

Laparoscopic D2 distal gastrectomy for advanced gastric cancer: a myth or a reality?

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Dr. Hu and associates (1) have published a randomized controlled trial (RCT) analyzing the safety and efficacy of radical laparoscopic and open distal gastrectomy (LG) with D2 lymphadenectomy for the treatment of advanced gastric cancer (AGC). The trial was conducted between September 2012 and December 2014 recruiting 1,056 patients with clinical stage T2-4N0-3M0. There were 528 patients in both groups. There were 15 experienced Chinese surgeons who participated in the RCT. The primary end points were morbidity and mortality within 30 postoperative days. The only complication that almost reached statistical significance in favor of open procedure was that of anastomotic leakage. Based on Clavien-Dindo classification, both groups were equivalent in their outcome. If one looks at the operating time, this was significantly longer in the laparoscopic group; however the blood loss was significantly less in the laparoscopic group. Postoperative variables such as time to first liquid intake and hospital stay favored the laparoscopic group but not by a large margin. The authors concluded that these results attest to the safety of LG with D2 lymphadenectomy for AGC by experienced gastric surgeons at high volume tertiary referral centers.

Like the above trial, a vast majority of gastric cancer surgeries in Japan and South Korea are performed at high-volume institutions, where at least 200 gastric cancer surgeries per annum are undertaken. In this RCT, the eligibility criteria for surgeons performing either open or laparoscopic D2 gastrectomies were (I) surgeons selected from the members of the Chinese

Laparoscopic Gastrointestinal Surgery Study (CLASS) group who have performed at least 50 distal gastrectomies with D2 lymphadenectomy; (II) have performed at least 300 gastrectomies for patients with AGC annually at each institute; and (III) were determined to be qualified surgeons by the CLASS academic committee on the basis of the evaluation of unedited videos of both their open and laparoscopic gastrectomy with D2 lymphadenectomy procedures. In contrast, the majority of gastric cancer surgeries in the United States are not necessarily performed in high volume centers and such stringent criteria for performing gastric resection in routine clinical settings are never applied. A “high volume” institution in the United States has been defined in some studies as an institution performing more than 15–20 gastrectomies per year (2,3). So the questions remain, (I) will Western surgeons ever be able to attain this sort of experience in gastric resection in their life time even if they are based at high volume tertiary centers; (II) is their training as thorough for performing gastric resection; and (III) will they be able to achieve the same results as their counterparts in the east in a short period of time? The answer to these questions is obviously no. This is evident by the fact, that despite the performance of less extensive lymphadenectomies (i.e., either D1 or D1+) in the United States, surgical morbidity and mortality rates for gastric adenocarcinoma are generally much higher in the United States than in the east. Seoul National University Hospital performs almost 1,000 gastric cancer operations per year, and recently reported a morbidity rate

of 18% and mortality rate of 0.5% (4). In a prospective, randomized trial from 24 Japanese institutions of D2 versus extended para-aortic lymphadenectomy, the morbidity rate was 20.9–28.1%, and the mortality rate was only 0.8% (5). In the United States, single institution series have reported morbidity rates following gastrectomy of up to 40% (6). A recent review of Medicare records found that over 80% of patients were operated on at centers that performed 20 or less gastrectomies per year, with inpatient mortality rates from 4.1–9.5% depending on comorbidities (3). One needs to remember that these statistics are for open and not for laparoscopic resection which is technically far more demanding. Therefore, one has to applaud the postoperative morbidity rates of this RCT (1) which is 15.2% in the LG group and 12.9% in open gastrectomy (OG) group. The mortality rate was 0.4% for LG and zero for the OG. These statistics will be very difficult to replicate by Western surgeons simply because of the far lower incidence of gastric cancer and therefore lack of experience with laparoscopic gastric surgery and D2 lymphadenectomy for AGC in their part of the world. Additionally, the incidence of gastric cancer has been steadily decreasing in the last 4 decades in most Western countries, Japan and USA which will further hamper gaining surgical experience in gastric surgery in the future (7). The lack of surgical experience has an important implication in gastric surgery because Wu *et al.* (8) have found that surgical morbidity and mortality rates decrease only after 200 radical gastric resections.

The second important issue is that of lymphadenectomy in particular D2 dissection. The two terminologies which are commonly used in gastric lymph node dissection are (I) non-compliance i.e., performance of less dissection than specified; and (II) contamination i.e., performance of more extensive dissection than specified. The compliance rates of D2 lymphadenectomy in the present RCT were very high; 99.4% for LG and 99.6% for OG. Therefore, there was hardly any violation of the set protocol. If we look at some of the statistics from the Netherland's RCT (9) for open D1 *vs.* D2 lymphadenectomy, non-compliance occurred in 84% of D1 and D2 cases. Furthermore, contamination occurred in 48% of the D1 and 52% of D2 cases. The results showed substantial protocol violations by the surgical-pathologic teams due to extending or limiting lymphadenectomy; leading either to under treatment or over treatment in both the D1 and D2 groups and impacting both the short and long-term results. A recent Korean study (10) has suggested that at least 42 gastrectomies are required to improve lymphadenectomy skills and reduction in complications.

This implies that the superior surgical results reported in this RCT for D2 gastrectomy are achieved as a result of a greater degree of technical expertise in gastric surgery through increased exposure over a prolonged period of time, a task which may not be attainable by the western surgeon even in high volume centers where the limited case load is shared by a number of gastric surgeons. To put this in perspective, most of the high volume centers in Japan, China and Korea are performing at least 200+ D2 gastrectomies per annum on a conservative estimate. It will take a western surgeon at least 10 years or even more to accumulate that sort of experience.

The foregoing discussion begs the questions: should the western surgeons continue to undertake laparoscopic D2 gastrectomy with limited training and expertise in this area? The answer to the above question is yes, provided (I) all the cases of AGC are referred to well established high volume gastric surgical centers; (II) the cases should be performed by a limited number of well-trained gastric surgeons who are proficient in both open and laparoscopic D2 gastric resections; (III) the surgeons with gastric surgery should undertake at least 6 months sabbatical to some well reputed high volume eastern gastric centers to undertake extensive training in gastric surgery followed by an objective evaluation of their skills akin to that expected of CLASS surgeons and (IV) lastly on their return to their home country, these surgeons should operate with a more senior gastric surgeon, with their results audited at monthly intervals to access their morbidity and mortality data. Certainly there is now ample evidence that D2 gastrectomy prolongs the survival of AGC and that laparoscopic surgery produces equivalent if not better results to open resection.

In the 21st century, it is hoped that national guidelines will be devised and implemented to improve the care of AGC patients. It is no longer acceptable, based on the data produced in the east, that a practicing general surgeon in a low volume “gastric resection center” should be permitted to continue to undertake occasional gastrectomy and less than D2 lymphadenectomy; even going so far as to say, that to do so, falls below a safe standard of care.

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Footnote

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