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Often Overlooked Problems with Handoffs: From the Intensive Care Unit to the Operating Room

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Over the last decade, increased attention has been focused on the transfer of care between clinical teams (“handoffs”) as a potentially modifiable factor in preventing adverse patient outcomes. Handoffs occurring in the perioperative setting may be particularly prone to error due to the need to exchange complex information and an environment that emphasizes efficiency and rapid turnovers. In such environments, use of a handoff protocol increases the duration of a handoff only slightly, while decreasing missed surgical information and improving nursing satisfaction.¹

A 2012 meta-analysis of best practices for perioperative handoffs by Segall et al.² identified more than 500 articles on this topic. Interestingly, all focused solely on the transfer of patient care from the operating room (OR) to the intensive care unit (ICU). As anesthesiologists and intensivists, we feel that perioperative handoffs in transfer of patients from the ICU to the OR have been overlooked, but are equally important. To further evaluate this topic, we performed a comprehensive PubMed, Cochrane, and Embase database search of subsequent investigations since 2012 using the same search terms as Segall et al.² Specifically, we included the following terms: handover, handoff and patient transfer, and combinations of the terms postoperative, anesthesia, postanesthesia, surgery, OR, ICU, critical care, intensive care, surgical intensive care, admission, communication, and team. Although more than 80 articles were identified, none addressed the transfer of care from the ICU to the OR.

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Reasons for the lack of research on ICU to OR handoffs in the literature are unclear. The “reverse handoff” from ICU to the OR is potentially even more important than from OR to ICU because ICU to OR transfers often occur in unstable patients scheduled for emergent or urgent surgical procedures and magnify the potential risk to patient safety.

While studies identifying errors in ICU to OR handoffs are lacking, we are confident that anecdotal experiences abound. The authors are familiar with several vignettes where care was compromised due to the lack of a comprehensive ICU to OR handoff. One example involved a patient with severe left ventricular dysfunction 3 days after cardiac surgery who developed bilateral femoral artery thrombosis and required urgent thrombectomy. On induction, the patient developed severe hypotension and remained hemodynamically unstable despite vasopressor and inotrope use. Case review later identified that the patient had been weaned off norepinephrine only an hour before returning to the OR. In another example, an ICU patient in end-stage renal failure was receiving q48h gentamicin. Because dosing was intermittent, gentamicin was thus not listed on the medication list on days it was not being given. The patient was taken to the OR on a day she was not scheduled to receive gentamicin. Although her day-of-surgery gentamicin level was already supratherapeutic, she received another dose in the OR.

The potential for errors to occur in the OR from an incomplete ICU handoff can also occur with care that may be routine in the ICU but not immediately apparent to the anesthesiologist. Examples of such “wouldn’t know unless you ask” therapies include the use of “sigh” breaths to maintain oxygenation during mechanical ventilation or unusual reactions to intermittently dosed sedatives. In all of these circumstances, the lack of a “nonstandardized” handoff meaningfully affects patient outcomes and thus warrants a structured approach.

Although the anesthesiology team has the ultimate responsibility to obtain a complete patient history, vital information may still be missed. Intubated, unstable, or critically ill patients may not always be a reliable source of information. Under these circumstances, a detailed clinician-to-clinician handoff is necessary. In addition, consistency of the clinician-to-clinician handoff can be challenging given that ICUs are often staffed using a shiftwork model. This approach increases the number of handovers, reducing caregiver familiarity with specific patient care details. Studies of care models with high discontinuity have found an increased incidence of adverse events.^{3,4} Obtaining accurate information can further be compromised in those hospitals that rely on paper records due to limited accessibility. Therefore, despite an anesthesiologist’s best efforts, obtaining all the necessary information when the patient needs to go to the OR from the ICU may not always be possible.

Standardized approaches during patient care handoffs, including mnemonics that establish topics and sequence, have been promoted and adopted by accreditation bodies.⁵ The most common standardized communication schemes are SBAR (Situation, Background, Assessment, Recommendations), SOAP (Subjective, Objective, Assessment, Plan), and the medical admission note.⁶ However, their use among different institutions and providers is varied and has limited sustainability in maintaining seamless transitions of care across providers and settings.⁷ One literature review of 46 articles presenting handoff mnemonics

indicated that SBAR was only used 70% of the time.⁸ A recent prospective observational study of hand-offs among critical care attending physicians found omissions of data to be as frequent as 50% using the SBAR format.⁶ Thus, currently recommended paradigms may not fit the context of clinical work in the ICU setting. Missing information such as vasoactive drug infusion doses, hemodynamic trends, timing of antibiotic dosing, isolation precautions, availability of blood products, and number of days of invasive lines all have the potential to compromise patient safety and result in patient care errors.

Just as the ICU physician requires a proper handoff from the OR anesthesiologist, the anesthesiologist requires a proper handoff from the ICU physician. We propose that a checklist be used to improve the completeness and consistency of information transfer between the ICU physician and the OR anesthesiologist. A sample preanesthetic checklist (Table 1) can be completed by a clinician and included in the patient's electronic medical record as a prerequisite to arrival in the OR.

While checklists have been used in a wide variety of surgical settings and demonstrated an ability to reduce error, establishing an effective checklist is not straightforward. A single checklist will not be able to account for every transfer contingency. Critics might also argue that addition of yet another checklist might increase "checklist fatigue" as many ICUs already have checklists for reducing complications such as central line infections and ventilator-associated pneumonia. Physicians may also become complacent and assume ICU to OR handoffs are now safe due to the mere presence of a completed checklist.⁹ For these reasons, we also advocate a mandatory verbal handoff between the most responsible clinicians to ensure communication of any rapidly occurring changes in clinical status. It is important to recognize that no amount of chart searching will substitute for a verbal handoff during transfer of care in the critical care setting.¹⁰ Given the role of anesthesiologists and intensivists in improving perioperative care delivery, the issue of ICU to OR handoffs presents an opportunity for all physicians involved to work together to improve the coordination of care throughout the intra- and postoperative periods.

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Table 1**Intensive Care Unit to Operating Room Checklist**

Patient name	Medical record number	Allergies	Isolation precautions
Do not resuscitate(Y/N)			
History of present illness			
Medical/surgical history			
Presence of cardiac implantable electrical device (current settings; last investigation, need to turn off antitachycardia/cardioversion or defibrillation function)			
Lines			
IVs			
Arterial lines			
Epidural catheter			
Drains (chest tube, nasogastric tube, spinal, external ventricular drain, Jackson-Pratt, wound vacuum)			
Current and recent IV infusions and dosing trends			
Hemodynamic trends			
Airway concerns			
Mechanical ventilator settings (needs nitric oxide [Y/N])			
Sedation and analgesic medication			
Recent transfusions (active type and screen and blood product availability)			
Antibiotic and dosing schedule			
Coagulation status			
Latest laboratory results			
Recommendations			

Y = yes; N = no.