

Laparoscopic total gastrectomy: further progress in gastric cancer

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Gastrectomy with extended D2 lymphadenectomy preserving the spleen and pancreas has been the standard approach for distal gastric cancer. However, for proximal advanced (>T2) tumors, splenectomy usually is performed to dissect the splenic hilum (no. 10) and lymph nodes along the splenic artery (no. 11). The risk of residual positive lymph nodes at these nodal stations (nos. 10 and 11) is calculated to be approximately 15 and 25%, respectively. The pancreas should be preserved except when achievement of a complete tumor resection (R0) requires distal pancreatectomy [1–9].

This surgical strategy has become the preferred procedure for open surgery. What about laparoscopic surgery for tumors located in the proximal or middle third of the stomach? Laparoscopically assisted distal gastrectomy has been performed widely in Asian countries [10], and more currently, totally laparoscopic distal gastrectomy without minilaparotomy is performed even in the West [11] for distal gastric cancers. But is laparoscopic total gastrectomy technically feasible and safe? Should the spleen be preserved or resected with the laparoscopic approach?

Sakuramoto et al. [12] have provided useful data for approaching these questions. Between 2004 and 2007, these authors performed pancreas- and spleen-preserving

total gastrectomy with D1+beta or D2 lymph node dissection and Roux-en-Y reconstruction for 74 patients with cancer located in the upper or middle third of the stomach. Of these 74 patients, 30 underwent laparoscopically assisted total gastrectomy (LATG), and 44 underwent open total gastrectomy (OTG). Although the operating time was longer by 95 min for LATG than for OTG ($p < 0.001$), blood loss less ($p < 0.001$) and the hospital stay was significantly shorter, by 5 days ($p < 0.05$), in the LATG group than in the OTG group. The number of lymph nodes harvested was high not only in the OTG group ($n = 51$) but also in the LATG group ($n = 43$). Given that anastomotic leakage, abdominal abscess, and pancreatic leakage occurred for 6 patients (13.6%) in the OTG group but for none of the 30 patients in the LATG group, the authors conclude that LATG is superior to OTG for proximal or middle-third tumors because it provides better quality of life (QOL) and fewer complications.

This study [12] supports the conclusion that not only laparoscopic distal gastrectomy but also laparoscopic total gastrectomy is technically feasible, safe, and effective. The results of laparoscopic spleen-preserving total gastrectomy are excellent. Minimal postoperative morbidity and a high number of lymph nodes dissected and examined certainly reflect surgeons and hospitals performing a high volume of laparoscopic gastrectomies. We discuss only some oncologic principles.

The authors carefully selected the patients for laparoscopic surgery, including mostly those with early-stage disease. Nevertheless, spleen preservation for patients with advanced serosa-positive (T3) and node-positive disease is associated with a substantial risk of splenic hilum-positive lymph nodes. Thus, preservation of the spleen may be with increased risk of residual disease in these nodes (station no. 10), nodal recurrence, and death. Despite efforts, it

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currently is impossible to predict nodal status among patients with advanced proximal gastric cancer, and splenectomy is perhaps suggested.

Can serious postoperative complications be reduced by laparoscopic rather than open total gastrectomy? It is difficult to answer from this relatively small retrospective study. Randomized controlled trials comparing open and laparoscopic total gastrectomies is the gold standard for assessing the impact of laparoscopic surgery in terms of both postoperative complications and oncologic outcomes.

What is the next step? Totally laparoscopic total gastrectomy by laparoscopic or robotic surgery avoiding minilaparotomy will be feasible in the near future. Indeed, because experience with laparoscopic technique is rapidly growing and technology is quickly refined, totally laparoscopic gastrectomy either as total gastrectomy for proximal tumors or distal gastrectomy for distal tumors will be widely used.

Although QOL improvement is rapid, overall survival and cure rates have improved only modestly. Despite standardized D2 gastrectomy and adjuvant pre- or postoperative chemotherapy and radiotherapy, the absolute overall survival benefit is limited, and many Western patients with advanced resectable tumor still die of the disease [13–18]. Efforts are underway to improve molecularly targeted therapy beyond its current effectiveness by developing robust markers to tailor targeted therapy for individuals most likely to respond to this therapy [19, 20].

The advent of the next-generation technologies has revolutionized scientific thinking and research in cancer [21–28]. We have started to understand complex molecular mechanisms underlying cancer and the tremendous complexity of multiple interacting genes and proteins as well as the interactions between environmental exposures and small molecules [21]. An exiting research road has already been opened for more effective molecular targeting therapy and personalized cancer medicine [29–37]. However, laparoscopic or robotic gastrectomy for improving QOL is already here to stay as the treatment of choice in both the East and the West.

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