

Laparoscopy-assisted D2 gastrectomy plus laparoscopic bursectomy in locally advanced gastric cancer patients

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Abstract: Laparoscopy-assisted gastrectomy has been well practised in eastern countries for early gastric cancer. A Japanese trial on bursectomy has demonstrated the trend of improving long-term survival outcomes in serosa-positive gastric cancer patients. We have preliminarily investigated and documented the feasibility and safety of laparoscopic bursectomy in laparoscopy-assisted D2 gastrectomy for locally advanced gastric cancer. However, in spite of this, this technique is still quite controversial and requires further high-qualified trials due to inadequacy of long-term outcomes.

Key Words: Gastric cancer; laparoscopy; bursectomy; lymphadenectomy; surgery



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Laparoscopy-assisted gastrectomy for gastrectomy cancer has started more than 20 years and been well spread and developed in Mainland China for nearly a decade (1,2). In Japan and Korea, the stage I diseases compose more up to 50-60% in population and laparoscopy-assisted gastrectomy has been well accepted for predictive early gastric cancer (3,4). According to the latest treatment guideline by Japanese Gastric Cancer Association, most of the GI surgeons accepted the selected candidates with early diseases to be considered for laparoscopic surgery. However, in China, the majority of gastric cancer is advanced diseases, while by many high-volume hospitals' experiences the proportion of early gastric cancer is only 10-20% in operated patients. Thus the stage I diseases only composed of 30% in laparoscopic surgeries in Mainland China, and D2/D2+ lymphadenectomy was performed in 69% laparoscopy-assisted gastrectomies (2).

Interestingly, among previous Chinese literatures, the reported incidences of complications (10.9%), mortality (0.4%), reoperation (1.1%) and conversion-to-open (4.1%) were similar with those among Japanese and Korean reports (2,5). The Chinese Laparoscopic Gastric Surgery Study (CLASS) group was established at

2009, and numerous Chinese laparoscopic GI surgeons were participated in and aimed to promote the level of Chinese studies on laparoscopic gastric surgery (2). As known, previous evidence based on open surgery indicated the D2 lymphadenectomy as a standard procedure for resectable advanced gastric cancer patients in common practice (6,7). What's more, for locally advanced gastric cancer, laparoscopy-assisted distal gastrectomy plus D2 lymphadenectomy was demonstrated to be a technically feasible and safe procedure by experienced hands (8,9). However, by now, we are still lack of the data of long-term survival outcomes by laparoscopy-assisted gastrectomy for advanced gastric cancer. After a multicenter retrospective case control study, CLASS group started its first multicenter randomized controlled trial "Multicenter Study on Laparoscopic Distal Subtotal Gastrectomy for Advanced Gastric Cancer (CLASS-01)", to compare long-term outcome (3-year overall survival and recurrence outcomes) between laparoscopic and open distal subtotal gastrectomy with D2 lymphadenectomy for locally advanced gastric cancer patients (10).

Many GI surgeons are familiar with and practise the surgical technique of bursectomy for advanced gastric



Video 1 Laparoscopy-assisted D2 gastrectomy plus laparoscopic bursectomy in locally advanced gastric cancer patients

cancer. Nevertheless, there is still the controversy on bursectomy whether it could bring survival benefits to advanced gastric cancer patients. Japanese Gastric Cancer Association only recommended it as an under-investigated technique for the serosa positive (sT4a) patients, but not for sT1-2 diseases (11). The major risk of bursectomy should be the potential iatrogenic injury of colonic vessels or pancreatic solid. Therefore, it's easy to understand that bursectomy is complex and difficult to be performed in laparoscopic gastric cancer surgery.

A Japanese multicenter randomized trial involving 11 hospitals and enrolling 210 sT2-4aN0-1 resectable gastric cancer patients compared bursectomy to conventional non-bursectomy procedure (12,13). As its reports, the overall postoperative complication rates were 14.4% and 14.2% in bursectomy and non-bursectomy groups, respectively. The risks of pancreatic fistula were rare around 2.9% and 6.6%, respectively. Its interim analysis showed that bursectomy group had a trend of lower peritoneal recurrence (8.7% *vs.* 13.2%). Survival curvature analysis also showed a trend of better 3-year overall survival rate of bursectomy group in serosa-positive subset (69.8% *vs.* 50.2%, $P=0.081$) (12,13). Therefore, this trial demonstrated that bursectomy might be feasible and safe, as well as with potential of improving long-term survival outcomes. Another high-qualified multicenter randomized trial (JCOG-1001) has launched from 2010 to enroll 1,000 sT3-4sa patients till 2020. The later one may give more robust evidence on estimating the surgical technique of bursectomy.

Therefore, based on the background stated above,

we thought of the feasibility and safety of laparoscopic bursectomy and performed a preliminary study to investigate its feasibility and safety of complete bursectomy in laparoscopy-assisted gastrectomy for advanced gastric cancer. It meant based on laparoscopy-assisted gastrectomy plus D2 lymphadenectomy, additional laparoscopic bursectomy required complete dissection of anterior layer of transverse mesocolon and pancreatic capsule. Finally, we reported 16 patients (7 distal and 9 total gastrectomies) with resectable advanced gastric cancer underwent complete laparoscopic bursectomy (*Video 1*) from Jan 2011 to Apr 2012 (14). There was no incidence of intraoperative vascular or visceral injury, and also no case converted to open surgery or died. The length of laparoscopic bursectomy was 45.3 ± 20.1 min, and mean total operation time was 287.3 ± 31.2 min, which was even shortened against that in our earlier stage of learning curve without bursectomy (293.5 ± 31.6 min) (14,15). Mean volume of blood loss was 75.5 ± 12.3 mL and mean postoperative hospital stay length was 11.3 ± 6.0 d (4-32 d) (14). The overall complication rate was 31.3%, concerning 6.3% peritoneal cavity infection, 6.3% wound infection, 12.5% pneumonia and 6.3% urinary tract infection (14). Besides, there was no case of pancreatic fistula, anastomotic leakage and adhesive intestinal obstruction. Laparoscopy-assisted D2 gastrectomy plus bursectomy for advanced gastric cancer appears feasible and safe.

Through our experiences, firstly, we believe well understanding the anatomy of bursa omentalis and the extension of complete bursectomy (inner layer) must be most important. The difficulty of laparoscopic bursectomy should be the dissection of anterior layer of transverse mesocolon and pancreatic capsule. Secondly, the operator needs a large amount of experiences of laparoscopic gastric cancer surgery to avoid iatrogenic injury of colonic vessels and pancreas solid. Thirdly, the team work should be paid enough attention to, so that both assistant and camera holder are required to well understand the operation procedure and practical anatomy. Especially, the assistant must try to expose the potential or masked space appropriately for the sake of facilitating operator to identify important structure correctively.

Additionally, yet, we should learn that there were some retrospective studies not to support the survival benefits of bursectomy. Yoshikawa T *et al.* found that in a serosa-positive series, bursectomy didn't have better 3-year and 5-year survival outcomes in posterior wall invaded group than those in others (16). Kochi M *et al.* reported 254 consecutive series of stage IA to IIIC diseases, and the 5-year

overall survival rate was 85.8% in the bursectomy group and 80.8% in the nonbursectomy group (hazard ratio =0.82; 95% CI, 0.37-1.74, P=0.60) (17).

In a short, the laparoscopy-assisted D2 gastrectomy plus complete bursectomy for locally advanced gastric cancer might be technically feasible and safe. However, in spite of this, this technique is still quite controversial and requires further high-qualified trials due to inadequacy of long-term outcomes.

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