The Effect and Durability of a Pregraduation Boot Camp on the Confidence of Senior Medical Student Entering Surgical Residencies

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OBJECTIVE: Medical school does not specifically prepare students for surgical internship. Preinternship courses are known to increase confidence in multiple key areas. We examined the immediate effect and durability of effect of a surgical pregraduation preparatory course or "boot camp" on provider confidence in technical and medical management skills.

DESIGN: A 5-day boot camp was offered to senior medical students (SMS) entering surgical programs. SMS were anonymously surveyed before, after, and 6 months following the course. The same survey was given 6 months into internship to a control group of surgical interns who graduated from the same medical school but did not participate in boot camp before graduation. Data were compared between the time intervals and across cases and controls using the Wilcoxon rank-sum and signed-rank tests and the Student t test.

SETTING: A joint effort between the University of Pennsylvania School of Medicine, the Department of Surgery at the Hospital of the University of Pennsylvania, and the Penn Medicine Simulation Center in Philadelphia, PA.

PARTICIPANTS: All senior medical students set to graduate from a single institution entering general surgery or surgery subspecialties were offered the course. Twenty-nine students participated in the course.

RESULTS: Post-boot camp confidence scores of SMS were significantly greater in all areas except placement of a peripheral intravenous catheter compared with pre-boot camp scores. Six months into internship, the SMS boot camp group felt more confident than controls in their ability to perform a cricothyroidotomy (median 2.5 vs 1.0, $p = 0.04$) and to insert a chest tube (median 3.3 vs 1.0, $p = 0.05$). Otherwise, there was no residual difference in confidence levels between the boot camp group and the controls.

CONCLUSIONS: Boot camps can improve self-confidence in young doctors in many areas of perioperative care before enrolling in surgical residency. The effect is most durable in high risk, infrequently performed technical tasks. Future studies are under design to examine the impact of boot camps on the "July Effect." (J Surg 69:536-543. © 2012 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: surgery education, boot camp, medical student education, simulation, July effect, provider confidence

COMPETENCIES: Patient Care, Medical Knowledge, Practice Based Learning and Improvement

INTRODUCTION

Internship remains a critical time in professional development for physicians, fraught with anxiety and fear.[1] Young doctors often experience their professional debut in unfamiliar hospitals distant from the comfortable environs of their own medical school. Recently imposed work hour regulations have limited the number of in-hospital hours for our most junior residents.[2] Historically, it was through the number of hours spent in the hospital that young doctors amassed the skills required to become competent surgeons.

In academic medicine, first year residents, commonly referred to as interns, are frequently the first physicians to be notified with nursing concerns, study results, and changes in patient condition. As such, their ability to recognize and manage clinical situations, initiate a work-up, and call for back-up is vital to successful patient outcomes. Transitions to the next level of responsibility in graduate medical education occur in late June/early July and the medical consequences of each physician's new role at this point has been called the "July Effect."[3]

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for the interns, the leap is huge as they possess a vast fund of knowledge, but their ability to perform as physicians is largely untested at the time of graduation from medical school.

Medical schools and surgical societies recognize the importance of teaching basic intern skills before graduation from medical school.[4] The concept of a preinternship "boot camp" has also gained the attention of surgical educators.[5-7] Many boot camps are designed to ensure that interns achieve a baseline competency before taking care of surgical patients. The course objectives are designed for students to incorporate the technical and medical management skills required for patient care, free from the acute anxieties that occur at the start of residency, while reinforcing cognitive concepts and highlighting institutional policies. Studies have shown that confidence and performance are improved because of these boot camps.[8,9] Simulation training, an effective teaching modality, usually serves as a fundamental component of boot camp.[10,11]

The durability of the effects of boot camp is largely unstudied. Measurement of the effects after the beginning of internship are challenging because interns are busy and often difficult to locate. Residents training at any single institution come from a variety of medical schools and do not share a common undergraduate medical education, making comparisons difficult. We sought to study the effect of a boot camp on student confidence in a variety of technical and medical management skills immediately following the course as well as 6 months into training to determine the utility of the course and to identify if the effect varied by skill type. We also compared the self-reported confidence levels of students graduating from the same institution who did not participate in the intern boot camp to those who completed the course at 6 months into internship to determine the durability of the effects of the boot camp on senior medical students (SMS).

METHODS

Beginning in the spring of 2009, SMS graduating from the University of Pennsylvania School of Medicine and enrolling in surgical training programs were offered a week-long surgical boot camp designed to ease the transition from medical student to intern. They were selected on a first-come, first-served basis. Enrollment was limited to allow a maximum student–instructor ratio of 4:1.

The course was conducted at the Penn Medicine Simulation Center, which is a 22,000-square foot facility with dual accreditation from the American College of Surgeons as a Level I Comprehensive Education Institute and the Society for Simulation in Healthcare. The Center houses human patient simulators set in realistic inpatient wards and converted operating rooms for team training, as well as task trainers for individual instruction in procedural skills, such as intravenous peripheral and central line placement, endotracheal intubation, and operation-specific procedures. Ample breakout rooms exist to allow a small group session to occur while more active scenarios are completed in other areas of the Center.

The course faculty included senior house staff officers (postgraduate year 4 and above), surgical fellows, and surgical intensivists, board certified in general surgery, trauma, and critical care medicine. Information gathered at independent focus groups for medical students, residents, and faculty was used to develop the curriculum. Each group was asked, "If an intern preparation course existed, what skills or exercises would you like to learn or would you have liked to have learned prior to graduation?" The final content was selected by the course director based on the responses from the focus groups.

Course Description

The 5-day course was divided into morning and afternoon sessions. The mornings were dedicated to didactic and skill sessions, whereas the afternoons focused on clinical scenarios using SimMan 3G simulators (Laerdal Medical, Stavanger, Norway). The morning sessions included instruction of the management of oliguria, postop bleeding, fever, chest pain, change in mental status, advanced cardiac life support (ACLS), chest tube insertion, central venous catheter insertion, and cricothyroidotomy (see Table 1). Simulation models were used to reinforce the applications of technical skills. The didactic component for procedures was designed to underpin the technical principles while emphasizing the importance of patient safety and the cognitive component of considering risks, benefits, and alternatives of care.

The afternoon sessions were team-based clinical simulation scenarios using the simulation suites and SimMan3G. Groups of 3 to 4 SMS were given a clinical vignette about a virtual patient and then were required to properly diagnose and treat each patient. The skills reviewed in the mornings were then incorporated into the afternoon clinical simulations. The fourth day of the course was dedicated to review of ACLS and basic organizational skills necessary for being an effective intern. The last day of the course was a comprehensive clinical simulation where the SMS faced more difficult clinical scenarios incorporating multiple skills learned throughout the week.

Survey

Each boot camp student was asked to complete an anonymous, voluntary 21-question survey (see Figure 1). Each question on the survey pertained to the student's level of confidence in regards to a particular management skill or technical skill on a 1 to 5 scale, with 5 being extremely comfortable. Three questions addressed the student's preparedness for internship and his/her perception of the boot camp's utility itself. The same survey was administered at 3 time intervals: the first day of boot camp before instruction, at the end of the course, and 6 months into internship. A control group of surgical interns was surveyed at 6 months into training. All the control subjects were graduates from the same medical school who had not participated in the boot camp but stayed at the same institution for graduate medical training. Survey responses were entered, without any identifiers, into an Excel spreadsheet (Microsoft Office 2007).