

Model for Team Training Using the Advanced Trauma Operative Management Course: Pilot Study Analysis

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BACKGROUND: Education and training of surgeons has traditionally focused on the development of individual knowledge, technical skills, and decision making. Team training with the surgeon's operating room staff has not been prioritized in existing educational paradigms, particularly in trauma surgery. We aimed to determine whether a pilot curriculum for surgical technicians and nurses, based on the American College of Surgeons' Advanced Trauma Operative Management (ATOM) course, would improve staff knowledge if conducted in a team-training environment.

METHODS: Between December 2012 and December 2014, 22 surgical technicians and nurses participated in a curriculum complementary to the ATOM course, consisting of 8 individual 8-hour training sessions designed by and conducted at our institution. Didactic and practical sessions included educational content, hands-on instruction, and alternating role play during 5 system-specific injury scenarios in a simulated operating room environment. A pre- and postcourse examination was administered to participants to assess for improvements in team members' didactic knowledge.

RESULTS: Course participants displayed a significant improvement in didactic knowledge after working in a team setting with trauma surgeons during the ATOM course, with a 9-point improvement on the postcourse examination (83%-92%, $p = 0.0008$). Most participants (90.5%) completing postcourse surveys reported being "highly satisfied" with course content and quality after working in our simulated team-training setting.

CONCLUSIONS: Team training is critical to improving the knowledge base of surgical technicians and nurses in the

trauma operative setting. Improved communication, efficiency, appropriate equipment use, and staff awareness are the desired outcomes when shifting the paradigm from individual to surgical team training so that improved patient outcomes, decreased risk, and cost savings can be achieved.

OBJECTIVE: Determine whether a pilot curriculum for surgical technicians and nurses, based on the American College of Surgeons' ATOM course, improves staff knowledge if conducted in a team-training environment.

DESIGN: Surgical technicians and nurses participated in a curriculum complementary to the ATOM course. In all, 8 individual 8-hour training sessions were conducted at our institution and contained both didactic and practical content, as well as alternating role play during 5 system-specific injury scenarios. A pre- and postcourse examination was administered to assess for improvements in didactic knowledge.

SETTING: The course was conducted in a simulated team-training setting at the Legacy Institute for Surgical Education and Innovation (Portland, OR), an American College of Surgeons Accredited Educational Institute.

PARTICIPANTS: In all, 22 surgical technicians and operating room nurses participated in 8 separate ATOM(s) courses and had at least 1 year of surgical scrubbing experience in general surgery with little or no exposure to Level I trauma surgical care. Of these participants, 16 completed the postcourse examination.

RESULTS: Participants displayed a significant improvement in didactic knowledge (83%-92%, $p = 0.0008$) after the ATOM(s) course. Of the 14 participants who completed postcourse surveys, 90.5% were "highly satisfied" with the course content and quality.

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CONCLUSIONS: Team training is critical to improving the knowledge base of surgical technicians and nurses in the trauma operative setting and may contribute to improved patient outcomes, decreased risk, and hospital cost savings. (J Surg Ed 72:1200-1208. © 2015 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: simulation, team training, ATOM, trauma, ACS-AEI, communication

COMPETENCIES: Medical Knowledge, Interpersonal and Communication Skills, Practice-Based Learning and Improvement, Systems-Based Practice

INTRODUCTION

Traditionally, education and training of surgeons has focused on the development of individual knowledge, technical skills, and decision making pertinent to specific patient scenarios.¹ Postgraduate training of the surgeon is dependent on a hierarchy that is based on experience, seniority, and at times, networking and connections.² It is commonly accepted that the relationship between the surgeon and his or her technical staff in the operating room functions when this hierarchy is followed by all those involved.³ Because of the grave responsibility that surgeons shoulder in every operative case, it is paramount that the operating room functions as a well-oiled machine.⁴ Therefore, analogies related to aircraft preparation and flight,⁵ team sports (basketball, football, soccer, crew, etc.),⁶ high-level military operations,⁷ as well as standardization of operating room checklists⁸ have powerfully affected, solidified, and confirmed the current hierarchical perioperative paradigm.

In trauma, this paradigm seems not only sensible but irreplaceable.⁹ An acutely injured patient in shock who requires immediate operative intervention necessitates a level of vigilance and immediacy that can be achieved only with high-level leadership.¹⁰ However, leadership does not occur in vacuum, and is irrelevant without execution of orders by all members of the team in an efficient and expeditious fashion.¹¹ Yet, continuing education, including that of the fully trained surgeon, habitually occurs in isolation. For example, the unique opportunity to hone trauma intervention and exposure skills offered in the American College of Surgeons' Advanced Trauma Operative Management (ATOM) and Advanced Surgical Skills for Exposure in Trauma (ASSET) courses is available to trauma surgeons, and offers cadaveric and animate models of acute penetrating trauma that are invaluable to understanding the anatomy of injury.¹² These scenarios are controlled not only regarding the location of the trauma, but also anesthesia and technical staff—usually employees of the simulation center who are familiar with the course itself, and who assist the learning surgeon as they recognize solutions and intervene. However, the trauma surgeon's

own operating room staff typically do not participate in a similar training course, much less in conjunction with the surgeon in a team-training environment—despite the fact that standardized team-training programs such as Team Strategies and Tools to Enhance Performance and Patient Safety have been evidenced to improve surgical outcomes.¹³

After our experience conducting quarterly Advanced Trauma Life Support, ATOM, and ASSET courses at the Legacy Institute for Surgical Education and Innovation (LISEI), we recognized an unmet need to train operating room staff members—surgical technicians and nurses—in a controlled-trauma educational environment. We recently developed a novel and complementary curriculum of team training using the ATOM course, coined “Advanced Trauma Operative Management for Scrubs,” or “ATOM (s).” After a morning session dedicated to didactic learning and preparation for trauma, surgical technicians and nurses worked as a team with the learning surgeon in the afternoon session of the ATOM course. Participants scrubbed with the surgeon in the supporting staff role in multiple controlled-trauma scenarios. Although our ultimate desired outcomes included improved communication, efficiency, appropriate equipment use, and staff awareness,¹⁴ we chose to assess didactic knowledge as a prerequisite and necessary skill that precedes nontechnical skills and team communication. One of the major areas emphasized was regarding how preparation and execution of trauma surgery differs from that of emergent or elective surgery.

We piloted this model during 8 ATOM(s) courses conducted over a 24-month period. Based upon pre- and posteducational written assessments and course evaluations, which are prudent to assess in a new course, we found a significant improvement in the knowledge base of the participants. Given our findings, we propose that operating room staff should be given the opportunity to learn the essentials of operative trauma interventions through team-based training, together with a lead surgeon.

MATERIAL AND METHODS

Course Participants and Design

Between December 2012 and December 2014, 22 surgical technicians and operating room nurses enrolled in 8 separate ATOM(s) courses, conducted at the LISEI (Portland, OR). Participants, who were offered the course based upon their center's surgeons' ATOM enrollment, had at least 1 year of surgical scrubbing experience in general surgery with little or no exposure to Level I trauma surgical care. Enrolling participants with little or no trauma experience was intended to first expose beginners to trauma in a simulated and controlled team-training environment, in an effort to improve knowledge base and comfort level. Additionally, surgeon learners taking the ATOM course included attending surgeons at Level I-IV trauma centers, general surgeons at rural hospitals, trauma fellows, and general surgical residents.

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