



Original Contribution

Simulation-based education with deliberate practice may improve intraoperative handoff skills: a pilot study



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Abstract

Study Objective: To examine the results of simulation-based education with deliberate practice on the acquisition of handoff skills by studying resident intraoperative handoff communication performances.

Design: Preintervention and postintervention pilot study.

Setting: Simulated operating room of a university-affiliated hospital.

Measurements: Resident handoff performances during 27 encounters simulating elective surgery were studied. Ten residents (CA-1, CA-2, and CA-3) participated in a one-day simulation-based handoff course. Each resident repeated simulated handoffs to deliberately practice with an intraoperative handoff checklist. One year later, 7 of the 10 residents participated in simulated intraoperative handoffs. All handoffs were videotaped and later scored for accuracy by trained raters. A handoff assessment tool was used to characterize the type and frequency of communication failures. The percentage of handoff errors and omissions were compared before simulation and postsimulation-based education with deliberate practice and at one year following the course.

Main Results: Initially, the overall communication failure rate, defined as the percentage of handoff omissions plus errors, was 29.7%. After deliberate practice with the intraoperative handoff checklist, the communication failure rate decreased to 16.8%, and decreased further to 13.2% one year after the course.

Conclusions: Simulation-based education using deliberate practice may result in improved intraoperative handoff communication and retention of skills at one year.

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1. Introduction

The medical handoff, defined as the transfer of patient care responsibility and information, is a common and risky perioperative event [1]. Eighty percent of serious, preventable adverse events are associated with communication failure. More than half of these events are attributed to handoff error [2]. Since the advent of restricted resident duty hours, as required by the Accreditation Council for Graduate Medical Education (ACGME), transfer of patient information and care between providers is occurring with greater frequency [3]. The surgical patient is especially vulnerable to loss of critical information, as multiple handoff exposures transpire throughout the perioperative period and care is transferred among nursing, surgery, and anesthesia staff [4,5]. In the intraoperative phase alone, anesthesia providers are permanently relieved in approximately one third of cases.¹

The ACGME mandates that all residency programs minimize trainee transfer of care and educate residents on systematic handoff processes [6]. There is little available literature describing when and how physicians learn techniques for delivering handoffs, and these skills historically have not been systematically or deliberately taught [7]. Research has shown that interns and residents desire a structured, systematic educational program focused on handoff communication [8]. As transfer of care education begins to take its place in residency curricula, several groups have reported improved handoff quality and patient outcomes after implementation [9,10]. Educational methods have included video and role-play scenarios, didactic lectures, direct observation, and formal evaluation of handoffs [9,10].

Simulation-based education is a unique learning environment for identification and resolution of patient safety threats in an effective, no-risk educational forum [11]. Simulation-based handoff training has resulted in improved critical information transfer and treatment goals in the intensive care unit (ICU) [12], and perceived effectiveness for operating room (OR) to Postanesthesia Care Unit (PACU) transitions.² The addition of deliberate practice to simulation-based education may improve acquisition and performance of clinical skills [13–18] and improve patient care [16–18]. Deliberate practice involves focused, repeated practice and feedback from an instructor so that errors may be corrected and performance improved. A predetermined mastery standard focused on a measured performance outcome must be met.

The combination of simulation-based education with deliberate practice to achieve a mastery standard is highly effective in promoting procedural skill acquisition and adherence to Advanced Cardiac Life Support (ACLS) algorithms among medical learners [19–26]. A deliberate practice model using simulation-based education has not been applied to handoff education.

Handoff research and educational methods specific to the perioperative period have centered on the postoperative handoff [27,28]. Several postanesthesia handoff processes have been developed to reduce communication errors in the Pediatric ICU and the Cardiac Surgical ICU [27,29]. The intraoperative period, however, is not well studied and literature addressing the unique considerations of the intraoperative handoff is limited. In addition, there are minimal data detailing methods to integrate handoff training into the anesthesiology residency curriculum. The aim of this study, therefore, was to explore the characteristics and patterns of anesthesia residents' intraoperative handoffs and to determine if the use of simulation-based education with deliberate practice improved trainee handoff performance during a simulated intraoperative scenario. Performance one year following the handoff simulation-based education was analyzed to determine retention of skills.

2. Materials and methods

Twenty-seven simulated OR scenarios involving 10 anesthesiology residents (CA1 - CA3) were evaluated in this study, which was approved by the Institutional Review Board of Cooper University Health Care. Each subject completed a survey of patient safety attitudes and a test developed specifically for this course to assess knowledge of handoff skills. Elements assessed on the pretest included current handoff practices, organization, and content.

Each resident read a patient stem and entered a simulated OR to receive a handoff from an attending anesthesiologist (anesthesiologist #1) managing an uneventful laparoscopic appendectomy. The resident continued caring for the patient for the simulated duration of the case, at which time another anesthesiologist (anesthesiologist #2) arrived to obtain the report. Several key events ensued during residents' time in the OR, including patients' hemodynamic instability, a request for additional vascular access by the surgeon, and escalation in postsurgical care from the PACU to the ICU. Residents were expected to communicate these additional details, in addition to the full history, to the oncoming relief provider (anesthesiologist #2).

A reflective video debriefing session was conducted by two trained simulation instructors for each resident. Residents were individually given feedback on their performance. A group debrief session was also held, at which time the barriers to effective handoff communication were explored and common errors and omissions addressed.

¹ Merkel MJ. Transfer of care: that's what we do all the time, right? American Society of Anesthesiologists Newsletter. Park Ridge (IL): American Society of Anesthesiologists; 2012;76(10):12-6.

² Weinger MB, Slagle JM, Kuntz A, et al. Improving actual handover behavior with a simulation-based training intervention [Abstract]. In: Proceedings of the Human Factors and Ergonomics Society Annual Meeting 2010;54:957-61.

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