Editorial

Post-operative outcomes in robotic and laparoscopic colorectal surgery

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Comment on: Feinberg AE, Elnahas A, Bashir S, *et al.* Comparison of robotic and laparoscopic colorectal resections with respect to 30-day perioperative morbidity. Can J Surg 2016;59:262-7.

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I am pleased to comment the article entitled "Comparison of robotic and laparoscopic colorectal resections with respect to 30-day perioperative morbidity" by Feinberg and colleagues (1). This is a retrospective study about robotic and laparoscopic colorectal procedures based on the American College of Surgeons National Surgical Quality Improvement Program database (ACS-NSQIP), a validate program that prospectively collects perioperative data from North America hospitals and abroad (2,3). The authors have selected patients underwent to robotic or laparoscopic colorectal procedures, excluding open approaches and abdominoperineal resections. They also performed a subgroup analysis for rectal resections only. The main outcomes of the study included operative time, conversion rate, blood transfusions, post-operative complications, length of stay, readmissions, reoperations and 30-day mortality. A total of 472 robotic and 8,392 laparoscopic colorectal resections were included in the study. No differences were found respect to age, gender, body mass index, comorbidities, functional status, operative time, blood transfusions and postoperative complications between the two groups. In the robotic group there was slightly more incidence of cancer diagnosis compared to laparoscopy and lower incidence of open conversion rate. In the subgroup analysis of rectal resections a total of 79 robotic and 1,370 laparoscopic procedures were included. The two groups were comparable with respect to all the variables analyzed, except for postoperative ileus, which resulted with a lower incidence in the robotic group. The authors performed a multivariate analysis in order to identify independent variables associated with open conversion rate. Male sex, colon cancer, Crohn's disease and diverticular disease were all identified as risk factors for open conversion, whereas robotic surgery was found to be a protective factor for open conversion compared to laparoscopy.

Colorectal surgery has undergone a remarkable evolution in the recent decades with the introduction of minimally invasive techniques. This innovation was possible thanks to the continuous technologic evolutions in the medical and surgical fields. Several studies with different opinions about the best treatment options have been published over the years, in order to search a validation in terms of oncologic appropriateness. However, the world literature recently produced, appears unanimous on the appropriateness of the minimally invasive techniques, especially for procedures performed at referral centers and by experienced surgeons. Laparoscopic surgery has been demonstrated to be a safe and feasible technique, though it is affected by some limitations. To overcome its disadvantages, the robotic systems have been introduced in the surgical practice, with successfully application to several types of operations. The first use of the robotic approach in colorectal surgery was described in 2002 (4). Subsequently, several authors have reported their experiences, underlining the advantages and the drawbacks of this type of approach, with often conflicting results (5-7).

One of the most described advantages of robotic surgery is the minor incidence of conversions to open surgery, compared to laparoscopy (8). In the article by Feinberg *et al.* (1), the authors confirmed this result, with a significant decreased incidence of conversion in the robotic group (9.53% *vs.* 13.72% in laparoscopy, P=0.008). This result is

similar to those reported in literature, with described values around 9–10% for robotics and 13% for laparoscopy (9). However, this finding has not been confirmed in the subgroup analysis of rectal resections. A similar result has been shown by the preliminary data of the RObotic Versus LAparoscopic Resection for Rectal Cancer (ROLARR) trial, with no significant advantage of the robotic system in terms of conversion rate (10). Furthermore, the authors performed a multivariate analysis in order to overcome the potential selection bias of the study. They evidenced that different factors could be independently associated with unplanned conversions, like male sex, malignancy and inflammatory bowel disease of the colon.

In the study by Feinberg *et al.* (1), no difference in operative time was found between the two groups. This is an interesting result, since one of the most important limitations of the robotic approach described in literature is the prolonged operative time compared to laparoscopy. This factor is explained by the need to dock and undock the robotic system during the procedures, in order to reach the correct position for every surgical step and, obviously, this is time consuming (6). Even in the rectal resections analysis no difference in terms of operative time was evidenced. This is a great result, showing that the standardization of the surgical procedures and the continuous training of the surgical staff with increasing experience in this field can improve the outcomes, leading to a progressive reduction of the operative time. In fact, the higher duration of operations for the robotic approach has been reported in literature especially in case of early experiences (11).

Another important reported result of the study by Feinberg *et al.* (1), is the low incidence of postoperative complications, with no statistical differences in the two groups. In particular, in the rectal resections analysis, a significant lower incidence of postoperative ileus was found (3.8% *vs.* 11.18%, P=0.039). The unplanned reoperation, which reflects the major complications rate, were similar in the two groups (4.87% *vs.* 4.6%, P=0.74), even in the rectal resections (6.33% *vs.* 5.4%, P=0.62), showing the safety of the two approaches. These results are inferior to those published by other authors, which can reach 11.5% in robotic surgery and 12.4% in laparoscopy (12,13).

There are several limitations in the study, and the authors describe them carefully. First of all it is a nonrandomized retrospective analysis, with different selection biases. In particular, no selection of the patients was carried out, and they were treated in robotics or in laparoscopy without selection criteria, maybe on the basis of the experience of each surgeon or, most likely, on the basis of the difficulty of the cases individually. In particular the surgeon experience is an important factor to consider, because it can influence the surgical outcomes, especially in terms of open conversions and surgical complications. Moreover there is no description of the surgical technique used for each operation, and possible variations could be included in every procedure, in particular for some open steps. The authors attempted to minimize this bias excluding the procedures with a planned open phase, but inevitably the technical details of each operation could not be registered. Finally, the most important bias of this study is the inclusion of several types of procedures for different types of indications. The authors mixed benign and malignant diseases, and in some cases this is an important limitation because strong differences could be present among the procedures. For example, a colonic resection could be very different if it is carried out for benign disease, such as diverticulitis or inflammatory bowel disease, and for cancer. In the latter, an accurate oncologic resection should be performed, with complete mesocolic excision and lymphadenectomy and with proper margins. Moreover, in case of benign disease a large variety of procedures could be performed, like extended colonic resections in case of inflammatory bowel disease, or like the execution of a diverting stoma in case of diverticulitis. Even in the groups of rectal resections there is no mention about the ileostomy, which often is carried out in these cases and that could be an important bias, especially for the evaluation of the operative time and complications. Furthermore, important operative differences could exist among the procedures, even for the same indication. Indeed, a transverse colonic resection could be very different from a right or left resection, especially in terms of operative time. After all, for the malignant diseases, the inclusion of oncologic outcomes like the number of lymph nodes excised or the tumor stage, would have been more interesting.

In conclusion this is an interesting report comparing robotics and laparoscopy in colorectal surgery. The results of this study confirm some advantages of the robotic approach, especially in terms of postoperative complications. There is a significant report about the operative times, which resulted with no difference in the two groups. However, a proper selection of the cases and the need for a randomized trial could be advocated for a better study of the real benefits of the robotic system in colorectal surgery.

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Footnote

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