

# Impact of Advanced Laparoscopy Courses on Present Surgical Practice

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## ABSTRACT

**Background and Objectives:** The introduction of new surgical techniques has made training in laparoscopic procedures a necessity for the practicing surgeon, but acquisition of new surgical skills is a formidable task. This study was conducted to assess the impact of advanced laparoscopic workshops on caseload patterns of practicing surgeons.

**Methods:** After we obtained institutional review board approval, a survey of practicing surgeons who participated in advanced laparoscopic courses was distributed; the results were analyzed for statistical significance. The courses were held at the University of Nebraska Medical Center between January 2002 and December 2010. Questionnaires were mailed, faxed, and e-mailed to surgeons.

**Results:** Of the 109 surgeons who participated in the advanced laparoscopy courses, 79 received surveys and 30 were excluded from the survey because of their affiliation with the University of Nebraska Medical Center. A total of 47 responses (59%) were received from 41 male and 6 female surgeons. The median response time from completion of the course to completion of the survey was 13.2 months (range, 6.8–19.1 months). The mean age of participating surgeons was 39.2 years (range, 29–51 years). The mean time since residency was 8.4 years (range, 0.8–21 years). Eleven surgeons had completed a minimal number of laparoscopic cases in residency (<50), 17 surgeons had completed a moderate number of laparoscopic procedures in residency (50–200), and 21 surgeons had completed a significant number of cases during residency (>200). Of the surgeons who responded, 94% were in private practice. Fifty-seven percent of the participating surgeons who responded reported a change in laparoscopic practice patterns after the courses. Of these surgeons, 24% had a limited residency laparoscopy expo-

sure of <50 cases. Surgeons who were exposed to  $\geq 50$  laparoscopic cases during their residency showed a statistically significant increase in the number of laparoscopic procedures performed after their class compared with surgeons who did not receive  $\geq 50$  laparoscopic cases in residency ( $P = .03$ ). In addition, regardless of the procedures learned in a specific class, surgeons with  $\geq 50$  laparoscopic cases in residency had a statistically significant increase in their laparoscopic colectomy and laparoscopic hernia procedure caseload ( $P < .01$ ). However, there was no statistically significant difference in laparoscopic caseload between surgeons who had completed 50 to 200 laparoscopic residency cases and those who had completed greater than 200 laparoscopic residency cases ( $P = .31$ ). Furthermore, the participant's age ( $P = .23$ ), practice type ( $P = .61$ ), and years in practice ( $P = .22$ ) had no statistical significance with regard to the adoption of laparoscopic procedures after courses taken. This finding is congruent with the findings of other researchers. Future interest in advanced laparoscopy courses was noted in 70% of surgeons and was more pronounced in surgeons with  $\geq 50$  cases in residency.

**Conclusion:** Advanced laparoscopic workshops provide an efficacious instrument in educating surgeons on minimally invasive surgical techniques. Participating surgeons significantly increased the number of course-specific procedures that they performed but also increased the number of other laparoscopic surgeries, suggesting that a certain proficiency in laparoscopic skills is translated to multiple surgical procedures. Laparoscopy experience of  $\geq 50$  cases during residency is a strong predictor of an increase in the number of advanced laparoscopic cases after attending courses.

**Key Words:** Laparoscopy, Training, Surgical courses, Colon, Hernia.

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## INTRODUCTION

With the ability to minimize surgical trauma, decrease postoperative surgical pain, reduce the length of the hospital stay, and provide a safe and esthetically pleasing

alternative to conventional open surgical methods, laparoscopic surgery has become the gold standard for many procedures over the past decade.<sup>1</sup> Many patients have come to expect a minimally invasive approach to their surgical procedures given the public notoriety the technique has recently received. To keep practices financially viable and to stay current within a quickly changing surgical atmosphere, an abundance of practicing surgeons have made training for advanced laparoscopic procedures a priority.<sup>2</sup> However, for the surgeon currently in practice, becoming proficient in new surgical techniques and implementing them in general procedures can prove to be an extremely formidable task.<sup>3</sup> To address this issue, the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) has worked to set high standards for laparoscopic courses, defining guidelines and regulations with regard to training and practice of laparoscopic procedures, including the recommendation that instructive courses be taken under the sponsorship of a university or recognized academic society.<sup>4</sup>

As utilization of laparoscopic surgery is introduced into ever more complicated procedures, researchers have shown the presence of a learning curve.<sup>5</sup> This has resulted in an initial rise in surgical complications associated with a surgeon's early laparoscopic cases, followed by a steady decline as laparoscopic expertise is achieved.<sup>3</sup> To help surgeons attain proficiency in laparoscopic techniques that have been developed after their residency, a new teaching paradigm has been introduced that focuses on animate courses and preceptor instruction. Studies have shown that participation in an animate laboratory and a preceptorship experience may determine the future performance of the surgeon in advanced laparoscopic surgery and that formal training can be a predictive factor for reduced complications and improved laparoscopic surgical skills.<sup>3,5,6</sup> Our study aims to evaluate the short-term changes in surgical practice after advanced laparoscopy courses, as well as compare and correlate the demographics and previous laparoscopy experiences of the surgeons who attended advanced laparoscopic courses.

## **MATERIALS AND METHODS**

From January 2002 to December 2010, 18 advanced laparoscopic workshops were hosted by the Center of Minimally Invasive Surgery at the University of Nebraska Medical Center. These workshops were designed to instruct practicing surgeons on the fundamentals of various advanced laparoscopic procedures. It should be noted that

in no way did completion of the workshops certify a competence in a surgeon's ability to perform the procedures. Workshops were held in accordance with SAGES guidelines for continuing medical education of laparoscopic techniques.<sup>4</sup>

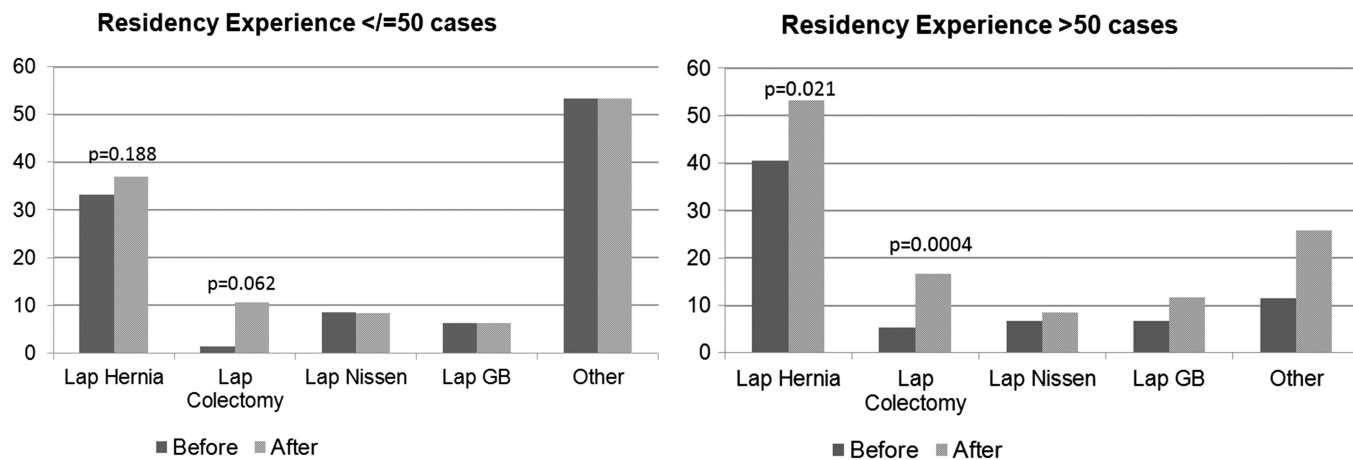
The faculty leading the various workshops were all fellowship-trained minimally invasive surgeons from the University of Nebraska Medical Center. The ratio of faculty preceptors to workshop participants was 1:4.

A total of 128 surgeons from 17 different states attended the workshops. Workshop emphasis included laparoscopic colectomies, single-incision laparoscopic surgery procedures, hernia repair, gastric bypass, and Nissen fundoplication. The workshops comprised a 1-day course, consisting of approximately 4 hours of didactic learning and 4 hours of clinical skills laboratory. The didactic portion of the workshops involved lectures, familiarization with the necessary surgical instruments, case studies, multimedia surgical demonstrations, and literature review. Per SAGES guidelines, patient selection, surgical indications and contraindications, surgical technique, and complication avoidance were addressed during these didactic sessions.<sup>4</sup> The clinical skills laboratory involved inanimate model simulations, as well as animal procedure stations. Each station was directly supervised by qualified faculty, thus allowing participants to acquire proper guidance and feedback by surgical preceptors. Participants were told at the end of the course to use their best professional judgment whenever using laparoscopic surgery techniques.

On the basis of the preference of the participants, surveys were mailed, faxed, or e-mailed to participants to complete at their discretion. Participants did not receive the survey immediately after their course, nor were they coerced into or rewarded for completing the survey. The survey consisted of a series of questions used to assess the surgeon's general demographic information, previous laparoscopic experience, course experience, future recommendations, and current practice patterns relating to laparoscopic surgery.

## **RESULTS**

Of the 109 surgeons who participated in the advanced laparoscopy courses, 79 received surveys and 30 were excluded from the survey because of their affiliation with the University of Nebraska Medical Center. The excluded surgeons were residents and fellows who had not yet finished their respective training. A total of 47 responses



**Figure 1.** Comparison of laparoscopic cases performed after advanced laparoscopic training by surgeons who had  $\leq 50$  cases or  $> 50$  cases during residency.

(59%) were received from 41 male and 6 female surgeons. The median response time from completion of the course to completion of the survey was 13.2 months (range, 6.8–19.1 months). The mean age of participating surgeons was 39.2 years (range, 29–51 years). The mean time since residency was 8.4 years (range, 0.8–21 years). Eleven surgeons had completed minimal laparoscopic cases in residency ( $< 50$ ), 17 surgeons had completed a moderate number of laparoscopic procedures in residency (50–200), and 21 surgeons had completed a significant number of cases during residency ( $> 200$ ). Of the surgeons who responded, 94% were in private practice. Fifty-seven percent of the participating surgeons who responded reported a change in laparoscopic practice patterns after the courses. Of these surgeons, 24% had a limited residency laparoscopy exposure of  $< 50$  cases.

Surgeons who were exposed to  $\geq 50$  laparoscopic cases during their residency showed a statistically significant increase in the number of procedures performed after their class compared with surgeons who did not receive  $\geq 50$  laparoscopic cases in residency ( $P = .03$ ) (**Figure 1**). In addition, regardless of the procedures learned in a specific class, surgeons with  $\geq 50$  laparoscopic cases in residency had a statistically significant increase in their laparoscopic colectomy and laparoscopic hernia procedure caseload ( $P < .01$ ). However, there was no statistically significant difference in laparoscopic caseload between surgeons who had completed 50 to 200 laparoscopic residency cases and those who had completed  $> 200$  laparoscopic residency cases ( $P = .47$ ). Furthermore, the participant's age ( $P = .23$ ), practice type ( $P = .61$ ), and years in practice ( $P = .38$ ) had no statistical significance with regard to the adoption of laparoscopic

procedures after courses taken. This finding is congruent with the findings of other researchers.<sup>3</sup> On average, participants gave a score of 4.5 points out of a possible 5 points for the overall course and most often wanted additional training in foregut, hernia, and bariatric surgeries. Future interest in advanced laparoscopy courses was noted by 70% of surgeons and was more pronounced in surgeons with  $\geq 50$  cases in residency.

## DISCUSSION

In the mid 1990s, a fundamental shift occurred in the field of surgery. Many surgeons realized the true benefits of laparoscopy and worked to improve their skills in this area. However, many surgeons contested that laparoscopy was inferior to current open techniques and failed to convert their practices toward this aim. As laparoscopy grew, its advantages became clearer, and it has now become the standard of practice in many surgical scenarios. Previous researchers have shown that post-residency training is most effective using SAGES criteria.<sup>4</sup> SAGES incorporates both didactic and hands-on procedural practices—a combination that has been shown to be effective in facilitating the acquisition of new surgical skills.<sup>5</sup> SAGES guidelines were followed for this article to determine the necessity and benefit of training courses for practicing surgeons.

Prior general consensus is that SAGES training programs prove most beneficial to surgeons who received at least limited exposure (50 cases) to laparoscopic surgery during residency.<sup>7</sup> In our opinion surgeons with  $< 50$  laparoscopic cases in residency would need more intense minimally invasive surgery coursework including

preceptorships and mini-symposiums. This study shows that the surgeons who have moderate (50–200 cases) to significant (>200 cases) experience in laparoscopy were the surgeons who were more likely to adopt new techniques and add them to their practice. Also of note is the finding that participating surgeons not only significantly increased the number of course-specific procedures that they performed but also increased the number of other laparoscopic surgeries, suggesting that a certain proficiency in laparoscopic skills is translated to multiple surgical procedures. It is interesting to note the significant increase in colectomy and hernia caseload after training. We speculate that this could be because of an increase in confidence conferred by the training and a concomitant increase in willingness to perform more difficult procedures when asked. These findings showcase the importance of providing general surgeons with training in advanced and novel laparoscopic techniques early in their careers to facilitate acquisition and comfort with laparoscopic technique in general.

It is important to note that the value of postsurgical training lies in the long-term performance results of surgeons and not in the immediate impact of these training workshops. Thus it is vital to monitor progress after workshops over a number of years. The loss of follow-up in some participants may have biased some of the results of our study. In the future, further emphasis on long-term follow-

up, >1 year, in a larger group of surgeons is needed, especially in terms of the number of procedures being performed and surgical skill level.

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