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Letter to Editor

Protocols for equipment checks: a routine ritual or a safety imperative?

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ABSTRACT

Advanced medical equipment, such as anaesthesia workstations, ventilators, infusion pumps, and monitoring devices, is central to modern anaesthesia practice. Despite technological advances, equipment failure remains a significant contributor to perioperative complications. Standardized pre-anaesthesia equipment checks are widely recommended to identify potential risks before patient exposure. However, adherence to these protocols varies across institutions due to workflow constraints, time pressures, and reliance on automated self-checks. Evidence from audits and observational studies shows that structured equipment inspections and safety checklists significantly reduce avoidable anaesthesia-related events. This article explores whether these procedures are essential safety measures or routine practices and emphasizes the importance of standardized checklists, institutional audits, and a safety-focused culture in improving perioperative outcomes.

Keywords: Medical equipment, Safety measures and Standardized checklist.

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Introduction

Advanced medical equipment—including anaesthesia workstations, ventilators, infusion pumps, suction systems, and airway devices—is crucial for safe anaesthetic practice. Although perioperative safety has improved due to technological advances, equipment failure continues to contribute to anaesthesia-related morbidity and catastrophic incidents. Studies evaluating operating room preparedness have shown that incomplete equipment checks still occur [4,6]. This raises a key question: do pre-anaesthesia equipment checks serve as essential safety barriers, or are they routine procedures performed out of habit?

Importance of pre-anaesthesia equipment checks

Anaesthesia machines are life-support systems responsible for ventilation, oxygen delivery, and administration of anaesthetic agents. Malfunctions in breathing circuits, gas supply systems, or ventilators can rapidly lead to hypoxia or other critical complications. The American Society of Anaesthesiologists (ASA) recommends a structured pre-anaesthesia checkout process, including examination of gas supplies, vaporizers, breathing circuits, scavenging systems, and alarms, to mitigate these risks [1]. Methodical inspections before anaesthesia induction help identify issues such as circuit leaks, disconnected gas pipelines, improper vaporizer placement, and ventilator dysfunction.

Evidence from safety checklists and audits

Patient safety initiatives demonstrate the effectiveness of standardized checklists in reducing perioperative complications. Equipment verification is a key component of the World Health Organization (WHO) Surgical Safety Checklist during the "Sign-In" stage before anaesthesia induction [2]. Multicentre studies evaluating the WHO checklist have reported significant reductions in surgical mortality and complications following its implementation [3]. International standards further underscore the critical role of standardized anaesthesia procedures and equipment verification in patient safety [7,8].

Compliance and institutional variability

Despite established guidelines, compliance with equipment check procedures varies widely. Studies have documented inadequate inspection of anaesthesia machines and airway equipment in many operating rooms [9]. Factors contributing to inconsistent compliance include high patient workloads, limited preparation time, staffing shortages, and overreliance on automated machine self-checks. While electronic diagnostics are valuable, they cannot replace manual verification of breathing circuits, emergency oxygen supplies, suction devices, and complex airway equipment.

Compliance challenges and human factors

Equipment-related incidents often stem from human factors rather than device malfunction [4]. Routine inspections frequently uncover issues such as poorly assembled breathing circuits, empty oxygen cylinders, misaligned vaporizers, or malfunctioning suction systems. Distraction, fatigue, assumption bias, and complacency can all compromise equipment verification. Studies of anaesthesia incident reporting systems confirm that adherence to standardized checklists and systematic inspections substantially reduces preventable adverse events [6,7,8].

Role of audits and safety culture

Regular audits of checklist usage improve adherence and patient safety outcomes [11, 12]. Institutional strategies such as frequent safety audits, simulation-based training, continuous professional development, and digital documentation of equipment inspections reinforce compliance and accountability. A strong culture of safety encourages vigilance, standardization, and continuous improvement, ensuring that technological advancements translate into better clinical outcomes.

Conclusion

Pre-anaesthesia equipment checks are vital safety measures designed to prevent avoidable perioperative complications, not mere administrative routines. Evidence from incident reports, clinical audits, and international safety programs shows that structured equipment verification significantly enhances patient safety. Strengthening compliance through institutional policies, ongoing education, and a safety-focused culture is essential to maximize the benefits of modern anaesthesia technology.

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