The Effect of a Focused Instructional Session on Knowledge of Surgical Staplers in General Surgery Residents

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INTRODUCTION: Surgical stapling devices have been used for a variety of purposes in both laparosopic and open surgery. Nevertheless, trainees rarely receive any focused instruction on their application and use. This study attempts to determine the baseline knowledge of surgical stapling devices possessed by surgical residents. Furthermore, we attempt to evaluate the effectiveness of a short didactic session in improving the trainee's knowledge of the use and function of surgical staplers.

METHODS: A 20-question multiple-choice test was created to evaluate a general surgery resident's knowledge on the design and use of circular, linear, and laparoscopic surgical staplers. The test was administered before and after attending a 40-minute instructional session on surgical stapling devices. The tests were then scored by a data analyst.

RESULTS: A total of 26 residents of 39 in the residency program (26/39, 67%) participated. The pretest mean was 10.62/20 (53%), whereas the posttest mean was 15.38/20 (77%). These results were significantly different on paired samples *t*-test analysis ($t_{(25)} = -10.3$; $p < 0.05$). The mean pretest scores were also significantly different between resident levels (R1-R2, 9.50; R3-R5, 11.31; $t_{(24)} = -2.10$; $p < 0.05$). Senior-level residents scored higher on posttest analysis, but this result was not significant (R1-R2, 14.70; R3-R5, 15.81; $t_{(24)} = -1.63$; $p > 0.05$).

DISCUSSION: There is a deficiency of knowledge of surgical staplers in general surgery residents, more so in junior residents. Didactic instruction is effective in raising the level of knowledge of surgical staplers in all residents, up to a similar level. Surgical educators should consider implementing programs like these for staplers and other types of surgical equipment. (J Surg 66: 288-291. © 2009 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: education, residents, stapling

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

Surgical stapling devices have been used for a variety of purposes in both laparosopic and open surgery. In general surgery, the use of stapling instruments for creating gastrointestinal anastomoses has been reinforced by data showing an equivalent complication rate between stapled and hand-sewn techniques for elective procedures.[1,2]

Technological advances in surgery ranging from stapling devices, to endoscopic technology, to laparoscopic instruments have brought new challenges for surgical educators. Consequently, a variety of educational techniques aimed at training residents in these devices have been attempted with varying success. These include in vivo laboratories dealing with instruction on surgical techniques,[3] as well as simulators such as computer-enhanced training devices, virtual reality simulators, and physical simulators.[4] To date, no study has examined a surgical resident's knowledge and understanding of surgical stapling devices.

METHODS

Four attending general surgeons created a 20-question multiple-choice test to evaluate a resident's knowledge relating to the function and purpose of circular, linear, and laparoscopic surgical staplers. Questions included specific details related to the operation of the stapler and function of certain aspects of each, such as the ability to compress tissue, function of the cutting element, staple heights, and troubleshooting poor stapler function. The test was administered to a group of general surgery residents representing all levels of training (R1-R5) at a weekly

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TABLE 1. Participating Residents According to Year of Training

	Frequency	Percent
Residents R1-R2	10/26	38.5
Residents R3-R5	16/26	61.5

academic teaching session. Residents were not informed of the topic of the session ahead of time, and therefore they could not prepare for the test. Informed consent was obtained from each participant before administering the test, and privacy was ensured by the assignment of random identifying numbers to all participants. Twenty minutes were allotted to complete the test. The tests were collected and placed into an envelope numbered 1. Thereafter, a 40-minute didactic teaching session on surgical staplers was given by an attending general surgeon and an industry representative of the stapling device. The session involved a structured lecture relating to the anatomy, purpose, function, and potential adverse events related to each stapling device. In effect, the didactic session served as a comprehensive orientation to each stapling device. After completing the session, the same multiple-choice test was administered to the participating residents as a posttest. Twenty minutes was again allotted for its completion. All tests were then collected and placed into another envelope numbered 2. Tests were then scored by the data analyst who was blinded to the timing of the test (predidactic or postdidactic session) and the identity of the surgical residents.

RESULTS

A total of 26 residents of 39 in the residency program (26/39, 67%) participated. Of these, 10/26 (39%) were in year 1 or 2 (R1 and R2) of their training, and 16/26 (62%) were in years 3-5 (R3-5) (Table 1). Table 2 shows the baseline test scores v. the test scores following administration of the didactic session. The pretest mean was 10.62 (53%) with the lowest score achieved being 8/20 (40%) and the highest score was 15/20 (75%). The posttest mean was 15.38 (77%) with the minimum score achieved being 11/20 (55%) and the highest score 19/20 (95%).

To examine whether there were statistically significant differences between pretest and posttest scores, a paired sample *t*-test was employed. A statistically significant improvement in resident scores ($\text{Mean}_{\text{Difference}} = -4.77$) was found ($t_{(25)} = -10.3$, $p < 0.05$) (Figure 1).

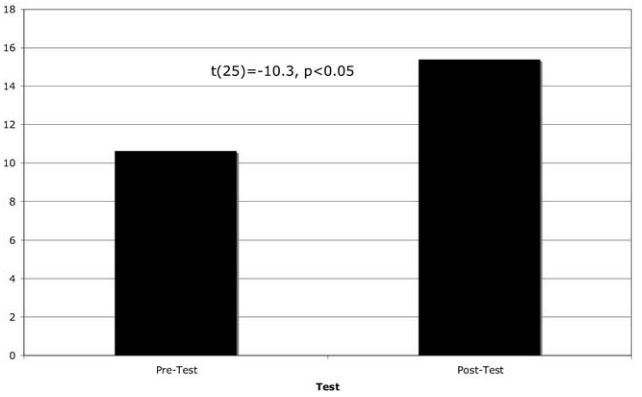

FIGURE 1. Test scores before and after the didactic session.

Figure 2 and Table 3 show the test scores according to year of training. To investigate differences between R1-R2 versus R3-R5 participants, an independent *t*-test was performed. In the pretest comparison, the R1-R2s mean score was 9.50/20 (48%) compared with 11.31/2020 (57%) for the R3-R5 group. A statistically significant difference between pretest means was found ($t_{(24)} = -2.10$, $p < 0.05$). On the posttest assessment, the R1-R2 mean score was found to be 14.70/20 (74%) compared with 15.81 (79%) for the R3-R5 group. In this case, there was not a statistically significant difference between the junior (R1-R2) and senior groups (R3-R5) ($t_{(24)} = -1.63$, $p > 0.05$). These results suggest that a didactic session can help to reduce the knowledge gap between junior- and senior-level residents.

DISCUSSION

The technological and instrument advancements that have transformed surgical techniques have greatly added to the surgeon's fund of knowledge. Consequently, the surgical resident is responsible for a significant amount of technical knowledge and training to benefit fully from the vast array of instruments available to them. The recent explosion in surgical technology has therefore placed new demands on surgical educators as to how best to teach their residents on the use of such equip-

TABLE 2. Test Scores Before and After the Teaching Session

	Mean	Median	Mode	Standard Deviation	Range	Minimum	Maximum
Pretest	10.62	10.00	8	2.282	7	8	15
Posttest	15.38	16.00	16	1.745	8	11	19
Prelinear stapler subgroup	3.46	3.50	4	0.905	3	2	5
Precircular stapler subgroup	3.46	4.00	4	1.334	5	1	6
Pre-endoscopic stapler subgroup	3.69	3.50	3	1.258	5	1	6
Postlinear stapler subgroup	4.62	5.00	4	0.637	2	4	6
Postcircular stapler subgroup	5.81	6.00	6	0.849	3	4	7
Postendoscopic stapler subgroup	4.96	5.00	6	1.038	3	3	6