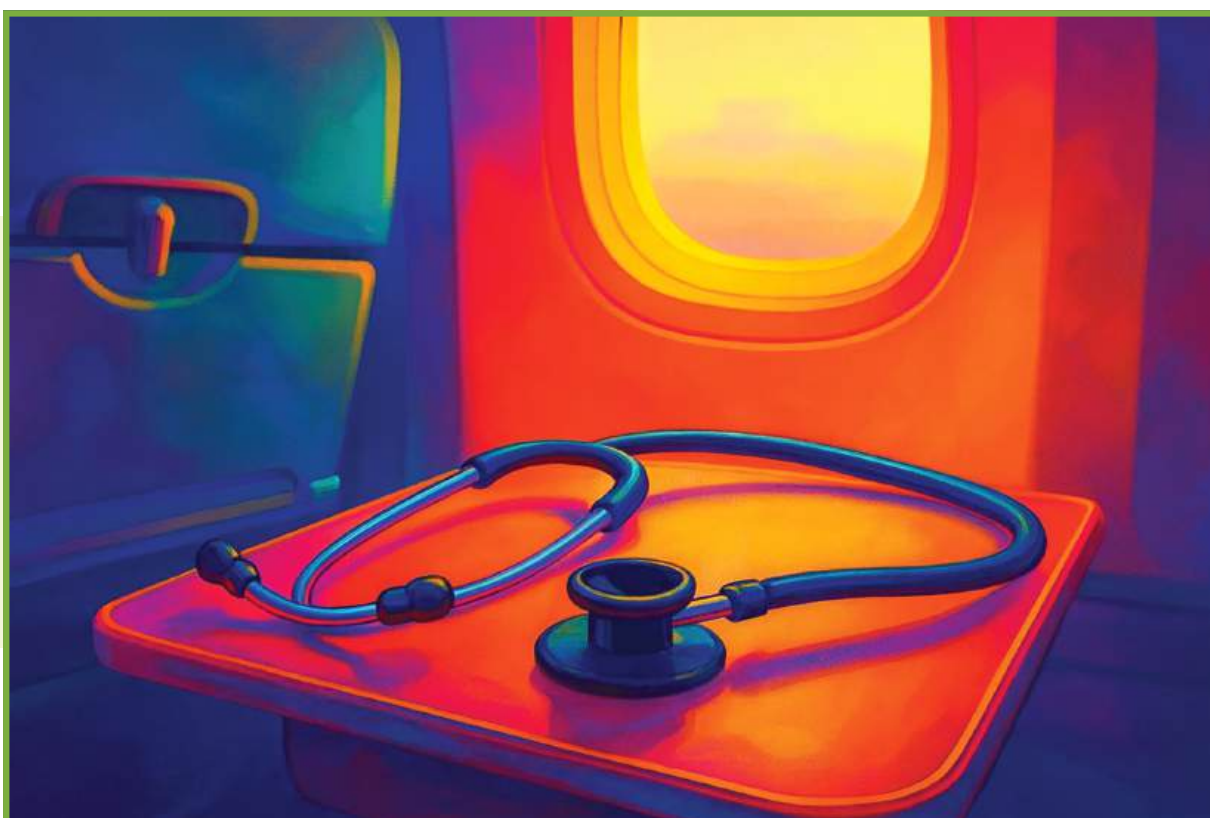


Why I Chose Emergency Medicine in India?



DR. ARIHANT JAIN

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A child collapsed on a flight — and it changed the direction of my career.

Before internship, I imagined myself becoming a paediatrician or a general physician. That felt familiar and predictable. Emergency Medicine wasn't even on my list. Then one moment shifted everything.

I was on a flight when a 2-year-old child suddenly collapsed due to low cabin pressure. The crew announced a medical emergency, and several doctors stepped forward: A senior cardiologist. A dermatologist. A radiologist. A general medicine trainee. And me — an intern standing quietly at the side. The air-hostesses were BLS-trained and prepared to perform CPR correctly. But once the cardiologist took the lead, confusion followed. He began giving instructions that didn't match paediatric CPR algorithms.

When the nurse tried to follow the correct steps she knew, he unintentionally overruled her, insisting on his version. The others stood uncertain — not because they lacked intelligence or dedication, but because emergencies weren't their everyday practice. And in that moment, something became painfully clear: **Our system doesn't prepare every doctor for real-world emergencies — especially when seconds matter.**

This isn't a criticism of any specialty. Every branch has depth, brilliance, and its own purpose. But that day made me aware of a simple truth: In India, we often produce super-specialists before we produce confident, emergency-ready clinicians. When I later rotated through the Emergency Department during internship, I finally learned paediatric BLS, PALS, and structured resuscitation. And when I looked back on that flight, it made me rethink the kind of doctor I wanted to become.

Not the most senior. Not the most knowledgeable. Just someone who could be useful in the moment someone needed help the most. That's **what drew me to Emergency Medicine**. The ability to help anyone, anywhere, with whatever resources are present. The willingness to act when others hesitate. The mindset of adapting, not waiting. In India, EM is still growing. Still misunderstood. Still building its place. But its need is unmistakable. That day in the flight didn't make me feel superior. It simply made me aware — of the gaps, the urgency, and the kind of doctor I hoped to become.

And that's why I chose **Emergency Medicine**.



A Slim Price to Pay? A Rare Esophageal Complication of Tirzepatide

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Abstract- A 42-year-old male with no significant comorbidities presented with hematemesis and a transient loss of consciousness. He had recently initiated pharmacologic therapy for weight loss and was on the fourth dose at the time of presentation. Upper gastrointestinal endoscopy revealed a Mallory-Weiss tear as the source of bleeding. While such tears are classically associated with forceful vomiting or retching, the temporal relationship between symptom onset and initiation of weight-loss therapy raises consideration of contributing factors. This case underscores the need for clinical awareness of gastrointestinal mucosal injury in patients receiving newer anti-obesity medications and highlights the importance of early recognition and supportive management in preventing complications.

Keywords- Weight loss, syncope, obesity, GLP-1 receptor agonists, gastroparesis, hematemesis, Mallory weiss tear.

Introduction

Mallory-Weiss tear (MWT) is a longitudinal mucosal laceration at the gastro esophageal junction, often resulting in upper gastrointestinal (GI) bleeding. It typically arises secondary to a sudden increase in intra abdominal pressure, most commonly due to forceful retching or vomiting. MWT accounts for approximately 5%–10% of non-variceal upper GI bleeding episodes and, in most cases, resolves spontaneously. However, significant hemorrhage requiring endoscopic or supportive management may occur. Tirzepatide, a novel dual glucose-dependent insulinotropic polypeptide (GIP) and glucagon-like peptide-1 (GLP-1) receptor agonist, has demonstrated substantial efficacy in the management of type 2 diabetes mellitus and obesity. Despite its therapeutic benefits, gastrointestinal adverse effects such as nausea, vomiting, and abdominal discomfort are frequently observed, particularly during dose escalation. We present a rare case of hematemesis secondary to a Mallory-Weiss tear that developed shortly after administration of tirzepatide. This case highlights a potentially serious gastrointestinal complication associated with the emetogenic effects of GLP-1 receptor agonists and emphasizes the importance of close clinical monitoring during initiation and dose titration of these agents.

Literature Review

Several studies have documented nausea, vomiting, diarrhea, and dyspepsia as the most frequent side effects of tirzepatide, with dose-dependence noted in clinical trials. In addition to these well-recognized effects, pancreatitis, gastroesophageal reflux disease (GERD), and drug-induced liver injury (DILI) have also been reported in isolated cases, particularly among those with pre-existing GI or hepatic conditions.

The occurrence of a Mallory-Weiss tear as a direct consequence of its emetic effects is a new finding. This report highlights the importance of recognizing and managing severe vomiting as a potential risk factor for upper gastrointestinal bleeding in patients using tirzepatide, particularly during the initial treatment phase or dose escalation.

Methodology

A 42-year-old male with a history of prediabetes (HbA1c 5.8%) presented to the emergency department (ED) with complaints of loose stools for the past 48 hours, followed by vomiting for 24 hours, and hematemesis for the past 60 minutes. The patient also reported experiencing two episodes of syncope prior to arrival.

Upon initial assessment, the patient was hemodynamically stable, with vital signs within normal limits, and a Glasgow coma scale (GCS) score of 15. His CNS examination was normal. There were no signs of neurological deficits or altered mental status. The patient was noted to have syncope prior to arrival, which was attributed to dehydration secondary to ongoing vomiting and diarrhea. An ECG was performed, which revealed normal sinus rhythm without evidence of ischemia or arrhythmia.

Neurologist opinion was taken. CT brain was done and was normal. Laboratory findings revealed a hemoglobin level of 12.9 g/dL, and liver function tests (LFTs) were normal, excluding acute liver pathology. The patient's electrolyte panel was unremarkable. Given the clinical presentation of hematemesis and vomiting, an upper gastrointestinal (UGI) endoscopy was performed, which revealed clotted blood at the gastroesophageal junction and a longitudinal tear, confirming the diagnosis of Mallory-Weiss tear.

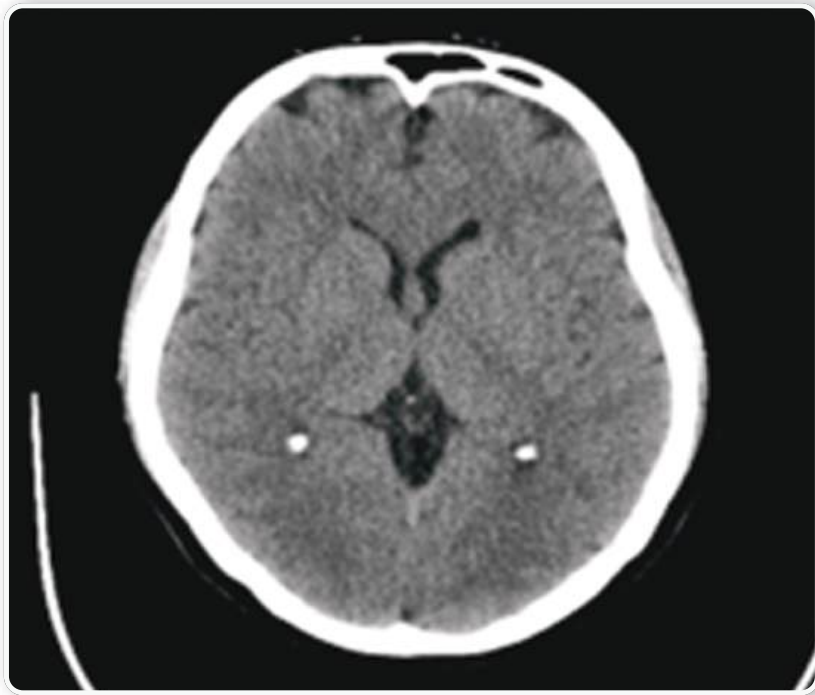


UGI Scopy Showing Mallory Weis Tear

Management and Outcome

The patient was initiated on intravenous proton pump inhibitor (PPI) infusion to reduce gastric acid secretion and facilitate mucosal healing. His vomiting subsided within hours, and there was no evidence of recurrent bleeding. He was closely monitored for signs of hemodynamic instability, but he remained stable throughout his hospital stay.

Over the course of a 3-day hospitalization, the patient's condition improved, and his symptoms resolved. He was discharged with appropriate instructions for follow-up care, including hydration, dietary adjustments, and prediabetes management. The patient was advised to avoid potential risk factors for further vomiting, such as alcohol and stress, and to follow up with his primary care provider for ongoing care and monitoring.



CT Brain Plain

Discussion

The hematemesis observed in this patient can be attributed to a Mallory-Weiss tear, which was precipitated by recurrent vomiting associated with gastroparesis. Gastroparesis, a condition involving delayed gastric emptying, is a well-known complication of certain medications, particularly those that affect gastric motility, such as tirzepatide. While tirzepatide is known to cause gastrointestinal side effects such as nausea, vomiting, and indigestion, the direct association with gastroparesis and its contribution to Mallory-Weiss tear has not been previously reported in the literature.

The underlying pathophysiology can be understood through a combination of mechanisms. Tirzepatide, a dual GLP-1 and GIP receptor agonist, slows gastric emptying as part of its pharmacodynamic action. This gastric stasis predisposes patients to nausea, vomiting, and gastroesophageal reflux disease (GERD). The delayed gastric emptying leads to prolonged distention of the stomach, which, when coupled with recurrent vomiting, increases the risk of retching and increased intra-abdominal pressure.

In this patient, the forceful vomiting—exacerbated by the gastroparesis induced by tirzepatide—caused retching at the gastroesophageal junction, leading to the longitudinal mucosal lacerations that characterize a Mallory-Weiss tear. These tears result in upper gastrointestinal bleeding, manifesting as hematemesis, as seen in this case. The repetitive vomiting and retching cycle, compounded by delayed gastric emptying, created an environment conducive to the development of the tear.

This case is particularly notable because the connection between tirzepatide-induced gastroparesis and the occurrence of Mallory-Weiss tear has not been documented in the current literature. Although gastrointestinal adverse effects like nausea and vomiting are well-recognized, the mechanical stress from gastroparesis, causing upper GI bleeding, is a previously unreported consequence. This highlights the need for increased awareness of the potential for gastric motility disorders induced by tirzepatide and their impact on the gastrointestinal tract, especially in patients who experience severe vomiting.

In conclusion, this case underscores the unrecognized risk of Mallory-Weiss tear associated with the use of tirzepatide, a medication that affects gastric motility. It is crucial for clinicians to be aware of the possibility that medications known to slow gastric emptying can lead to gastroparesis, vomiting, and ultimately, upper gastrointestinal bleeding. This novel association warrants further investigation to better understand the long-term and potentially severe gastrointestinal side effects of tirzepatide in clinical practice. This version provides a deeper dive into the mechanism behind the Mallory-Weiss tear, emphasizing that the tirzepatide-induced gastroparesis and its contribution to the hematemesis and upper GI bleeding has not been previously described in the literature.

Conclusion

This case poignantly underscores the unforeseen consequences of tirzepatide-induced gastroparesis, a condition that led to recurrent vomiting, retching, and ultimately a Mallory-Weiss tear resulting in hematemesis. While prediabetes is often manageable with lifestyle modifications like regular exercise and dietary changes, this patient, despite having a relatively controlled HbA1c, found himself vulnerable to an unexpected and serious gastrointestinal complication. The gastroparesis induced by tirzepatide went unrecognized, creating a cascade of events that led to the upper GI bleeding. This case highlights the importance of holistic care, where medication side effects must be weighed against underlying metabolic conditions. The impact of prediabetes and a lack of preventive measures like exercise cannot be understated, yet this patient's experience reveals a new clinical dimension—the potential for medication-induced gastrointestinal complications. It serves as a reminder of the necessity for vigilant monitoring of patients on medications with gastric motility effects and the need to consider all aspects of a patient's health to prevent such serious outcomes. Future studies should focus on the impact of GLP-1 receptor agonists on gastric motility, vomiting, and upper GI bleeding. Understanding these medication-induced complications will be crucial in identifying high-risk patients and developing preventive strategies. Additionally, personalized treatment plans that consider both metabolic health and medication side effects could improve patient outcomes and safety.

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The Clot That Spoke Louder Than Words When Hematuria Heralds Hemorrhagic Shock – A Post-PCNL Wake-Up Call

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Case Snapshot

A 49-year-old male arrived in profound shock after passing ~1.5 L of frank blood per urethra in <2 hours. Sudden onset, profuse sweating, generalised weakness.

Past history: Bilateral PCNL + DJ stenting 45 days ago; left DJ removed 15 days ago; discharged well.

Primary Survey

- Airway: Patent
- Breathing: RR 32/min, SpO₂ 96% RA, clear
- Circulation: HR 136 bpm, BP 60/non-recordable, CRT >3 sec
- Disability: GCS 15/15, Temp 95.5°F, RBS 148 mg/dL

Secondary Survey

- Pallor++, cold clammy extremities, suprapubic tenderness/guarding.

Key Investigations

- Hb 8.6 g/dL → ABG: pH 7.56 / PCO₂ 23.5 / HCO₃ 20.2
- ECG: sinus tachycardia
- POCUS (RUSH protocol)
 - Heart normal, no effusion
 - IVC fully collapsing (CI ~54 %)
 - Bladder: ~230 mL homogeneous clot/hematoma

Resuscitation

- 2 large-bore IVs → 1 L crystalloid bolus → Tranexamic acid 1 g → 1 PRBC (2 reserved) → Urgent urology alert

Definitive Care

- Cystoscopy → massive clot evacuation
- DSA → Ruptured right renal artery pseudoaneurysm → Superselective embolization + graft placement
- Discharged stable after 7 days

Final Diagnosis

Major haemorrhagic shock secondary to ruptured right renal artery pseudoaneurysm post-PCNL

Take-Home Pearls for the ED

1. Any gross hematuria 1–8 weeks post-PCNL = pseudoaneurysm until proven otherwise.
2. Collapsing IVC + bladder clot on POCUS = start resuscitation and call interventional radiology early.
3. TXA + balanced transfusion + rapid angioembolization is the winning triad (>95 % success, >90 % renal preservation).
4. Delayed presentation (weeks–months) is classic – the clot is often the only warning.

Bottom Line

- “Don’t wait for a scream when the whisper was enough.”
- In post-PCNL haematuria, treat the clot as a sentinel bleed.
- Ten seconds of POCUS and one decisive phone call can save a kidney and a life.

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SACTEM X RAPIDO



Electromechanical Association Artifact – An Electrocardiographic Artifact that Mimics Ischemia

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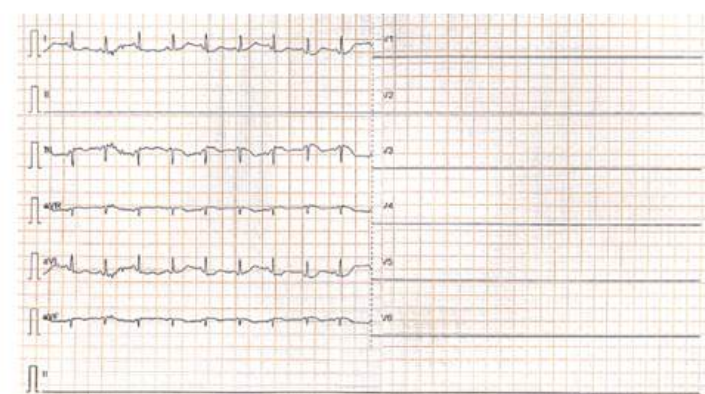
Case Presentation

A teenage female presented to the emergency department with acute onset breathlessness for 2 hours. She was a known cerebral palsy and mucopolysaccharidosis type 3 patient. There was no history of chest pain, palpitation, or cough with expectoration. She had tachycardia with a pulse rate of 119 beats per minute, and his blood pressure was 90/60 mm of Hg. A respiratory system examination revealed coarse crepitations on both lung fields. After the stabilization of the patient, a 12-lead ECG was taken. The 12-lead electrocardiogram (ECG) is presented in Figure.



Lead ECG at presentation

The electrocardiogram shows a normal sinus rhythm with a heart rate of 119 beats/min with bizarre looking ST-segment elevation in lead aVR and ST-segment depression in Lead II, III, aVL and aVF. The electrocardiogram showed a normal sinus rhythm with a heart rate of 119 beats/min with ST-segment elevation in lead aVR and ST-segment depression in Lead II, III, aVL and aVF. However, the morphology of these ST segment and T wave changes in Lead II, III, aVR, aVL and aVF were bizarre and were absent in the lead I. These Bizarre changes are termed Electromechanical Association artifacts (EMA artifacts). These are also called pulse-tapping artifacts as they are due to arterial pulsations or precordial pulsations. The artifact arose from the left lower limb because lead I was spared since lead I is obtained by placing the negative electrode in the right limb and the positive electrode in the left limb. The ECG was repeated with the lead clip placed more proximally on the left lower limb. Even then, the artifact persisted as the child's limb was skinny. Hence, we acquired an ECG without the lower limb electrode. This resulted in ECG, which recorded electrical activity in lead I, III aVL, aVR and aVF. In this ECG, there were no EMA artifacts



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Discussion

The term Electromechanical Association (EMA) artifact was first coined by Aslanger et al.³ in 2010. He first described this in a patient who presented to the Emergency department with syncope, wherein these artifactual deflections were misdiagnosed as the cause for syncope. They also reported cases with these artifactual deflections, which they named the Electromechanical Association artifact. Electromechanical association artifacts are 'Heart made' artifacts due to deflections of the lead produced by distal pulses, usually the radial pulsations (usually in patients with AV fistula) or posterior tibial pulsations. Precordial pulsations can also produce it in emaciated individuals. EMA artifacts are heart-made and synchronize with the cardiac rhythm.⁴ This is because the electrical activity of the heart precedes the mechanical activity of the heart. Hence ECG will record QRS first, and then while the ECG is recording the ST segment and T wave, the radial artery pulsations will cause deflections in the lead clip/electrode. Hence these artifactual deflections will cause deflections in the ECG at the ST segment or T wave and synchronize with every QRS. This was described as QRS-Artifact associations. The other artifacts, such as artifacts because of tremors, usually will not synchronize with heart rhythm. The artifacts will be easily identified as they fall in front, on and after the QRS complex (QRS-artifact dissociation). This makes distinguishing these artifactual deflections from true ST segment, and T wave changes difficult. In the original description of Aslanger et al.⁵ report, all three patients were misdiagnosed as having cardiac pathology. The cardiologist diagnosed one patient with ventricular bigeminy; two patients were misdiagnosed as having acute coronary syndrome by emergency physicians. One case report described the misdiagnosis of EMA artifacts as U waves.⁶ However, the EMA artifact can be identified if we carefully scrutinize the ECG. The EMA artifact almost always spares one limb lead depending on the source of artifactual deflections. If the artifact arises from the right arm, lead III will be spared as lead III will be recorded by placing electrodes on the left upper limb and left foot.

Why should an emergency physician be aware of this?

Electromechanical association artifacts are 'Heart made' artifacts (QRS-artifact association). They arise because arterial pulsations cause deflections on the lead clip, or the adhesive electrode kept on the limbs for taking ECG. However, they usually spare one limb lead, depending on the source. Thus, careful scrutinization of ECG can result in identifying these deflections as artifacts rather than pathological conditions. Timely identification of these artifacts in will prevent unwanted and potentially harmful therapies like thrombolysis or anticoagulation.

Key words

Artifact, EMA artifact, Pulse tapping Artifact, Electromechanical Association artifact, Heart made artifact, Case report.



Profile and Outcomes of Mechanically Ventilated Patients in the Emergency Department ICU: A Single-centre Prospective Observational Registry

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CO-AUTHOR
DR. FARZANA M. SHAMSU

Emergency Departments (EDs) in India have become inadvertent holding areas for critically ill patients due to a systemic scarcity of ICU beds (~3/100,000 population). In response, ED-based ICUs (ED-ICUs) are emerging as a pragmatic alternative. However, evidence describing outcomes of mechanically ventilated patients in such settings is virtually non-existent. This study aims to address this glaring knowledge gap by profiling ventilation practices and short-term outcomes within an Indian ED-ICU.

Introduction

Airway management through endotracheal intubation and mechanical ventilation is a fundamental component of emergency and critical care. However, despite extensive research in ICU settings, data on the practices and outcomes of mechanical ventilation in the ED-ICU are scarce. Emergency departments (EDs) in India face increasing critical care demands with limited ICU capacity. India's ICU bed availability (~3 beds per 100,000 people) is among the lowest globally, contributing to prolonged ED stays for critically ill patients. [1] To address this, some Indian centers have developed ED-based ICU (ED-ICU) models or acute care units equipped for advanced monitoring and life-sustaining therapies. [1] These dedicated ED-ICUs aim to provide immediate ICU-level care, mitigating delays in definitive management caused by ICU overcrowding. Despite their growing relevance, literature on ED-ICU models in India remains sparse and is largely limited to single-center registries. [2] Mechanical ventilation constitutes a major burden in these settings. Approximately one-third of ICU patients in India require ventilatory support, reflecting significant resource utilization. [3] Ventilated patients demand intensive monitoring, frequent interventions, and are prone to complications such as barotrauma, hemodynamic instability, and ventilator-associated infections. The morbidity associated with mechanical ventilation is substantial, particularly given that intubation is typically initiated for life threatening respiratory or neurologic compromise. Airway management in the ED presents particular challenges. Emergency intubations must be performed rapidly, often with limited preparation time and under suboptimal conditions. In India, emergency medicine is a relatively nascent specialty-formally recognized only since 2009-and standardized airway practices are still evolving. [2] ED-ICUs operate under unique constraints such as high patient turnover and acute patient instability, which may influence both airway safety and ventilator management strategies.

To address these gaps in knowledge, we established a prospective single-centre registry of mechanically ventilated adults in the ED-ICU. The primary aim was to characterize the indications for intubation. Secondary objectives included evaluating airway management techniques, ventilator settings, sedative and paralytic use, duration of ventilation, incidence of ventilator-associated pneumonia, and short-term outcomes including extubation, tracheostomy, and in-hospital mortality.

Materials And Methods

This was a prospective observational study conducted in the Emergency Department Critical Care Unit at Amrita Institute of Medical Sciences, Kochi, Kerala, India. All consecutive adult patients (≥ 18 years) intubated and mechanically ventilated in the ED-ICU from February to July 2024 were included ($n=37$). Patients intubated prior to hospital arrival or under 18 years old were excluded. The study protocol was approved by the institutional ethics committee with waiver of informed consent due to the observational design and use of de-identified data.

Data were collected using a structured case report form. Recorded variables included patient demographics (age, sex), primary diagnosis, indication for intubation, and airway management details (device used and number of attempts). Pharmacologic agents for induction, paralysis, and analgesia were noted, as were initial ventilator settings and mode. Development of ventilator-associated pneumonia (based on clinical and radiographic criteria)

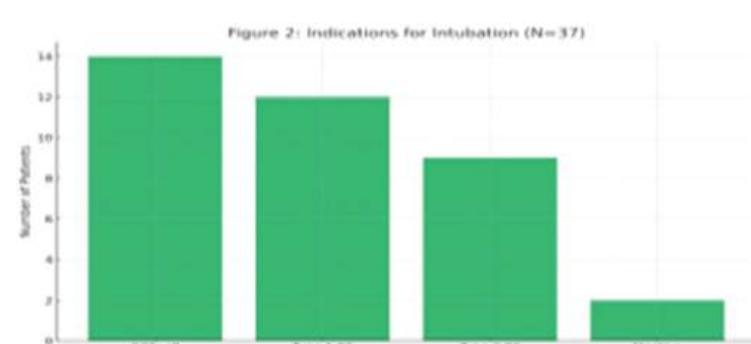
and its pathogens were documented. Key outcomes were duration of mechanical ventilation, extubation success, tracheostomy requirement, and in-hospital mortality. Descriptive statistics (means or medians for continuous data, proportions for categorical data) summarized the findings.

Results

Neurologic compromise (low GCS ≤ 8) and acute hypoxemic respiratory failure dominated intubation indications (37.5% and 32.4%, respectively). Despite challenging ED conditions, first-pass intubation success was achieved in 89%-mostly via direct laryngoscopy (94.6%). Etomidate and rocuronium were preferred pharmacologic agents. Pressure-control ventilation (PC) was the dominant mode (78.4%). VAP developed in 8.1% of patients, with *Klebsiella pneumoniae* and *Pseudomonas aeruginosa* as key pathogens. The all-cause in-hospital mortality was 54.1%, and only 32.4% were successfully extubated. Mortality was higher in patients under 60 years (62.5%), with volume-control ventilation (62.5%), and those developing VAP (66.7%). However, none of these predictors achieved statistical significance-underscoring sample size limitations and the urgent need for multicentric validation. During the six-month study period, 37 patients were included. Twenty-two patients (59.5%) were male

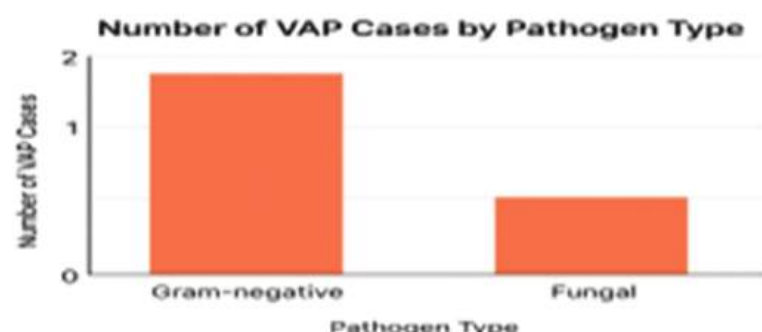


The most common indications for intubation were low Glasgow Coma Scale (GCS ≤ 8) for airway protection (37.5%) and acute hypoxemic respiratory failure (Type I) (32.4%) (Figure 2). Type II (hypercapnic) respiratory failure accounted for 24.3% of intubations, and the remaining patients were ventilated for elective reasons.



Airway management was generally successful. Direct laryngoscopy was used in 94.6% of intubations; video laryngoscopy was used in the remainder. First-attempt success was achieved in 89% of cases, and no patient required more than three attempts to secure the airway. Etomidate was the induction agent in 66.7% of intubations, with ketamine (26.7%) and propofol (6.7%) used in others. Rocuronium was used as the paralytic agent in 92.0% of cases, while atracurium was used in 8.0%. Fentanyl served as the primary analgesic. Regarding ventilator strategy, the initial mode was pressure-control in 70.27% of patients (47.78% on PCV, 19.68% on A/C-PCV and 2.81% on PRVC), while the remaining patients were managed with volume control modes. (Figure 3). 67.6% required 1-5 days of ventilatory support; only 5.4% required more than 15 days.

Ventilator-associated pneumonia was diagnosed in 3 patients (8.1%). Gram-negative bacilli predominated among the noted VAP pathogens



The overall hospital mortality was high: 20 patients (54.1%) died while admitted. Of the 17 survivors, 12 (32.4%) were successfully extubated, 4 (10.8%) underwent tracheostomy, and 1 patient (2.7%) was discharged still mechanically ventilated

- Predictor Category n Survivors n Deaths Total Mortality Rate (%) Gender Male 12 10 22 45.5 Female 8 7 15 46.7
- Ventilation mode Pressure-control (PC) 17 12 29 41.4 Volume-control (VC) 3 5 8 62.5
- Ventilator-associated pneumonia (VAP) No VAP 19 15 34 44.1 VAP 1 2 3 66.7
- Age group < 60 years 6 10 16 62.5 ≥ 60 years 14 7 21 33.3

Conclusion

Mechanically ventilated patients in Indian ED-ICUs represent a critically ill, high-risk cohort. This study exposes a vulnerable intersection of emergency and intensive care-where early decisions determine survival, yet structured protocols remain lacking. Our findings advocate for national recognition of ED-ICUs as formal critical care entities, the development of context-specific airway and ventilator protocols, and the establishment of larger registries to drive data-backed reforms. In resource-strained systems, the ED-ICU isn't a luxury-it's a necessity.

Discussion

In summary, this single-centre ED-ICU cohort was predominantly male and characterized by critical neurologic or respiratory illness requiring intubation. The first-pass intubation success rate (89%) was high, consistent with previous emergency airway studies. [4] Direct laryngoscopy was the primary technique in nearly all cases. The preference for pressure-control ventilation mirrors findings from other resource limited ICU settings. [5] Notably, the incidence of VAP (8.1%) in our ED-ventilated patients does not exceed rates typically reported in general ICU cohorts, where approximately 15-30% of ventilated patients develop VAP-corresponding to 10-20 cases per 1,000 ventilator-days, though this can vary significantly across settings [6,7]. Gram-negative pathogens were the most noted VAP organisms, aligning with known ICU microbiology. [8] The in-hospital mortality (54.1%) is similarly high compared to other critical care populations in similar settings. [9,10] These findings highlight the need for targeted quality improvement in ED-ICUs. Implementation of standardized ventilation protocols (e.g. lung-protective strategies) and strict infection prevention measures should be emphasized [11,12]. Establishing ongoing ED-based ventilation registries would facilitate continuous monitoring of care processes and outcomes to drive improvements. None of the examined predictors reached statistical significance in this small cohort. There was a non significant trend toward lower odds of death with pressure-control ventilation and among males, and higher odds with VAP.

Increasing age showed a non-significant trend toward reduced mortality in this model, likely reflecting survivor bias in discharge timing.

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DR. GOKUL B

Case Report

- Emergency - Max Vaishali
- A middle aged man came to ER self
- Complaints of: Breathing difficulty
- Rapid initial 10sec assessment: Patient sick

Primary Survey

- Airway - Patent
- Talking but abnormal sounds heard-Stridor
- Excessive salivation present.

Intervention

- Positioning done - head tilt and chin lift
- Breathing - Dyspnoeic,Tachypnoeic,Spo2- 93%on RA,B/l chest rise equal,B/l air entry equal,incidental crepts on inspiration noted over both lobes

Intervention

- Nasal prongs @2l/minutes
- Dublin and Budecort neb Ongoing
- Injection ADR 1MG im stat given

Circulation

- Peripheries- warm and pink, PR-85/minutes, Regular ,BP-110/70
- Disability : AVPU- Alert,RBS-124

Exposure

- Temp- Normal
- No rashes noted

Patient Re-assessment

- No improvement in above condition- both vitally and symptomatically

While a DD of

- Stridor - Angioedema
- Anaphylaxis-?Drug induced.
- Epiglottis
- AE of COPD
- Pulmonary edema

While the following DD were kept in mind for management.

Due to sick condition of the patient

- Intubation was proceeded by ER team and the Airway video as added below:
- After stabilisation of the patient:
- Intubated- Airway secured and taken on a Ventilator
- And post intubation care continued
- SAMPLE history obtained

Signs and Symptoms: No CVS/RS/Renal/endocrine symptoms

Last Meal: Afternoon

Event prior

- As per his office colleague
- Patient took some tablet for cough and cold from nearby some pharmacy and on his pocket :
- ER team found
- T.Azhithral
- T.Paracetamol

General Examination

- HEENT- drooling of saliva present,otherwise normal.
- CVS-NAD
- RS-On VT,B/l Rhonchi present
- CNS-NAD
- ABDOMEN-NAD
- CNS-NAD

A diagnosis of Angioedema- drug induced Epiglottis

Definitive care

- ET care
- IV steroids
- Steroid/Adr. Neb
- Antibiotics
- Anti histamines

Plan

- Admission in ICU under Medicine team
- ENT consult

Ref:

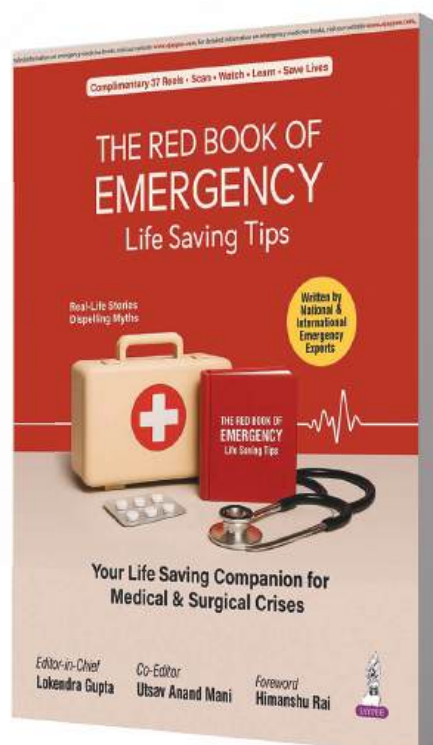
- Patient- Mr.Ashok kumar
- 35/M
- ER Bed No:09
- 03/03/25 @08:45PM.

Managed by

- ER team,Max Vaishali
- Dr.Gokul B
- Dr.Abhijeet Karyakar
- Dr. Dheeraj B Nair
- Dr.Tausif

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Emergency Care in India: Where We Stand— and How We Can Move Faster

DR. AKHIL PRADEEP
2nd year Emergency Medicine Resident
Govt Medical College and Hospital
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India's emergency care has expanded rapidly in the past decade, but access and quality still vary sharply between urban and rural settings. National programs have scaled ambulance fleets and 24×7 round the clock availability, while pioneering state models in various states have shown, what integrated systems can deliver. The next leap will require standardizing protocols, investing in time-sensitive networks for trauma, Heart Attack, stroke), and tightening data systems across states.

The National Picture

Under the National Health Mission (NHM), ambulance services (Dial '108' for emergency response; '102' for patient transport) now operate in 35 States/UTs. As per Government of India data (NHM-MIS), by 'June 2024' the country fielded 15,283 Basic Life Support (BLS) units, 3,044 Advanced Life Support (ALS) units, and 3,918 Patient Transport Vehicles (PTVs).

Parallel facility upgrades continue: the Government reports thousands of PHCs and First Referral Units functioning round-the-clock, strengthening initial triage and stabilization capacity, especially outside metros.

Nationally, emergency demand is high and growing. Recent analyses using HMIS indicate substantial emergency department registrations and significant mortality burden among emergency presentations—evidence that system performance directly affects survival.

Urban vs Rural: The Reality

Urban India enjoys denser hospital networks, shorter transport times, and more specialists, yet crowding and referral bottlenecks remain common. Rural areas have improved first-contact access through 24×7 PHCs/FRUs and expanded ambulance reach but face longer pre-hospital times and gaps in definitive care (trauma, PCI, neurology). Research and policy reviews consistently describe emergency services as fragmented, with variable protocol adherence and uneven, less trained workforce distribution.

State Spotlights

Tamil Nadu's TAEI (Tamil Nadu Accident & Emergency Care Initiative)

TAEI is a state-wide model that strengthens pre-hospital, in-hospital, and referral care using standardized protocols and a hub-and-spoke design. Documented features include rapid triage, time-bound care bundles for trauma, STEMI, and stroke. Tamil Nadu's emergency transport backbone is substantial: the state publically lists over 1,200 ambulances (BLS, ALS, neonatal, and special units) under its 108 system which stands critical for TAEI's pre-hospital activation and inter-facility transfers.

Advantages demonstrated by TAEI

System integration: clear pre-hospital to definitive-care pathways reduce time to thrombolysis/PCI and trauma surgery.

Condition-specific bundles: free, protocolized STEMI and stroke thrombolysis.

Scalable governance: state NHM stewardship with published centres and manuals improves transparency and replication potential.

Uttar Pradesh: Scaling Transport and Time-Sensitive Networks.

Uttar Pradesh has expanded emergency transport aggressively. State officials reported ~4,845 ambulances in service across 108/102 and ALS categories in 2025; media summaries break this down to ~2,200 (108), 2,270 (102), and ~375 ALS. These figures reflect NHM operations communicated by the Mission Director in public briefings.

The state is also rolling out a STEMI network (HRIDAY SETU / STEMI Care UP) using a hub-and-spoke model anchored at KGMU, RMLIMS, SGPGI and others. Early reports show rapid ECG triage, remote expert confirmation, and timely thrombolysis at spoke hospitals, aiming to compress door-to-needle times in district settings. Training of trainers (ToT) and phased district coverage began in March 2025.

Kerala: KANIV-108 and Trauma Access Planning

Kerala operates KANIV-108 as a trauma-focused 108 network, with 315 BLS ambulances deployed to cover road-traffic blackspots with 12-hour and 24-hour units. Policy proposals from the state have also emphasized placing major emergency facilities every 80–100 km along roads to achieve <1-hour access for most residents—a rational design target for trauma systems.

What's Working

Scale and reach: National ambulance coverage and 24×7 first-contact sites are far wider than a decade ago, and 108/102 are now available in nearly all States/UTs.

State models: TAEI shows integrated emergency care at scale; UP's STEMI network and Kerala's KANIV-108 illustrate focused, time-sensitive pathways.



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| Social Media Marketing (SMM) | Graphic Design | IVR Marketing |
| Search Engine Optimisation (SEO) | App Store Optimization (ASO) | WhatsApp Marketing |
| Online Reputation Management | App Store | SMS Marketing |
| Pay-Per-Click (PPC) Advertising | Optimization (ASO) | Chat Bot Marketing |
| Email Marketing | Video Marketing | Website Design |

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