



# The growing use of robotics training in colorectal surgery: a pivotal point for assessment of outcomes

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While the advancement of laparoscopy has significantly increased in several areas of surgery, its utilization in some specialties, such as colorectal surgery remains low (1,2). In 2012, a previously published work reported about 60% of colon resections are performed laparoscopically in an elective setting, while utilization of laparoscopy for rectal surgery was ranged from 19–37% depending on the hospital setting (3). The adoption of minimally invasive robotic techniques, however, has increased significantly and has been suggested to help overcome some of the limitations of laparoscopic surgery (4–6). In a previous study, after accounting for other variables, patients who underwent robotic-assisted colectomy had significantly lower rates of complications compared to those with laparoscopic procedures (6).

In 2011, Disbrow *et al.* created and implemented a standardized robotic training program for residents interested in colon and rectal surgery. In the October 2017 issue of *Journal of Surgical Education*, the authors published a study with the objective to assess the effect of the usage of this training curriculum. For this purpose, the authors surveyed all colon and rectal surgeons who have graduated residency from 2013 to 2016. The survey included 18 questions and was designed to determine the number of open and minimally invasive cases done during residency for those who participated versus those that didn't participate in the course. In addition, the questions were designed to determine barriers to training and practice patterns upon completion of residency.

The survey had a 43% response rate, and the majority

(nearly 80%) of responders participated in the robotic training course. During general surgery residency, 91.7% of surgeons were exposed to laparoscopic colorectal procedures and 50% performed more than 25 cases. During colorectal fellowship, all of the participants had laparoscopic training and 67% of them performed more than 50 cases. The authors state that respondents reported 84% of colectomy cases and 74.8% of rectal resections were being performed via an MIS approach, which is higher than previously reported (3). There was no difference between surgeons who participated in the training program and who did not participate when examining the laparoscopic approach for colectomies. However, there was a difference between the two groups in terms of preferred option for rectal resections, as the robotic approach was preferred for those surgeons who participated in the course. Unexpectedly, the proportion of the robotic rectal resection is higher compared to the colon resections without a concurrent decrease in laparoscopy, but a decrease in open procedure. Thus, the robotic approach can facilitate using minimally invasive approaches in challenging cases where laparoscopy can have its limitations.

When asked about potential barriers to using a robotic approach, the most common barrier was a surgeon preference of laparoscopy (28.8%), followed by inadequate robotic training (20.5%), inability to get console time (16.4%), no access to a robot at the current institution (16.4%). Other studies have evaluated barriers to robotic utilization, among surgeon preference due to lack of tactile sensation (7); expense of the robotic system, thus lack of

access (8); and increased cost of procedure without showing benefits (9).

The authors report several limitations, mainly revolving around the limitations to survey studies, including sample errors and responders' inaccuracies. In addition, the authors do recognize that while the robotic training program could have played a role in the participants current practice, this study cannot show a definite causative relationship. Other recent literature on the use of robotic techniques in colorectal surgery support the growing prevalence and safety of robotic colorectal surgery. Halabi *et al.*, in a nationwide analysis, noted an increase in robotic colorectal surgery over 2009–2010, with robotic approaches constituting 2.78% of all cases (5). This rate has been replicated in other nation-wide studies (10). Consistent with Disbrow *et al.*, Halabi and colleagues found that rectal cancer was also the most common indication for robotic surgery. Robotic surgery was also associated with an increased cost, higher rates of bleeding (for colon cases only), and lower rates of conversion to open compared to laparoscopy, but equivalent in terms of length-of-stay, morbidity, and leak rates (5). Other recent studies have shown that robotic approaches in abdominal and pelvic cases were associated with longer operative time but decrease length of stay (11).

In 2016, a roundtable consensus of experts in robotic surgery developed a three-step proposal for robotic colorectal surgery training, consisting of a basic training module, and advanced training module, and supervised clinical practice of increasing complexity (12). However, there have been few other studies on the training of surgeons in robotic colorectal surgery (13), most of which are small, single-institution case series (14–16). For example, Guend *et al.* examined the learning curve of colorectal cancer resections among surgeons at a single institution and determined that in order to establish a robotic colorectal surgery program, an average of 75 cases are needed to reach proficiency, with a shorter learning curve observed as the training program becomes more established (17).

Thus, the study by Disbrow *et al.* has important implications for the future of robotic colorectal surgery. First, it shows that MIS approaches to colorectal surgery have significantly increased and are higher than previously reported. There is a higher implementation of robotics in rectal resections, compared to colon resection. This suggests that recent colorectal fellowship graduates feel comfortable using robotic surgery for complex cases. Although the authors claim that this increase may have been impacted by the implementation of a national robotics

training program, this association is unclear. Further studies are needed to establish this relationship. Another impact of these findings is the need to assess the outcomes of the robotic, laparoscopic, and open cases done by this growing cohort of surgeons who have received robotic training during their colorectal fellowship. Future studies should focus on assessing not just the volume, but the quality of cases done by these different approaches.

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