APSA

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ANAESTHESIA PATIENT SAFETY ASSOCIATION

NEWSLETTER

ANAESTHESIA INCIDENT REGISTRY: THE FIRST REPORT ➤

From Vision to Reality: The Anaesthesia Incident Registry

Registry Will Pave The Way For The New Mode Of Learning

Dr J Balavenkatasubramanian
Founding Chairman, APSA

Dear Colleagues,

Greetings.

It gives me immense happiness to note that the Anaesthesia Patient Safety Association of India is coming out with this very informative newsletter.

APSA is truly a great initiative that would aid in decreasing peri-operative morbidity and possibly mortality. The several initiatives and collaborations that APSA has envisaged will bear rich dividends and excellent peri-operative outcomes.

I want to particularly congratulate the APSA team that have brought to life the long cherished dream of having an Anaesthesia Incident Registry, my special thanks to Dr Murali Thondebhavi for being the catalyst in making this dream a reality.

I am confident that this registry will pave the way for the new mode of learning and will help us to learn from each other and collectively emerge more safer and stronger as Anaesthesiologists and Peri-operative physicians.

I am confident APSA will grow from strength to strength and make remarkable strides in patient care in India.

Best regards,

Dr. J. Balavenkatasubramanian

Senior Consultant Anaesthesiologist
Ganga Medical Centre and Hospital, Coimbatore

Secretary
World Federation of Societies of Anaesthesiologists

Immediate Past President
Indian Society of Anaesthesiologists

Vision Statement

Dr Sunil Pandya

National Chairman, APSA India

To create a national culture where every anaesthesia delivered in India, across operating rooms, critical care units, and non-operating room locations is guided by uncompromising standards of patient safety, supported by data-driven learning, transparent reporting , and equitable access to safe practices across urban and rural healthcare systems.

It is both a privilege and a profound responsibility to present the inaugural newsletter of the Anaesthesia Patient Safety Association (APSA), India. APSA has been conceived as a national platform dedicated to strengthening the culture, science, and systems of patient safety in anaesthesia. Through collaboration, learning, and collective vigilance, we aim to advance safer perioperative care across the diverse healthcare landscape of our country. India today performs an extraordinary volume of surgical and procedural care. Current estimates suggest that 30 to 40 million surgical procedures are performed annually across the nation. When we include Non-Operating Room Anaesthesia (NORA), procedures in cath labs, endoscopy suites, radiology suites, oncology units, and interventional platforms, the number of anaesthesia procedures in India likely exceeds 45 to 50 million each year. Behind every one of these procedures stands an anaesthesiologist safeguarding physiology, vigilance, and life itself.

Encouragingly, anaesthesia-related mortality and serious morbidity have steadily declined over the past several decades, both globally and within India. Advances in monitoring technologies, safer pharmacology, structured training programs, and the emergence of a strong safety culture have contributed to this remarkable progress. Yet, the vast scale and diversity of healthcare delivery in India remind us that patient safety must remain our most constant priority.

It is in this spirit that APSA has been established to serve as a national platform dedicated entirely to advancing anaesthesia patient safety. The major highlight of this inaugural newsletter is the launch of the National Anaesthesia Critical Incident Reporting Registry (AIR). The AIR registry represents a transformative step toward building a non-punitive, learning-oriented safety ecosystem in Indian anaesthesia practice. By systematically capturing and analysing critical incidents across institutions, we can identify patterns, recognise system vulnerabilities, and translate these insights into preventive strategies that enhance patient safety nationwide.

"Patient safety must remain our most constant priority. "

Another landmark initiative underway is the National Malignant Hyperthermia Registry. Although rare, malignant hyperthermia remains one of the most catastrophic emergencies encountered in anaesthesia practice. Establishing a national registry will help improve early recognition, preparedness, genetic understanding, and access to life-saving therapy, while also fostering awareness and preparedness across institutions.

Safe Anaesthesia: Every Patient, Every Time.

Looking ahead, APSA is committed to several strategic priorities that will shape the future of safe anaesthesia practice in India. One key initiative will be the development of APSA Standard Operating Procedures (SOPs), practical, evidence-based safety frameworks that can guide anaesthesia practice across diverse clinical environments. These SOPs will be designed to be adaptable, pragmatic, and implementable even in resource-limited settings.

Equally important is our commitment to bridging the urban–rural safety divide. A large proportion of surgical care in India occurs in district hospitals, smaller institutions, and remote healthcare settings where access to advanced infrastructure and training opportunities may be limited. APSA seeks to support these institutions by promoting safe, achievable standards of anaesthesia care applicable across all levels of healthcare delivery.

In addition, APSA plans to initiate national safety audits, clinical registries, and quality improvement programs that will enable us to better understand national practice patterns and outcomes. Such data-driven initiatives will help establish benchmarks, identify gaps, and guide focused educational and policy interventions aimed at further reducing anaesthesia-related morbidity and mortality.

Patient safety is not merely a protocol, it is a professional ethos. It requires vigilance, humility, teamwork, and a willingness to continuously learn and improve. The success of APSA will ultimately depend on the active participation of anaesthesiologists across the country reporting incidents, contributing to registries, sharing experiences, and championing safety in every clinical environment.
Let this inaugural newsletter mark the beginning of a collective national effort to advance safer anaesthesia care in India.

Together, let us reaffirm our shared commitment:
Safe Anaesthesia: Every Patient, Every Time.

Dr Nilesh Naphade

Hon. Secretary, APSA India

As APSA moves forward, our vision remains clear — to foster education, collaboration, transparency, and system-level learning so that patient safety remains at the heart of anaesthesia practice.

Greetings from the desk of the APSA Secretariat.

It is a privilege to introduce the inaugural newsletter of the Anaesthesia Patient Safety Association (APSA). This newsletter marks an important milestone in our journey to strengthen awareness, education, and collaboration in advancing patient safety in anaesthesia and perioperative medicine.

I would like to congratulate Team APSA for bringing out this first newsletter, which will serve as an important platform to share initiatives, highlight achievements, and engage the anaesthesia community in the common goal of improving patient safety.

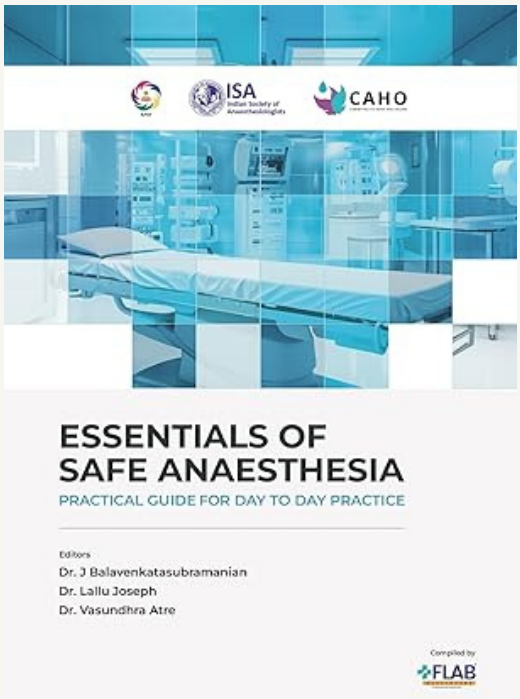
Over the past year, APSA has focused on creating meaningful educational and collaborative platforms to promote safe anaesthesia practices.

One of the major highlights was the APSA Online Course on Anaesthesia Patient Safety (August–October 2025), which witnessed participation from more than 400 physician anaesthesiologists across the country. The course generated tremendous academic engagement, and several participants were awarded Gold, Silver, and Bronze medals in recognition of their outstanding performance. This initiative represents a significant step toward strengthening the culture of perioperative patient safety.

Continuing our global engagement, APSA organized the NATA–APSA International Webinar on Patient Blood Management in January 2026.

The webinar helped increase awareness about Patient Blood Management (PBM) strategies among anaesthesiologists in India and across the globe, emphasizing the importance of evidence-based blood conservation practices in improving patient outcomes.

APSA also endorsed a national seminar in New Delhi in October 2025 on the theme “Patient Safety During Recovery from Anaesthesia: Reducing Morbidity.” The programme was well attended by practicing anaesthesiologists and stimulated valuable discussions on improving safety during the critical recovery phase of anaesthesia.



APSA has several important educational initiatives planned in the coming months:

Safety in NORA: An Update, to be held at SRIHER, Chennai on 10 April 2026, focusing on emerging safety challenges and best practices in Non-Operating Room Anaesthesia.

Leadership Training Programme, in association with Jain University and CAHO, beginning April 2026, aimed at nurturing leadership and quality improvement skills among healthcare professionals.

IMPACT-CC (Integrated Multidisciplinary Programme for Advancing Critical Care Training), a comprehensive training module led by leading intensivists to empower anaesthesiologists with deeper insights into critical care practice, scheduled to commence mid-May 2026.

We sincerely thank CAHO (Consortium of Accredited Healthcare Organizations) for their valuable support with logistics and for partnering with APSA in advancing several of these initiatives.

APSA also continues to work on important long-term patient safety initiatives including the MH Registry and the AIR – Anaesthesia Incident Registry, which aim to strengthen reporting systems, promote learning from incidents, and improve patient safety across institutions.

As APSA moves forward, our vision remains clear — to foster education, collaboration, transparency, and system-level learning so that patient safety remains at the heart of anaesthesia practice.

We look forward to the continued support and active participation of the anaesthesia community in these efforts.

Dr. Nilesh Naphade
Secretary
Anaesthesia Patient Safety Association (APSA), India

Dr Murali Thondebhavi

Project Lead, AIR

There is something most of us recognise but rarely say aloud — that some of the most important lessons in our careers came not from textbooks or conferences, but from cases that didn't go as planned. A difficult airway that tested us. A drug error that shook us. A near-miss that we carried home and couldn't quite put down.

In most instances, those experiences remain exactly that — personal. Discussed quietly with a trusted colleague, perhaps, and then filed away. Our culture has long treated complications as matters of individual accountability rather than opportunities for collective learning. That instinct is understandable. But it comes at a cost. Every incident that goes unreported is a lesson that never reaches the colleague who needed it most.

It is with that conviction that the Anaesthesia Incident Registry (AIR) was established.

Anaesthesia Incident Registry [AIR] - Getting Docked to Patient Safety

What AIR is — and What it is Not

AIR is a national, voluntary, and fully anonymous incident reporting platform for anaesthetists across India. It operates through the DOCKED app, which is free to download and free to use.

Incidents are reported without any patient identifiers, hospital details, or reporter information.

Each report is reviewed by a panel of over 50 expert anaesthetists drawn from across the country, representing every subdomain of our specialty.

Docked

SIMPLIFY. STREAMLINE.

Their analysis — grounded in current evidence and clinical experience — is compiled into structured learning points and shared with the broader anaesthesia community through this newsletter, every month.

AIR is not a surveillance mechanism. It exists for one purpose only — to help us learn from experience, collectively and without judgement.

An Invitation To Participate

Every anaesthetist reading this has, at some point, encountered a situation that gave them pause — an unexpected complication, a system failure, a moment where the outcome could easily have been different. In the vast majority of cases, those experiences are never formally recorded. They remain in individual memory, and when we retire, they retire with us.

WE ARE ASKING YOU TO CHANGE THAT.

Report your incidents on DOCKED — anonymously, without fear, and without the burden of formal documentation. A near-miss is worth reporting. A system problem is worth reporting. Any case that made you think this could have gone very differently is worth reporting.

There are over 50,000 anaesthetists practising in India. If we build a culture of reporting — even among a fraction of that number — we will create the most comprehensive anaesthesia safety dataset this country has ever had. The lives saved will not make headlines. But they will be real.

The Lesson From Aviation

The transformation of commercial aviation safety over the past few decades offers a compelling parallel.

In the 1970s, flying carried a genuine and significant risk. Today, it is among the safest modes of transport in the world. The IATA Annual Safety Report (2024) documents this shift in stark terms — the accident rate in commercial aviation fell from 3.72 per million sectors in 2005 to 1.13 in 2024, a reduction of nearly 70% in under two decades.

It was a cultural shift that achieved this progress in safety. The aviation industry built a system in which every incident, every near-miss, and every operational anomaly was reported, investigated, and learned from — systematically and without attribution of blame. ICAO Annex 13 highlights this principle explicitly: *the purpose of incident investigation is "the prevention of accidents and incidents" — not to apportion blame or liability.*

That shift — from individual accountability to systemic learning — is what made aviation safer. It is the same shift we are asking anaesthesia in India to make.

What Has Been Achieved Elsewhere

The evidence from other countries is instructive. The ASA Closed Claims Project, established by the American Society of Anesthesiologists in 1984, has spent four decades systematically analysing anaesthesia-related malpractice claims. The longitudinal data tell an encouraging story — a meaningful reduction in catastrophic outcomes, including death and permanent neurological injury, over the course of those years. That improvement was not incidental. It was the direct result of honest, data-driven examination of what was going wrong.

In the United Kingdom, the Royal College of Anaesthetists' National Audit Projects (NAPs), running since 2003, have produced landmark analyses of major airway complications, accidental awareness under anaesthesia, perioperative anaphylaxis, and cardiac arrest. Their findings have influenced clinical practice well beyond British shores — including, in many cases, our own.

We have drawn on these resources for long enough. The time has come to build something of our own.

Alignment With National Policy

What lends this initiative particular weight is that it is not merely a professional aspiration — it is a response to an explicit national mandate.

The National Patient Safety Implementation Framework (NPSIF) 2018–2025, issued by the Ministry of Health & Family Welfare, Government of India, calls for the establishment of a reporting system that is "non-punitive, confidential, independent, timely, system-oriented and responsive in nature." It mandates that anonymous incident reports "be examined by an independent agency" and acknowledges that adverse events are "mainly attributed to failure of the system rather than an individual."

The DOCKED-APSA model is designed precisely to fulfil these requirements. DOCKED provides the anonymous reporting infrastructure. APSA functions as the independent reviewing body. The expert panel conducts the analysis. This newsletter completes the cycle by returning the learning to the community.

A Word Of Gratitudel

The AIR exists because of a collective effort — the team behind the DOCKED app, our expert reviewers, the APSA family, and the teachers and mentors who shaped our belief that we owe it to our patients to always do better.

To the anaesthesia community — thank you for reading. We hope you will join us.

Warm regards,

Dr Murali Thondebhavi
Project Lead,
Anaesthesia Incident Registry (AIR)
Anaesthesia Patient Safety Association of India (APSA)

Thank you for being part of this nationwide initiative to improve patient safety in anaesthesia. Your incident reports are the foundation upon which APSA will build meaningful guidelines, learning points, and ultimately, safer practice across India.

To ensure your contributions have the greatest impact, while maintaining the complete anonymity we have promised, here are a few simple guidelines.

What to Report:
Every Submission helps APSA generate the most useful guidelines and learning points

"Your voice, anonymised but powerful, shapes safer anaesthesia for everyone."

— Team Docked

The Ripple Effect of Your Report:

Every log you submit -

1) Contributes to national data on anaesthesia incidents.
2) Helps identify emerging patterns and risks.
3) Contributes to the monthly guidelines and learning points.
4) Ultimately protects patients and colleagues across India.

Docked

How the App Protects Your Anonymity

We designed the AIR portal with privacy as its cornerstone. When you submit a report-

Design Feature	What It Means for You
No patient identifiers captured	The app does not ask for—and cannot store—name, UHID, address, or any details that could identify a patient
No reporter information collected	We do not capture your name, registration number, hospital, or any data that could trace the report back to you
Auto-delete after 7 days	Once submitted, the log is visible to expert reviewers for only 7 days, then automaticaly deleted from their view
No local storage	Reports are not saved on your device; they are securely transmitted and stored only in the central database
No downloading permitted	Reviewers cannot download, screenshot, or print logs—ensuring your submission stays within the secure portal

"You Remain, And Will Always Remain, Completely Anonymous."

— Team Docked

APSA

Inaugural Report: February, 2026

ANAESTHESIA INCIDENT REGISTRY

We are pleased to present the inaugural report of the Anaesthesia Incident Registry (AIR). In the month of February 2026, 50 incidents were reported anonymously through the Docked App.

These incidents were analysed and grouped into categories based on the classifications entered by the reporting clinicians. The distribution was as follows:

AIRWAY INCIDENTS	6
RESPIRATORY	1
CARDIAC	4
MEDICATION ERRORS	4
PROCEDURE-RELATED INCIDENTS	8
POSITIONING-RELATED	2
MULTIPLE CATEGORIES	25

Where incidents shared common themes or overlapping elements, they were clubbed together based on inputs received from our expert panel. Key takeaway messages have been formulated drawing upon these expert opinions and the best available evidence in the current literature.

In keeping with our commitment to maintaining complete anonymity of the reporting clinicians, a brief summary of each incident has been presented, followed by the relevant key takeaway messages.

Transfer at a Cost: When Moving the Critically Ill Becomes a Critical Incident

During transfer of a haemodynamically compromised post-cardiac surgery patient for planned re-exploration, the intra-aortic balloon catheter was accidentally dislodged after the tubing became entrapped beneath a bed wheel, causing uncontrolled arterial haemorrhage and a fifteen-minute interruption of circulatory support. Catheter reinsertion was accomplished, but persistent bleeding raised concern for an arterial wall injury attributable to balloon trauma, managed with continuous manual compression for the duration of surgery.

The transfer of critically ill patients is an essential component of modern medical care. It is imperative to adopt standardised checklists to mitigate adverse events during this process. [1,2]

Studies conducted as recently as 2022 have identified significant deficiencies in intra-hospital patient transfer procedures. These included failure to recheck patients' identification, vital parameters, and various lines and tubes before and after transport.[2,3]

In critically ill cardiac patients, the use of mechanical circulatory support devices adds considerable complexity to the transfer process. Personnel responsible for transferring such patients must be adequately trained to secure, manage, and troubleshoot these devices. [1]

The adoption or formulation of standardised transfer protocols, alongside repeated audits to ensure adherence, could prevent accidental disconnections and device malfunctions. [1,3]

1. Tetlow S, Birch M, Verma M, Gatherer R, Shepherd SJ. Interhospital transfer of critically ill cardiac patients. Crit Care Med. 2026;54(3):644-653. doi: 10.1097/CCM.0000000000007033

2. Canellas M, Palma I, Pontifice-Sousa P, Rabiais I. Checklist for a safe intra-hospital transport of critically ill patients: A scoping review. Enferm Glob. 2020;19(60):557-572. doi: 10.6018/eglobal.411831

3. Ghosh Roy R, Biswas C. Intra-hospital transport protocol. Int J Adv Res Nurs. 2022;5(2):229-233.

Wrong Drug, Wrong Route, Wrong Outcome: Breaking the Cycle of Medication Errors in Anaesthesia.

A systemic analgesic prescribing concern was identified at a busy orthopaedic unit, where 1g intravenous paracetamol was routinely administered intraoperatively regardless of anaesthetic modality or patient weight, with repeat doses of equivalent magnitude administered in the recovery unit and ward within two hours of the last intraoperative dose. The absence of weight-based dosing criteria and minimum inter-dose interval enforcement constituted a recurring risk of inadvertent paracetamol overdose across the patient population.

Medication errors remain a significant source of preventable harm in anaesthetic practice. Wrong-route errors — such as inadvertent epidural administration of intravascular agents — can cause catastrophic outcomes. Drug administration to the wrong patient frequently stems from inadequate pre-procedure identification checks. Wrong-dose errors arise from calculation mistakes, unfamiliarity with paediatric dosing, or failure to account for patient weight and co-morbidities. Unlabelled or poorly labelled syringes represent a persistent hazard, particularly during high-pressure intra-operative scenarios. (1,2,4) Merry et al have also found that drug administration errors were significantly reduced when the anaesthesiologists used a barcode reader with a voice prompt. (1)

Prevention requires a multi-layered approach. The WHO Surgical Safety Checklist and standardised pre-induction drug verification protocols are foundational.(3) All syringes must be labelled immediately upon preparation using colour-coded, internationally standardised labels. (2) Prefilled, commercially prepared syringes reduce preparation errors. Independent double-checking of high-risk drugs (e.g., neuromuscular blocking agents, concentrated electrolytes) is strongly recommended.(1)Non-Luer connectors for neuraxial and enteral routes physically prevent wrong-route errors. (2) Staff education, fatigue management, and a non-punitive reporting culture further support safe practice.(4)

1. Merry AF, Webster CS, Hannam J, Mitchell SJ, Henderson R, Reid P, et al. Multimodal system designed to reduce errors in recording and administration of drugs in anaesthesia: prospective randomised clinical evaluation. BMJ.2011;343:d5543.

2. Jensen LS, Merry AF, Webster CS, Weller J, Larsson L. Evidence-based strategies for preventing drug administration errors during anaesthesia. Anaesthesia. 2004;59(5):493–504.

3. World Health Organization. WHO Surgical Safety Checklist and Implementation Manual. Geneva: WHO Press; 2009.

4. Glavin RJ. Drug errors: consequences, mechanisms, and avoidance. Br J Anaesth. 2010;105(1):76–82.

Beyond the Mask: Deficiency in Anaesthesia Service and the Doctrine of Vicarious Liability

In a resource-constrained operative environment, institutional and surgical pressure compelled the sole on-duty anaesthesiologist to administer spinal anaesthesia for an elective caesarean section while simultaneously managing an unresolved postpartum haemorrhage, leaving the newly anaesthetised patient under unsupervised technician care. Consequent failure to recognise and treat spinal-induced hypotension resulted in cardiac arrest complicated by ventricular tachycardia, which was managed with cardiopulmonary resuscitation, defibrillation, and inotropic support.

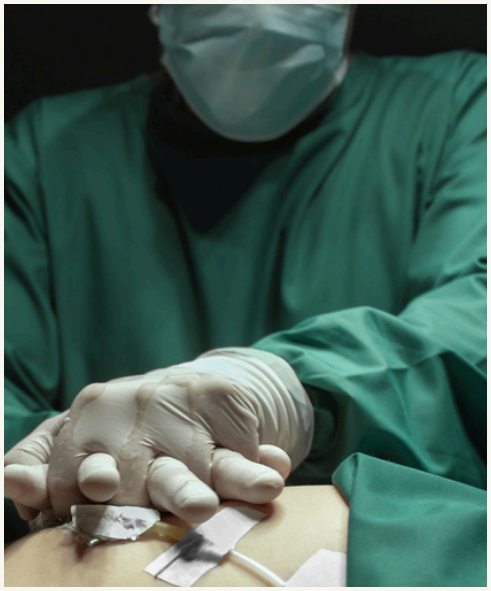
While the integration of qualified anaesthesia technicians has materially enhanced the efficiency of perioperative care, it does not attenuate the anaesthesiologist's professional accountability. The supervising anaesthesiologist remains vicariously liable for any adverse event arising in the course of service delivery. The Indian Society of Anaesthesiologists' Guidelines for Practising Anaesthesiologists in India explicitly mandates, as a minimum standard, the continuous presence of a qualified and registered anaesthesiologist in any operating room in which a patient is undergoing a procedure under anaesthesia. Non-compliance with this standard renders the anaesthesiologist, the operating surgeon, and the institution jointly susceptible to liability under the doctrine of vicarious liability — each being accountable, in varying measure, for the conduct of those operating within their clinical authority. (1)

In cases involving cardiac arrest or the omission of pre-anaesthetic evaluation, the evidentiary principle of res ipsa loquitur applies, inverting the burden of proof such that it falls upon the treating clinician to rebut the inference of negligence.

In an increasingly litigious medico-legal environment, it is incumbent upon anaesthesiologists to cultivate a rigorous understanding of deficiency in service, vicarious liability, and the allocation of the burden of proof. (2)

1. https://www.isaweb.in/Pdf/ISA-PPF-GUIDELINES.pdf.

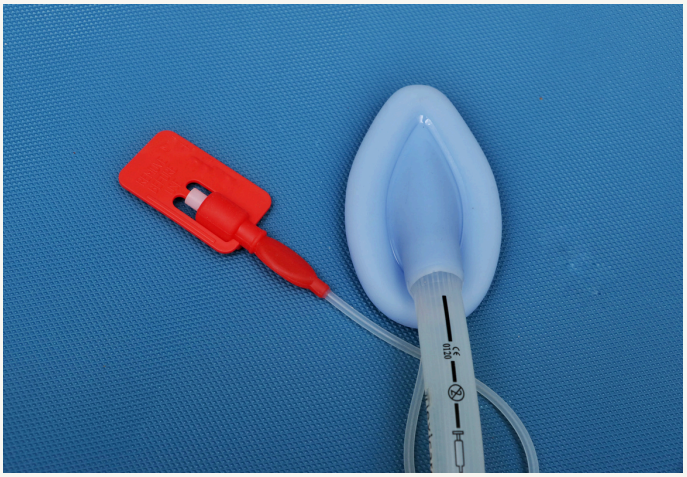
2. Attri JP, Momin S, Kaur G, Sandhu KS, Bala N, Channa SS. Anaesthesia provider's perception of law: Focus on preventive measures. Indian J Anaesth. 2015 Feb;59(2):73-8. doi: 10.4103/0019-5049.151342. PMID: 25788738; PMCID: PMC4357889.



Under Pressure: Why LMA Cuff Monitoring Cannot Be an Afterthought

Following elective RIRS under general anaesthesia using a ProSeal LMA, a patient developed post-operative tongue swelling and pharyngeal discomfort, prompting retrospective file review which uncovered a prior undisclosed episode of laryngeal oedema after anaesthesia for an identical procedure. The patient subsequently required admission to a tertiary ENT unit, where the condition was attributed to aphthous ulceration.

The laryngeal mask airway (LMA) — comprising a ventilation tube coupled to an inflatable elliptical cuff — provides a seal around the laryngeal inlet for airway maintenance under general anaesthesia and serves as a critical rescue device in the difficult airway. A substantial body of evidence implicates excessive intracuff pressure in direct mucosal ischaemia and inflammation, with consequent postoperative pharyngolaryngeal morbidity. Dr Archie Brain, the LMA's progenitor, established 60 cmH2O as the upper safe limit for intracuff pressure. Pressure assessment may be subjective — digital palpation of the pilot balloon, an acknowledged imprecise surrogate — or objective, employing a manometer, pressure transducer, or intrinsic syringe recoil. Optimal management requires direct pressure measurement and iterative cuff volume adjustment to sustain values within the recommended range.



The clinical imperative for such vigilance is unambiguous. Seet and colleagues demonstrated a reduction in pharyngo-laryngeal complications from 46% to 13% upon prospective limitation of cuff pressure to 60 cmH2O. Continuous intra-cuff pressure monitoring thus exerts a measurable and clinically meaningful impact on theKey Takeaways for Clinical Practice incidence and severity of postoperative airway complications, warranting its adoption as a routine standard of LMA-based anaesthetic practice.

1. Simon LV, Torp KD. Laryngeal Mask Airway. [Updated 2023 Jul 11]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK482184

2. https://qualitysafety.bmj.com/content/qhc/23/4/299.full.pdf

3. Fritz, A.V., Mickus, G.J., Vega, M.A. et al. Detrimental Effects of Filling Laryngotracheal Airways To Excessive Pressure (DEFLATE-P): a quality improvement initiative. BMC Anesthesiol 20, 46 (2020). https://doi.org/10.1186/ s12871-020-00963-x

4. Corda DM, Robards CB, Rice MJ, Morey TE, Gravenstein N, Vasilopoulos T,Brull SJ. Clinical application of limiting laryngeal mask airway cuff pressures utilizing inflating syringe intrinsic recoil. Rom J Anaesth Intensive Care. 2018 Apr;25(1):11-18. doi: 10.21454/rjaic.7518.251.cuf. PMID: 29756057; PMCID:PMC5931177.

5. https://associationofanaesthetists publications.onlinelibrary.wiley.com/doi/pdf/10.1046/j.1365-2044.2002.270913.

Left Behind: The WHO Sign-Out Checklist and the Silent Danger of the Retained Throat Pack

A breakdown in intraoperative communication between the anaesthetic and surgical teams resulted in the undocumented insertion of two throat packs, only one of which was retrieved prior to extubation. The second pack was subsequently coughed out by the patient post-extubation, constituting a significant retained foreign body incident

Surgical intervention, while life-preserving, carries an inherent risk of preventable perioperative morbidity. The WHO Safe Surgery Saves Lives initiative (2007) and its 19-item Surgical Safety Checklist (2009) were conceived to address this risk systematically. Critically, 43% of adverse intra-operative events are attributable to failures in standard care — failures the checklist is specifically designed to intercept.1

The checklist encompasses three perioperative time points: Sign In, Time Out, and Sign Out. The Sign Out — completed before the patient leaves the theatre — holds particular salience for the anaesthesiologist. It mandates confirmation that swab and instrument counts are correct, providing the final structured opportunity to verify removal of the throat pack: a pharyngeal gauze inserted to protect the airway during oropharyngeal procedures.

A retained throat pack is a potentially fatal oversight. Upon extubation, an undetected pack may precipitate acute airway obstruction, hypoxia, and cardiac arrest. Meta-analyses confirms that adherence to the structured checklist reduces postoperative complications and mortality.2,3 In this context, the Sign Out is not a bureaucratic formality — it is the anaesthesiologist's last line of defence.

1. Jain D, Sharma R, Reddy S. WHO safe surgery checklist: Barriers to universal acceptance. J Anaesthesiol Clin Pharmacol. 2018 Jan-Mar;34(1):7–10. doi: 10.4103/joacp.JOACP_307_16.

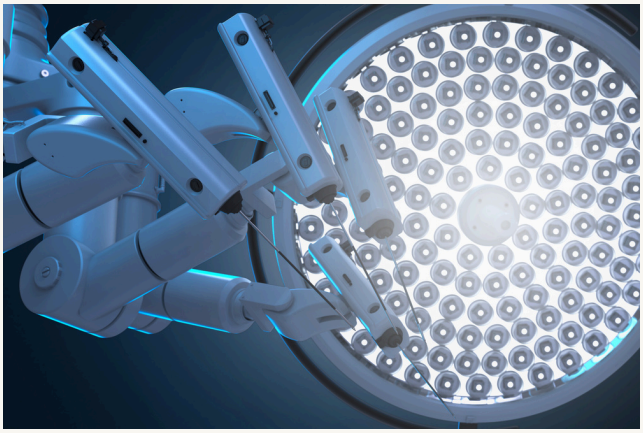
2. Bergs J, Hellings J, Cleemput I, Zurel Ö, De Troyer V, Van Hiel M, et al. Systematic review and meta-analysis of the effect of the World Health Organization surgical safety checklist on postoperative complications. Br J Surg. 2014;101:150–8. doi: 10.1002/bjs.9381.

3. Haynes AB, Weiser TG, Berry WR, Lipsitz SR, Breizat AH, Dellinger EP, Herbosa T, et al.; Safe Surgery Saves Lives Study Group. A surgical safety checklist to reduce morbidity and mortality in a global population. N Engl J Med. 2009;360(5):491–9. doi: 10.1056/NEJMsa0810119.

Heads Down, Nerves at Risk: Positioning-Related Shoulder Dysfunction in Prolonged Trendelenburg

Development of skin excoriation, shoulder dysfunction and pain following head low position more than 6 hours for robotic abdominoperineal resection

Prolonged steep Trendelenburg positioning is associated with shoulder girdle dysfunction, attributable to stretch-induced injury of the brachial plexus or direct compressive trauma to the supraspinatus and deltoid musculature, clinically manifesting as weakness in shoulder abduction.(1) Mechanical restraints employed to prevent caudal patient migration — including shoulder braces — may further exacerbate neuromuscular compromise through sustained focal pressure on vulnerable muscular and neural structures.(1,2)



1. Wolthers SA, Lassen BV, Rasmussen LT, Rosenstock SJ, Foss NB. Position-related postoperative peripheral neuropathy after laparoscopic colorectal surgery: a comparative single-centre prospective cohort study. J Laparoendosc Adv Surg Tech A.2022;32(4):349–354.

2. Grossmann NC, Aschwanden FJ, Cornelius J, Malkmus C, Zahiti L, Viktorin P, et al. Impact of patient positioning during surgery on neuropathies after robot-assisted laparoscopic radical prostatectomy: a randomised controlled trial. BJU Int. 2025;135(5):802–809.

Prophylaxis or Peril: The Double-Edged Risk of Perioperative Antibiotic Administration

A recurring pattern of perioperative haemodynamic instability coinciding with antibiotic administration was identified across two cases, with one episode complicated by the simultaneous administration of a thoracic epidural top-up in a patient on telmisartan for hypertension undergoing major upper abdominal surgery under general anaesthesia. The temporal convergence of epidural sympathetic blockade, antihypertensive medication, and potential antibiotic-induced anaphylaxis rendered definitive attribution difficult, underscoring the importance of staggered drug administration and heightened vigilance during the induction period.

Perioperative antibiotic prophylaxis, whilst indispensable in surgical infection prevention, carries an inherent risk of hypersensitivity reactions ranging from mild cutaneous manifestations to life-threatening anaphylaxis, mandating continuous vigilance throughout the administration period.(1) Intradermal skin testing prior to antibiotic administration cannot reliably exclude adverse reactions upon subsequent full intravenous dosing, and slow continuous infusion is therefore preferred over bolus delivery to facilitate early detection of evolving hypersensitivity.(1) Effective management is contingent upon prompt recognition of the event, timely institution of supportive therapy, and judicious use of adrenaline and vasoactive agents. Furthermore, administration of antibiotic prophylaxis a minimum of fifteen minutes prior to induction of anaesthesia is strongly advocated to mitigate the compounding haemodynamic consequences of concurrent anaesthetic agents.(2)

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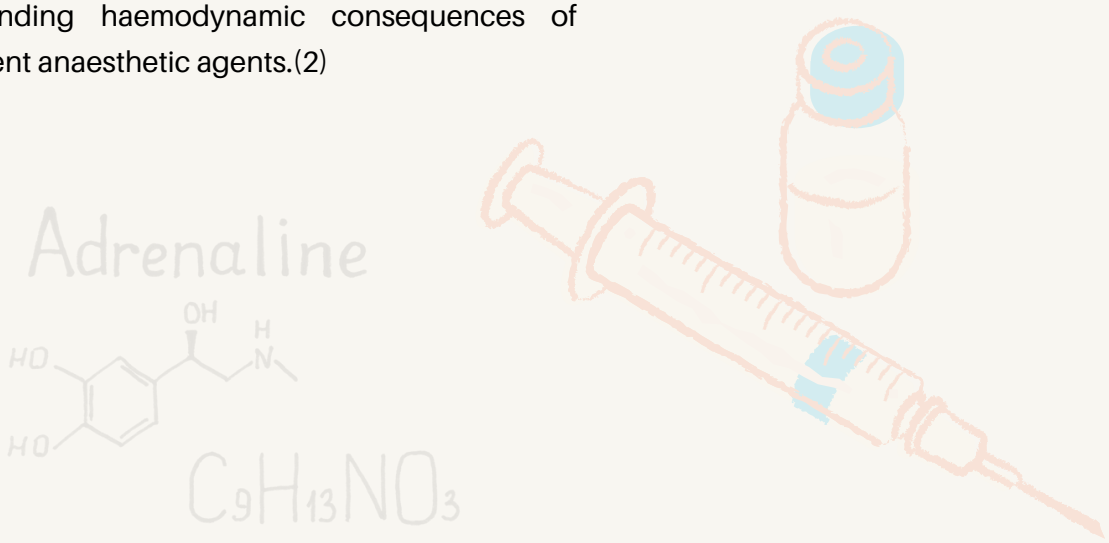
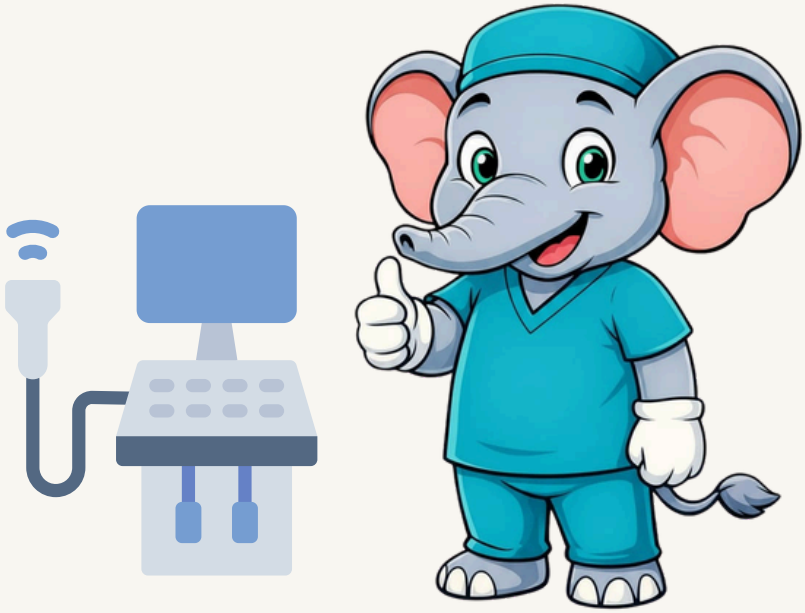


Beneath the Surface: Vascular Anomalies and the Hazards of Central Venous Cannulation

Central venous cannulation in a patient with hepatic cirrhosis and portal hypertension was complicated by inadvertent puncture of anomalously engorged cervical vessels, resulting in haemothorax, a complication potentiated by the distorted vascular anatomy characteristic of advanced portal hypertension. A concurrent incident of subclavian arterial puncture during internal jugular vein cannulation, consequent upon excessive lateral needle trajectory, further underscored the heightened procedural hazard inherent to central venous access in patients with cirrhotic vasculopathy.

Patients with congenital or acquired vascular abnormalities are at substantially elevated risk of haematoma formation and vascular injury during invasive procedures, with central venous cannulation representing a particularly hazardous intervention in this cohort. Pre-procedural ultrasonographic assessment of the intended cannulation site is strongly advocated, as real-time imaging affords delineation of aberrant or engorged vascular structures, thereby enabling a more informed and cautious procedural approach.(1,2)

Particular circumspection is warranted during the dilation step of catheter insertion; dilatation must be performed with deliberate, controlled force to preclude mechanical injury to adjacent vascular and thoracic structures.(3)



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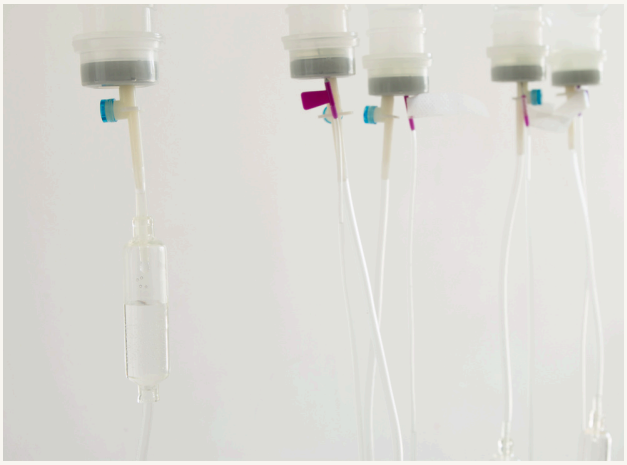
Lost in the Lines: Wrong-Route and Wrong-Drug Errors in Perioperative Infusion Management

Meticulous labelling of all drug delivery tubing in conjunction with syringes is imperative to preclude inadvertent line misconnection and the consequent administration of unintended agents.(1) Robust education, structured supervision, and competency-based training of clinical nursing personnel in the safe management of analgesic and vasoactive infusions are essential institutional safeguards against medication administration errors in both ward and critical care settings.(2)

Independent double-checking of all drug infusions by two qualified practitioners prior to administration represents a cornerstone of safe medication practice and has demonstrated efficacy in reducing the incidence of clinically significant administration errors.(3)



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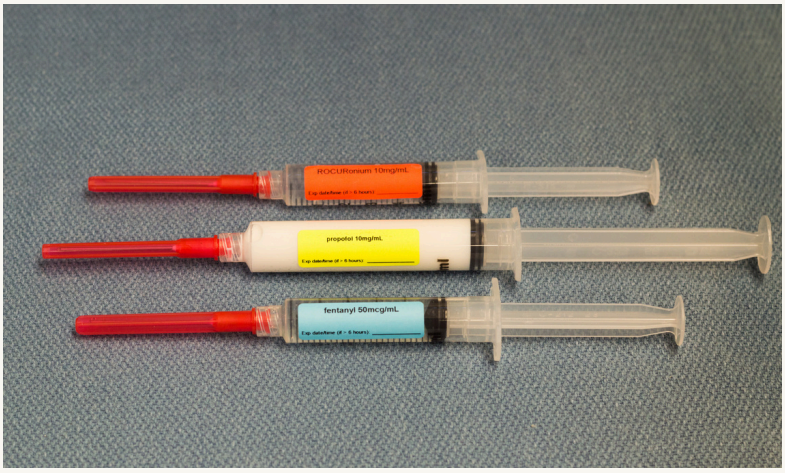

Warming the Patient, Burning the Trust: Iatrogenic Thermal Injury from Improvised Intraoperative Warming Devices

An improvised warming device comprising a water-filled glove was employed to manage intraoperative hypothermia in a critically ill patient undergoing emergency laparotomy for bowel perforation with septic shock, in the absence of a validated active warming modality. Unattended application of the device during a period of competing clinical demands resulted in contact thermal injury at the site of application, constituting a preventable iatrogenic burn in an already haemodynamically compromised patient.

In resource-constrained surgical environments, improvised warming techniques are frequently employed as pragmatic alternatives to validated thermoregulatory devices to mitigate intraoperative hypothermia; however, such practices carry a substantive risk of iatrogenic thermal injury.(1) Water-filled gloves, in particular, are associated with localised thermal concentration and progressive temperature elevation at the contact interface, with the risk of burn injury compounded significantly by prolonged and unsupervised application.(2)

The use of approved, evidence-based intraoperative warming devices is strongly advocated wherever resources permit. Where improvised alternatives are unavoidable, effective interprofessional communication is paramount. Pertinent clinical information regarding active warming interventions must be conveyed explicitly, whether through written documentation at the point of care or via direct verbal handover to the relieving anaesthesiologist or theatre technician, to ensure uninterrupted vigilance and patient safety.

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Depth, Pressure and Vigilance: Airway Catastrophes, Emergence Complications and Irrigation Fluid Dynamics in Anaesthetic Practice

Negative pressure pulmonary oedema arose as a direct consequence of endotracheal tube occlusion secondary to patient biting during the emergence phase of general anaesthesia, representing a preventable post-extubation respiratory complication

Intraoperative oxygen desaturation was observed in a paediatric patient immediately following penile block administration under general anaesthesia, occurring concurrently with the commencement of surgical stimulation and necessitating prompt haemodynamic assessment to exclude local anaesthetic systemic toxicity.

Intraoperative development of raised peak airway pressure, respiratory acidosis, conjunctival oedema, and coarse pulmonary crepitations during endoscopic spine surgery was consistent with significant irrigation fluid absorption and consequent acute fluid overload.

Inadequate depth of anaesthesia predisposes to intraoperative airway instability; unopposed airway collapse under conditions of insufficient anaesthetic depth may culminate in negative pressure pulmonary oedema if not promptly recognised and managed.(1,2) Premature surgical stimulation before attainment of adequate anaesthetic depth constitutes a recognised precipitant of laryngospasm and consequent oxygen desaturation,(1) whilst even seemingly innocuous events — such as endotracheal tube occlusion secondary to patient biting during emergence — are capable of generating sufficient negative intrathoracic pressure to precipitate pulmonary oedema.(2) Prophylactic placement of a bite block, optimally positioned between the molar teeth, is a simple yet effective measure to preclude endotracheal tube compression, and it remains a cardinal principle of safe anaesthetic practice to extubate patients either in a fully awake state with intact protective reflexes or under sufficiently deep anaesthetic planes to obtund airway reactivity.(1,2) Equally, vigilant monitoring of irrigation fluid balance is imperative during endoscopic spinal procedures; whilst systemic fluid absorption is comparatively lower than that observed in transurethral resection of the prostate, the risk remains clinically significant, particularly during endoscopic discectomy.(3,4)

Operative irrigation pressures should be maintained at the minimum level requisite for adequate visualisation, with published data suggesting working pressures in the range of 4.4– 31 cmH2O, pressures exceeding this threshold being associated with headache, cervical pain, and autonomic disturbance.(3,4,5) Ensuring unobstructed irrigant outflow, minimising operative duration, and employing refined endoscopic surgical technique collectively mitigate the volume of systemic fluid absorption and its attendant complications.(6)

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Viggy

THE VIGILANT ELEPHANT

Viggy is the cheerful little elephant you'll meet throughout this newsletter. Dressed in OT scrubs and always alert, Viggy represents vigilance, memory, teamwork, and learning from experience — the very pillars of safe anaesthesia practice.

Every month Viggy highlights key lessons from critical incident reports submitted by anaesthesia professionals across the country. By sharing these insights, Viggy helps ensure that one team's experience becomes everyone's safety lesson

VIGGY'S JOB IS SIMPLE BUT IMPORTANT:

"SEE IT. SHARE IT. LEARN FROM IT."

THE OFFICIAL MASCOT OF

APSA

DR SHLOK SAXENA
DR THRISHUL MUNIRAJU

HYPOXEMIA DURING ANAESTHESIA: EARLY DETECTION AND MANAGEMENT

Hypoxemia during anaesthesia remains one of the most dreadful, undesirable, and imminently disastrous perioperative events. It needs immediate attention with early diagnosis of the potential cause and prompt measures to reverse it, so as to prevent hypoxic damage to vital organs, particularly the brain and heart. Despite the technological advancements in monitoring standards and the use of advanced airway devices, episodes of oxygen desaturation continue to occur in operating rooms, post-operative recovery rooms, procedural rooms, and intensive care units.

The American Society of Anaesthesiologists (ASA) has long stressed the importance of continuous oxygen monitoring as a standard of care; still, hypoxemia can develop rapidly and more frequently in certain groups of patients, like pediatric, geriatric, morbidly obese, and critically ill patients. [1] Thereby, it is of prime importance for every anaesthesiologist to understand the physiology, etiology, and management protocols

Hypoxia and Hypoxemia

Hypoxemia refers to reduced oxygen tension in the arterial blood, typically defined by PaO2 levels of 60 mmHg or less. Whereas, hypoxia refers to a broader and critical condition in which there is decreased oxygen supply and delivery at the tissue level. [2] Thus, it is possible that a patient might be hypoxic without having hypoxemia, which could be because of anemia or cyanide toxicity.

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Physiological changes under anaesthesia which predispose the patient to hypoxemia:

- Reduction of Functional residual capacity (FRC) – In the supine position, loss of diaphragmatic tone, and neuromuscular blockade (post-induction of GA)
- Ventilation – Perfusion (V/Q) mismatch
- Atelectasis – Increases the shunt fraction and impairs oxygenation.
- Impaired hypoxic pulmonary vasoconstriction (HPV)
- Reduced tone of the airways and increased collapsibility

Even brief episodes of hypoxia and desaturation can lead to arrhythmias, myocardial ischemia, neurological injury, or cardiac arrest, requiring prompt attention and correction.[3]

Intraoperative causes of hypoxemia are multifactorial and can be described as:

- Patient-related factors
- Equipment-related factors
- Anaesthesia provider-related factors– skill and experience of anaesthesiologist also play a key role in early diagnosis and effective management of hypoxia

ABCDE APPROACH TOWARDS IDENTIFYING THE CAUSE OF HYPOXEMIA[4][5]

A – AIRWAY-RELATED CAUSES

- Obstructed airway – large tongue, tongue fall (sedated patients), oropharyngeal secretions, laryngospasm, kinked endotracheal tube [6]
- Misplaced endotracheal tube – Esophageal/ Endobronchial intubation
- Aspiration of Gastric contents – obstruction of the endotracheal tube
- Atelectasis – postinduction; more commonly in laparoscopic surgeries and in obese patients
- Bronchospasm, pulmonary oedema (cardiogenic/ fluid overload), pulmonary embolism (sudden hypoxemia)

B – BREATHING PROBLEMS:

- Severe bronchospasm
- Pneumothorax
- High spinal anaesthesia
- Inadequate breathing/ ventilation
- Residual neuromuscular blockade
- Central respiratory depression

C – CIRCULATION:

Circulatory failure – prevents oxygen transportation to the tissues; commonest causes are Hypovolemia, Arrhythmias, cardiac failure, and severe anaemia.

D – DRUGS

All the anaesthetic agents tend to reduce respiratory function, and thereby can lead to hypoxia if adequate oxygenation is not supplemented. Examples: Opioids, Volatile agents, Sedatives, Muscle relaxants, high level of subarachnoid block.

E - EQUIPMENT RELATED CAUSES

- Breathing circuit disconnection/ obstruction
- Issues with oxygen supply – empty oxygen cylinder/ low pressure in pipelines/ misconnection in pipelines/ hypoxic gas mixture delivery
- Monitoring equipment failure – faulty pulse-oximetry probe or battery malfunction
- Vaporizer malfunction
- Ventilator issues

HYPOXEMIA DURING SPECIAL SITUATIONS

- One lung ventilation
- Carbon monoxide poisoning
- Methemoglobinemia
- Cyanide toxicity
- Congenital heart disease (right-to-left shunt)

METHODS OF EARLY DETECTION OF HYPOXIA

Early detection of hypoxemia remains the key to preventing vital organ damage and adverse outcomes. Detection relies on a combination of appropriate monitoring technology, utmost vigilance, and structured interpretation.

PULSE OXIMETRY (SPO2)

Pulse oximetry is the primary tool for detecting low oxygen concentration, and continuous monitoring of SpO_2 is recommended as the standard of care by the American Society of Anaesthesiologists, the World Federation of Societies of Anaesthesiologists, and the Indian Society of Anaesthesiologists. It provides an early warning of hypoxemia, and monitoring SpO_2 trends offers more meaningful information than isolated values. However, pulse oximetry has limitations, including delayed detection during rapid desaturation and the possibility of false readings in conditions such as low perfusion states, hypovolemia, hypothermia, anemia, dyshemoglobinemia, and even when certain colors of nail polish are present.

CAPNOGRAPHY (ETCO2 MONITORING):

The American Society of Anaesthesiologists mandates continuous ETCO2 monitoring as standard of care for all patients undergoing general anaesthesia and moderate or deep procedural sedation.[7] Similar to this, even Indian Society of Anaesthesiologists in its guidelines for practising anaesthesiologists in India mandates ETCO2 monitoring for all laparoscopic surgeries, and mentions that it is desirable to use ETCO2 monitor for all cases needing general anaesthesia.[8] Continuous ETCO2 monitoring helps to confirm adequate ventilation and the appropriate placement of the endotracheal tube. It provides early recognition of hypoventilation, apnoea, circuit disconnection, airway obstruction, and oesophageal intubation.[9]

INSPIRED OXYGEN MONITORING (FIO2)

Monitoring of inspired oxygen concentration is an essential safety feature for preventing hypoxemia in patients. Different types of oxygen concentration analysers have been used in the past; however, the most common type currently employed in modern anaesthesia workstations is the paramagnetic oxygen analyser, as it is highly sensitive and accurate. It is also important that the sample gas from the breathing circuit be collected as close as possible to the patient end to prevent it from being mixed with the rebreathing mixture, especially when practising low-flow anaesthesia. This helps in the early detection of pipeline errors, hypoxic gas mixtures, and equipment malfunctions.[10]

MONITOR ALARMS

Appropriately setting alarm limits on the monitors and ventilators helps in the detection of early leaks in the circuit, low FiO2, and high airway pressures.

ADVANCED OXYGENATION MONITORING DEVICES

Oxygen Reserve Index (ORI): real-time, non-invasive, and novel technology based on multi-wavelength pulse co-oximetry. Provides early warning of impending hypoxia, with studies reporting a median (range) lead time of 31.5s (19 – 34s) prior to changes observed in SpO2 values. [11]

CLINICAL VIGILANCE

Irrespective of all the available monitoring devices, the clinical experience and vigilance of anaesthesiologists hold their own importance in scenarios when monitoring devices might fail. Chest wall movements, reservoir bag compliance, auscultatory findings, and skin color changes (late sign) must be monitored regularly.

EARLY HYPOXEMIA DETECTION DEMANDS THREE ABSOLUTES—MONITOR PRECISELY, STAY VIGILANT, INTERPRET WISELY.

SYSTEMATIC APPROACH TO THE MANAGEMENT OF HYPOXIA

Hypoxia during anaesthesia can manifest at any stage, starting from the induction of anaesthesia to maintenance, and also at the end of surgery during extubation. Some patients may present with hypoxia in the post-operative phase in the recovery room, thereby utmost vigilance and monitoring should be done for all patients till they are safe to be discharged from the PACU units to the room.

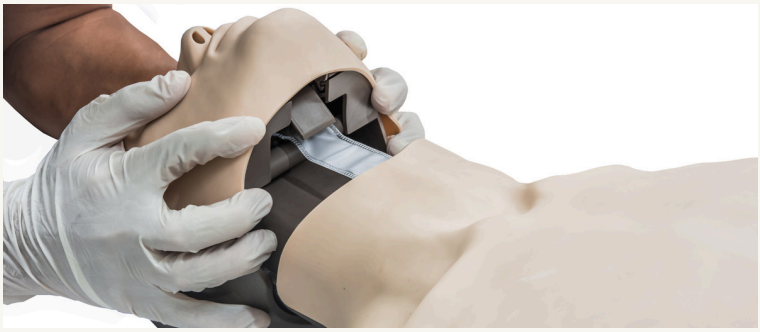
When desaturation occurs, oxygenation must precede diagnostic refinement. Immediate escalation of FiO_2 to 100%, manual ventilation when uncertainty exists, and systematic airway reassessment reduce the cognitive overload and prevent fixation bias. A clear declaration of the event and role assignment improves team performance.

STEP 1: Call for HELP – If hypoxia is sudden and needs immediate management, extra help is always desirable and can definitely improve the outcomes.

STEP 2: Increase FiO2 to 100%

STEP 3: Identification of cause and management

Management depends on early diagnosis of the cause, which can again be identified systematically by the 'ABCDE' approach.[4][5]



A – Check for Airway!

- Assess for signs of airway obstruction – it could be because of tongue fall, or any mass compressing the airway.
- Check for signs of laryngospasm
- Identify the position of the endotracheal tube – rule out oesophageal/endobronchial intubation or any kinks/ blockage of the tube.
- Check for the presence of blood/ vomitus/ secretions in the airway.

Actions to be taken:

- Remove airway obstruction. Provide chin lift, jaw thrust manoeuvre if the patient is breathing via a face mask.
- Insert a nasopharyngeal or oropharyngeal airway.
- If unsure about the appropriate placement of the endotracheal tube, remove it and reinsert or ventilate via face mask.
- Thorough suctioning of the airway for secretions
- In the event that it becomes difficult to ventilate the patient after trying all the adjuncts, try waking up the patient if possible.
- Emergency surgical airway to be considered – Needle cricothyrotomy or tracheostomy if you "can't intubate, can't ventilate".

Obstruction of the airway remains the most common cause of hypoxia under anaesthesia, and early diagnosis and management do improve patient outcomes.

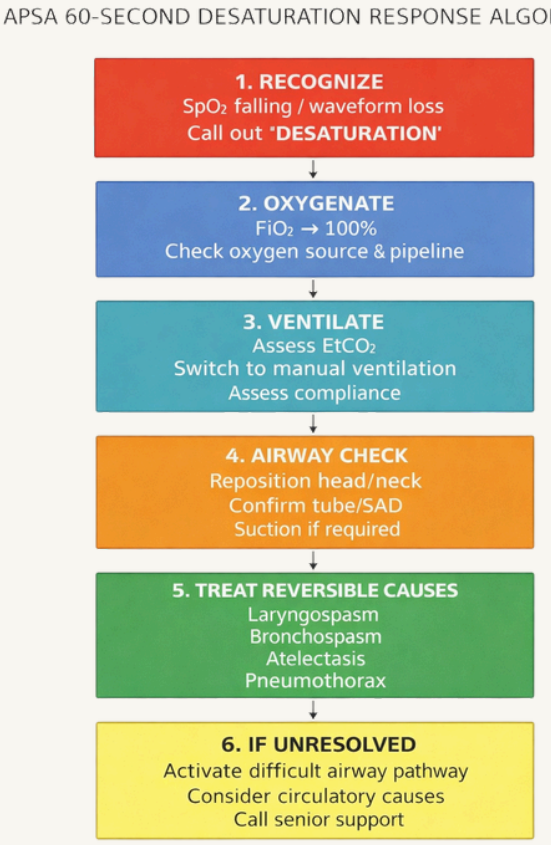
SYSTEMATIC APPROACH TO THE MANAGEMENT OF HYPOXIA

B – Check Adequacy of Breathing

- Watch for chest wall movements and the adequacy of tidal volume.
- Check for signs of respiratory depression/ distress – may be due to sedation/ high spinal.
- Auscultate the chest for the presence of bilateral normal breath sounds or any adventitious sounds. Rule out bronchospasm, rales, rhonchi, or crepitations.
- Also, look for the presence of bilateral equal chest movements.
- Rule out pneumothorax/ pleural effusion/ consolidation/ pulmonary oedema.
- Gastric distension during bag mask ventilation may splint the diaphragm and can interfere with breathing, mainly in infants.

Actions to be taken:

- Adequate ventilation is to be achieved immediately, maybe with a face mask/ supraglottic device/ endotracheal intubation, depending upon the procedure, until the cause of hypoxia is identified and treated accordingly.
- Treatment of bronchospasm – inhaled beta 2 agonists/ steroids.
- Emergency needle decompression through the 2nd intercostal space in the midclavicular line to be done – If pneumothorax is critical and associated with hemodynamic changes (tension pneumothorax)
- Suctioning of the lower airway for secretions should be done if necessary.
- Gastric decompression with a nasogastric or orogastric tube as needed
- Ultimately, identification of the underlying problem and its treatment remains the immediate plan of action.



SYSTEMATIC APPROACH TO THE MANAGEMENT OF HYPOXIA

C – Check Adequacy of Circulation

- Assess the patient's heart rate, blood pressure, peripheral perfusion, and capillary refill time.
- Assess the severity of blood loss, active bleeding, if any, and the amount of blood collected in suction bottles or surgical mops.
- Identify the cardiac causes leading to circulatory collapse or the presence of septic shock.
- Assess for hypovolemia
- Check for the depth of anaesthesia or level of spinal anaesthesia.
- Check for venous compression if any – gravid uterus/ surgical compression.
- Pulse oximetry – loss or improper pulsatile waveform, or difficulty in picking up the pulse signal

Actions to be taken:

- Check for hypovolemia and its correction – IV fluids/ blood as indicated.
- Correction of blood pressure
- Appropriate vasopressors as indicated (ephedrine/ phenylephrine/ norepinephrine)
- Head low or leg up position – increases the venous return to the heart; left lateral position – in pregnant patients to relieve the pressure of the gravid uterus compressing the IVC.
- In the event of cardiac arrest – Commence CPR immediately and try to identify the potential causes of cardiac arrest (4 H's and 4T's – Hypotension, Hypoxia, Hypothermia, Hypovolemia, Tension pneumothorax, Tamponade (cardiac), Toxic effects (drugs, deep anaesthesia, sepsis), Thromboembolism (pulmonary embolism).

D - Drug Effects

- Assess the doses of all anaesthetic drugs, and avoid overdosing, as most of them cause respiratory and cardiovascular depression.
- High-dose opioids cause respiratory depression, which can lead to hypoxemia.
- Muscle relaxants, if not reversed adequately, may lead to residual paralysis and can prevent adequate ventilation, leading to hypoxemia and hypoxia.
- Drug-related anaphylaxis may lead to bronchospasm and circulatory collapse, which may lead to hypoxia. Identify potential allergies in a patient, if any (latex or specific drug, etc), and avoid them.

Actions to be taken:

- Identification of potential drugs causing side effects and their appropriate treatment.
- Adequate reversal of muscle relaxants and the use of neuromonitoring prevent residual neuromuscular block.
- Naloxone intravenously can be used to reverse opioid induced side-effects (respiratory depression mainly)
- Treatment of anaphylaxis – Removal of the causative agent, administering with 100% oxygen, bronchodilators, steroids, antihistaminic and intravenous adrenaline to be done

SYSTEMATIC APPROACH TO THE MANAGEMENT OF HYPOXIA

E - Equipment Issues

- Identify the proper placement of the pulse oximeter, check for peripheral vasoconstriction or hypothermia, which can interfere with pulse-oximetry readings.
- Check for adequacy of the entire breathing system with the anaesthesia machine and gas delivery systems.

Actions to be taken:

- Check for adequacy of central oxygen supply pressure or oxygen cylinder pressure. If the oxygen cylinder is empty, then it should be replaced immediately.
- Obstruction or disconnection in the breathing circuit or endotracheal tube should be identified and acted upon promptly.
- Adequate warming of peripheries, if hypothermia is the cause of incorrect pulse oximetry readings.

All precautions taken at intubation must be taken at extubation, and continuous monitoring of oxygen saturation with supplementary oxygen should be done postoperatively in morbidly obese patients, patients with difficult airways, and maxillofacial surgeries.[12] If needed patient is to be electively ventilated and monitored in the ICU, followed by planned extubation if there is any suspicion of postoperative airway oedema, depending upon the type of surgery.

HUMAN FACTORS AND SYSTEMS SAFETY

Crisis management effectiveness depends on closed-loop communication, role clarity, and deliberate reassessment. Structured debriefing converts adverse events into institutional learning and strengthens system resilience.

CONCLUSION

Hypoxemia during anaesthesia remains a central patient safety challenge. Anticipation, integrated monitoring, immediate oxygenation, systematic diagnosis, and coordinated team leadership together define safe outcomes. Vigilance — not dramatic rescue — sustains patient safety.

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WHY REGULAR AUDIT IS NEEDED: MONITORING STANDARDS IN THEPERIOPERATIVE PERIOD - THE CASE FOR ONGOING CLINICAL AUDIT

The mantra of modern anaesthesia has shifted from "the patient survived the surgery" to "the patient recovered without avoidable harm."

1. THE CORE PROBLEM: THE GAP BETWEEN STANDARD AND PRACTICE

One of the first lessons we learn during training is what constitutes minimum monitoring. The ASA (American Society of Anaesthesiologists), the WFSA (World Federation of Societies of Anaesthesiologists) have clearly defined mandatory monitoring standards. [1,2] Position statements regarding minimum monitoring standards have been put forward by the Indian Society of Anesthesiologists (ISA) and same has been emphasized further in private practitioners module released by ISA. [3] Intraoperative mishaps may trace back to failures in these basic systems rather than complex physiological mysteries. Without an audit we don't know the extent of the problem nor its effects.

A regular audit answers a deceptively simple but critical question: "Are our patients actually receiving the monitoring required for safe anaesthesia?"

THE "BIG FIVE": WHERE DO WE STAND?

a. Pulse Oximetry (SpO_2) The single most significant advancement in anaesthesia safety. While ubiquitous, "disconnect intervals" during patient positioning or transport compromise patient safety. Safety Pearl: A pulse oximeter is not a luxury; it is a physiological extension of the anaesthesiologist's eyes.

b. Non-Invasive Blood Pressure (NIBP) While NIBP monitoring is standard practice, cycling frequency often drops during long, stable maintenance phases, during positioning and transport, leading to delayed detection of hypotension.

c.Electrocardiogram (ECG) Monitoring for arrhythmias and ST-segment changes is standard. However, lead placement for example using only Lead II, maybe suboptimal for detecting intraoperative ischaemia in high-risk patients. Use of ECG monitoring during sedation and NORA areas may not be universal.

d. Capnography ($EtCO_2$) Despite being a mandatory gold standard, capnography remains the most underutilised tool in smaller centres. $EtCO_2$ is the earliest indicator of circuit disconnection or accidental oesophageal intubation – events where pulse oximetry provides only a delayed warning.

e. Temperature Monitoring Often the forgotten monitor. In the Indian context, where OT air conditioning can be poor, suboptimal temperature management can be a significant contributor to delayed recovery or surgical site infections.

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2. INDIA IS NOT ONE HEALTHCARE SYSTEM

India's healthcare landscape is uniquely fragmented, with high-tech corporate hospitals coexisting alongside resource-constrained rural centres. In this context, minimal monitoring standards provide the bedrock of patient safety. A single audit at one institution, at one point in time, tells us almost nothing about the national picture. This diversity means acompliance gap in one setting may not exist in another. Regular, geographically representative audits map this variationand direct resources where they are most needed.

Dimension	Variability in India
Infrastructure	Tertiary Teaching Hospital vs. a 10-bed nursing home in a Tier-3 town
Ownership	Government (INIs vs state vs district), corporate, charitable, private solo-practitioner
Resources	Piped oxygen, pulse oximetry, capnography, quality of anesthesia machines
Systems	Systems compliant with NABH versus unaccredited hospitals
Language & literacy	Affects consent, communication, and handover quality

3. PERIOPERATIVE MONITORING FAILURES HAVE DIRECT, MEASURABLE CONSEQUENCES

Inadequate perioperative monitoring is not an abstract risk, it contributes to death and permanent harm. In India:

•Anaesthesia-related mortality is significantly higher than in high-income countries [3]

•Hypoxia, unrecognised hypotension, undetected arrhythmias, and delayed recognition of malignant hyperthermia orembolism are preventable with basic monitoring.

•The Lancet Commission on Global Surgery identified low availability of pulse oximetry in low- and middle-incomecountries, India's rural sector mirrors this reality. [4]

WITHOUT AUDIT, WE CANNOT QUANTIFY THE PROBLEM, JUSTIFY INVESTMENT, OR DEMONSTRATE IMPROVEMENT.

4. WHY REGULAR AUDIT – NOT JUST A ONE-TIME STUDY

A single audit is a photograph. A regular audit is a film. Audit must be an ongoing process because:

a. Practice Drift Standards, once met, can erode. Staff turnover, equipment failure, budget cuts, and complacency allcause gradual decline. Regular audit identifies these deficiencies before they become embedded in culture.

b. Accountability and Culture Change Knowing that practice will be re-audited changes behaviour. It creates a culturewhere monitoring standards are a professional norm, used without fail.

c. Closing the Audit Cycle The audit cycle is meaningless if it ends at data collection. Regular audit enables: Identification of gaps → Implementation of interventions → Re-audit to confirm improvement → Sustained change.

d. Evolving Standards Monitoring guidelines are updated as evidence grows – capnography for all intubated patients,neuromuscular monitoring, processed EEG. Regular audit ensures practice keeps pace.

e. Medicolegal and Accreditation Imperatives With NABH accreditation increasingly required and medicolegal scrutiny of anaesthetic deaths rising, documented audit trails of monitoring compliance protect both patients and practitioners.

5. THE EQUITY PRINCIPLE: EVERY PATIENT DESERVES THE SAME STANDARD

In a country with stark disparities, audit is also a social justice tool. The patient undergoing an emergency caesarean section in a district hospital deserves the same physiological surveillance as one in a tertiary centre. Regular audit makes this aspiration measurable.

6. BUILDING A NATIONAL EVIDENCE BASE

India-specific perioperative outcome data remains scarce. Multicentre, repeated audit generates normative data for Indian practice, evidence to inform India-specific guidelines rather than imported Western ones, and benchmarking data for international comparison and advocacy.

In a country as vast, diverse, and unequal as India, regular audit is the only honest mechanism by which the profession can answer, with evidence rather than assumption, whether its patients are truly safe.

HOW TO CONDUCT THE AUDIT:

KEY OBJECTIVES:

Compliance: Assessing consistent use of pulse oximetry, NIBP, ECG, and capnography

Alarm Management: Evaluating response time to alarm fatigue

Documentation: Bridging the gap between what was monitored and what was recorded
What You're Auditing Whether minimum monitoring standards (SpO_2, NIBP, ECG, capnography, temperature) were applied and documented across all perioperative phases – preoperative, intraoperative, and recovery.

STEP-BY-STEP:

Step 1 – Define Your Standard Choose a reference standard to audit against – the ASA or WFSA minimal monitoring guidelines are the simplest starting point. List which monitors are required at each phase. This becomes your checklist.

Step 2 – Decide Your Sample You don't need hundreds of cases to start. Select 30–50 consecutive elective surgical cases over a defined period (e.g., one month), including a mix of general, spinal, and regional anaesthesia where possible.

Step 3 – Design a Simple Data Collection Sheet One page per patient. Columns for patient ID, type of surgery, anaesthesia type, and yes/no ticks for each monitoring parameter at each phase. Add a column for "reason if not done." Keep it anonymous.

Step 4 – Collect the Data A single observer – a resident, consultant, or trained nurse – fills the sheet in real time in the OT, or from the anaesthesia record immediately after the case. Real-time data collection is more accurate than retrospective review, but both are acceptable.

Step 5 – Analyse Simply Calculate compliance as a percentage for each parameter. Example: ECG applied in 42/50 cases = 84% compliance. A basic Excel sheet is sufficient. No complex statistics are required.

Step 6 – Present the Findings Share results with your department via a brief presentation or printed summary. Highlight areas of high compliance and, more importantly, where and why it fell short.

Step 7 – Identify the Reason for Gaps Was it equipment unavailability, staff habit, or documentation failure? The reason determines the fix. A brief team discussion often surfaces the real barriers.

Step 8 – Implement a Change Introduce one focused intervention based on findings – a laminated monitoring checklist in each OT, a prompt on the anaesthesia record form, a brief staff orientation, or a formal equipment procurement request.

Step 9 – Re-Audit Repeat the same audit 3–6 months later using the same method. Compare compliance rates before and after. This closes the audit cycle and confirms whether the change worked.

The entire process – from design to re-audit – is achievable within 6–12 months, requires no special software or funding, and can be led by a single motivated resident or consultant. That is precisely what makes it both credible and publishable.

CONCLUSION:
Monitoring standards exist to protect patients, but only if they are consistently applied and regularly verified. In a country as vast and unequal as India, clinical audit is not an academic exercise; it is a necessity to identify evidence-practice gaps and improve our practice. Regular audit closes that gap – one OT, one checklist, one cycle at a time.

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APSA AMBASSADORS

Driving Patient Safety Through Shared Insights

Every movement needs its energy, and ours comes from a remarkable team of early-career anaesthesiologists spread across the length and breadth of India.

When we put out the call, we were genuinely moved by the response. These are busy clinicians — residents, junior consultants, early-career specialists — who chose to raise their hands and say, *"Patient safety matters to me, and I want to do something about it."* That means a lot.

Our APSA Ambassadors are rooted in their own institutions and communities, yet united by a shared purpose — making anaesthesia safer for every patient. They will engage with peers through academic forums, social media, awareness campaigns and community outreach. They will be writing, presenting, debating, and most importantly, having real conversations about why safety culture matters in our specialty.

They are not just representatives — they are change-makers. And they are already making a difference simply by choosing to be here.

We are proud of this team. Not just for what they will do, but for who they already are — thoughtful, driven young doctors who understand that great anaesthesia is not only about skill, but about systems, awareness, and accountability.

Dr Aarjvi Patel
Dr Abinayah Kanniah
Dr Alka Trivedi
Dr Amritha Nair
Dr Anil K Poduri
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