GUIDELINES

Position Statement of ISCCM on Intrahospital Transport of Critically Ill Patients

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Abstract

Background and purpose: Intrahospital transport (IHT) of critically ill patients is essential for diagnostic and therapeutic indications, requiring thorough assessment and careful preparation of patients, staff, and equipment throughout the process. Variability in practices among hospitals can affect patient safety and may result in adverse events (AEs). This position statement is designed to provide guidance to multidisciplinary critical care teams in the adoption of evidence-based recommendations aimed at mitigating risks and improving safety during patient transport.

Method: This position statement has been drafted by an expert committee on IHT constituted by the Indian Society of Critical Care Medicine. The process involved thorough review of literature from electronic database using PubMed services. Recommendations made are tailored with considerations for Indian setting; the units may further modify these as per local needs and equipment and staffing available. The final manuscript was written after achieving consensus among members, and final draft was accepted by all the committee members.

Results: This position statement offers a compilation of 38 strategic recommendations, which are comprehensive and deal with all aspects of IHT of the critically ill. Recommendations provided in this document are, therefore, applicable for routine use during the IHT. They cover all phases of transport and answer questions pertaining to pre-, intra-, and post-transport considerations. It will help to achieve uniformity, minimize AEs, and enhance safety.

Conclusions: This is a standard set of 38 evidence-based recommendations to ensure safety for IHT, tailored for implementation in various criticalcare settings across India. Science is ever-changing, and periodic review will be needed to keep it up to date with emerging evidence and standards.

Keywords: Critically ill, Intrahospital transport, Patient safety, Recommendations.

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Highlights

- This position statement on intrahospital transport (IHT) provide workable uniform organized framework of recommendations applicable at the bedside for enhancing safety during IHT.
- It has been jointly produced by (I-TOUCH) study group, with peer review by expert and designated members from Indian Society of Critical Care Medicine for application in Indian context.

Introduction

Intrahospital transport (IHT) refers to the transfer of critically ill patients from the intensive care unit (ICU) to various locations within the hospital for diagnostic and therapeutic purposes.[1] This process is frequently associated with risks of adverse events (AEs), some of which may be life-threatening. Global incidence of AEs reported during IHT range from 3 to 75%.[2]

The I-TOUCH study group prospectively evaluated over 1,000 IHT episodes across 15 centers in India. They reported occurrence of AEs in 10% instances, with life-threatening events seen in 0.18% patients.[3]

Despite the presence of several guidelines and a few recommendations, there has been no consensus regarding the ideal practice guidelines for IHT in critically ill patients.[4,5]

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Objective

The primary objective of this position statement is to establish standardized recommendations tailored for the Indian context, aimed at multiprofessional critical care personnel to enhance the safety of ICU patients during IHT.

Methodology

A committee of 24 members with expertise in IHT of ICU patient was formed by Indian Society of Critical Care Medicine (ISCCM). A virtual meeting of the committee was conducted under the chairmanship of the president ISCCM (PB) on September 5, 2024. It was unanimously decided to compile and release a standard position statement to address variable IHT practices across India. The main goal was to implement evidence-based standardized transport policy applicable to critical-care setting in Indian context. Initial draft of the statement was prepared by authors AT and KZ. Research articles on the subject (n = 136) were identified by extensive literature search from electronic databases inclusive of Google Scholar, Ovid, Science Direct, and mainly using PubMed service. The PICO methodology of structured inquiries was adapted during search. Using MeSH (medical subject headings), the following keyword combinations were used: "IHT AND ICU patients," "risk/benefit assessment," "pretransport assessment," "monitoring during transport," "AE during transport," "equipment, devices medications during transport," "transport teams," "risk factors and complications," and "consensus or recommendations."

Seventy-eight full-text articles were screened. Fifty-two studies on IHT published in English language from 1970 to 2024 were used to construct initial draft of position statement. Identification, screening, eligibility, and recommendation done as per Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram depicted in Figure 1.

The electronic copy of initial draft was sent to all committee members. It was then submitted for peer review to the guideline committee of ISCCM. Systematic review of the literature and individual studies were not assessed systematically for quality of evidence and GRADE of recommendation, thus differentiating position statement from guideline development. Summary of the position statement recommendations for IHT as outlined in Table 1.

Question 1: What are the Risk Assessment Methods Involved in IHT of ICU Unstable Patients?

Recommendations

1a. We recommend proactive risk assessment through good clinical review of unstable, critically ill patients, based on the level of urgency, the number of infusion pumps, particularly the use of catecholamines, and respiratory support needing positive end-expiratory pressure (PEEP).

1b. We additionally recommend the use of established simplified scores: Acute Physiologic Assessment and Chronic Health Evaluation (APACHE) II score, Therapeutic Intervention Scoring System (TISS) score, Glasgow Coma Scale (GCS) score, and Sequential Organ Failure Assessment (SOFA) score related to the severity of patient illness before IHT.

Rationale

The IHT of unstable critically ill patients within the hospital setting is often imperative for both diagnostic and therapeutic interventions. Patients admitted to the ICU face an elevated risk of AEs during IHT.[1]

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Murata et al. conducted a comprehensive meta-analysis encompassing 12,313 IHTs and 1,898 patients across 24 studies. The analysis revealed that the overall incidence of AEs was 26.2% (95% CI: 15.0–39.2).[2]

The I-TOUCH, a large Indian prospective, multicenter observational study, reported data on 1,072 episodes of transport for 893 patients from 15 centers. Adverse events occurred during 102 (9.6%) transports.[3]

The occurrence of cardiac arrest remains a grave concern, and the incidence ranges from 0.34 to 1.6%.[6]

The I-TOUCH study group reported cardiac arrest in two (0.18%) patients who were on high doses of vasoactive agents and being transported emergently.[3]

Parmentier-Decrucq et al. reported a higher incidence of AEs, if patients were on vasoactive medications, that is, norepinephrine (odds ratio (OR) = 4 (1.8–8.8); $p = 0.001$) and dobutamine (OR = 2.7 (1.1–6.7); $p = 0.041$).[7]

Harish et al. reported that patients with higher severity of illness scores (sequential organ failure assessment (SOFA) score 16.3 ± 5.8 vs 10.0 ± 4.3, $p = 0.000$ and APACHE II score 22.5 ± 11.0 vs 10.8 ± 6.5, $p = 0.000$) were significantly more likely to develop AEs and/or need cardiopulmonary resuscitation (CPR).[8]

Mechanical ventilation was a risk factor for IHT complications in a prospective observational study.[9]

In 12 French ICUs belonging to the OUTCOMEREA group, a prospective multicenter cohort study was conducted on 6,242 patients on invasive mechanical ventilation. Post-IHT complications in critically ill patients receiving invasive mechanical ventilation were recorded in 621 patients (37.4%).[10]

Patients ventilated with PEEP are at an increased risk, and the indication for procedures away from the ICU has to be weighed carefully in these subjects.[9,10]

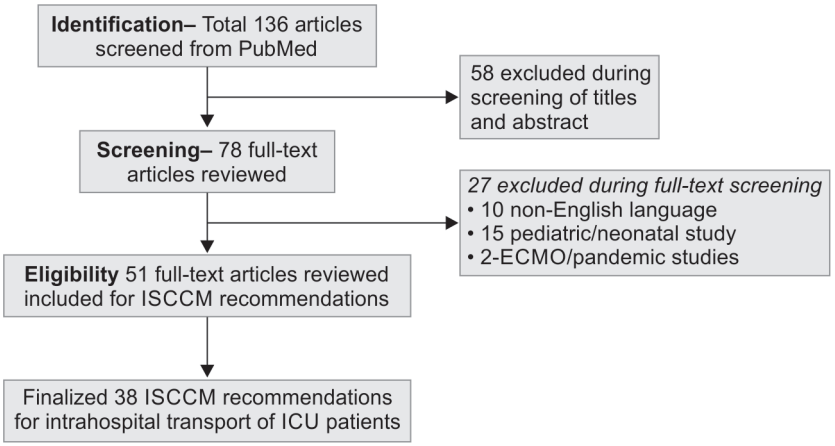

Fig. 1: PRISMA flow diagram

Table 1: Summary of recommendations by ISCCM committee on IHT of critically ill patients

S. No.	*Questions*	*Recommendations of ISCCM committee on IHT of critically ill patients*	
1.	What are the risk assessment methods involved in IHT of ICU unstable patients?	1a.	We recommend proactive risk assessment through good clinical review of unstable, critically ill patients, based on the level of urgency, the number of infusion pumps, particularly the use of catecholamines, and respiratory support needing positive end-expiratory pressure (PEEP).
		1b.	We additionally recommend the use of established simplified scores: Acute Physiologic Assessment and Chronic Health Evaluation (APACHE) II score, Therapeutic Intervention Scoring System (TISS) score, Glasgow Coma Scale score, and Sequential Organ Failure Assessment (SOFA) score related to the severity of patient illness before IHT.
2.	What are the essential components of pretransport patient assessment?	2a.	We recommend that the intensivist evaluate indication for transport and assessment of risk and benefit before deciding to transport the patient.
		2b.	We recommend that the transporting nurse should evaluate baseline vital signs, SpO_2 by pulse oximetry, and head-to-toe assessment of ICU patient prior to transport. Subsequently, accompanying ICU doctor should do a thorough "A-B-C-D-E" assessment, once patient is transferred on to portable ventilator and monitoring equipment.
3.	What should be the team composition to ensure safety of patient during IHT?	3a.	We recommend that at least two team members should be present during IHT of ICU patient. One of the members should be ICU nurse assigned to take care for that patient in the respective shift.
		3b.	We recommend that at least one member involved in IHT should have Advanced Cardiac Life Support (ACLS) certification with additional training in managing ventilated patients, handling airway emergencies, and labile hemodynamic state.
		3c.	We recommend critical care physician/ICU doctor to accompany patients who are intubated, hemodynamically unstable, or are anticipated to require acute intervention.
4.	How do we address the need of essential transport equipment and monitoring during IHT?	4.1a.	We recommend that minimum standard essential monitoring equipment, including blood pressure monitor, pulse oximeter, and cardiac monitor/defibrillator, should accompany every patient during every IHT. Continuous end-tidal carbon dioxide monitoring is desirable, if available.
		4.1b.	We recommend additional equipment, as required, for managing ABC (airway, breathing, and circulation) be available along with the pharmacological agents in transport cart (Table 2).
		4.2a.	We recommend intensivist to enlist and refrain the transport team from use of additional equipment not warranted as per clinical condition.
		4.2b.	We suggest that the device list should be customized as per local needs and hospital policy.
5.	What is the importance of documentation and communication during pre-, intra-, and post-transport of ICU patient?	5a.	We recommend implementation of checklist to document pre-, intra-, or post-transport clinical observations. Hospitals can customize this checklist as per local needs.
		5b.	We recommend clear handoff communication between transport team and receiving intrafacility team throughout all phases of transport: pre-, intra-, and post-transport phases.
		5c.	We recommend the need of effective planning and communication between ICU transport team and other in-house destination department to reduce transport time and unnecessary waiting period during IHT.

(Contd...)

6.	What are the roles and responsibilities of transport team?	6a. We recommend the team leader to brief the team members at the destination about relevant history, the current clinical condition, and indication of transport of patient. 6b. We recommend that the ICU team should optimize the clinical condition of the patient before IHT and the transport team to prepare and anticipate specific patient considerations (as suggested in Fig. 2). 6c. We recommend that the team leader should assign a team member to perform necessary documentation of pretransport clinical condition as well as obtain consent for the transport. 6d. We recommend that the team leader should decide the timing after communication and collaboration with other healthcare providers who will be performing procedure or investigation at destination site. 6e. We recommend team leader to map out safest and most efficient and fastest IHT route to the destination site with help of local logistics (ancillary staff of hospital) to enable timely actions, such as holding elevator ready, crowd control, etc., to minimize time of transport. 6f. We recommend transport team member to frequently assess, monitor, and document the clinical condition to ensure safety during all phases of pre-, intra-, and post-transport of IHT patient.
7.	What is the protocol for handling serious unexpected AE during IHT?	7a. We recommend standard protocol of AHA algorithm[11] or to establish clear protocols as per local hospital policy for handling serious unexpected events (e.g., cardiac arrest, respiratory failure). 7b. We recommend IHT team should be trained and familiar with this protocol.
8.	What are the ethical and legal considerations for IHT of ICU patient?	Ethical considerations 8.1a. We recommend patients (or their surrogates, when unable to consent) should be informed about the reasons for the transfer, the expected outcomes, and any risks involved. 8.1b. We recommend that the method of IHT should accommodate the patient's physical and emotional comfort. 8.1c. We recommend, whenever possible, to allow family members to accompany the patient during IHT. 8.1d. We recommend the following established protocols for handoff communication during IHT. Legal considerations 8.2a. We recommend proper training and adherence to safety protocols to mitigate the accusations of negligence and legal liabilities. 8.2b. We recommend thorough documentation of the consent, IHT process, and clinical decisions. 8.2c. We recommend that the IHT team adhere to their local hospital policies, which is both a legal and ethical obligation to ensure patient safety. 8.2d. We recommend maintaining the patient's confidentiality and privacy during IHT.
9.	How is patient safety ensured during IHT?	9a. We recommend elective IHT after stabilization and optimization of the ICU patient. 9b. We recommend avoiding emergent IHT of ICU patient without optimization, unless deemed to be life-saving, such as control of bleeding using angioembolization. 9c. We recommend emergent IHT only if it is a life-saving indication for safety of patient. 9d. We recommend monitoring of IHT patients every 15 min in elective transport and every 5 min in emergent indications. 9e. We recommend transport protocol to include routine checkup of equipment used during transport.
10.	What are the steps essential for continuous quality improvement and training for safety of IHT?	10a. We recommend that hospitals with critical care facility should have written protocol for IHT designed as per local need. 10b. We recommend training of nursing staff with competency-based transport scenario during education of nurses new to critical care. 10c. We suggest implementing incident reporting and conducting audits of all related reports to evaluate the factors contributing to safety issues encountered during transport.

Question 2: What are the Essential Components of Pretransport Patient Assessment?

Recommendations

2a. We recommend that the intensivist evaluate indication for transport and assessment of risk and benefit before decision of IHT.

2b. We recommend that the transporting nurse should evaluate baseline vital signs, SpO_2 by pulse oximetry, and head-to-toe assessment of ICU patient prior to transport. Subsequently, accompanying ICU doctor should do thorough "A-B-C-D-E" assessment once patient is transferred on to portable Ventilation and monitoring equipment.

Rationale

The IHT of the ICU patients is evident in the literature as a procedure associated with significant risks. Nevertheless, interfacility transfers occur more frequently than interhospital transfers.[12,13]

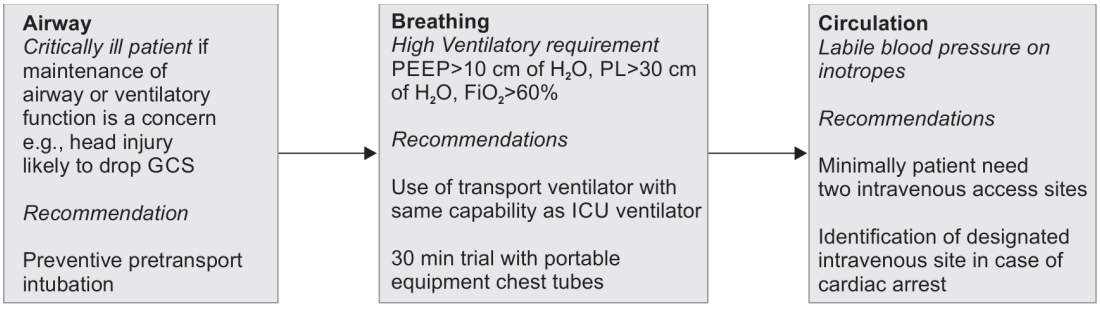

Fig. 2: Critical indicators when considering IHT

The use of IHT is primarily for diagnostic or therapeutic purposes. It is essential to conduct a thorough risk–benefit analysis regarding IHT prior to implementation.[14]

A few studies have evaluated impact of IHT on treatment change.[15]

Evolution of technology allows various noninvasive diagnostic testing (echocardiography and point-of-care ultrasonography) and therapeutic procedures (percutaneous tracheostomy and endoscopies) to be performed bedside, leading to reduction in exposure of ICU patients to transport-related risks. Such advancements call for revisiting indications and benefits of IHT in current practice.[16–18]

However, specialized procedures that necessitate advanced equipment, such as magnetic resonance imaging, interventional radiology, and surgical facilities, are essential. Consequently, the implications of IHT on patient outcomes cannot be overlooked. The pretransport clinical assessment and identification of critical indicators (airway, breathing, and circulation) (Fig. 2) is essential for establishing criteria that determine the safe transport of ICU patients within the hospital. The essential components of pretransport patient assessment include a thorough evaluation of the patient's medical history, a comprehensive physical examination, vital signs monitoring, and the identification of any immediate medical needs. Additionally, it is crucial to assess the patient's level of consciousness, mobility, and any potential risks associated with transport.[19]

The creation and execution of specialized checklists for IHT have demonstrated effectiveness in enhancing safety and quality for ICU patients exposed to IHT.[20] This process is critical for ensuring patient safety and optimizing outcomes during the transport procedure.

Question 3: What should be the Team Composition to Ensure Safety of Patient during IHT?

Recommendations

3a. We suggest that at least two team members should be present during IHT of ICU patient. One of the members should be ICU nurse assigned to take care for that patient in the respective shift.

3b. We suggest that at least one member involved in IHT should have minimum Advanced Cardiac Life Support Certification (ACLS) with additional training in managing ventilated patients, handling airway emergencies, and labile hemodynamic state.

3c. We suggest doctor trained in ACLS and ventilator management to accompany patients who are intubated, hemodynamically unstable, or are anticipated to require acute intervention.

Rationale

Guidelines from the European Society of Intensive Care Medicine (ESICM) and the Society of Critical Care Medicine (SCCM) recommend that critically ill patients be accompanied by a minimum of two escorts during transport to ensure optimal safety and care. These guidelines also strongly recommend presence of physician with training in airway management and advanced cardiac life support, and critical care training or equivalent, to accompany unstable patients.[5,21]

Comprehensive review by Waydhas emphasized the need of critical care physician for IHT of unstable patients.[22]

Prospective study by Mazza et al. regarding transport of ventilated, unstable patients reported low incidence of complications owing to the presence of qualified physician in transport team.[23]

Question 4: How do We Address the Need of Essential Transport Equipment and Monitoring during IHT?

Recommendations

4.1a. We recommend that minimum standard essential monitoring equipment, including blood pressure monitor, pulse oximeter, and cardiac monitor/defibrillator, should accompany every patient during every IHT. Continuous end-tidal carbon dioxide monitoring is desirable, if available.

4.1b. We recommend additional equipment, as required, for managing ABC (airway, breathing, and circulation) be available along with the pharmacological agents in the transport cart for IHT of ICU patient as per implications (Table 2).

4.2a. We recommend intensivist to enlist and restrict the transport team from use of additional equipment not warranted as per clinical condition.

4.2b. We suggest that the device list should be customized as per local needs and hospital policy.

Rationale

The primary concern during IHT is to continue same level of monitoring and care as in ICU.

One of the preliminary studies in *Lancet* highlighted the importance of continuous display of the electrocardiogram (ECG) (using a battery-operated ECG oscilloscope) in recognizing high incidence of arrhythmias in transported patients.[24]

Velmahos et al. demonstrated use of Life Support for Trauma and Transport (LSTAT), Integrated Medical Systems, Inc, a multimodal monitoring system, including ventilator, defibrillator, suction, hemodynamic monitors, infusion and invasive monitoring channels, capnography, blood analysis, and electrocardiography, as safe platform for IHT of trauma patients.[25]

Table 2: Recommended minimum standard equipment for IHT[5]

Essential for all intrahospital transport	*Mandatory equipment*
Respiratory support equipment	Airway (nasopharyngeal and oropharyngeal of adult sizes), ETT (7, 7.5, 8, 8.5), supraglottic airway, LMA, BVM, PEEP valve, standard portable suction, portable ventilator with invasive and noninvasive support with disconnect and high-pressure alarm. Two working laryngoscope, bougie, and portable oxygen tank
Circulatory support equipment	Multifunction portable monitor with ECG, blood pressure, pulse oximeter, $ETCO_2$ device. Defibrillator with external pacer, intravenous fluid and perfusion set, syringes, and needles
Emergency drugs and fluids	Epinephrine, atropine, amiodarone, inotropes, analgesics, and isotonic intravenous fluids
Miscellaneous (other clinical equipment)	Glucometer with lancets and strips. torch, thermometer, protective PPE gloves, mask

BVM, bag valve mask; ECG, electrocardiogram, $ETCO_2$, end-tidal carbon dioxide; ETT, endotracheal tube; LMA, laryngeal mask airway.

Link et al. reported the development and implementation of a mobile transport unit designed for high-risk ICU patients. This unit is equipped with advanced medical technologies, including ECG monitors, arterial and intracranial pressure monitors, syringe pumps, and a respirator, ensuring a safe and effective transport solution for critically ill patients.[26]

Braman et al. demonstrated significantly less alteration in acid–base balance, hemodynamic fluctuations arising due to arrhythmia, and hypotension during IHT of ventilated patients with the use of portable mechanical ventilators compared with use of manual resuscitator bag.[27]

Weg and Haas conducted a prospective single-blind study that concluded that manual bagging of ventilated patients during transport is safe, provided that the accompanying personnel possess knowledge of the required inspired oxygen fraction and minute ventilation. These variables can be effectively managed during interhospital transport with appropriate training for the escort.[28] Excessive equipment, wires, and tubing can lead to disorganization, resulting in errors that jeopardize safety. An increase in equipment does not equate to improved outcomes, if it leads to more errors and distracts caregivers from their primary focus on patient care.[22]

Question 5: What is the Importance of Documentation and Communication during Pre-, Intra-, and Post-transport of ICU Patient?

Recommendations

5a. We recommend implementation of checklist to document pre-, intra-, or post-transport clinical observations. Hospitals can customize this checklist as per local needs.

5b. We recommend clear handoff communication between transport team and receiving intrafacility team throughout the pre-, intra-, and post-transport phases of ICU patients.

5c. We suggest the need of effective planning and communication between ICU transport team and other in-house destination department to reduce transport time and unnecessary waiting period during IHT.

Rationale

A before and after intervention (transport checklist) trial conducted by Choi et al. reported significant reduction in both overall and serious unexpected events between study groups. The trial highlighted the importance and benefit of documentation of transport checklist during IHT.[29]

The creation of an IHT tool aims to reduce the risks linked to the transport of critically ill patients within the hospital setting. This tool equips ICU nurses with a comprehensive documentation system that integrates patient assessments with procedural guidelines. Furthermore, this tool can be regularly audited to enhance patient safety.[30]

Beckmann et al., in cross-sectional case review of incident reports submitted to the Australian Incident Monitoring Study in Intensive Care Unit (AIMS-ICU), reported 47 critical incidents out of 176 due to communication and liaison issues between ICU and destination.[12]

Lovell et al. performed an audit of 97 IHT patients and identified that poor communication between ICU and destination contributed to unnecessary delay.[31]

Nagpal et al. conducted a systematic quantitative assessment of risks associated with poor communication in surgical care and inferred that supplement verbal handover with written handover to prevent information degradation.[32]

Question 6: What are the Roles and Responsibilities of Transport Team?

Recommendations

6a. We recommend the team leader to brief team members at the destination about relevant history, the current clinical condition, and indication of transport of patient requiring IHT.

6b. We recommend that the ICU team should optimize the clinical condition of unstable critically ill patient before IHT and the transport team to prepare and anticipate specific patient considerations (as suggested in Fig. 2).

6c. We recommend that the team leader should assign a team member to perform necessary documentation of pretransport clinical condition as well as consent for the transport.

6d. We recommend that the team leader decide the timing after communication and collaboration with other healthcare provider who will be performing procedure or investigation at destination site.

6e. We recommend team leader to map out safest and most efficient and fastest IHT route to the destination site with help of local logistics (ancillary staff of hospital) to enable timely actions, such as holding elevator ready, crowd control, etc., to minimize time of transport.

6f. We recommend transport team member to frequently assess, monitor, and document the clinical condition to ensure safety during all phases of pre-, intra- and post-transport of IHT patient.

Rationale

Team performance is increasingly acknowledged as essential for ensuring safe IHT. Ineffective coordination among providers at different organizational levels significantly impacts the quality and safety of patient care.[33]

The IHT team is often a part of intensive care team which work under circumstances that change frequently, may be assembled *ad hoc*, and have a dynamically changing team membership.[34]

Team leaders are instrumental in enhancing team performance and effectiveness, as well as sustaining these levels even in challenging situations.[35]

Team leaders communicate relevant situational information to the team while exemplifying self-correction and fostering teamwork skills among team members.[36]

Effective communication among all members of the transport team is essential, as is a clear understanding of their respective roles within the transport process. This approach is crucial for minimizing delays and preventing mishaps both during transit and upon arrival at the final destination.[37]

IHT team should utilize checklist for monitoring and documentation to minimize risk associated while transporting.[30]

An evidence-based review by Kulshrestha and Singh emphasized the importance of stabilization and optimization of clinical condition in pretransport phase.[38]

Nurses play a pivotal role as integral members of the transport team, often taking on leadership responsibilities. Their primary duty is to ensure the safety of patients throughout the transport process. By proactively identifying potential AEs and addressing risk factors, nurses significantly enhance patient safety outcomes.[39]

An Indian study reported that development and implementation of IHT tool had positive impact on transport practices of nurses and reduction in frequency of AEs.[40]

A prospective observational study by Bergman et al. reported lack of communication, coordination, and situational awareness of transport team, leading to potential safety hazard during IHT. Knowledge of hospital infrastructure plays a crucial role when a patient needs to be relocated from the ICU to different areas within the hospital, ensuring safe transport through the use of corridors and elevators. The fastest and most effective route map for the procedural area must be established prior to IHT of ICU patients, taking in consideration flooring inclines and sharp, narrow turns and availability of spacious and secure elevators.[14,41]

Question 7: What is the Protocol for Handling Serious Unexpected AE during IHT?

Recommendations

7a. We recommend standard protocol of AHA algorithm[11] or to establish clear protocols as per local hospital policy for handling serious unexpected events (e.g., cardiac arrest, respiratory failure).

7b. We recommend IHT team should be trained and familiar with this protocol.

Rationale

Numerous single-center studies conducted in India have indicated a significant occurrence of severe AEs, including hypoxia and hypotension. These findings highlight the necessity for critical interventions, such as CPR and endotracheal intubation.[42,43]

The prevalence of cardiac arrest is a significant concern, with incidence rates varying between 0.34 and 1.6%.[7]

A large prospective multicenter study conducted in India reported that cardiac arrest occurred in two patients (0.18%) who were receiving high doses of vasoactive agents during emergency transport.[3] One of the risk factors identified by Beckmann et al. was the lack of adequate protocols for patient management during IHT. The author emphasizes the importance of professional societies and local units adopting guidelines and protocols to enhance the safety and efficiency of IHT.[12] Numerous studies have established a correlation between IHTs conducted in emergency situations and the onset of AEs. This association is likely attributed to insufficient time for optimal patient stabilization and inadequate equipment verification prior to transport.[31,44,45]

A multitude of research studies have underscored the significance of implementing precautionary measures in the form of a checklist.[5,21,46] However, these measures may pose challenges when applied within the context of Indian settings.

Based on our own experience, and having reviewed data from the I-TOUCH study, our research identified few practical and immediately applicable summary of recommendations (Table 1) for IHT, which can be adopted for local use after modification as applicable.[3]

Question 8: What are the Legal and Ethical Considerations for IHT of ICU Patient?

Recommendations

Ethical considerations

8.1a. We recommend patients (or their surrogates, when unable to consent) should be informed about the reasons for the transfer, the expected outcomes, and any risks involved.

8.1b. We recommend that the method of IHT should accommodate the patient's physical and emotional comfort.

8.1c. We recommend, whenever possible, to allow family members to accompany the patient during IHT.

8.1d. We recommend the following established protocols for handoff communication during IHT.

Legal considerations

8.2a. We recommend proper training and adherence to safety protocols to mitigate the accusations of negligence and legal liabilities.

8.2b. We recommend thorough documentation of the IHT process, clinical decisions, and consent.

8.2c. We recommend that the IHT team adhere to their local hospital policies, which is both a legal and ethical obligation to ensure patient safety.

8.2d. We recommend maintaining the patient's confidentiality and privacy during IHT

Rationale

In many ICU scenarios, the patient may lack capacity, and consent may need to be obtained from legal representatives or family members. It is important to ensure care is taken to minimize discomfort during IHT. Recommendations for ethical and legal considerations are modified and adopted from standard guidelines for family-centered care of adult ICU patient.[47]

Question 9: How is Patient Safety Ensured during IHT?

Recommendations

9a. We recommend elective IHT of ICU patient after stabilization and optimization.

9b. We recommend avoiding emergent IHT of ICU patient without optimization, unless deemed to be life-saving, such as control of bleeding using angioembolization.

9c. We recommend emergent IHT only if it is a life-saving indication for safety of patient.

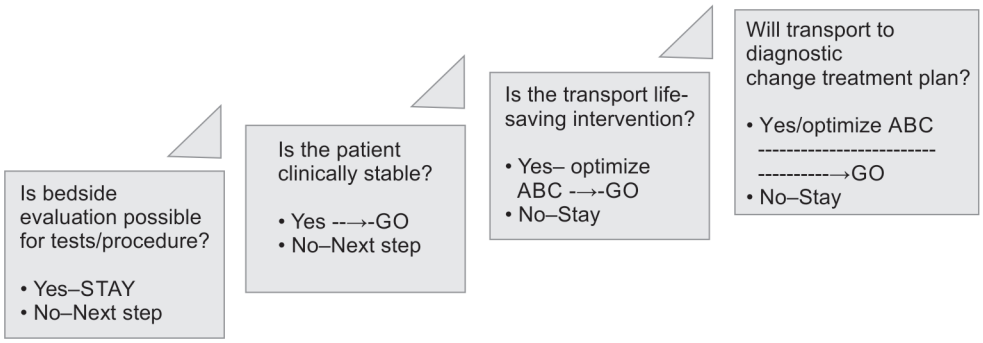

Fig. 3: IHT decision steps

9d. We recommend monitoring of IHT patients every 15 minutes in elective transport and every 5 minutes in emergent indications.

9e. We recommend transport protocol to include routine checkup of equipment used during transport.

Rationale

The I-TOUCH study reported emergent IHT as independent predictor of AE.[3] The prospective, observational study from Austrian University reported increase in incidence of complications during emergent IHT vs elective situations.[10]

Strategies to overcome the increased patient–staff ratios should be implemented, because if fewer staff remain in the ICUs during IHT, patient safety may be compromised, potentially putting those patients remaining in the ICU at risk during the time of the IHT.[48] Recent research indicates that the consistent implementation of IHT guidelines, protocols, and checklists across all ICUs is essential for preventing AEs.[49]

Question 10: What are the Steps Essential for Continuous Quality Improvement and Training for Safety of IHT?

Recommendations

10a. We recommend that hospitals with critical care facility should have written protocol for IHT designed as per local need.

10b. We recommend training of nursing staff with competency-based transport scenario during education of nurses new to critical care.

10c. We suggest implementing incident reporting and conducting audits of all related reports to evaluate the factors contributing to safety issues encountered during transport.

Rationale

Various guidelines have suggested written protocol for IHT to be developed by multidisciplinary team, and periodic evaluation for continuous quality improvement.[5,21]

We suggest criticalcare physician to make decisions regarding IHT for life-saving interventions in emergent situations when optimization is not feasible (Fig. 3).

Alamanou and Brokalaki highlighted the active role of nursing staff training in enhancing safety during IHT and designing of IHT protocol.[50]

A Chinese study involving survey of emergency nurses involved with IHT reported that establishment of written standard transport protocol may help in reducing AEs.[51]

Author Contributions

KZ and AT are responsible for conceptualization and data curation. AT is responsible for methodology and writing the original draft. All the authors are involved in formal analysis, project administration and visualization, and review and editing of the manuscript.

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