Comparison of Laparoscopy-Assisted Distal Gastrectomy and Open Distal Gastrectomy for Early Gastric Cancer

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In recent years, laparoscopy-assisted distal gastrectomy (LADG) has become widely used for the treatment of early gastric cancer. In our hospital, LADG has been performed in 53 patients since it was adopted in November 2006. In the present study, we compared 45 of these LADG patients with T1N0M0 stage IA early gastric cancer and 49 patients who underwent open distal gastrectomy (ODG) during the same period for cancer of the same stage. The compared outcomes included operative time, bleeding loss, and number of lymph node dissections, which reflected the surgical outcomes, as well as the times to first water intake, oral intake, flatus, and bowel movement, and blood test results white blood cell (WBC), C-reactive protein (CRP), which reflected the postoperative course. The length of postoperative hospital stay and complications were also compared. There were no significant differences in operative time or number of lymph node dissections between the groups, although blood loss was significantly lesser with LADG (p<0.05). There were no significant differences in postoperative course between the 2 groups. These findings suggest that LADG can be performed with the same level of safety as conventional ODG in cases of stage IA gastric cancer and that it may be recommended as the standard operative procedure in these patients.

Introduction

The first laparoscopy-assisted distal gastrectomy (LADG) in Japan was performed by Kitano et al. in 1991. At present, LADG for early gastric cancer is listed as “a procedure performed for clinical research therapy” according to the Japanese Gastric Cancer Treatment Guidelines (Japanese Gastric Cancer Association, 2010) and is assigned a “recommendation level of grade C” according to the Practice Guidelines for Endoscopic Surgeries (Japan Society for Endoscopic Surgery, 2008). This procedure is performed only in patients who meet the established criteria, receive an explanation of the procedure, and provide consent. Further accumulation of evidence and standardization of the procedure are expected in the future. We have performed LADG in 53 patients since this procedure was first adopted in November 2006. In the present study, we compared the clinical outcomes of LADG for pathological stage IA early gastric cancer between 45 of these patients and 49 patients who underwent open distal gastrectomy (ODG) during the same period to evaluate the safety and validity of LADG.

Subjects and methods

We retrospectively analyzed distal gastrectomies performed in 94 patients with early gastric cancer with a T1N0M0 clinical(c)-stage IA over 8 years (from July 2005 to June 2013). The surgical procedure was LADG in 45 patients and ODG in the other 49 patients.

The surgical indications for LADG at our hospital are gastric cancer of T1a (the exclusion criteria...
specified cancer suitable for endoscopic mucosal resection [EMR] and endoscopic submucosal dissection [ESD]), T1bN0M0 and c-stage IA according to the Japanese Classification of Gastric Carcinoma\textsuperscript{4}, in those who have no history of upper abdominal surgery. Post EMR or ESD cases one also included.

Surgical outcome was judged based on operative time, amount of blood loss, and number of lymph nodes dissected. The postoperative course was judged according to the times to first water intake, oral intake, flatus, and bowel movement; time to drain removal; blood test values (white blood cell [WBC], C-reactive protein [CRP]) ; and length of postoperative hospital stay and complications. Complications were defined as Grade II or higher according to the Classification of Surgical Complications (Clavien-Dindo classification)\textsuperscript{5}.

Statistical investigation of the 2 groups was performed using Mann-Whitney’s U-test with Stat View version 5.0 (Abacus Concepts, Berkeley, CA, USA). A difference of \(p<0.05\) indicated statistical significance. Continuous variables are expressed as mean values ± standard deviation (SD).

Surgical procedures

LADG and ODG are performed at our hospital as follows (numbers in parentheses are the number of dissected lymph nodes). Lymph node dissection of D1 (Nos. 1, 3, 4sb, 4d, 5, 6, 7) or D1+ (D1+ Nos. 8a, 9) was performed in accordance with the Japanese Gastric Cancer Treatment Guidelines\textsuperscript{4}.

1. LADG

Under general anesthesia, the patient was placed in a supine open-leg dorsoasacral position (both hands free) with feet slightly downward. After a pneumoperitoneum was established using the open technique, 5 ports were placed. Trocar placement consisted of: infraumbilical, 12 mm, with a small incision for the scope (also for the pneumoperitoneum): right upper abdomen, 5 mm; right lower abdomen, 12 mm; left upper abdomen, 11 mm; and left lower abdomen, 5 mm. The procedure was initiated by division of the greater omentum 4 cm from the gastroepiploic arcade toward the first branch of the short gastric vessel, which included lymph node nos. 4d and 4sb. Division of the gastrocolic ligament was continued distally toward the first portion of the duodenum using an ultrasonically activated device. The roots of the right gastroepiploic vessel and gastrocolic trunk were exposed by dissection through electrocautery. The right gastroepiploic vein and artery were individually divided after clipping to clearing lymph node no. 6. The duodenum was transected 1 or 2 cm distal to the pylorus using an automatic suturing device (Endo GIA\textsuperscript{TM} Ultra Universal Standard Stapler, 60 mm; Covidien, Mansfield, MA, USA). After the right gastric, proper, and common hepatic arteries had been exposed for clearing of the no. 5 and 8a lymph nodes, the right gastric artery was clipped. The left gastric vein and gastric artery were exposed and divided individually with clips to enable dissection of the no. 7 lymph node. Thereafter, the no. 1 and 3 lymph nodes were dissected and the upper third of the lesser curvature was skeletonized.

A 5-cm incision was then made in the upper abdominal midline. Through this mini laparotomy incision, the stomach was pulled out of the peritoneal cavity. The resection line of the stomach was determined by palpation to locate the preoperatively applied intragastric clips used to confirm the tumor location. The stomach was transected first from the greater curvature to the half point of the resection line using an Endo-GIA-60. After the resected stomach and lymph nodes were removed from the peritoneal cavity by mini laparotomy, intestinal anastomosis and reconstruction using Billroth-I (B-I) or Roux-en-Y (R-Y) reconstruction procedure were performed.

In the B-I procedure (hemi-double stapling technique) (Figure-1A), the anvil of an automatic
anastomotic device (DST Series™ EEA™ Staplers, 28 mm, EEA-28; Covidien, Mansfield, MA, USA) is attached to the stump of the cut duodenum through a small abdominal incision. Thereafter, the stomach is pulled outside the body, and the stomach including the lesion is resected on the pyloric side using the Endo-GIA-60. At that time, a cut is made from the lesser curvature side; moreover, a stoma of approximately 3 cm is made at the same site. The EEA-28 is inserted through this opening, a hollow shaft is pushed out from the stapled stump of the remnant stomach on the greater curvature side, and union is achieved using the previously loaded duodenal stump to obtain a mechanical anastomosis. After the absence of bleeding at the anastomotic site via the gastric lumen is confirmed, the remnant stomach EEA-28 channel is closed with the Endo-GIA-60. Buried sutures are used for the lesser curvature suture site stump.

In R-Y reconstruction (Figure-1B), the jejunum is cut 20 cm from the ligament of Treitz with the Endo-GIA-60. End-to-side anastomosis is performed at a site 25 cm from the remnant gastrojejunostomy. The jejunum is lifted using an anterior colon route and a side-to-side stapled anastomosis to the posterior wall of the greater curvature of the remnant stomach is performed. The anastomosis creates a stoma between a point approximately 1 cm orally from the greater curvature side of the remnant stomach and a site 6 cm from the elevated jejunum stump. An Endo-GIA-60 is inserted into the oral direction from both sites for the anastomosis. A closed drain is placed in the lesser curvature side of the anastomosis and the wound is closed.

2. ODG
An incision is made at the midline of the upper abdomen from just below the xiphoid process to the umbilical region and a typical distal gastrectomy with B-I reconstruction and D1 or D1+ dissection or R-Y anastomosis is performed. The anastomosis was made by hand-suturing with Albert–Lembert technique or mechanical suturing, which is similar to the suturing used was in LADG.

Results
Table-1 indicates the comparison of the background clinical factors (Table-1). With regard to the number of patients, 45 underwent LADG and 49 underwent ODG. The male–female ratios in LADG and ODG were 27/18 and 30/19, respectively, and did not significantly differ. The mean ages in the LADG and ODG groups were 64 years and 69 years, respectively, whereas the mean body mass indexes were 22.0 ± 3.2 and 20.6 ± 3.2, respectively; neither of these values showed significant intergroup differences. The tumor location was classified as either the middle- or lower-third portion of the stomach; the middle-third/lower-third location ratios in LADG and ODG were 29/16 and 38/11. Comorbidities were present in 13 patients (hypertension in 4, diabetes in 2, others in 7; 28%) of the 45 LADG patients and in 28 patients (hypertension in 14, diabetes in 6, others in 8; 57%) of the 49 ODG patients, which suggests a significant difference in the comorbidity rate.

The groups of 45 LADG patients and 49 ODG patients were compared. Among the surgical factors (Table-2), the operative time was 282 ± 59 min in the LADG group versus 263 ± 91 min in the ODG group, and the difference was not significant. However, blood loss was significantly lower in the LADG group (173 ± 143 ml) than in the ODG group (303 ± 276 ml). Of the LADG patients, B-I was performed in 37 (82.2%)
and R–Y was performed in 8 (17.0%) of the ODG patients, B–I was performed in 40 (81.6%) and R–Y was performed in 9 (18.3%) patients. LADG was converted to open surgery in 1 patient with a hemorrhage where bleeding control was difficult. The anastomosis suturing was classified as hand or mechanical. The anastomosis in was made mechanically in all cases of the LADG group. In the ODG

### Table 2 Comparison of surgical factors

<table>
<thead>
<tr>
<th></th>
<th>LADG (n=45)</th>
<th>ODG (n=49)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative time (min)</td>
<td>282 ± 59</td>
<td>263 ± 91</td>
<td>0.103</td>
</tr>
<tr>
<td>Blood loss (ml)</td>
<td>173 ± 143</td>
<td>303 ± 276</td>
<td>0.003</td>
</tr>
<tr>
<td>Reconstruction (cases)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Billroth I/ Roux-en-Y</td>
<td>37/8</td>
<td>40/9</td>
<td>0.940</td>
</tr>
<tr>
<td>Anastomosis Suturing (cases)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hand/ Mechanical</td>
<td>0/45</td>
<td>9/40</td>
<td>0.002</td>
</tr>
<tr>
<td>No. of lymph nodes dissected</td>
<td>26.4 ± 16.1</td>
<td>25.0 ± 15.5</td>
<td>0.606</td>
</tr>
</tbody>
</table>

ODG, open distal gastrectomy; LADG, laparoscopy-assisted distal gastrectomy

### Table 3 Comparison of postoperative blood test results

<table>
<thead>
<tr>
<th></th>
<th>LADG (n=45)</th>
<th>ODG (n=49)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC on POD 1 (/mm³)</td>
<td>8977.7 ± 2459.6</td>
<td>10326.5 ± 3021.3</td>
<td>0.024</td>
</tr>
<tr>
<td>WBC on POD 3 (/mm³)</td>
<td>8289.4 ± 2998.8</td>
<td>7476.9 ± 1632.4</td>
<td>0.250</td>
</tr>
<tr>
<td>WBC on POD 5 (/mm³)</td>
<td>6101.4 ± 2846.1</td>
<td>5759.5 ± 1632.4</td>
<td>0.675</td>
</tr>
<tr>
<td>CRP on POD 1 (mg/dl)</td>
<td>3.57 ± 1.99</td>
<td>5.98 ± 3.30</td>
<td>0.001</td>
</tr>
<tr>
<td>CRP on POD 3 (mg/dl)</td>
<td>9.75 ± 3.77</td>
<td>11.30 ± 6.52</td>
<td>0.530</td>
</tr>
<tr>
<td>CRP on POD 5 (mg/dl)</td>
<td>5.17 ± 4.07</td>
<td>5.68 ± 3.25</td>
<td>0.192</td>
</tr>
</tbody>
</table>

LADG, laparoscopy-assisted distal gastrectomy; ODG, open distal gastrectomy; WBC, white blood cells; POD, postoperative day; CRP, C-reactive protein

### Table 4 Comparison of postoperative results

<table>
<thead>
<tr>
<th></th>
<th>LADG (n=45)</th>
<th>ODG (n=49)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>First water intake (days)</td>
<td>4.1 ± 1.0</td>
<td>4.7 ± 2.2</td>
<td>0.254</td>
</tr>
<tr>
<td>First fluid intake (days)</td>
<td>5.2 ± 1.2</td>
<td>5.8 ± 2.5</td>
<td>0.334</td>
</tr>
<tr>
<td>First flatus (days)</td>
<td>3.7 ± 1.1</td>
<td>4.0 ± 1.3</td>
<td>0.400</td>
</tr>
<tr>
<td>First bowel movement (days)</td>
<td>4.6 ± 1.5</td>
<td>4.6 ± 1.6</td>
<td>0.927</td>
</tr>
<tr>
<td>Drain placement (days)</td>
<td>6.5 ± 2.0</td>
<td>7.2 ± 2.5</td>
<td>0.179</td>
</tr>
<tr>
<td>Postoperative stay (days)</td>
<td>14.1 ± 14.5</td>
<td>12.2 ± 5.0</td>
<td>0.233</td>
</tr>
</tbody>
</table>

LADG, laparoscopy-assisted distal gastrectomy; ODG, open distal gastrectomy

### Table 5 Comparison of postoperative complications

<table>
<thead>
<tr>
<th></th>
<th>LADG (n=45)</th>
<th>ODG (n=49)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of complications (Grade II* or higher)</td>
<td>5 (11%)</td>
<td>4 (8%)</td>
<td>0.627</td>
</tr>
<tr>
<td>Anastomotic stenosis</td>
<td>3 (6%)</td>
<td>2 (4%)</td>
<td></td>
</tr>
<tr>
<td>Anastomotic leakage</td>
<td>1 (2%)</td>
<td>1 (2%)</td>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
<td>1 (2%)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Anastomotic bleeding</td>
<td>0</td>
<td>1 (2%)</td>
<td></td>
</tr>
<tr>
<td>Ileus</td>
<td>0</td>
<td>1 (2%)</td>
<td></td>
</tr>
</tbody>
</table>

LADG, laparoscopy-assisted distal gastrectomy; ODG, open distal gastrectomy

*Classification of Surgical Complications (Clavien-Dindo classification)
group, anastomoses were sutured by hand in 9 (18.3%) and mechanically in 40 (81.6%) cases. The mean number of lymph nodes dissected was 26.4 ± 16.1 with LADG and 25.0 ± 15.5 with ODG; however, the difference in these values was not statistically significant.

When comparing the blood test results for WBC and CRP (Table 3) measured on postoperative days (POD) 1, 3, and 5, the WBC and CRP levels were found to be significantly lower on POD 1 in the LADG patients. When comparing postoperative outcome (Table 4), the times to first water intake, fluid intake (oral intake), flatus, and bowel movement, time to drain placement (removal); and length of postoperative hospital stay did not differ significantly.

Complications were seen in 5 (11%) of 45 LADG patients and in 4 (11%) of the 49 ODG patients; these values were not significantly different (Table 5). There were 3 cases of anastomotic stenosis and 1 case each of suture failure and pneumonia among the LADG patients, whereas there were 2 cases of anastomotic stenosis and 1 case each of suture failure, anastomotic bleeding, and ileus among the ODG patients. At present, there has been no port-site hernia or recurrence, and a surgical site infection was noted in only 1 patient in each group.

**Discussion**

The first LADG in Japan was performed more than 20 years by Kitano et al.\(^1\) in 1991; at present, this procedure is performed in many institutions. The results of national surveys presented at the 8th, 9th, 10th, and 11th Annual Meetings of the Japan Society for Endoscopic Surgery\(^6\)-\(^9\) showed a marked increase in the number of LADGs performed, from 1,298 patients in 2001 to 3,657 patients in 2006, 7,341 patients in 2009, and 7,596 patients in 2011. The proportion of gastric cancer surgeries that are laparoscopy-assisted was reported to have increased to 14.6% at the 8th Annual Meeting (2005), 20% at the 9th Annual Meeting (2007), 25.9% at the 10th Annual Meeting (2009), and 27.9% at the 11th Annual Meeting (2011). Although surgical indications for LADG have been mentioned in the Japanese Gastric Cancer Treatment Guidelines\(^2\) (Japanese Gastric Cancer Association, 2010) and have a recommendation level of grade C according to the Practice Guidelines for Endoscopic Surgeries\(^3\) (Japan Society for Endoscopic Surgery, 2008). As per the LADG indications that we adopted, the procedure is performed only in patients who fulfill the criteria in the above guidelines, receive a full explanation and give consent, and have no history of upper abdominal surgery.

We started introducing LADG in November 2006 and performed this procedure in 55 patients between 2006 and June 2013. Mechanical anastomosis in ODG was introduced in 2006, which has been used in all cases since 2008. With regard to the gradual introduction of LADG, Tanigawa et al.\(^11\) investigated the associated operative time and blood loss, and found that the learning curve stabilized at approximately the 10th case after procedure introduction. In terms of establishment of the surgical technique, Fujieda et al.\(^12\) reported that blood loss decreased after 40 procedures were performed and Murakami et al.\(^13\) reported that the variance in blood loss and operative time tended to decrease after the procedure had been performed in approximately 30 cases, by which time a stable technique was achieved. In surgeries at our hospital, one of the authors of this report always participates as the surgeon or assistant in LADG. In contrast, there are no fixed personnel in the case of other studies. Doctors associated with a specific surgery society or endoscope surgery technique specialty are selected with priority as the surgeon performing LADG to ensure surgical safety.

The major advantage of laparoscopic surgery is its low surgical invasiveness and early recovery compared with open surgery. In this study, we compared WBC and CRP levels on POD 1, 3, and 5 as a postoperative assessment of invasiveness (Table 3). The results showed significantly lower WBC and CRP levels on POD 1 with LADG, which is believed to be an indication of its low invasiveness; nevertheless, a comprehensive assessment with other test results, vital signs, and subjective and objective assessments of pain are needed. In this study, the WBC and CRP level increased by a significantly greater extent in the ODG group than in the LADG group on POD 1. Sang-II Lee et al.\(^14\) reported that CRP level decreased significantly on
POD 5. Hayashi et al.\textsuperscript{15} reported, in addition to the CRP level, the interleukin 6 (IL–6) level decreased significantly on POD 0 and 1, whereas Adachi et al.\textsuperscript{16} reported that IL–6 level decreased significantly on POD 3. These data were not significantly different between the 2 groups.

Many retrospective comparative investigations following ODG and LADG have been published, several of which have included large numbers of patients (Table–6)\textsuperscript{17–22}. With respect to surgical results, many reports have shown that LADG increases operative time\textsuperscript{17–19,21–22} and decreases blood loss\textsuperscript{17,18,21,22}. In terms of postoperative course, many reports have shown that LADG shortens the time until flatus\textsuperscript{17–20,21–22}. There are also a considerably large number of reports showing that the length of hospital stay decreases with LADG\textsuperscript{19,21–22}.

In addition to the above results, Yasuda et al.\textsuperscript{23} reviewed the results of LADG at multiple institutions in case studies with 100 or more patients\textsuperscript{24–27} and randomized controlled trials (RCTs)\textsuperscript{15,28–30}, and showed that in cases of cancer, LADG was associated with a longer operative time but a similar complication rate, earlier recovery of gastrointestinal function, and a shorter LADG than ODG. The reports of Itabashi et al.\textsuperscript{31}, Kishimoto et al.\textsuperscript{32}, Ishikawa et al.\textsuperscript{33}, and Fukunaga et al.\textsuperscript{34} with fewer than 40 patients show nearly the same results despite the differences among institutions. In this study, we compared 49 ODG patients and 45 LADG patients. Compared with the results of the retrospective studies and RCTs by the above authors, the postoperative outcomes of times to first water intake and flatus showed earlier recovery in LADG patients; among the surgical outcomes, a significantly lower blood loss was observed with LADG in the present study. However, there was no significant difference in operative times. This may be attributed to the fact that at our hospital, for the 49 patients who underwent ODG, the operator had ≤5 years of experience since graduation in 30 cases (61.2%), 6–10 years in 9 cases (18.3%), and ≥11 years in 10 cases (20%). Thus, for the purpose of education and guidance, >60% of the doctors were in their 5\textsuperscript{th} year or less of surgical practice. In contrast, for the 45 LADG patients, the doctors were in their ≤5\textsuperscript{th} year of surgical practice in 13 cases (28.8%), 6\textsuperscript{th}–10\textsuperscript{th} year in 13 cases (28.8%), and ≥11\textsuperscript{th} year in 19 cases (42.2%). Thus, approximately 60% were in their ≥5\textsuperscript{th} year of surgical practice.

LADG is used for malignant diseases. Hence, not only the surgical results and postoperative course, but also the degree of complete recovery—that is, the long-term outcome—is important. Moreover, although no recurrence has been observed thus far with this technique in the present study, continued observation of the course will still be needed. Appropriate lymph node dissection based on an accurate preoperative diagnosis and indications is important for enabling complete recovery. Lymph node assessment was performed preoperatively with upper gastrointestinal endoscopy, computed tomography, ultrasonography, and a upper gastrointestinal series, while a rapid pathological diagnosis was made intraoperatively as needed. Lymph node dissection of D1 or D1 + was performed in accordance with the Japanese Gastric Cancer Treatment Guidelines. The number of lymph nodes dissected in this study was 25.0 ± 15.5 with ODG and 26.4 ±
16.1 with LADG, which were not significantly different. Therefore, it is believed that sufficient dissection can be performed with LADG.

A local diagnosis is made using preoperative upper gastrointestinal endoscopy findings and intraoperative findings, and includes cases in which additional resection is necessary from pathological results after EMR or ESD. The length of postoperative hospital stay was 12.2 ± 5.0 days for the ODG patients and 14.1 ± 14.5 days for LADG patients, and these values also did not significantly differ.

In the present study, complications included anastomotic leakage in 1 ODG patient (2%) and 1 LADG patient (2%). Suture failure in the LADG patient occurred after a B-1 (hemi–double stapling technique) reconstruction, leading to a minor leak from the anastomotic arch and the portion that is piled up of the stapler site. At present, buried sutures for the stump are primarily used in the portion that stacks a stapler site. Anastomotic stenosis occurred only in 5 cases that underwent mechanical anastomosis, including 2 (4%) of the 49 ODG patients and 3 (6%) of the 45 LADG patients (thus, in 5 [5.3%] of the 94 patients). Repeat surgery was needed in 1 patient in March 2007, which was not long after LADG was introduced at our hospital. In this patient, the entrance of the staple for the R-Y anastomosis in LADG was closed with Endo-GIA 60, and stenosis and obstruction occurred at the same site. Since that time, we have not used a mechanical suture device to close the entrance, and have instead performed a full-thickness hand-sewn closure. In the other 4 cases, improvement was observed with balloon dilatation using upper gastrointestinal endoscopy.

Anastomotic and suture complications are believed to occur locally due to intraoperative manipulations. Grade III or higher complications were noted in 3 anastomotic stenosis cases only in the LADG group. Endoscopic dilatation was performed in 2 of these cases, whereas re–suture surgery was performed in the other case. To prevent anastomotic stenosis and anastomotic leakage with mechanical anastomosis and sutures, it is important to maintain adequate local blood flow and ensure that the anastomotic lumen is of an appropriate size. To achieve this, it is important to avoid excessive tension on the anastomotic and suture sites and ensure appropriate and precise instrument manipulations and a working space to adequately perform the procedures. This requires regular training in instrument and forceps manipulation, conducting surgery according to standardized procedures, and cooperation between operators working with a common purpose. We suppose that these measures could overcome severe complications associated with the learning curve.

Conclusion

In this study, we compared LADG and ODG for early gastric cancer and found no significant differences between the 2 procedures in terms of surgical factors (operative time, number of lymph nodes dissected) or postoperative results (times to first water intake, fluid intake, flatus, and bowel movement; duration of drain placement; length of postoperative hospital stay; and blood test results). The results of a comparison of complications revealed a significant decrease in blood loss with LADG and a significant decrease in serum WBC and CRP levels on POD 1. These results suggest that the use of LADG may improve the safety and lower the invasiveness associated with these surgeries to the same level as that noted for ODG. Based on our results, we believe that LADG can be recommended as a standard therapy and is more favorable than ODG for the treatment of stage IA early gastric cancer.

References