



Operative choice for colon and rectal cancer: what matters?

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The article entitled “*Long-term outcomes of robot-assisted surgery in patients with colorectal cancer*”, published in the *Annals of Surgical Oncology*, is a timely analysis of oncologic outcomes comparing robotic and conventional laparoscopic techniques (1). Several other studies have demonstrated equivalent short-term outcomes between robotic and laparoscopic groups, including postoperative complications and hospital length of stay (2-5). However, long-term oncologic outcomes for the robotic approach have not yet been well evaluated. In this context, the authors should be congratulated for conducting a national study on this topic of great interest to cancer surgeons. While this is a retrospective cohort study, it is population-based, data are prospectively abstracted, and the authors have adjusted for important clinical covariates. They find that disease-free survival, all-cause mortality, and recurrence-free survival are comparable for the robotic and laparoscopic approaches for both colon and rectal cancer.

The authors were wise to analyze colon and rectal cancers separately, because rectal cancer treatment is inherently more complex, particularly in the surgical phase of care. There have been multiple randomized trials (RCTs) comparing rectal cancer surgical approaches. A recent systematic review revealed that most studies show comparable short- and long-term oncologic outcomes when comparing the open and laparoscopic approaches for rectal cancer (6). However, two of six RCTs showed that the laparoscopic approach was not noninferior to the open approach, based on a composite score that included total mesorectal excision (TME) grade, distal and circumferential margins (7,8). These studies suggested caution for the laparoscopic approach. However, the composite score was a

novel metric in these two trials not yet validated and there was no difference between open and laparoscopic groups in TME grade or margin status as individual outcomes outside of the composite score. Two-year oncologic outcomes were recently reported and there was found to be no significant difference between laparoscopic and open groups (9). The recently published ROLARR RCT comparing laparoscopic and robotic approaches for rectal cancer showed no difference in short-term outcomes between groups, including conversion (10). Long-term oncologic outcomes are pending for this trial. It will be interesting to see if the laparoscopic versus robotic results are comparable to the current Pinar study.

This new study by Pinar and colleagues adds important information to the literature on the two most commonly-used minimally-invasive options for colon and rectal cancer surgery—laparoscopic and robotic-assisted resection. Of course, there are practical issues to consider when assessing the value of an operative approach. Determining that one surgical option is better than the others and that surgeons should therefore adopt the surgical option found to be favorable in a study is not practical. Only 50–60% of colon cancer and 10–20% of rectal cancer resections are currently done by conventional laparoscopy because the operations are challenging (11,12). The skill set to perform laparoscopic low anterior resection for low and mid rectal cancers in patients having neoadjuvant therapy is not available to many surgeons. The imaging and ergonomic advantages of the robotic platform allow many surgeons to complete a minimally invasive operation that may otherwise be too difficult by the laparoscopic approach (2-5). For many, the robotic approach is for operations not able to

be performed laparoscopically by the operating surgeon. For others, both laparoscopic and robotic approaches are not part of their skill sets, and the best option is the open approach. Operative resection for rectal cancer requires advanced operative skills and adherence to oncologic standards for optimal outcomes regardless of operative approach. Until minimally invasive surgery (MIS) training efforts result in widespread adoption of MIS for rectal cancer, the emphasis should be on doing the operation well rather than doing it by a specific surgical approach.

This Danish study highlights the differences in national data resources and cancer management worldwide. European health care systems with national data registries can perform compelling, population-based studies like this one. Nationalized healthcare also positions nations such as Denmark to promote national practice standards to improve quality. Outside of the United States (US), regionalization for complex rectal cancer surgery has allowed fewer institutions with higher volumes to develop multidisciplinary expertise to provide high quality care. Here in the US, the medical culture is more individualistic, making standardization and regionalization more challenging. US hospital systems are focused on their monetary bottom line, and there is little incentive to regionalize care or otherwise cooperate regionally or nationally.

Leading US colon and rectal surgeons have recognized European and Canadian efforts to improve rectal cancer care, and have developed initiatives to standardize and improve quality for rectal cancer in this country. The National Accreditation Program for Rectal Cancer (NAPRC), developed through collaboration between the Optimizing the Surgical Treatment of Rectal Cancer (OSTRiCh) consortium and the American College of Surgeons Commission on Cancer (CoC), was designed with the goal of standardizing best practices for patients with rectal cancer using a multidisciplinary approach (13). The American Society of Colon and Rectal Surgeons Rectal Cancer Coordinating Committee meets regularly to discuss the same. The effort to standardize and teach total mesorectal resection across Sweden in 1994 demonstrated the feasibility of implementing best practices for techniques that impact disease-free survival and local recurrence (14). An effort analogous to this would be very challenging in the US without developing and promoting national guidelines and may be resisted by US surgeons accustomed to operating with techniques guided by “how I was trained”. For many, rectal cancer resection training is still by the open

approach. Increasing the adoption of MIS in the US may be best served by increasing MIS training efforts. Young fellowship-trained colon and rectal surgeons have adopted the robotic approach even more than the laparoscopic approach for rectal cancer, possibly due to the development and implementation of The National Colon and Rectal Surgery Fellowship Training Course in 2011 (15).

The cost of the robotic platform has limited widespread adoption for many colon and rectal surgeons. In a risk adjusted payer expense database study, our group showed that the laparoscopic approach for colorectal surgery is less expensive than the robotic approach. However, the significant difference in conversion rates for this study population (lap 15.1% *vs.* robotic 7.6%, $P < 0.001$) composed of real world surgeons with varying degrees of MIS expertise resulted in mitigation of the cost difference by 27%. In addition, both MIS approaches were less expensive than the open approach (16).

In conclusion, this nationwide cohort study of patients having colorectal cancer surgery between 2010 and 2015 finds no significant difference in oncologic outcomes when comparing laparoscopic and robotic-assisted surgical approaches. Currently, surgeons choosing surgical options will do so based on training, personal skill sets, practice “fit”, hospital resources, and cost. Large scale efforts that standardize operative, radiologic, and pathologic techniques and reporting may allow improved oncologic outcomes by any surgical approach. The future of MIS options—laparoscopic, robotic, or a novel yet-to-be developed MIS approach improving oncologic outcomes will depend on standardizing training efforts and increasing MIS adoption and expertise.

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to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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