

# LAPAROSCOPY – ASSISTED DISTAL GASTRECTOMY WITH LYMPH NODE DISSECTION FOR GASTRIC CANCER

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## ABSTRACT

**Objective:** To investigate the feasibility, safety, and associated median survival outcomes of laparoscopy-assisted distal gastrectomy (LADG) with lymph node dissection for gastric cancer.

**Methods:** We analyzed the clinical data from 50 consecutive patients with gastric cancer who received LADG at Hue central hospital from January of 2011 to January of 2014.

**Results:** LADG was successfully carried out in 49 patients; LADG was converted to open surgery in 1 case. The mean operation time was 180 minutes (120-300 minutes), and the mean number of dissected lymph nodes was 12 (5 - 20). The average length of hospital stay was 8.5 days (7-16 days). The morbidity and mortality rate was 12% and 0%. A total of 49 patients were followed for a subsequent 6-36 months (median, 24months). The 2-year disease-free survival (DFS) and overall survival (OS) rates were 78% and 90%, respectively.

**Conclusion:** In this preliminary report, HALDG was found to be a safe, feasible, and efficacious procedure for the treatment of gastric cancer with encouraging 2-year overall survival rates.

**Key words:** laparoscopy-assisted distal gastrectomy (LADG), gastric cancer.

## I. INTRODUCTION

Since the first reported successful case of laparoscopic gastrectomy for early gastric cancer by Kitano in 1991 [1], laparoscopic colectomy and gastrectomy has been widely applied in recent years [2], [3]. They have become the surgeries of choice for an increasing number of surgeons due to its superiority over conventional procedures such as quicker recovery, less postoperative pain, reduced hospital stay length... [4]. Despite its rapid development and wide application to many diseases, there are two main limiting factors for the its applications, namely the technical sophistication and the concern about oncologic safety. Therefore,

there is still a significant number of surgeons choosing classical open surgery since they are afraid that the results of laparoscopic surgery in terms of extend of lymphadenectomy, oncologic outcomes and recurrence rate are not comparable to open surgery... Although the evidence is still scarce [5], based on promising results from centers in Europe and North America and also taking into account the economic status of local residences, we started to implement laparoscopic surgery for curative treatment of gastric cancer in 2007 at our institute.

The aim of this study is to determine the mid-term outcomes of laparoscopy-assisted distal gastrectomy with lymphadenectomy.

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**Received:** 4/11/2014; **Revised:** 17/11/2014 by Pham Nguyen Tuong  
**Accepted:** 5/12/2014

## II. PATIENTS AND METHODS

### 2.1. Patients

Fifty patients diagnosed with distal gastric cancer, treated with laparoscopy-assisted gastrectomy with D1+ $\alpha$  (D1 + LN 7) or D1+ $\beta$  (D1+ LN 7, 8, 9) lymphadenectomy at Hue Central hospital from 01/2011 to 01/2014 were included in our study.

#### *Inclusion criteria:*

- Adenocarcinoma is confirmed on preoperative tumor biopsy and surgical specimen pathological examination.

- Localized antropyloric gastric cancer, including the incisura angularis detected on endoscopy, CT scan images and confirmed by intraoperative description of the lesion.

#### *Exclusion criteria:*

- Past history of previous abdominal surgery with upper midline incision, severe cardiovascular and pulmonary disease.

- Presence of distance metastasis (liver, peritoneum...) or direct invasion of adjacent organs (classified as T4 according to TNM classification of UICC 1997).

### 2.2. Research methodology:

A retrospective, observational non-comparative study

Data collected includes age, gender, tumor location, pathologic result, tumor stage, number and location of lymph nodes harvested, mortality rate, intraoperative and postoperative complications.

Long term outcome is determined by late complication, local recurrence, distal metastasis and survival time.

Preoperative preparation: Fasting one day before surgery, colonic lavage and prophylactic antibiotic

#### **Surgical technique:**

##### *Patient position*

Under general anesthesia, the patient was placed supine, with legs abducted about 30°, head lifted about 20° and the whole body slightly tilted to the right. The surgeon stood between the patient's legs and the camera operator on the patient's right.

##### *Trocar placement*

Four trocars were used including one 10-mm paraumbilical trocar for a laparoscope, another 10-mm trocar in the left midclavicular line at the level of the umbilicus and a 5-mm trocar in the anterior axillary line below the costal margin for the surgeon to dissect. A 5-mm trocar then was inserted in the midline above the umbilicus for the assistant to lift the stomach.

##### *Surgical techniques*

We perform distal gastrectomy with transection line of the stomach at least 5cm proximal to the tumor macroscopically. Transection of the stomach and closure of the duodenal stump was carried out using Endo GIA 35mm. We perform a D1+ $\alpha$  (D1 + nodal stage 7) hoặc D1+ $\beta$  (D1+ nodal stage 7, 8, 9) lymphadenectomy according to Japanese classification of Gastric Carcinoma 1981 [6]. We restore intestinal continuity using Billroth II method (antecolic Polya gastrojejunostomy) extracorporally. Through a 5-cm midline incision, we brought the resected part of the stomach along with tumor outside the peritoneal cavity to perform the anastomosis.

Classification and numbering of harvested lymph node were done right after surgery. We opened the specimen to recheck the size, location and appearance of the tumor.

##### **Follow up**

Patients were advised to return to our department and receive long-term follow up two weeks after being discharged at the Oncologic center. Routine adjuvant chemotherapy and radiotherapy will be indicated for stage II and III diseases.

We continued following the patients every 3 months for the first year and every 6 months in the following years. We ordered complete blood count, CEA, CT scan, upper endoscopy every year or earlier if there were any symptoms of recurrence.

**III. RESULTS**

**3.1. General characteristics**

- 50 patients (38 males, 12 females)
- Mean age: 54 years (32-78 years)

**3.2. Disease characteristics**

- Tumor locations: All tumors were locate at the inferior one-third of the stomach. Tumors were staged as T1 (2 patients), T2 (12 patients) and T3 (36 patients) according to pathologic reports.

- No patients received pre-operative neoadjuvant therapy. Postoperative adjuvant chemotherapy were indicated in 42 patients classified as stage II and III.

- Pathologic result of the surgical specimens confirmed 100% tumors were adenocarcinoma.

**3.3. Surgical characteristics**

- Laparoscopic surgery was successful in 49 cases. We had to convert to open surgery in one case because there was bleeding from the gastroduodenal artery that could not be controlled laparoscopically.

- 1 patient received intraoperative blood transfusion.

- Lymph node dissection: we performed D1+α lymphadenectomy in 9 cases and D1+β in 40 patients with stage II and III.

- Mean number of lymph node harvested: 12 nodes (5-20)

- Mean operative time 180 mins (120-300 mins)

- Mean postoperative hospital stay: 8,5 days (7-16 days)

**- Intraoperative complications**

*Table 1: Intraoperative complications*

Complications	n	%
Bleeding	3*	6
Injuries of other organs	0	0
Total	3	6

\* Bleeding from gastroduodenalartery: 1 case managed by open surgery.

**- Postoperative complications**

*Table 2: Postoperative complications*

Complication	n	%
Gastrojejunostomy leakage	0	0
Duodenal stump leakage	1**	2
Anastomosis stricture	0	0
Anastomosis bleeding	2*	4
Gastric stasis	0	0
Acute pancreatitis	0	0
Early post-op bowel obstruction	0	0
Intraabdominal abscess	1*	2
Wound infection	1*	2
Pneumonia	1	2
Reoperation	1	2
Death	0	0

\*Successful conservative treatment, \*\*Failed non-operative treatment, reoperation required

Post-operative complication rate 12%

**3.4. Follow-up**

- Among 49 successful cases, 43 cases were completely followed. Mean follow-up time 24 months (6-36 months): two-year disease-free survival rate was 78 %, overall survival rate was 90%.

**IV. DISCUSSION**

For cancer of the distal third of the stomach, the first laparocopy-assisted distal gastrectomy for early gastric cancer was performed by Kitano in 1991 and earliest evidences first appeared in 1994 [1], [3]. In 1996, Ballesta-Lopez first used total laparoscopic gastrectomy and reported its safety and feasibility for the treatment of this procedure [7]. Although total laparoscopic gastrectomy has been performed for 20 years, its development is hindered by technical difficulties, long operative time, the increased cost by the use of laparoscopic anastomosis devices [8] and the fact that it is not feasible in obese patients or patients with large

tumors [9]. In our circumstance, the majority of patients came to the hospital in late stages with large tumor size and most of them also had low economic status. Therefore, LADG became the treatment of choice of all 50 patients in our research.

Although adjuvant chemotherapy can bring significant survival benefits [10], [11], curative gastrectomy with lymphadenectomy is still the first-line treatment of gastric cancer [12], [13]. In our study, we used D1 +  $\alpha$  lymphadenectomy for early gastric cancer (stage I) and D1+ $\beta$  lymphadenectomy for the rest (stage II,III). Most of Japanese surgeons recommend D2 or D3 lymphadenectomy and D2 lymphadenectomy has become the standard of care in Japan [11]. However, there were conflicting results in many Western studies. In one clinical trials comparing D1 and D2 gastrectomy, the mortality rate for D1 was 4-6% and for D2 was 13%. The figures were even 10% vs 3% in another study. A study of H. Danielson, Cuschieri A on 200 patients showed that complications of D2 gastrectomy were associated with dissection of the duodenopancreatic complex and splenectomy during dissection of lymph node group 9,10 and 11. Other researches showed similar long-term outcomes of D1+ $\beta$  and D2 gastrectomy [14]. In a study of Kim MC on 114 patients with D1+ $\alpha$ , D1+ $\beta$  gastrectomy, survival rate after 5 years was similar to conventional open surgery. Early results from study of Nguyễn Minh Hải - Chợ Rẫy hospital with 14 cases of D1 + $\beta$  gastrectomy and Triệu Triệu Dương from hospital 108 with 75 D2 gastrectomy cases demonstrated promising results [15], [16], [17]. In our study, the mean number of harvested lymph nodes was 12 nodes, which satisfied the minimum number of dissected nodes required by Japanese guideline [18].

We had 3 cases (6%) having intraoperative complications (table 1): one case had to be converted to open surgery due to uncontrolled bleeding from gastroduodenal artery. There were 6 patients (12%) having post-operative

complications (table 2) including 2 cases (4%) with gastrojejunostomy bleeding, 1 case with duodenal stump leakage requiring reoperation. The most difficult technical aspect was gastrointestinal continuity reestablishment which was associated with the majority of post-op complications. Similarly, a Japanese study on 1185 patient and a Korean study on 1237 patients on LADG for gastric cancer reported post-op complication rates of 12,7% and 13,1 %, respectively, in which anastomosis-related complication rates were 5,1 and 1,9 respectively [2], [20]. In our opinion, when we use a 5-6-cm incision to perform gastrojejunostomy extracorporally, the surgeon have to be careful not to stretch excessively to prevent injuries to the spleen and short gastric vessel. Special caution has to be paid to cases when the tumor locates high with the stomach in which the resection line has to be high to ensure oncologic outcome. In these cases, the length of the anastomosis has to be sufficient to prevent stretching or angulation of the anastomosis. We were able to successfully treat other complication conservatively (intraabdominal abscess, wound infection).

Recurrence and post-op survival are two very important criteria to assess the outcome of the procedure oncologically. This, in turn, depends on many factors including early diagnosis, tumor location, size and degree of invasion, nodal metastasis and intraoperative lymphadenectomy... In this research, 2-year DFS and OS were 78% and 90% which are comparable to previous studies [21], [22]. Recently, Park et al. [23] reported the 5-year overall survival rate of 239 patients receiving laparoscopic gastrectomy for cancer (130 T2, 63 T3 and 46 T4 tumors) as 86,6%, 77,7%, 58,7% respectively, which were similar to open surgery.

## V. CONCLUSION

Despite the limiting number of patients, this

preliminary study has proved that laparoscopy-assisted distal gastrectomy with lymphadenectomy is a safe, feasible with acceptable oncologic results procedure which can prevent the patient

from having a large incision of open surgery. However, a larger scale study with longer duration of follow-up is necessary for better determination of oncologic results.

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