Which is better, robotic or laparoscopic total mesorectal excision surgery? Does it really matter?

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The lead article "*Robotic-assisted total mesorectal excision (TME) for rectal cancer results in a significantly higher quality of TME specimen compared to the laparoscopic approach—report of a single center experience*" as published in the July, 2018 issue of *International Journal of Colorectal Disease*, illustrates the multiple issues confronting surgeons in the management of rectal cancer. The authors are to be congratulated on their excellent operative results; particularly in their robotic TME group where complete total mesorectal excision was achieved in >97% of their specimens (1). That said, this study raises more questions than it offers answers.

Some of the most influential studies in surgical literature, pertain to changing the platforms through which we operate. Landmark trials such as the CLASICC, COST and COLOR II trials, provided strong evidence in support of laparoscopic resection for the treatment colorectal cancer (2-4). In doing so these studies established that laparoscopy is a viable and practical means to provide sound oncologic treatment for our patients. As such, laparoscopy is now considered a standard of care for colon cancer, but while widely employed in rectal cancer, its role remains less clearly defined (5).

With respect to robotic surgery, there has been a steady and persistent increase in the utilization of this platform in recent years. From 2009 to 2010, the utilization of robotic surgery has increased across all hospital settings in the United States (i.e., urban, rural, teaching, non-teaching) (6). There has been a myriad of benefits offered in support of robotic surgery, including 3D optics, increased dexterity

provided by wristed instruments, and purported ease of use for both benign and malignant surgical disease (7). Additionally robotic surgery provides an ideal potential platform for applications of artificial intelligence (AI), advanced image guided surgery and potential safety attributes. While largely theoretical at present, together they offer exciting future possibilities. While some reports have shown robotic surgery to result in fewer conversions to open, and lower blood loss compared to Laparoscopic surgery, no other significant clinical differences between laparoscopic and robotic surgery were observed (8,9).

It is well recognized that robotic surgery is more expensive than conventional laparoscopy or open surgery (10-12). Furthermore, the cost of treatment will always factor into a patient's treatment plan and will surely influence how surgeons provide care to their patients. However, the cost of innovation is always initially high. We must first and foremost truly understand if a treatment is better, before we can apply economic evaluation to a therapy.

A major issue that comes to bear in considering rectal cancer surgery focuses around one central issue: rectal cancer surgery is difficult. Operating within the confines of the deep bony pelvis, with the field occupied by a malignancy, in an area where it is hard to see, and small amounts of blood make visualization problematic makes the entire endeavor challenging. Further, limits on reach for dissection and retraction are considerable. All of these factors combine to create a difficult environment for the

operating surgeon.

The proof of this obvious surgical reality, rests in the multitude of articles published in the last 15 years surrounding the optimization of first open, then laparoscopic, then robotic TME, and more recently, transanal TME (7,10,13,14). The reason all of these approaches have attracted such attention, is the underlying drive of the surgical community to make high quality rectal cancer surgery simpler and more easily attainable.

The disappointing reality with all of these approaches, is that they only serve to highlight the underlying notion, that the TME is a very difficult operation. No individual technique has emerged as being a hands-down improvement over its predecessor. Each approach has earned its supporters, who tout their benefits; both known and imagined. Open surgery allows for palpation of the tumor and application of a TA stapler in a single firing across the very distal rectum. Laparoscopic surgery trades tactile sensation, for the ability to visualize the pelvis in a manner never before seen in open surgery. Robotic surgery adds to this the benefits of 3D imaging, wristed instruments in the pelvis, and the ability for the surgeon to control three arms at the point of surgery. Transanal TME surgery allows for a direct approach to the most difficult aspect of the dissection, the distal dissection, at the beginning of the operation. This direct approach also has the advantage of providing excellent visualization.

The arguments submitted about which is the "better" operation in the above article, hearkens back to the days of debating the differences between hand-assisted, versus laparoscopic colorectal surgery. In that era, the real question should have surrounded how to teach the surgical community to perform minimally invasive rather than open colon surgery, not if hand-assisted was better or worse than laparoscopic colon surgery. In a similar fashion, with the differences between laparoscopic and robotic TME surgery less profound a protracted argument over which is the superior approach is misguided. The focus of the surgical community should be realigned. Despite the current evidence in the literature, MIS approaches to rectal cancer remained mired below 50%, more than 25 years following the performance of the first laparoscopic colorectal surgeries. The underlying issues remain the same. The most important thing for patients with rectal cancer, is to have access to surgeons who are well-trained in the techniques of total mesorectal excision. Whether the TME is accomplished in an open, laparoscopic, robotic or taTME fashion is secondary. That being said, the fact

that multiple authors have shown excellent outcomes for both laparoscopic and robotic rectal cancer surgery, argues for a movement to bring the benefits MIS to these patient groups (14-16). If the additional draw of robotic surgery to either patients or surgeons, offers a way to move the needle forward, in terms of expanding the adoption of MIS approaches for rectal cancer patients around the globe, this would clearly be to their advantage. As a surgical community, if we could focus on training to optimize surgical practice, first around the principles of TME surgery, then on how to train in each platform, this would represent a momentous accomplishment with great benefit.

In this paper, with both study groups having greater than 4 years of post-operative surveillance, it was interesting to see that while the quality of the TME is different between both groups, the local recurrence rate is a phenomenally low, at two patients between both robotic and laparoscopic cohorts (1). Ultimately, local recurrence and survival are what surgeons and patients are most concerned with, not TME specimen quality, and there was no difference in the robotic and laparoscopic groups.

The dictum "if all you have is a hammer, all the world is a nail", is apropos in surgery. Too often the surgeon's comfort or inexperience with a procedure, is translated into a declarative statement regarding the virtues or vices of an operation. Having been trained in, and originally performing only open TME surgery, then having done over 1,000 laparoscopic rectal procedures, 300 robotic rectal procedures and 100 transanal TMEs, I feel comfortable utilizing each of these approaches. To me, each of these techniques and platforms has their own pros and cons, which are both inherent and will vary depending upon the performing surgeon's experience and skill set.

I don't think any trial is going to determine which approach is superior; the differences are simply not that great. The resources required to design and implement an investigation tailored towards answering these specific questions would be a substantial undertaking, which is unlikely to be cost-effective, or yield definitive results, without extraordinarily large numbers. Additionally, any comparison study will be subject to the criticism that the operating surgeon was more comfortable with, or better at one of the operations; either robotic or laparoscopic TME. Because at this point in time, few rectal cancer surgeons possess true clinical equipoise on this issue. Resources for this type of trial, would be better allocated towards establishing and implementing large scale training and clinical mentorship programs in open, laparoscopic, robotic

and transanal TME surgery.

Most importantly, the individual surgeon must endeavor to achieve a high level of competency in one or several of these TME techniques, so the patient can benefit from an optimal cancer operation. Lowering morbidity, decreasing local recurrence rates and increasing overall survival, represent the optimal goals for surgeons and their patients. Robotic and laparoscopic TME offer wonderful opportunities to accomplish these ends.

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Footnote

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