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ORIGINAL RESEARCH

An Interprofessional Senior Medical Student Preparation Course: Improvement in Knowledge and Self-Confidence Before Entering Surgical Training

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Purpose: Senior medical students are variably prepared to begin surgical training; and a national curriculum was established through the American College of Surgeons to better prepare senior medical students for surgical training. The purpose of our course is to prepare senior medical students to more effectively enter surgical training programs. We recently enhanced our independently developed surgical training preparation course by increasing exposure to surgical anatomy, medical physiology, surgical skills, and point-of-care ultrasound. We evaluated the impact of our interprofessional training course to increase confidence and readiness among senior medical students entering surgical training.

Methods: The course focused on pre- and post-operative patient care, surgical anatomy, human physiology, and bedside ultrasound. Didactic lectures in anatomy, human physiology, and bedside ultrasound were provided prior to all hands-on simulated patient care sessions and mock surgical procedures. To evaluate our interprofessional curriculum, we administered pre- and post-course surveys, pre- and post-course knowledge tests, and a final surgical anatomy laboratory practical examination to 22 senior medical students who were enrolled in the course. All students created a final surgical anatomy presentation.

Results: The students demonstrated a 100% pass rate in surgical anatomy. The knowledge test, which included assessment of knowledge on perioperative surgical decision making, human physiology, and bedside ultrasound, demonstrated an average improvement of 10%. Statistically significant improvements in median confidence values were identified in 10 of 32 surveyed categories, including surgical skills ($p < 0.05$); 84% of student goals for the course were achieved. The medical students' surveys confirmed increased confidence related to the use of point-of-care ultrasound, teamwork experience, and basic surgical skills through small group interactive seminars and surgical simulation exercises.

Conclusion: Our preparation for surgical training course resulted in high student satisfaction and demonstrated an increased sense of confidence to begin surgical training. The 10% improvement in medical student knowledge, as evaluated by a written examination, and the significant improvement in confidence level self-assessment scores confirms this surgery preparation course for senior medical students successfully achieved the desired goals of the course.

Keywords: surgical trainee, simulation-based training, clinical anatomy, medical student education

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Introduction

First-year surgical trainee assessments reveal significant variability in the preparedness of medical students entering surgical training programs; senior medical students often demonstrate suboptimal technical skills and deficiencies in their

knowledge of surgical anatomy.[1–4] Establishing readiness to begin surgical training is particularly important in the face of existing concerns raised regarding the lack of confidence of even graduating surgical trainees to enter independent surgical practice.[5–11] This is particularly concerning at this time due to the additional training constraints that include work-hour restrictions, a decline in open surgical procedures, and decreased surgical autonomy for surgical trainees.[12–14]

Medical school clerkship directors and surgical faculty strive to develop the best methods to prepare senior medical students to enter surgical training. In the last decade a number of institutions have created preparatory courses for senior medical students entering surgical training programs. In the United States, a consensus statement now recommends that all senior medical students entering surgical training complete a surgical preparatory course that includes training in basic technical skills and simulation-based clinical education.[15–17] Our Department of Surgery first offered such a course in 2009, a time when several other centers were developing similar courses and the national curriculum was being established by the American College of Surgeons (ACS), the Association of Program Directors in Surgery (APDS), and the Association for Surgical Education (ASE).[2] The national curriculum includes the common elements of simulated patient care scenarios, practice in the interpretation of radiographs, technical skills training, and point-of-care ultrasound (POCUS).[2] Specific training in surgical anatomy, although considered important, has unfortunately not been a focus of the national surgical training preparatory curriculum.

Incoming surgical trainees have been reported to possess limited knowledge of surgical anatomy, lack confidence in procedural skills, and to be unprepared to acquire the necessary technical skills in the early years of their surgical training.[1,18] Reasons include the variability in medical student education and training, the growing emphasis on surgical quality, and the increasing use of paramedical staff. These factors likely contribute to diminished medical student responsibility.[2,3] Improving medical students preparation for their first years of surgical training has been identified as one way to overcome some of these barriers and accelerate the acquisition of skills required of surgical trainees.[18] Leading surgical organizations have called for revised training and a new educational approach to address these issues. These organizations have even suggested beginning surgical training during the senior year of medical school for students who will pursue surgical programs.[19] Evidence exists that the implementation of specific preparatory courses for pre-surgical trainees focused on practical skills is successful in improving their readiness for surgical training programs.[20]

It has been proposed that the lack of medical student preparation creates an add-on effect throughout surgical training resulting in a lack of readiness among even senior trainees for independent surgical practice.[21] Contributing factors to the lack of readiness include work-hour restrictions, limited overnight hours, which often foster surgical trainee independence, a decline in open surgical procedures, decreased surgical trainee autonomy, and the added time required for documentation in the electronic health record (EHR).[15,22–27] The implementation of the 80-hour week has resulted in a decrease of approximately 15% in the training time available to trainees during their surgical training programs.[27] Collectively, these factors have led to a decline in the acquisition of essential skills by surgical trainees in the first year of their training programs, leading to decreased readiness to start fellowship training or independent practice.[21] Improving the readiness of entering senior medical students offers one way of mitigating some of the effects of these factors.

Our original course identified 32 learning categories, and they remain the same in the current course. They are based upon input from faculty, surgical trainees, and senior medical students. The effectiveness of the original course to improve first-year surgical trainee performance was demonstrated through an analysis of performance evaluations.[28] In 2014, we enhanced our course to provide case-based mock surgical procedures and to make surgical anatomy, bedside ultrasound, and a review of human physiology the focus of the course. Our interprofessional four-week course now includes enhanced collaboration between faculty from Surgery, Anesthesia, Human Anatomy, Physiology, Pharmacy, Legal Services, and Nursing. Specific simulation exercises in transfusion medicine and POCUS were also added to the course.[29] The current course has five integrated components: small-group didactic instruction, team-based simulation exercises, POCUS training (NanoMaxx ultrasound, SonoSite, Inc., Bothell, WA), simulated surgical procedures, and mock Morbidity and Mortality (M&M) conference presentations. The goal of the current course is to emphasize hands-on surgical skills training and to integrate the review of preclinical and clinical sciences. The time dedicated to basic science review, surgical anatomy, mock surgical procedures, clinical science instruction, and topics related to personal

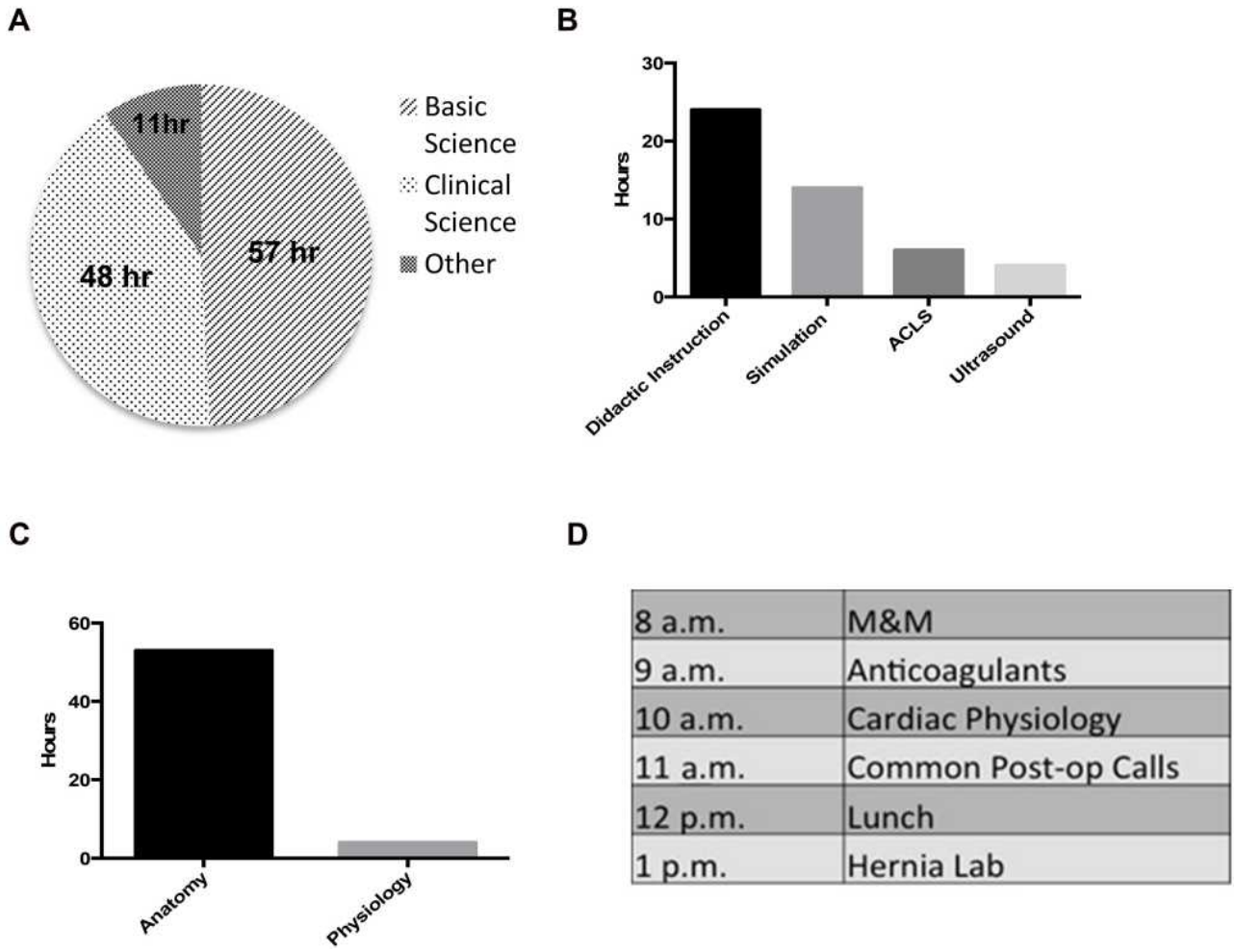

Figure 1 Course content breakdown. (**A**) Division of education between basic and clinical science. (**B**) Clinical science content includes: 24 hours of didactic instruction, 14 hours of simulation, 6 hours of ACLS certification, and 4 hours of point-of-care ultrasound training. (**C**) Basic science content by discipline is 53 hours of anatomy and 4 hours of physiology. (**D**) Sample of a daily activities agenda during the course.
Abbreviation: ACLS, Advanced Cardiac Life Support.

well-being is illustrated in Figure 1A. These course enhancements were designed to integrate surgical and clinical skill development essential for surgical training (Table 1). We hypothesized that these enhancements would result in increased knowledge and sense of confidence among senior medical students who complete the course.

Methods

To evaluate our enhanced curriculum, we administered pre- and post-course Likert-type surveys in 32 categories, pre- and post-course knowledge examinations that tested clinical knowledge expected of surgical trainees, and a final surgical anatomy practical examination to the medical students participating in the course over a three-year period. The medical students, a sample size of 22 students, were evaluated based on their participation during surgical simulations and on their performance on written and practical examinations.

Didactic Instruction

Students are assigned literature reviews commonly recommended to surgical trainees. Basic science instruction is divided into 14 hours of didactic anatomy, 39 hours of mock surgery, and 4 hours of physiology and pathophysiology (Figure 1A). Students also receive 48 hours of clinical science instruction emphasizing perioperative care through simulation experiences; the hours dedicated to ultrasound training, simulation exercises, and advanced cardiac life support (ACLS) certification. Ultrasound training sessions included Focused Assessment with Sonography for Trauma (FAST) and Focus Assessed

Table 1 The Five Core Learning Objectives

1. Students will become familiar with the anatomic exposures of common surgical procedures and the surgical anatomy of the neck, chest, abdomen/pelvis, inguinal canal, and the extremities.
2. Students will become familiar with basic surgical techniques including suturing, knot tying, and vascular and GI anastomosis.
3. Students will become familiar with and demonstrate competence in the management of common emergency scenarios and procedures.
4. Students will become familiar with the perioperative evaluation and care of the surgical patient and the basic science foundations of surgical care.
5. Through a simulated operating room environment, students will learn standard operating room procedures, resource management, roles, safety, and teamwork.

Transthoracic Echocardiography (FATE) examinations. Ultrasound simulation workshops included the use of live volunteers as well as training on Viamedix simulators (CEA Healthcare, Sarasota, FL) (Figure 1B). Anatomists provide extensive instruction in regional anatomy and senior surgeons supervise the simulated operations and the associated anatomic dissections (Figure 1C). While the emphasis of the course is on surgical skills training and perioperative patient care, didactic instruction also includes focused reviews on radiology, pathology, and hospital epidemiology. A typical day in the schedule of the course is divided such that didactic instruction occurs in the morning and the surgical skills laboratory takes place in the afternoon (Figure 1D).

Clinical Simulation Exercises

Students engage in team-based exercises using high-fidelity TraumaMan mannequins (SIMULAB, Seattle, WA) and simulated clinical scenarios (Table 2). Team leadership roles are rotated with the student teams being evaluated by faculty members during the exercises and debriefing sessions.

Simulated Surgical Procedures

Case based mock surgery exercises are performed in the anatomy laboratory and highlight the relevant regional anatomy. Following completion of the mock surgical procedures, extended anatomic dissections are carried out

Table 2 List of Clinical Simulations and Associated Skills

Clinical Simulation	Skill
Perioperative hypoxemia	Manage ventilator use, interpret arterial blood gases, describe modes of ventilation
Postoperative bleeding	Check vitals, make a differential diagnosis, initiate resuscitation, initiate massive transfusion protocol
Postoperative chest pain	Obtain electrocardiogram (EKG), order laboratory tests and chest x-ray, give nitroglycerin
Leak after esophagectomy	Order laboratory tests, order esophagram, choose antibiotics
Heart block and tamponade	Run code, follow Advanced Cardiovascular Life Support (ACLS) algorithm, obtain echocardiogram, identify potential causes such as hyperkalemia
Pulmonary embolism after bariatric surgery	Evaluation of airway, breathing, circulation, examine wound, obtain EKG, order chest computed tomography scan
Gastric leak after Nissen fundoplication	Start oxygen, order esophagram, transfer to surgical intensive care unit
Postoperative arrhythmia and hypoxia	Interpret EKG, assess pharmacology of antiarrhythmic drugs, identify alterations in postoperative pulmonary physiology
Postoperative anastomotic leak	Identify associated clinical history, signs and symptoms
Anaphylaxis	Manage a difficult airway and intubation, use of oral airways, jaw thrust, chin lift, and medications used for intubation
Perioperative sepsis	Identify risk factors such as neutropenia and immunosuppression, promptly obtain cultures, administer fluids, initiate antibiotics

Table 3 List of Surgical Simulations and Associated Skills

Surgical Simulations	Operation
Head and neck	Thyroidectomy
Hepatopancreatic biliary	Liver mobilization, open cholecystectomy, distal pancreatectomy with splenectomy
Cardiothoracic	Tube thoracostomy placement, thoracotomy, pericardial window
Abdominal wall, hernia, axilla	Axillary dissection, inguinal and femoral hernia repair
Alimentary tract	Right and left hemicolectomy, small bowel resection, Graham patch closure of peptic ulcer perforation, pyloroplasty with vagotomy
Vascular, transplant	Femoral-popliteal bypass, abdominal aortic aneurysm repair, superior mesenteric artery embolectomy nephrectomy, renal transplant, fasciotomy
Trauma	Lateral neck dissection

under the direction of the surgical faculty to demonstrate the associated regional anatomy (Table 3).

The goal of the mock surgical exercises is to teach the clinical anatomy associated with these surgical procedures. The sessions are designed to help students retain and recall the surgical anatomy during their surgical training programs with no expectation of mastering advanced surgical procedures that they would be unlikely to perform as a first-year surgical trainee. The mock surgical procedures encompass a wide range of anatomic regions and include

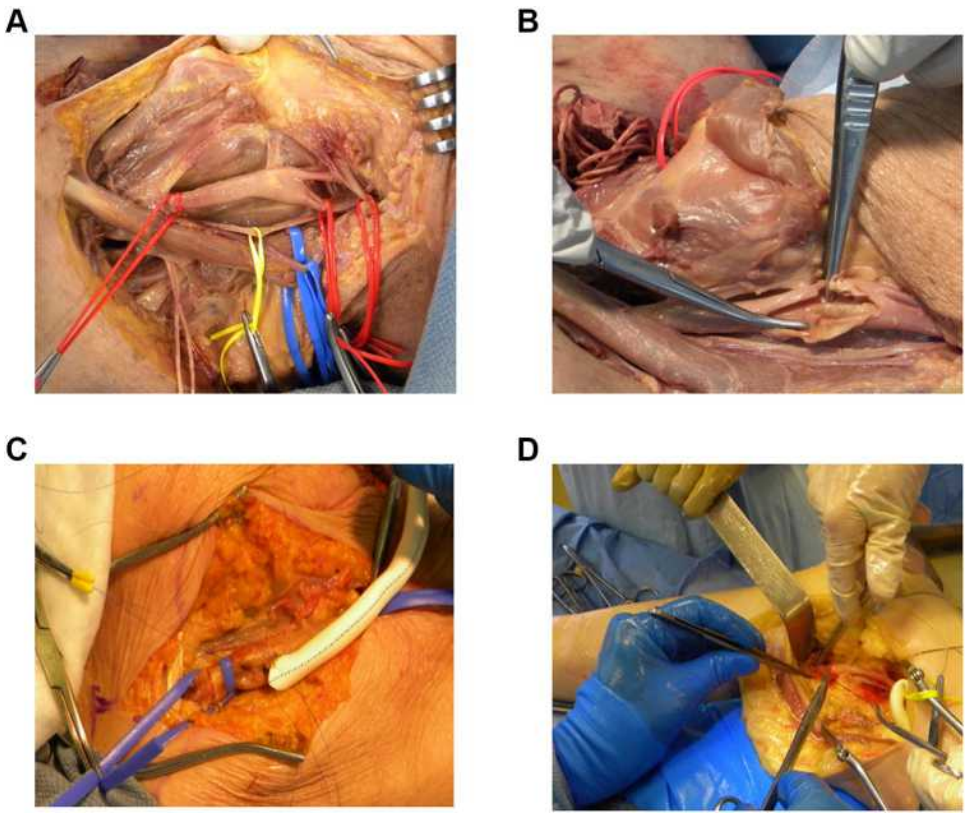

Figure 2 Training in operative anatomy. (**A**) Trauma neck exploration. (**B**) Carotid Endarterectomy. (**C**) Femoral-popliteal bypass graft proximal exposure proximal anastomosis. (**D**) Femoral-popliteal bypass graft distal exposure with distal anastomosis.

A

B

Op note for ANAT7800 4/13-2016

Student A

PREOPERATIVE DIAGNOSIS: Ischemic bowel

POSTOPERATIVE DIAGNOSIS: Ischemic bowel, superior mesenteric artery emboli

OPERATION PERFORMED: laparotomy, embolectomy from superior mesenteric artery

SURGEON: Student A

Assistants: Student B

ANESTHESIA: General endotracheal anesthesia

COMPLICATIONS: non

INDICATIONS FOR PROCEDURE:

This patient has a history of persistent atrial fibrillation. He presented with acute onset of generalized abdominal pain. He also complained of nausea and vomiting. Physical exam was normal except for a general tenderness in the abdomen. Plain abdominal x-ray was normal. Angiography showed occlusion of the superior mesenteric artery. The patient was immediately planned for surgery.

DESCRIPTION OF OPERATIVE PROCEDURE:

The patient was brought to the operating room where the he was placed in the supine position with arms out to the side.. General anesthesia was induced and the patient was intubated. A foley catheter was placed and the skin was prepped and draped. A timeout was performed by the attending surgeon.

A midline laparotomy was made and the soft tissues were dissected using electrocautery, The peritoneal cavity was entered sharply. There was no injury to the underlying viscera. The bowel appeared pale. We examined the small and large bowel and we could find no signs of necrosis or perforation. The superior mesenteric artery was visualized. There was no palpable pulse distal to the suspected site of the emboli. Proximal and distal control was obtained. A small horizontal incision was made using an 11-blade at the proximal end of the artery. A Fogarty catheter was inserted into the artery and the emboli was extracted. The arterial incision was then closed using Prolene 7-0, hemostasis was obtained. After this, we visually confirmed return of circulation. The fascia was closed using 0-looped PDS, and the skin was stapled. The patient awoke from general anesthesia in the operating room. The patient tolerated the procedure well.

Figure 3 Team based interactive learning experience. (**A**) Students participated in each simulated operation as a team-based approach and technical skills training included use of central lines and ultrasound. (**B**) Students were required to write operative notes after each procedure and this is an example of one of those notes.

important open operations that are currently encountered less frequently (Figure 2A). The anatomy laboratory exercises also incorporate common first-year surgical trainee-appropriate basic surgical techniques including suturing, knot tying, instrument identification, central line insertion, chest tube placement, emergency cricothyroidotomy, and laparoscopic trocar placement (Figure 3A). Experienced staff surgeons provide both instruction and feedback regarding technical skills development throughout the exercises. To better appreciate team dynamics and responsibilities, students rotate operating room (OR) team roles for the 12 mock surgical sessions between primary surgeon, assistant surgeon, and scrub technician. The student in the role of primary surgeon is responsible to submit a mock operative report, which is evaluated by the faculty (Figure 3B).

The medical student teams are also assigned a mock surgical complication scenario at the completion of every surgical training session. Complication scenarios are selected to represent common complications that could arise as a result of each of the mock surgical procedures. The team members analyze the complications based on their review of the surgical literature and the student in the role of primary surgeon presents the complication the following morning at the mock M&M conferences attended by senior surgeons. Students are evaluated on the quality of their M&M presentations based on clinical accuracy, communication style, demonstration of responsibility, and their level of confidence during their presentations.

Capstone Presentations

Capstone presentations utilize a flipped classroom format as this promotes high levels of student learning and information retention.[30] Each student selects a surgical procedure and associated surgical anatomy to present to their classmates during the last week of the course.

Evaluation and Statistical Analysis

Students were evaluated on the results of the pre- and post-knowledge tests, the surgical anatomy practical examina-

Table 4 Breakdown of Course Components and Their Associated Percentage of the Grade

Course Component	% Grade
Practical Examination	30
Final Presentation	10
Final Exam	15
Laboratory Performance	15
Dictations	10
Participation	10
Professionalism	10

tion, and quality of their individual capstone surgical anatomy presentations (Table 4). The faculty also evaluated students' operative notes, laboratory work, and ability to promote teamwork during both simulation sessions and the mock surgical procedures. Students' confidence levels were evaluated using pre- and post-course surveys.

We analyzed data collected over three years. Pre- and post-test confidence scores were analyzed using the Student's *t*-test and the Mann–Whitney *U*-test. All data analyses were performed using the SPSS software (IBM SPSS Statistics for Windows, Version 21.0; Armonk, NY).

Results

All participating students completed all assessments, including the pre- and post-course surveys, the knowledge tests, the final laboratory practical examination, the simulated patient care exercises, and the mock M&M presentations.

Median confidence scores increased in 27 of the 32 categories. We documented a statistically significant improvement in median confidence scores in 10 of the 32 categories ($p < 0.05$); there were no categories in which confidence scores decreased. Statistically significant improvements were directly related to clinical and surgical simulation scenarios. These categories included: listing the steps of major operations, managing post-operative complications, and intravenous fluid management (Figure 4). Eighty-four percent of students' goals for the course were either "largely" or "completely" met based on qualitative Likert scale survey results.

The post-course multiple-choice examination testing clinical knowledge expected of first-year surgical trainees demonstrated a 10% average improvement in final quantitative scores. The laboratory practical examination had a 100% pass rate. All 22 students reported that, because of the course, they experienced an increased sense of confidence to begin surgical training.

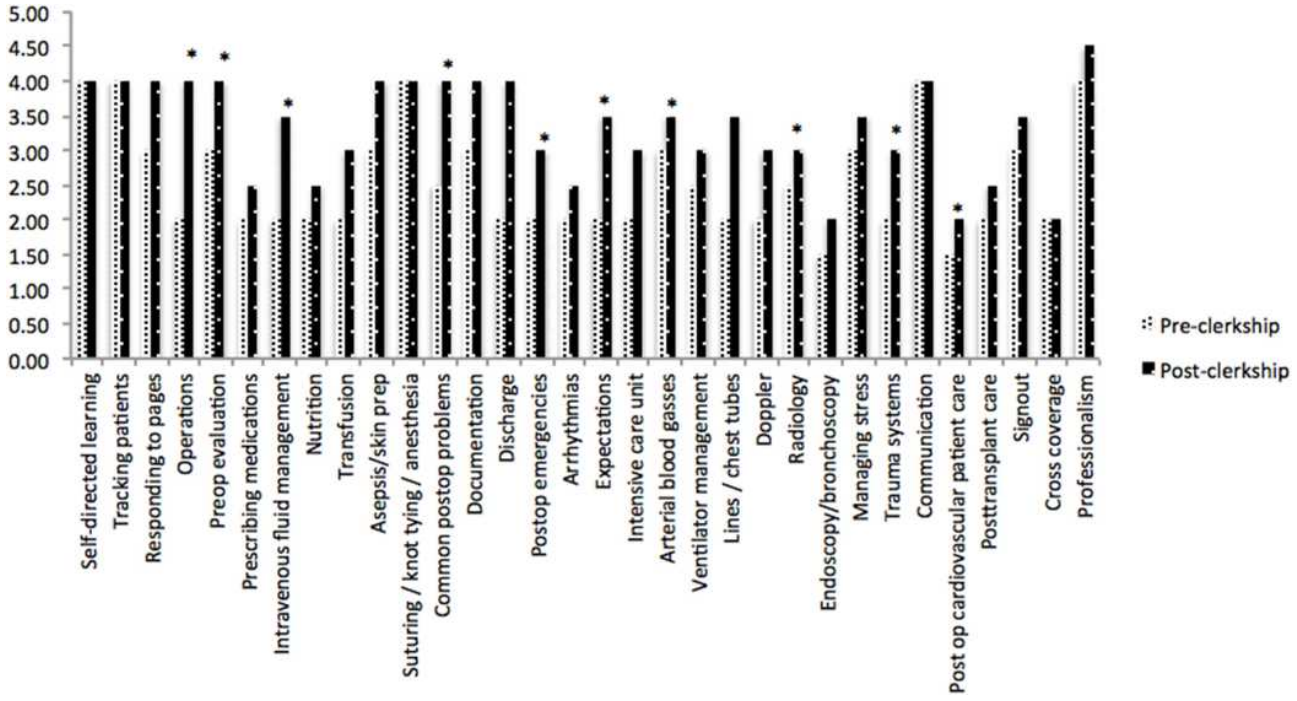

Figure 4 Confidence scores (median): pre- versus post-clerkship surveys (32 categories). Scores were obtained on a 5-point Likert-type scale. *P < 0.05.

A cost analysis was completed and demonstrated that $5,250 (USD) per year covered all costs for 3 lightly embalmed cadavers, use of surgical equipment, and suture supplies. This results in a total cost of $15,750 (USD) for the three years, and a cost of $716 (USD) per student for the 22 students who participated in the study.

Discussion

The national curriculum designed by the ACS, APDS, and ASE recognizes simulation exercises as an important innovation to improving both cognitive and procedural skills.[17,31] Simulation-based training (SBT) has been demonstrated to significantly improve cognition and learning in an environment detached from the high stress levels associated with a first-year surgical trainee's work in the clinical setting. Additionally, SBT is increasingly recognized as an effective method to enhance communication skills and teamwork in patient care scenarios.[32] Medical students can practice simulated clinical tasks without placing patients at risk.[33,34] New surgical trainees have significantly improved their basic surgical skills after participating in SBT.[35,36] Currently, much of what used to be taught at the bedside is now being taught through SBT. Simulation-based POCUS training has also been demonstrated to be valuable for medical students who enter other surgical training programs.[37] Preparation courses, like ours, introduce advanced SBT and advanced POCUS into the senior year of the medical school curriculum. Globally, similar programs have been instituted and demonstrated success. Although medical school curricula differ between countries, the need to improve surgical skills training during medical school appears to be nearly universal.[38,39]

Recently it has become advantageous to utilize new technologies and we now teach amidst the early engagement of new teaching tools such as augmented, mixed, and virtual reality platforms. Current programs now rely heavily on the implementation of distance learning due to the protracted COVID-19 viral pandemic. The rigorous application of these technologies to teach surgical anatomy and basic surgical skills will be required as we continue to prepare senior medical students to enter surgical training.[40]

Our four-week preparatory course for senior medical students entering surgical training includes hands-on surgical training in the cadaver laboratory and medical pharmacology reviews taught by hospital-based pharmacists. Cadaver surgical training is usually considered to be an excellent substitute for actual surgery and is a very realistic training model.[31,41] Our course also emphasizes the importance of instilling competence and confidence in medical students to safely prescribe medications, an area also recognized by other surgical educators.[42] We incorporated hospital-based pharmacists into our faculty as interprofessional educators to assist our medical students to review the safety aspects of the medical prescription process.

Our three-year qualitative and quantitative analyses of the course demonstrate the success of our current curriculum to increase medical students' confidence to perform the skills needed to enter surgical training. Fostering confidence in the trainee is a particularly relevant milestone, as a lack of confidence has been reported in up to 40% of senior surgical trainees.[21] Recently published data confirms the benefits of instilling confidence in surgical trainees through bootcamp courses with the maintenance of acquired confidence through subsequent surgical skills training sessions.[43] Enhanced confidence endorsed by the students in our course is likely based on successful surgical skill acquisition in the surgical anatomy laboratory and patient management skills acquired through repetitive team simulation sessions. The goal of our course is to enable first-year surgical trainees, through enhanced surgical skills and an increased sense of confidence, to achieve and maintain effectiveness despite stressful workloads, work-hour restrictions, and a time consuming EHR.

Pre- and post-course survey results demonstrated that median confidence scores increased in 27 of 32 categories, reaching statistical significance in 10 of the 32 categories (Figure 4). The greatest improvements in confidence were in understanding the sequence of operative procedures and in managing common postoperative problems. Those gains were likely due to the effect of the clinical simulation exercises and the simulated surgical procedures, both of which received the highest qualitative feedback from the students. Significant improvement was not registered in nine categories as pre-course confidence scores in these areas were already high. Nonetheless, these categories reflect important skills for surgical trainees and were worthy of review in the surgical training preparation course. A third group of 13 categories did not achieve statistically significant improvement in confidence despite low pre-test scores; these areas must be regarded as areas for future improvement in our course.

All participating medical students reported an overall increased level of confidence to enter surgical training. Student comments were highly favorable. The

effectiveness of the core elements of this course to improve first-year surgical trainees' performances were documented in an earlier analysis.[28]

Inter-professional collaboration, defined as the process through which multiple interdependent professionals generate collective action toward patient care needs, was a key element of our course.[44] Although there were consistent lead faculty members, the course relied heavily on collaboration between faculty members from a wide variety of disciplines. Students were introduced not just to the content of topics presented but also to how other specialties think about and approach patient care; they also learned how departments such as pharmacy, pathology, and hospital epidemiology function within the hospital.

The 11 hours of non-clinical instruction address areas related to resiliency among senior medical students and surgical trainees. These areas include (1) avoiding burnout through emotional and physical resiliency;[45] (2) dealing with personal finances, as most medical students carry a significant loan burden;[46] (3) student concerns about their knowledge of the business aspects of medicine; and (4) training in hand-offs, which has been documented to produce significant improvement in surgical trainee performance.[47] Medical professionalism is a core GCME competency, but few medical students learn much about the rich history of their profession, weakening their professional identity. Recognizing this, we incorporated sessions on both the history of surgery and on medical ethics to the curriculum. The national ACS first-year surgical trainee preparatory curriculum now also includes a History of Surgery module.

Faculty donated their time to the teach the course. Equipment and cadaver costs at our institution were supported by generous philanthropic donations and by the medical school. The cost to run our course was approximately $716 (USD) dollars per student. It was determined by others that the greatest expense in such a course is that of the additional faculty time commitment. Adding surgical anatomy to an existing surgical training preparatory course at one center required approximately 100 additional faculty hours. Although this was the estimate of their initial time investment; they proposed that the faculty time investment for subsequent years might be reduced. They also suggested that the required faculty time investment could be shared between faculty, senior surgical trainees, and fellows further reducing the faculty time commitments.[48]

The strengths of our study include: (1) the fact that all medical student participants completed all of their surveys, written tests, and practical examinations; (2) the educational research experience of the faculty; (3) the longevity of the course; and (4) the high faculty to student ratio, which facilitated individual learner feedback. The weaknesses of our study include: (1) the fact that we have not obtained follow-up of students' performances during their surgical training; and (2) that medical student assessments of their cross-coverage capabilities showed no improvement following completion of the course. In the future we will track long term student performance in their training programs. The lack of improvement in student cross-coverage capability may have resulted from a decreased emphasis on the mock-page simulations and the associated faculty feedback. To improve this, we will collaborate with the nursing school faculty to design enhanced mock-page simulation scenarios and the rigor of faculty feedback. We will evaluate medical student cross-coverage capabilities based on pre-determined expectations for the medical student cross-coverage performance.

Conclusion

Our four-week preparation course for senior medical students was designed to prepare senior medical students for surgical training. Inter-professional collaboration, the review of medical physiology, focusing on surgical anatomy, and specific surgical skills training were key elements of our current course. We documented a 10% improvement in general knowledge and a 100% pass rate in the surgical anatomy final examination. The results of our pre- and post-student surveys demonstrate improvement in both quantitative and qualitative measures associated with a high level of student satisfaction, and an increased sense of confidence to enter the first year of surgical training. We documented that the greatest improvements were in the students' confidence in surgical procedures, post-operative patient management, and intravenous fluid management.

Ethical Approval

Our educational study was reviewed and granted exempt status approval by the University of Minnesota Institutional Review Board, Minneapolis, Minnesota (IRB No. 1506E74743). Exempt status approval was granted based on the educational nature of the study, maintenance of confidentiality, and deidentification of all data.

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Disclosure

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