Technical Skills Acquisition in Surgery-Bound Senior Medical Students: An Evaluation of Student Assertiveness

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OBJECTIVE: To prepare students pursuing surgical careers, we devised a senior subinternship curriculum supplement that focused on the acquisition of technical skills required of surgical residents. We hypothesized that more assertive students, those that accomplished more of the curriculum, would perform better on a technical skills Objective Structured Clinical Examination (OSCE).

DESIGN: Senior medical students rotating on their first general surgery subinternship were administered a 6-station OSCE on the first day of their subinternship and again during the final week of the month-long rotation. A self-directed, 38-task "scavenger hunt" representing common intern level clinical skills, procedures, and patient care activities was provided to each student.

SETTING: The study was performed at Jefferson Medical College, a large, private medical school in Philadelphia, PA.

PARTICIPANTS: Forty-nine senior students completed surgical subinternships between July 2009 and September 2010, and participated both in the pre-/post-OSCEs and the scavenger hunt.

RESULTS: Students performed significantly better on the post-rotation OSCE than on the pre-rotation OSCE; 70.2% ± 8.1% vs. 60.4% ± 12.0%, $p < 0.0001$. Assertiveness scores from the "scavenger hunt" did not correlate with final OSCE scores ($r = -0.328$, $p = 0.25$), and were negatively correlated with the change between pre- and post-OSCE scores ($r = -0.573$, $p < 0.04$). Individual student assertiveness scores were determined by the number of tasks completed over the course of the rotation.

CONCLUSIONS: As surgical education becomes more streamlined with evolving work hour restrictions, medical school education is playing an increasingly pivotal role in preparing students for internship. In our study, individual assertiveness in completing structured self-directed learning tasks did not directly predict the acquisition of proficiency in technical skills. We feel assertiveness is overshadowed by other factors that may carry more weight in terms of technical skills acquisition. Further studies are required to delineate these factors and ultimately enhance technical skills acquisition during medical school. (J Surg 69:529-535. © 2012 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: Objective Structured Clinical Examination (OSCE), surgery curriculum, medical students, surgical skills, assertiveness

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

INTRODUCTION

Medical school surgical education and training is an ever-evolving process that requires constant evaluation and redesign to fit the current surgical environment. The cornerstone of surgical education was the Halstedian method.[1] This was based on an apprenticeship model that emphasized large case volume to teach operative skills and techniques to young, inexperienced surgical residents. However, there has been a shift in the paradigm of surgical training due to resident work hour restrictions, patient safety issues, and strict regulations of operating room costs.[1,2] Residency now requires surgical trainees to be more independent learners, mastering technical skills in a simulation laboratory with less faculty feedback about performance.[2] To meet the current demands of surgical residency, medical schools must adapt their curricula to provide surgery bound senior medical students with a solid fund of knowledge and a more advanced technical skills set that will allow them to succeed during their surgical internships.

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Poster Presentation at Surgical Education Week, Annual Meeting of the Association of Surgical Education. Boston, MA, 2011, March 22–24

Designing a fourth year medical school curriculum for efficient and effective surgical clinical and technical skills acquisition can be a challenging task. One must tailor the surgical education to acknowledge the differences in learning styles between medical students and surgical residents as noted by Engels et al. and others, as well as choose the appropriate method for student assessment.[3] In 1975, Ronald Harden et al. developed the objective structured clinical examination (OSCE) as an assessment tool of clinical competencies.[4] Although there is some debate over its consistent reliability, validity, and feasibility, OSCEs are generally accepted by many as the proficiency evaluation strategy of choice.[5-7]

To help adequately prepare students pursuing surgical careers, we devised a senior subinternship curriculum supplement that focused on technical skills acquisition through a scavenger hunt and OSCE. This encouraged the students to actively seek out learning opportunities in common intern level clinical skills, procedures, and patient care activities. Our assumption is that surgery bound medical students' exhibit the traditional "surgical personality," demonstrating traits of confidence, high motivation and independence.[8] We, therefore, hypothesized those more assertive students, those who accomplished more of the curriculum, would perform better on the technical skills OSCE and, thus, be better prepared for surgical residency.

METHODS

Overview

Two consecutive senior medical student classes between July 2009 and September 2010 participated in the senior surgery student curriculum supplement designed and implemented to foster technical skills acquisition and development. Senior medical students considering careers in surgery and choosing to rotate within the Department of Surgery at our institution were administered a 6-station OSCE on the first day of their first general surgery senior subinternship. Students completing more than one senior rotation in surgery only participated during their first rotation of senior year. The same OSCE was administered again during the final week of the month-long rotation. Average results from the 2 examinations were compared. Student performance on the senior OSCE was also compared with a third year surgery clerkship OSCE, an examination independent of this study, which all students had to take in order to pass the third year of medical school.

At the beginning of the rotation, students were also supplied with a self-directed 38-task "scavenger hunt," representing common intern level clinical skills, procedures, and patient care activities (Fig. 1). The goal was for each student to complete as many of the objectives listed in the "scavenger hunt" as possible during the course of the rotation. Individual student assertiveness was calculated by the total number of self-reported tasks completed over the course of the rotation divided by the total number of possible tasks. Assertiveness scores or task completion scores were then compared with the total OSCE scores as well as the point change between the pre- and post-rotation OSCEs.

Students were required to participate in the curriculum supplement; however, neither OSCE scores nor assertiveness scores were factored into the students' rotation grades. Despite being mandatory, some students dropped the rotation after the first day and only completed the pre-rotation OSCE, and their data were excluded. Correct answers and detailed descriptions of task steps and evaluator expectations were reviewed with all participants at the conclusion of the post-rotation OSCE as a means of providing further education. The Thomas Jefferson University Institutional Review Board approved our curriculum supplement and permitted access to students' individual performance scores for the purpose of this study.

OSCE

The 6 stations included tasks identified as important learning objectives for surgical interns. In the University Clinical Skills and Simulation Center, students formally rotated through each station. Fifteen minutes were allotted for each encounter. The stations included radial arterial line placement, sterile gowning and gloving, incision and drainage of an abscess, interpretation of computed tomography (CT) images and radiographs of common general surgery pathologies, surgical instrument identification, and basic suturing techniques. Students were observed remotely through closed circuit televisions in our clinical skills center's control room and were scored using a standardized point system and grading sheets established before the examination.

1. In the first station, students were asked to insert a radial arterial line into a mannequin's arm. They were scored based on their performance of 5 key aspects of the procedure, including performing an Allen's test, palpating the radial pulse, appropriate needle and guide wire insertion, and successful placement of the catheter.
2. In the second station, students were asked to gown and glove sterilely. The students were observed and scored based on correct technique, including opening sterile packages, properly handling the sterile gown from the inside, and proper closed gloving technique.
3. In the third station, students were presented with the clinical scenario of a patient presenting with a subcutaneous abscess. We prepped the upper left back of a mannequin's torso with a purulent appearing fluid filled packet covered by an overlying layer of silicone, imitation skin. An incision and drainage kit was provided, as well as instructions to appropriately treat the abscess and write a procedure note. After the encounter, the mannequin was inspected, and the procedure note was graded. Points were awarded based on the effectiveness of the incision (i.e., sufficient size, and/or cruciate/elliptical incision), completeness of the drainage, adequacy of the packing, and the inclusion and quality of certain key elements in the procedure note, such as time and date, diagnosis, procedure, and signature.
4. At the fourth station, students were presented with 10 radiologic images, including plain films, CT scans, and an-