Effects of a Laparoscopic Course on Student Interest in Surgical Residency

Atul K. Madan, MD, Constantine T. Frantzides, MD, PhD, Roderick Quiros, MD, Nadav Dujovny, MD, Christopher Tebbit, MD

ABSTRACT

Background: The number of surgical residency applicants has been declining. Early introduction of the discipline of surgery is thought to stimulate early interest in surgical residency. This study investigated the hypothesis that a laparoscopic skills course introduced in preclinical years would stimulate student interest in entering surgical residency.

Methods: Preclinical medical students participated in a laparoscopic skills training course. All students underwent an animate laboratory at the beginning and at the end of the course. Students were divided into 4 separate groups: virtual reality, box trainer, both trainers, and control group. Before and after the course, students were asked their residency interest. First- and second-year medical students participated in the course.

Results: Before the course, 56% of the students desired to go into general surgery or a surgical subspecialty. After the course, 49% of the students expressed interest in entering general surgery or a surgical subspecialty. A decrease occurred in students who desired to go into surgical subspecialty residency from 31% to 15% (P=NS), and an increase occurred in students who desired to go into general surgery residency from 25% to 34% (P=NS). No statistically significant difference was seen in the 4 individual training subgroup analyses.

Conclusions: Participation in a laparoscopic skills course does not affect medical student interest in entering surgical residency. A trend was noted in students choosing general surgery over surgical subspecialty training after this course. Surgical educators need to investigate methods to encourage preclinical medical student interest in surgical residencies.

Key Words: Medical education, General surgery, Laparoscopy, Preclinical students, Residency choice, Medical students.

INTRODUCTION

Except for the past 2 years, it has been suggested that the number and quality of surgical residency applicants is declining.[1–6] The cause of the decline is multifactorial.[7] These include front-end bias, primary care push, generation X issues, medical school debt, malpractice issues, length of residency, hours during residency, lifestyle issues, and the view that surgery is less technologically advanced.[3,8–18] Many medical schools as well as admissions committees have a strong primary care push that creates a front-end bias in our medical schools today.[19] The values and attitudes of our current medical students (which have been labeled as Generation X) often do not parallel those required by a surgeon.[20]

The average medical student graduates with a large amount of debt.[13,21] Although some of the debt is subsidized by the federal government, much is not. Even the small amount that is subsidized by the federal government often cannot be deferred for 5 years (the minimum time a resident will spend to become a general surgeon). One study demonstrated that general surgeons have about half the return on investment compared with that in other specialties including urology and orthopedics.[22]

Depending on the surgical specialty, malpractice insurance and similar issues may affect residency choice.[23] Although the length of the clinical residency is 5 years, many programs or residents, or both, have chosen to extend this for various reasons. In addition, if students desire to go into a highly competitive surgical subspecialty, such as surgical oncology or pediatric surgery, they may be looking at close to a decade before earning significant salary to pay off their student loans. During surgery residency, the hours and call schedule are often

Department of Surgery, University of Tennessee Health Science Center, Memphis, Tennessee, USA (Dr Madan).

Evanston Northwestern, Evanston, Illinois, USA (Dr Frantzides).

Rush University, Chicago, Illinois, USA (Drs Quiros, Dujovny, Tebbit).

The authors would like to acknowledge the technical assistance of Mrs. Courtney Bishop in the preparation of this manuscript.

Address reprint requests to: Atul K. Madan, MD, Chief, Section of Minimally Invasive Surgery, Assistant Professor of Surgery, UT Health Sciences Center, 956 Court Ave, Room G210, Memphis, TN 38163, USA. Telephone: 901 448 5910, Fax: 901 448 1639, E-mail: amadan@utmem.edu

extreme. The mandated 80-hour work week limit requirement may be "evening the field," but that has yet to be determined.[24,25]

Even so, general surgery is not felt to be one of the technologically advanced fields in medicine by many students. For obvious reasons, the field of general surgery is slow to adopt new procedures without appropriately testing them with the current gold standards. Many other disciplines are much quicker (for better or for worse) in adopting new technologies or procedures. This seemingly slower adoption may be perceived negatively by students.

It has been thought that the introduction of the general surgery discipline early in preclinical medical school years may stimulate early interest in surgical residency in medical students.[26,27] Thus, we tested the hypothesis that a laparoscopic skills course introduced in preclinical years will stimulate student interest in entering surgical residency.

METHODS

This study used preclinical medical students (year 1 and year 2). Our Institutional Review Board exempted this study for formal review. All of the students went through a laparoscopic training course. All medical students volunteered for this course. This course included 2 animate laboratory sessions with porcine models as well as 10 training sessions in an inanimate laboratory. In the animate porcine sessions, the students were asked to perform 4 tasks including placing a piece of bowel into a laparoscopic retrieval bag, deploying a stapler on a piece of bowel, performing a liver biopsy, and measuring a piece of bowel with an umbilical tape.

The inanimate training actually varied by group: Group A—virtual reality training, Group B—inanimate box training, Group C—both trainers, and Group D—control. The virtual reality training was performed on the Minimally Invasive Surgery Trainer - Virtual Reality (MIST-VR), and the inanimate box training was performed on the Laparoscopy Training Simulator (LTS 2000). The course was taught by a laparoscopic faculty member and a fellow. All students were asked their residency choice before and after the course using a fill-in-the-blank questionnaire. All choices were divided into general surgery, surgical subspecialty, and nonsurgical. Undecided, OB/GYN results were categorized as nonsurgical choices. Surgical subspecialties included neurosurgery, orthopedics, surgical oncology, ENT (ear, nose, and throat), urology, and vascular surgery. Chi-squared tests were used for statistical analysis (GraphPad InStat Version 3.05)

RESULTS

This study included 59 students. The average age was 24 years, with 30 males and 29 females, and 39 first year medical students and 20 second year medical students.

Before the sessions, 33 students wished to go into a surgical residency (56%). After the course, only 29 (49%) desired to go into surgery (P=NS) **(Table 1)**. When analyzing general surgery versus surgical subspecialty, 15 (25%) students desired to go into general surgery before the course; while 20 (34%) students decided to go after the course (P=NS; **Table 1**). On the other hand, students who decided to go into a surgical subspecialty decreased from 18 (31%) to 9 (15%), P=NS; **Table 1**. Although a trend occurred for more students to go into general surgery compared with surgical subspecialties, this did not reach statistical significance.

Table 2 demonstrates the subgroup analyses for all 4 training groups. No statistically significant differences were noted, possibly because of the small sample size in the subgroup analyses.

DISCUSSION

Our data demonstrate that participation in a laparoscopic skills course did not obviously affect medical student interest in entering surgical residency. Of course, other possible reasons exist as to why no obvious effect on residency choice occurred. Our sample size may have been too small. The course may have been too brief. It may be that our student interest was too high before the course because students who volunteered were more likely to choose a surgical residency.

We did see a slight trend in a shift from students desiring

Table 1.
Student Residency Choice Before and After a Laparoscopic Skills Course*

Specialty	Before	After
Nonsurgical Specialty	26 (44%)	30 (51%)
Surgery (all)	33 (56%)	29 (49%)
General Surgery	15 (25%)	20 (34%)
Surgical Subspecialty	18 (31%)	9 (15%)

*P=NS for all comparisons.

Table 2.
Student Residency Choices Before and After a Laparoscopic Skills Course by Group*

Specialty	Group A		Group B		Group C		Group D	
	Before	After	Before	After	Before	After	Before	After
Nonsurgical Specialty	2 (13%)	4 (27%)	5 (38%)	2 (15%)	6 (38%)	9 (56%)	2 (13%)	5 (33%)
General Surgery	7 (47%)	9 (60%)	7 (54%)	9 (69%)	4 (25%)	4 (25%)	8 (53%)	8 (53%)
Surgical Subspecialty	6 (40%)	2 (13%)	1 (8%)	2 (15%)	6 (38%)	2 (19%)	5 (33%)	2 (13%)

*P=NS for all comparisons.

to go into general surgery over surgical subspecialty after the course. Although it has been suggested that the field of general surgery be introduced into preclinical years, our data suggest that a laparoscopic skills course may not be an effective method for increasing interest in surgery. Kozar et al[28] suggest that a brief intervention can help influence students toward general surgery; although their data only showed a trend towards an increase in general surgery choice and no change in surgical specialty choice.

Our results do suggest that preclinical exposure to general surgery may influence students who are interested in other surgical subspecialties to consider general surgery. One study[29] showed that while many of the strongest students chose surgical residencies, they selected surgical subspecialties. Our thought is that certain students are inclined to go into a surgical field. It may be possible to entice these students to consider general surgery instead of a surgical subspecialty by courses such as the one described in this study.

Surgical educators need to investigate methods to encourage preclinical student interest in surgical residency. These methods should be tested and demonstrated to be effective before investing time and resources in them. It may be that active participation in the medical school admission process would lead to greater interest in general surgery.

References:

1. Association of American Medical Colleges National Residents Matching Program Database. National Resident Matching Program Results and Data 2001: Selected Data Tables 2001. Available at: http://www.nrmp.org/res match/data tables.html.

2. Marschall JG, Karimuddin AA. Decline in popularity in general surgery as a career choice in North America: review of postgraduate residency training selection in Canada, 1996–2001. *World J Surg*. 2003;27:249–252.

3. Bland K, Isaacs G. Contemporary trends in student selection of medical specialties: The potential impact on general surgery. *Arch Surg*. 2002;137:259–267.

4. Newton DA, Grayson MS. Trends in career choice by US medical school graduates. *JAMA*. 2003;290(9):1179–1182.

5. Greenfield LJ. Challenges to academic surgery. Are we recruiting the best and brightest? *ACOS*. 2000;85(3):21–24.

6. Cofer JB, Biderman MD, Lewis PL, et al. Is the quality of surgical residency applicants deteriorating? *Am J Surg*. 2001;181: 44–49.

7. Richardson HC, Redfern N. Why do women reject surgical careers? *Ann R Coll Surg Eng*. 82(suppl):290–293, 2000.

8. Griffen WO Jr., Schwartz RW. Controllable lifestyle as a factor in choosing a medical career. *Am J Surg*. 1990;159:189–190.

9. Woodworth PA, Chang FC, Helmer SD. Debt and other influences on career choices among surgical and primary care residents in a community-based hospital system. *Am J Surg*. 2000;180:570–575.

10. Richardson JD. Workforce and lifestyle issues in general surgery training and practice. *Arch Surg*. 2002;137:515–520.

11. Hennington JA. Why the numbers are dropping in general surgery. *Arch Surg*. 2002;137:255–256.

12. Craven JE. The generation gap in modern surgery. *Arch Surg*. 2002;137:257–258.

13. Zinner M. Surgical residencies: are we still attracting the best and the brightest? *Bull Am Coll Surg*. 2002;87:20–25.

14. Erzurum V, Obermeyer R, Fecher A, et al. What influences medical students' choice of surgical careers. *Surgery*. 2000;128: 253–256.

15. Schwartz RW, Simpson WG, Strodel WE, Jarecky RK, Griffen WO Jr., Young AB. Career change: in quest of a controllable lifestyle. *J Surg Res*. 1989;47:189–192.

16. Azzizzadeh A, McCollum CH, Miller CC, Holliday KM, Shilstone HC, Lucci A Jr. Factors influencing career choice among

medical students interested in surgery. *Curr Surg.* 2003;60:210–213.

17. Schwartz RW, Jarecky RK, Strodel WE, Haley JV, Young B, Griffen WO Jr. Controllable lifestyle: a new factor in career choice by medical students. *Acad Med.* 1989;64:606–609.

18. Schwartz RW, Haley JV, Williams C, et al. The controllable lifestyle factor and students' attitudes about specialty selection. *Acad Med.* 1990;65:207–210.

19. Nash DB, Veloski JJ. Emerging opportunities for educational partnerships between managed care organizations and academic health centers. *West J Med.* 1998;168:319–327.

20. Losyk B. Generation X. what they think and what they plan to do. *Public Management.* 1997;79:4–5.

21. Hardacre JM, Chen H, Martin C, Lillemoe KD. General surgery and fellowship training: opinions of surgical intern applicants and fellowship directors. *Surgery.* 2000;127(1):14–18.

22. Weeks WB, Wallace AE. Financial returns on specialty training for surgeons. *Surgery.* 2002;132(5):795–802.

23. Hoffman JP. Does no good deed go unpunished? Notes to a young surgeon. *Am Surg.* 2004;70(2):97–100.

24. Accreditation Council for Graduate Medical Education. Report of the ACGME work group on resident duty hours. 2002; 1–9.

25. Drazen JM, Epstein AM. Rethinking medical training - the critical work ahead. *N Engl J Med.* 2002;347:1271–1272.

26. Polk HC Jr. The declining interest in surgical careers, the primary care mirage, and concerns about contemporary undergraduate surgical education [editorial]. *Am J Surg.* 1999;178:177–179.

27. Bland KI. The recruitment of medical students to careers in general surgery: emphasis on the first and second years of medical education. *Surgery.* 2003;134(3):409–413.

28. Kozar RA, Lucci A, Miller CC, et al. Brief intervention by surgeons can influence students toward a career in surgery. *J Surg Res.* 2003;111:166–169.

29. Callcut R, Snow M, Lewis B, Chen H. Do the best students go into general surgery? *J Surg Res.* 2003;115:69–73.