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LETTER TO THE EDITOR

Benefits of minimally invasive surgery in the treatment of gastric cancer

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Abstract

We read with great interest the article that retrospectively analyzed 814 patients with primary gastric cancer, who underwent minimally invasive R0 gastrectomy between 2009 and 2014 by grouping them in laparoscopic *vs* robotic procedures. The results of the study highlighted that age, American Society of Anesthesiologists status, gastrectomy type and pathological T and N status were the main prognostic factors of minimally invasive gastrectomy and showed how the robotic approach may improve long-term outcomes of advanced gastric cancer. According to most of the current literature, robotic surgery is associated with a statistically longer operating time when compared to open and laparoscopic surgery; however, looking at the adequacy of resection, defined by negative surgical margins and number of lymph nodes removed, it seems that robotic surgery gives better results in terms of the 5-year overall survival and recurrence-free survival. The robotic approach to gastric cancer surgery aims to overcome the difficulties and technical limitations of laparoscopy in major surgery. The three-dimensional vision, articulation of the instruments and good ergonomics for the surgeon allow for accurate and precise movements which facilitate the complex steps of surgery such as lymph node dissection, esophagus-jejunal anastomosis packaging and reproducing the technical accuracy of open surgery. If the literature, as well as the analyzed study, offers us countless data regarding the short-term oncological results of robotic surgery in the treatment of gastric cancer, satisfactory data on long-term follow-up are lacking, so future studies are necessary.

Key Words: Gastric cancer; Robotic gastrectomy; Laparoscopy; D2 lymphadenectomy; Long-term outcomes; Morbidity

Core Tip: Laparoscopic and robotic approaches are compared in the treatment of gastric cancer focusing on the prognostic factors as well as the oncological benefits brought about. While the long-term outcomes of laparoscopic surgery have been increasingly cited in recent years, only a few studies have analyzed the long-term results of the robotic approach, underlining the importance of future studies. A relevant aspect of robotic gastrectomy is the possibility to perform a more accurate lymph node dissection, which results in a longer survival with advanced gastric cancers.

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TO THE EDITOR

We read with interest the Nakauchi *et al*[1] study, which retrospectively examined 814 patients with primary gastric cancer undergoing a minimally invasive R0 gastrectomy, between 2009 and 2014 in Kanazawa (Japan), comparing the laparoscopic and robotic approach and looking at the 5-year overall survival (OS) and recurrence-free survival (RFS). We were pleased to see from the results of the study that the robotic approach could improve the long-term outcomes of advanced gastric cancer. The authors observed that the robotic approach led to significantly better RFS compared to the laparoscopic one in patients with p-Stage II/III tumors, although no significant difference in OS was detected, nor in OS and RFS in p-Stage patients treated with laparoscopy or robotics.

The study also revealed that age > 65 years, American Society of Anesthesiologists physical status 3, total or proximal gastrectomy, and disease status T4 and N positive, are all independent prognostic factors[1]. Since gastric cancer is the fifth most common malignancy in the world and the third cause of cancer death, it is worth it to identify the most appropriate technical approach for this disease being minimally invasive surgery the standard approach for several GI surgery procedures[2,3].

Surgical treatment remains the only therapeutic option with curative intent. Total or subtotal gastrectomy, associated with D2 lymphadenectomy, represents the therapeutic gold standard for gastric cancer. We must acknowledge that the traditional surgical approach, open surgery, remains the most widespread surgical technique. Although, laparoscopy has become almost constant in general surgery, the use of the laparoscopic technique for gastric surgery is yet scarce in the case of malignancies. As supported by various authors, laparoscopy has several technical drawbacks and limitations, including two-dimensional vision, stiffness of instruments, limited range of motion, amplification of hand tremors and uncomfortable surgical placement which makes some fundamental surgical steps, such as D2 lymphadenectomy, extremely complex[2,4].

According to the paper discussed, the pN factor is strongly associated with survival after gastric cancer treatment, confirming the thesis that laparoscopy in gastric cancer is more adequate in the earlier stages. In contrast, the safety and oncological adequacy of laparoscopic-assisted radical D2 gastrectomy for advanced gastric cancer are still under discussion[5]. From the meta-analysis, it emerges that the main variables associated with a statistically significant advantage of laparoscopic technique over open surgery are represented by: Reduced blood loss, lower complication rate, faster recovery and reduced pain at the expense of a longer surgical time and fewer lymph nodes removed, therefore a potential worse local control of the disease[6,7].

Alongside laparoscopy, robotic technology allows us to overcome the technical difficulties of laparoscopy, thanks to the three-dimensional vision, instruments' articulation and greater ergonomics for the surgeon, offering a better therapeutic approach to the minimally invasive treatment of stomach tumors. Thus, the short and medium term results of robotic gastric surgery can be almost compared with open and laparoscopic procedure when taken into account surgeon experience and technical implementation of the robotic system.

We fully agree with the authors, who have shown a significantly lower morbidity in the group of patients treated with robotics than in the laparoscopic group, as widely discussed in many studies. A recent meta-analysis, which compared laparoscopy with robotics in the treatment of gastric cancer, highlighted that the robotic approach appears to achieve better surgical results in the short term, also thanks to the ability to recover a greater number of lymph nodes, namely lymph nodes in station n. 7, 8a, 9 and 11p, which are avowedly more difficult to reach, ensuring a more appropriate staging and chemotherapy plan[8].

A study conducted in Japan reported, among the advantages of robotic surgery, a lower intraoperative blood loss, with a consequent reduction in the dissemination of cancer cells in the peritoneal cavity during surgery and, therefore, a better prognosis. Another aspect highlighted is a lower risk of dehiscence of the esophagus-jejunal anastomosis, along with a lower incidence of internal hernias[9-11]. From the short-term results it emerges that robotic gastrectomy is a safe technique that potentially allows to extend the number of patients treatable with a minimally invasive approach, overcoming the technical difficulties of laparoscopy, offering some benefits in terms of blood loss, conversion rate, overall number of lymph nodes removed and in suprapancreatic areas, procedure-specific postoperative morbidity and shorter length of hospital stay[12].

Robotic gastrectomy is a safe and effective surgical technique when performed by experienced surgeons, however, it is associated with a longer operative time and a higher economic value than laparoscopic and open approaches[13,14]. Indeed, one of the factors that slows down the spread of robotic surgery is the particular technical expertise required while handling the robotic devices, resulting in a steeper learning curve for the specialized operator. The cost and longer timeframe of robotics make future studies necessary[15], as well as the need for randomized controlled trials comparing the two techniques with a long-term follow-up, on which publications are still scarce given the relatively recent diffusion of the technique[16].

Given the greater cost of robotics, we want to underline one of the limitations of the study discussed here, represented by possible errors in the selection of patients. The availability of robotic devices is strongly dependent on the wealth of the country and of the individual; both patients who are aware of the advantages of the robotic approach and experienced surgeons who are able to perform this novel technique could lead to an overuse of the technique. In Western countries, robotic devices are associated with longer operative time, and higher costs but fewer post-operative complications resulting in lower hospitalization costs, and shorter hospital stays[17].

In conclusion, the study discussed here provides valid results on the correct therapeutic management of patients with gastric cancer, with the aim to bridge over some of the difficulties and technical limitations that laparoscopy encounters in major surgery. Essentially, laparoscopic D2 lymphadenectomy remains a challenging procedure: In particular, the dissection of the lymph nodes along the celiac, hepatic and splenic arteries makes this approach technically complicated and time-consuming even for well-trained surgeons. It is in this context that robotic surgery is worth looking at and it represents a useful tool that overcomes some limitations of conventional laparoscopic techniques, even if greater surgical and anesthetic times and the higher costs have to be considered when compared to open surgery.

Although, in accordance with the international literature that ascribes better results to robotic surgery in perioperative outcomes in terms of blood loss, and postoperative complications, future studies of higher quality are necessary due to the lack of data on long-term results, given the relatively recent diffusion of the technique. In a long-term perspective, considering the need for further studies on larger samples of patients from Western countries, we believe that robotic technology for gastric cancer surgery, taking into account the many advantages it offers, can become a gold standard[18].

FOOTNOTES

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