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EVALUATUON OF THE SURGICAL OUTCOMES AND QUALITY OF LIFE IN GASTRIC CANCER PATIENTS AFTER LAPAROSCOPIC TOTAL GASTRECTOMY

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SUMMARY OF DOCTORAL DISSERTATION

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DISSERTATION LAYOUT

The dissertation is presented in 145 pages (references and appendix not include). It is structured with Introduction (2 pages), Literature review (43 pages), Materials and Methods (22 pages), Results (37 pages), Discussion (37 pages) and Conclusion (2 pages).

The dissertation consists of 62 tables, 13 diagrams, 27 figures and 174 references (17 in Vietnamese, 157 in English).

Appendix includes publications, references, questionaire and patient list.

INTRODUCTION

1. Rationale of the study

Although the morbidity and mortality has gradually decreased over the past 50 years, gastric cancer is the fifth most common malignancy and the fourth leading cause of cancer-related death worldwide in 2020. For a long time, gastrectomy and lymphadenectomy has been the standard treatment for gastric carcinoma. In 1999, Umaya and Azagra were the first two authors to report laparoscopic assisted total gastrectomy and D2 lymph node dissection. Laparoscopic total gastrectomy is not as popular as partial gastrectomy, accounting for only 25% of total gastric resections based on a survey conducted by the Japanese Society of Laparoscopic Surgery in 2015. Many reports were published on the feasibility and safety of laparoscopic total gastrectomy. However, the majority of these reports came from large centers and were mostly performed by surgeons skilled in laparoscopic surgery. After total gastrectomy, the symptoms include dumping syndrome, esophageal reflux, digestive disorders, malabsorption, diarrhea, flatulence, anorexia… appear and seriously affect the patient's quality of life. These symptoms are summarized as “Postgastrectomy Syndrome”. A lot of surgical methods were researched to maintain and restore the function of the removed stomach such as nerve preservation, replacing the stomach with other anatomical structures and various methods of reconstruction. However, the evidences demonstrating the effectiveness of these methods were limited due to the lack of appropriate assessment tools. Assessing the severity of symptoms occurring after gastrectomy and clarifying the extent of impact on the patient is especially important. In order to establish an appropriate tool

to determine the incidence and association of postgastrectomy syndrome with reported outcomes, the Japanese Postgastrectomy Syndrome Working Party designed and constructed a new integrated questionnaire, the Postgastrectomy Syndrome Assessment Scale (PGSAS)-45, to specifically assess symptoms, vital status, and quality of life in postgastrectomy patients. Laparoscopic gastrectomy for cancer was first performed in Vietnam at Cho Ray hospital in July 2005. This surgery is currently only performed in large centers with adequate experts and equipment. To date, there have been many reports on the safety and feasibility of laparoscopic surgery in treating stomach cancer in Vietnam. However, there have not been many studies specifically evaluating surgical outcomes and the impact of postgastrectomy syndrome on patients' quality of life with the PGSAS-45 scale, especially for laparoscopic total gastrectomy.

With respect to the aforementioned rationale, we carried out the study "Evaluation of the outcomes and quality of life in gastric cancer patients after laparoscopic total gastrectomy" with the goals:

1. Evaluating the surgical outcomes of laparoscopic total gastrectomy for cancer.

2. Assessing the quality of life and some related factors of patients after laparoscopic total gastrectomy using the Postgastrectomy Syndrome Assessment Scale PGSAS-45.

2. Scientific contribution and practical implication of the study

Stomach cancer is one of the most common malignancy in the world. In Vietnam, according to the data from Globocan (2020), stomach cancer is the third leading cause of cancer-related death. Early diagnosis and radical treatment of stomach cancer have currently made the strong progress thanks to the development of modern devices such as flexible endoscopy with biopsy, narrow-band imaging, magnifying endoscopy with integrated NBI, endoscopic ultrasound... Early gastric cancer often have vague and atypical clinical symptoms, easily confused with other stomach diseases. At the time of diagnosis, most gastric cancers are in an advanced stage and the possibility of radical treatment is difficult. Depending on the location, stage, and level of invasion of stomach cancer as well as the patient's condition, partial or total gastrectomy with lymph node dissection are the surgical methods of choice. Total gastrectomy for cancer was previously mainly performed by open surgery. However, due to the growing trend of minimally invasive surgery, laparoscopic total

gastrectomy has been applied by some authors but accounts for a small proportion because of the difficulty of lymph node dissection and esophagojejunostomy.

Chapter 1. LITERATURE REVIEW

1.1. ANATOMY AND PHYSIOLOGY OF THE STOMACH

1.1.1. Anatomy of the stomach

In terms of surgical application, according to the Japanese classification of gastric carcinoma, to determine the location of longitudinal lesion. The stomach is anatomically divided into three portions, the upper, middle and lower parts, by the lines connecting the trisected points on the lesser and greater curvatures.

The stomach wall consists of 5 layers: serosa, subserosa, muscularis propria, submucosa, mucosa.

In 1981, the Japanese Gastric Cancer Association (JGCA) numbered the lymph node groups to facilitate surgeons in standardizing lymph node dissection. The latest division of the lymph node system includes 23 categories and 4 stations published in the Japanese classification of gastric carcinoma in 2011.

1.1.2. Physiology of the stomach

The stomach is an organ with both mechanical and chemical functions to store, move and digest food, including excretion, movement and digestion of food.

1.2. DIAGNOSIS OF GASTRIC CARCINOMA

1.2.1. Clinical diagnosis

Clinical symptoms are vague and mild in the early stages but become more severe and persistent as the disease progresses. Abdominal pain and weight loss are the most common symptoms at first diagnosis.

1.2.2. Para-clinical diagnosis

- Gastroscopy with biopsy: is the gold standard in diagnosing gastric cancer, allowing direct observation of the gastric mucosa and biopsy of suspicious areas. A recently developed technology is narrow band imaging (NBI). This endoscopic tool is capable of distinguishing the lesions <1cm, with accuracy, sensitivity and specificity above 95%, avoiding unnecessary biopsies, and accurately determining the edge of the lesion before endoscopic treatment.

- Endoscopic ultrasound: is a useful tool in assessing the depth of invasion of tumors in the digestive tract. Endoscopic ultrasound is appropriate in the evaluation of cT, especially for T1a and T1b, because it can identify the indications for endoscopic resection. In addition, endoscopic ultrasound enables the fine needle biopsy of suspected lymph node, thereby helping to determine the nodal stage. Endoscopic ultrasound also plays an important role in diagnosing infiltrative gastric cancer thanks to the ability to biopsy with a fine needle under the guidance of endoscopic ultrasound.

- Laparoscopy exploration and cytology of peritoneal lavage fluid: are the important methods in assessing the stage of the disease and are more reliable than CT in detecting the spread of the disease.

- Computed tomography: helpful in assessing the invasion around the lesion and systemic metastases. The sensitivity of CT in diagnosing nodal staging varies (62.5%-91.9%) and there is a lack of consensus on specific diagnostic criteria.

- Indocyanine green (ICG) and near-infrared fluorescence imaging: Applications of near-infrared fluorescence imaging using ICG in gastric cancer surgery include: (1) detecting sentinel lymph nodes; (2) determining the extent of lymph node dissection; (3) locating the tumor and determine the resection margin; (4) evaluating the anastomotic blood supply.

1.3. CLASSIFICATION OF GASTRIC CANCER

1.3.1. Macroscopic classification

In 2011, the JGCA macroscopically divided gastric cancer into 6 types, of which type 0 is early gastric cancer. This is considered the most reasonable and comprehensive classification.

- Type 0: superficial.
- Type I: mass.
- Type II: ulcerative.
- Type III: infiltrative ulcerative.
- Type IV: diffuse infiltrative.
- Type V: unclassificable.

1.3.2. Microscopic classification

Lauren classification (1965): Microscopically, gastric cancer is classified into: intestinal and diffuse carcinoma.

1.4. STAGES OF GASTRIC CARCINOMA

AJCC staging is based on tumor, lymph node and distant metastasis (TNM) classification. AJCC's latest TNM staging system

(8th edition, 2017) includes clinical, histopathological and histopathological stage after adjuvant therapy.

1.5. GASTRIC CANCER TREATMENT

1.5.1. Algorithm of standard treatment

According to the Japanese gastric cancer treatment guidelines 2018 (5th edition).

1.5.2. Gastric cancer surgery and lymph node dissection

- Types and definitions of gastric surgery

+ Surgery with curative intent: standard gastrectomy (resection of at least 2/3 of the stomach with a D2 lymph node dissection), non-standard gastrectomy (modified and extended surgery).

+ Non-curative surgery: palliative and reduction surgery.

- Surgery for gastric cancer: total gastrectomy, distal gastrectomy, pylorus-preserving gastrectomy, proximal gastrectomy, segmental gastrectomy, local resection, non-resectional surgery, completion gastrectomy, subtotal resection of remnant stomach.

- Determination of the extent of gastric resection

+ Resection margin: proximal margin of at least 3 cm is recommended for T2 or deeper tumors with an expansive growth pattern (types 1 and 2) and 5 cm for those with an infiltrative growth pattern (types 3 and 4). When these rules cannot be satisfied, it is advisable to examine the whole thickness of proximal resection margin by frozen section. For T1 tumors, a gross resection margin of 2 cm should be obtained.

+ Selection of gastrectomy: The standard surgical procedure for clinically node-positive (cN+) or T2–T4a tumors is either total or distal gastrectomy. For cT1N0 tumors, the following types of gastric resetion can be considered according to tumor location: pylorus-preserving gastrectomy, proximal gastrectomy, local resection of the stomach and segmental gastrectomy should still be regarded as investigational treatments.

- Lymph node dissection:

+ Extent of lymph node dissection: D1, D1+ or D2 lymph node dissection are defined according to the type of gastrectomy conducted.
+ Indications: D1 or D1+ lymphadenectomy is indicated for cT1N0 tumors and a D2 for cN+ or ≥ cT2 tumors. D2 lymphadenectomy

should be performed whenever the possibility of nodal involvement cannot be dismissed.

+ D2+ lymphadenectomy: Dissection of no. 10 (splenic hilar lymph node), no. 14v (superior mesenteric venous lymph node), no. 13 (posterior pancreas head lymph node), no. 16 (abdominal aortic lymph node).

1.5.3. Adjuvant therapies for gastric cancer

- Adjuvant chemotheray: According to Japanese guidelines, adjuvant chemotherapy is indicated for pathological stage II, III (except T1, T3N0) gastric cancer after gastrectomy with D2 lymphadenectomy. According to NCCN, adjuvant chemotherapy is indicated for pathological T2-4 or N+ tumors.

- Neoadjuvant chemotheray: According to NCCN, neoadjuvant chemotherapy is indicated for clinical T2-4, any N. According to Japanese guidelines, neoadjuvant chemotherapy is considered for clinical T2-4 with bulky lymph node or no 16 (a2/b1) metastasis and no other non-curative factors.

1.6. LAPAROSCOPIC TOTAL GASTRECTOMY FOR CANCER

1.6.1. Indications

- Advanced cancer locates or invades the 2/3 upper of the stomach or with tumors that partial gastrectomy does not ensure the safe resection margin.

- Hereditary diffuse gastric cancer (CHD1 mutation), both in the prophylactic setting and when gastric cancer has been confirmed.

1.6.2. Contraindications

- Distant metastasis gastric cancer, unless performed in the context of a clinical trial. The only published randomized controlled trial of chemotherapy versus surgery plus chemotherapy failed to show any benefit in adding surgery to the treatment plan.

- Partial gastrectomy would provide negative margins, due to the increased risk of complications associated with total gastrectomy compared with partial resection

1.6.3. Patient selection

- Provider factors:

+ Surgeon experience: need at least 20 cases of laparoscopic distal gastrectomy or 44 cases of laparoscopic total gastrectomy, to be considered proficient.

+ Hospital resources: Modern operating room, responsive anesthesia team, intensive care unit, gastroenterology and interventional radiologists, new imaging technologies such as 4K or 3-dimensional high-resolution laparoscopic systems and new high-energy knives...

- Patient factors: comorbidities, obesity, previous abdominal surgery, disease extent.

1.6.4. Lymphadenectomy in laparoscopic total gastrectomy

In principle, D1 or D1+ lymphadenectomy are indicated for early gastric cancer and D2 for advanced gastric cancer and for cases with apparent regional lymph node metastasis. The evidence based on the results of the JCOG0912 study, confirming the non-inferiority of laparoscopic distal gastrectomy compared to open surgery for early gastric cancer, could be applied to laparoscopic total gastrectomy.

After the results of the JCOG0110 study, the latest Japanese gastric cancer treatment guidelines removed the no. 10 lymph nodes from D2 lymphadenectomy in total gastrectomy for advanced gastric cancer that invade the greater curvature. Spleen-preserving no. 10 lymph node dissection may be recommended for patients with locally advanced gastric cancer invading the greater curvature.

1.6.5. Reconstruction after laparoscopic total gastrectomy

Currently, esophagojejunal anastomosis after laparoscopic total gastrectomy is mainly divided into two types: side-to-end anastomosis using circular stapler and side-to-side anastomosis using linear stapler. The advantages of anastomosis using linear stapler: performed in a narrow mediastinum, achieving appropriate anastomotic size, reducing jejunal tension.

1.7. QUALITY OF LIFE AFTER GASTRECTOMY

1.7.1. The importance of assessing quality of life

Postoperative quality of life is an important consideration in evaluating the results after surgeries, especially cancer surgeries. The best treatment for gastric cancer would offer the longest survival, the least toxicity, and the best health- related quality of life. Although the primary objective of gastrectomy is to cure cancer, the second most important goal is to minimize PGS-related adverse events and to preserve the patients' QOL. It is known that the type of gastrectomy affects the incidence and severity of PGS, and various procedures to preserve or reconstruct gastric function have been proposed to

confront these problems. Therefore, it is very important to determine the clinical factors that affect the QoL of patients after gastrectomy, in addition to the type of gastrectomy and reconstruction performed.

1.7.2. The quality of life asessment questionaire

Components of gastric cancer-related HRQoL include gastrointestinal symptoms, systemic symptoms, global functioning, and social and psychological health. Over the past 20 years, there has been increasing interest in creation and validation of HRQoL questionnaires. When selecting a questionnaire relevant to a treatment population, a surgeon or researcher should be attentive toward the relative emphases of individual HRQoL surveys

Postgastrectomy syndrome assessment scale (PGSAS)-45, designed by JPGSWP, is a multidimensional and newly developed questionnaire based on Short Form-8 Health (SF-8) and Gastrointestinal Symptom Rating Scale (GSRS). It was expected to provide a realistic image of the status of the patients and to be regarded as a gold standard in surveillance of the PGS and evaluation of various types of gastrectomy and reconstruction.

1.8. THE STUDIES ON THE OUTCOMES AND QUALITY OF LIFE AFTER LAPAROSCOPIC TOTAL GASTRECTOMY

1.8.1. Vietnamese research

In November 1961, the first symposium on gastric surgery was held. Since then, surgery for gastric cancer has been widely implemented. Laparoscopic gastrectomy and lymphadenectomy were first performed in Vietnam at Cho Ray hospital in July 2005. Despite being increasingly popular, laparoscopic gastrectomy is only performed in large centers with adequate experts and equipment. In 2012, Trieu Trieu Duong compared the results of 60 gastric cancer patients with laparoscopic gastrectomy and D2 lymph node dissection with 71 patients with open surgery. In 2012, Do Van Trang evaluated the surgical results in 70 patients who underwent laparoscopic distal gastrectomy and D2 lymph node dissection. In 2014, Pham Nhu Hiep reported 64 cases of laparoscopic distal gastrectomy with lymph node dissection. In 2014, Do Truong Son reported 216 gastric cancer patients undergoing laparoscopic gastrectomy with D2 lymph node dissection. In 2017, Vo Duy Long reported 112 cases of laparoscopic gastrectomy with D2 lymph node

dissection. In 2022, Dinh Van Chien reported 70 cases of laparoscopic total gastrectomy and D2 lymph node dissection.

In Vietnam, except for Dinh Van Chien's research, there have not been many studies specifically evaluating laparoscopic total gastrectomy for cancer as well as the QoL after gastrectomy using the specific scales.

1.8.2. Research in other countries

In 1999, Azagra reported the first successful laparoscopic total gastrectomy with D2 lymph node dissection and end-to-side esophagojejunostomy. Since then, despite being not as common as subtotal gastrectomy, many randomized controlled studies have reported the safety, feasibility, and oncological outcomes of laparoscopic total gastrectomy for cancer in both early (JCOG1401, KLASS-03 and CLASS-02) and advanced stages (CLASS-04).

Regarding studies evaluating QoL after gastrectomy, there were no specific studies on total gastrectomy, but this surgery was often combined with other types of gastrectomy. In 2014, Nakada reported QoL in 1777 postgastrectomy patients to validate the PGSAS-45. In 2017, Takahashi compared the QoL between 393 cases of total gastrectomy and 475 cases of subtotal gastrectomy Roux-en-Y reconstruction using the PGSAS-45. In 2018, Kinami identified the factors related to QoL in 2,368 patients after gastrectomy for cancer. In 2022, Kunisaki compared QoL in 1020 patients after total gastrectomy and 518 patients after proximal gastrectomy.

Chapter 2. MATERIALS AND METHODS

2.1. MATERIALS

Consists of patients diagnosed with gastric adenocarcinoma who underwent laparoscopic total gastrectomy with lymph node dissection at Hue Central Hospital and Hue University of Medicine and Pharmacy Hospital from January 2019 to February 2022.

2.1.1. Inclusion criteria

- Gastric cancer with T stage ≤T4a, no bulky lymph node and no distant metastasis locates or invades the 2/3 upper of the stomach

or at the remaining part that partial gastrectomy cannot achieve the safe resection margin.

- Postoperative histopathological diagnosis is gastric adenocarcinoma.
- Patients have all the necessary information for the study.

2.1.2. Exclusion criteria

- Tumor invade the gastroesophageal junction.
- Patients with diseases that are contraindicated for laparoscopic surgery.
- ASA >3.
- Patients have been using andidepressants, psychiatric drugs or suffer from neuropsychiatric diseases.
- Patients loss contact at the time of 1 month follow-up after surgery.
- Presence or history of cancer of other organs.
- Patients disagree to participate in the study.

2.2. STUDY METHODS

2.2.1. Study design

Prospective descriptive study, clinical intervention without control.

2.2.2. Sample size

Using the formula to calculate the sample size:

$$n = Z^2_{1-\alpha/2}\frac{p(1-p)}{d^2}$$

We have n = 43,27. Our minimal sample size is 44 patients.

2.3. STUDY MEASURES

2.3.1. Characteristics of patients

- Age, gender, body mass index.
- ASA, medical history.
- Clinical symptoms.

2.3.2. Surgical outcomes of laparoscopic total gastrectomy

2.3.2.1. Tumor characteristics during and after surgery

- Tumor location.
- Tumor size.
- Macroscopic classification.
- Pathohistological stage: according to AJCC 2017.
- Level of differentiation.

2.3.2.2. Surgical outcomes

- Reconstruction.
- Duration of operation.
- Surgical blood loss: calculated according to the Lopez-Picado formula:

$$Blood\ loss\ (ml) = \frac{BVx(Hct_i - Hct_f)}{Hct_{mean}}$$

- Intraoperative complications.
- The number of dissected lymph nodes, the number of metastatic lymph nodes.

2.3.2.3. Outcomes after surgery

- Time of recovering bowel movement.
- Hospital stay.
- Complications: graded according to the modified Clavien-Dindo scale.
- Ajuvant therapy.

2.3.2.4. Metastasis, recurrence, survival

- Metastasis, recurrence.
- Overall survival.
- Disease-free survival.

2.3.2.5. Procedure of laparoscopic total gastrectomy with lymph node dissection

a. Indications: Advanced cancer locates or invades the 2/3 upper of the stomach or with tumors that partial gastrectomy does not ensure the safe resection margin. Patients do not have diseases that are contraindications to laparoscopic surgery

b. Surgical tools

- Imaging system and common abdominal laparoscopic tools.
- Ultrasonic cutting for surgery.
- Unipolar electric knife.
- Linear and circular staplers.

c. Patient preparation

The surgeon and anesthesiologist explain to the patient and family abouts the medical condition, surgical and anesthesia procedures and complications. Nurses instruct the patients how to clean the entire body, especially the abdominal area before surgery.

b. Patient posture and surgeon

- Patient posture: place in the supine, tilt to the right by 15^0.

- Surgeon: the main surgeon stands on the right or between two legs of the patient.

c. Location and number of trocars

We usually use 5 trocars, the position of trocars depends on the surgeons' habits and standing position.

d. Surgical steps

- Step 1: Place the trocars, pneumoperitoneum, laparoscopic exploration.

- Step 2: Totally remove the greater omentum and no. 4sa, 4sb, 4d lymph nodes.

- Step 3: Remove the lymph node station 6. Expose and ligate the right gastroepiploic vein in front of the Henle's trunk, ligate the right gastroepiploic artery which is next to the branch derived from the gastroduodenal artery.

- Step 4: Remove the lymph nodes station 5, 12a. Transect the duodenum using linear stapler

- Step 5: Remove the lymph nodes station 8, 7, 9.

- Step 6: Remove the lymph nodes station 11p, 11d, 1, 2, 3. Cut the anterior and posterior vagus nerve to expose the abdominal esophagus.

- Step 7: Total gastrectomy and Roux-en-Y esophagojejunostomy. This step can be performed by laparoscopy or by a 5cm midline laparotomy above the umbilicus.

+ Side-to-end anastomosis using circular stapler:

This anastomosis is usually performed with a small incision due to the difficulty in inserting the anvil into the esophagus and fixing the anvil. This anastomosis is often chosen when the surgical field is good, the esophageal diameter is wide enough and does not need to move the esophagus too much. After the stomach is removed, the suture is sewn around the lower end of the esophagus. Insert the anvil of circular stapler into the lower end of the esophagus, fix it with the suture. Cut the jejunum 20cm below the ligament of Treitz. Insert the stapler into the loop, make the esophagojejunal anastomosis, close the end of the loop. The side-to-side or end-to-side jejunojejunostomy is created with linear stapler or hand suture.

+ Side-to-side anastomosis using linear stapler:

This anatomosis can be totally performed by laparoscopy. Side-to-side anastomosis is often chosen when the surgical field is narrow,

the esophageal diameter is small and the esophagus can be dissected easily. After lymphadenectomy, the stomach is pulled down to expose and cut the vagus nerve. The esophagus is freed at least 5cm above the resection margin. Transect the esophagus and duodenum. Open a small hole on the left side of the esophagus and at the free edge of the jejunal loop about 20cm below the ligament of Treitz, bring the loop upward through the anterior transverse colon. Anastomose the loop to the esophagus with a linear stapler. The side-to-side or end-to-side jejunojejunostomy is created with a linear stapler or hand suture. Place a drain under the left diaphragm. Close the incision.

e. Management of the intraoperative complications

According to the international consensus on complications after gastrectomy, intraoperative complications are divided into: (1) damage to major blood vessels or organs requiring removal or reconstruction; (2) bleeding during surgery requiring emergency blood transfusion and (3) medical diseases that interrupt or change the surgical plan such as anaphylactic shock, cardiac arrest, myocardial infarction...

The most dangerous intraoperative complication is bleeding, mostly due to damage to blood vessels during lymph node dissection. A study by Kumagai in 2021 showed that the rate of intraoperative bleeding requiring conversion to open surgery was 0.17%. The author recommends the routine usage of gentle gauze compression on the bleeding site to control bleeding. As a results, no conversions due to intraoperative bleeding have been experienced in the last 2 years. Damage to organs or blood vessels requiring resection or reconstruction is a rare intraoperative complication in recent studies. Most of these complications, when they occur, thanks to the experience and development of surgical instruments, are successfully treated conservatively. When major vascular damage is detected, it is necessary to immediately convert to open surgery to better assess the extent of the damage and consult with a vascular surgeon immediately.

2.3.3. Assessing the quality of life and some related factors of patients after laparoscopic total gastrectomy using the Postgastrectomy Syndrome Assessment Scale PGSAS-45.

2.3.3.1. Evaluation time

We meet every patient face-to-face or interview by phone to guide them in fully completing the PGSAS-45 questionnaire

(translated into Vietnamese) at 1, 6, and 12 months after surgery. After receiving the questionnaire from the patient, if there are missing items, the patient can be confirmed by phone.

2.3.3.2. How to calculate points

After collecting all the PGSAS-45 questionnaires answered from patients, the results will be filtered by aggregation and selection. Twenty-three symptom-related items were clustered into 7 symptom subscales. The score of each symptom subscale is calculated as the average of the scores of the items in the group and the total symptom score is calculated as the average of all 7 symptom subscales.

The following outcome groups were selected as the main outcome mesures: physical, mental, esophageal reflux, abdominal pain, meal-related discomfort, indigestion, diarrhea, constipation, dumping syndrome, quality of ingestion, total symptom score and dissatisfaction for daily life.

2.4. DATA HANDLING

Data was input and handled by SPSS version 26 (IBM SPSS Statistics for Windows, Version 26.0).

Chapter 3. RESULTS

3.1. CHARACTERISTICS OF PATIENTS

- Age: mean age was 56,9 ± 12,5 years (27-82), the most common age group was from 50 to 69 years, accouting for 57,8%.
- Gender: male/female ratio was 1,04/1.
- Body mass index: average BMI was 21,0 ± 2,6 kg/m^2, the majority of patients have an average body mass index, accounting for 62.2%.
- ASA: the majority were classified as ASA 2, accounting for 57,8%.
- Medical history: The majority had medical diseases, of which the highest proportion of disease was cardiovascular disease and other diseases, accounting for 17.8%. All patients are consulted and treated before surgery.
- Clinical symptoms: abdominal pain was the most common, accounting for 91.1%, followed by gastrointestinal bleeding (28.9%). Abdominal masses and pyloric stenosis were the least common.

3.2. SURGICAL OUTCOMES OF LAPAROSCOPIC TOTAL GASTRECTOMY

3.2.1. Tumor characteristics during and after surgery

- Tumor location: Tumors were mainly located in the middle or 2/3 lower part, accounting for 46.7% and 33.3%, respectively.

- Average tumor size: 4.2 ± 2.5cm (0.5-10), most patients had lesion size from 3-5cm, accounting for 35.6%.

- Macroscopic classification: Infiltrative ulcerative (type III) and ulcerative (type II) were the majority, accounting for 44.4% and 33.3%, respectively.

- Pathological stage:

+ Stage T: T2, T3, T4a were equivalent and account for the highest rate of 28.9%. There were 2 cases of Tis tumors, accounting for 4.4%.

+ Stage N: Approximately 1/2 of patients had no lymph node metastasis. The rates of lymph node metastasis groups were nearly equal.

+ Stage TNM: Stages IIA and IIIA account for the highest rates, 17.8% and 24.4%, respectively.

- Level of differentiation: Poor differentiation accounts for the majority with 37.8%, followed by good differentiation with 20%.

3.2.2. Surgical outcomes

- Reconstruction: Most of the esophagojejunal anastomosis was performed in the side-to-end fashion, accounting for 82.2% and with staplers, accounting for 82.2%.

- Average duration of operation: 218.8 ± 69.3 minutes, median 210 minutes, (105-510), statistically shorter in the stapler group than the hand sewn group.

- Average surgical blood loss: 431.6 ± 426.5ml, median 308.9 ml (0-1991.3).

- Intrioperative complications: no cases recorded.

- The average number of dissected lymph nodes was 17.1 ± 9.3 lymph nodes (1-47).

- The average number of metastatic lymph nodes was 3.9 ± 6.6 lymph nodes, at most 30, statistically larger in the T4a group than in the below T4a group.

- The lymph node metastasis ratio is 0.2 ± 0.3.

3.2.3. Outcomes after surgery

- Average time to recovering bowel movement: 4.2 ± 1.4 (1-7) days.

- Average hospital stay: 11.6 ± 3.7 (8-24) days.

- Postoperative complications: There were 10 complications occurring in 8 patients, accounting for 22.2%, of which anastomotic leakage was the most common complication, accounting for 6.7%. There were 4 cases with complications from grade III or higher according to Clavien-Dindo, accounting for 8.9%.

- Adjuvant therapy: among patients indicated for adjuvant therapy, the majority of patients received the full course of treatment, accounting for 28.9%. The number of patients without treatment indication accounted for 40%.

3.2.4. Metastasis, recurrence, survival

The time of follow-up was until February 31, 2023, the longest is 49 months, the shortest is 12 months. We tracked 40 cases (88.9%) and lost 5 cases (11.1%).

- Metastasis and recurrence: There were 9 cases of metastasis, accounting for 20%. The average time to metastasis was 10.7 months (4-32). There was 1 case of hilar lymph node recurrence, accounting for 2.2%. There were no cases of anastomotic recurrence.

- Survival

+ The average overall survival was 35.4 ± 2.6 months, the average disease-free survival was 34.6 ± 2.8 months.

+ Overall survival rates after 1, 2, 3 and 4 years are 91.1%, 70.3%, 59.9% and 52.4%, respectively. Disease-free survival rates after 1, 2, 3 and 4 years were 77.4%, 67.7%, 56.7% and 56.7%, respectively.

+ Survival in the below T4a group was statistically longer than the T4a group (p=0.047).

+ Survival in the group of patients who received a full course of adjuvant therapy was statistically longer than the group who did not receive a full course of therapy and had indications but no treatment (p<0.001).

Chapter 4. DISCUSSION

4.1. CHARACTERISTICS OF PATIENTS

- Age: average age was 56.9 ± 12.5 years old, of which the oldest is 82 years old and the youngest is 27 years old. The most common age group is from 50 to 69 years old, accounting for 57.8%. This result is similar to other studies.

- Gender: male/female ratio is approximately equal (1.04/1), different from the trend of males predominating over females in most studies. Endogenous factors such as sex hormones are thought to play a key role in providing protection for women and increasing the risk of gastric cancer in men.

- The average body mass index was 21.0 ± 2.6 kg/m2, the majority of patients had an average body mass index (18.5-22.9), accounting for 62.2%. There were 11 overweight patients, accounting for 24.4%, including 3 obese patients (BMI ≥ 25). Our results are also similar to other authors. Regarding the relationship between BMI and surgical outcomes, in our study, the complication rate was not statistically significant between the BMI ≥23 and BMI <23 groups (p=0.100). In general, total gastrectomy is safe and feasible, even for obese patients.

- ASA and medical history: the majority of patients had medical diseases, accounting for 53.3%. Of these, cardiovascular disease accounts for the majority with 17.8%, the proportion of patients with 2 or more medical diseases is 11.1%. The medical diseases in this study were mostly mild. All were consulted with specialists and received stable treatment before surgery. The difference in complication rate between patients with and without comorbidities in this study was not statistically significant (p=0.835). This result is similar to other studies. According to the ASA scale, the majority of patients in our study had ASA 2, accounting for 57.8%. There were 4 patients with ASA 3, accounting for 8.9%. The complication rate between ASA groups was not statistically different (p=0.457).

- Clinical symptoms: the majority of patients had abdominal pain, accounting for 91.1%. The next most common symptoms were gastrointestinal bleeding (28.9%) and weight loss (13.3%). We had 1 case (2.2%) with no clinical symptoms. Our results are similar to other authors.

4.2. SURGICAL OUTCOMES AFTER LAPAROSCOPIC TOTAL GASTRECTOMY

4.2.1. Tumor characteristics during and after surgery

- Tumor location: mostly in the middle part, accounting for 46.7%, followed by the 2/3 lower part with 33.3%. This result is similar to other studies. Regarding surgical indications related to the location of the tumor, in our study, there were 2 cases of tumors located in the upper part with T3N0 and T2N0 stage, respectively, both did not meet the indications for proximal gastrectomy (cT1N0 tumor) according to Japanese gastric cancer treatment guideline. Therefore,

the indication for total gastrectomy in these 2 cases was reasonable.

- Average tumor size: 4.2 ± 2.5cm, the largest is 10cm and the smallest is 0.5cm. Most patients had tumors ranging in 3-5cm size, accounting for 35.6%. This result is equivalent to other studies.

- Macroscopic classification: type II (ulcerative) and type III (infiltrative ulcerative) were the most common, accounting for 33.3% and 26.7%, respectively. Most studies showed that the ulcerative type is the most common type in gastric cancer.

- Pathological stage:

T2, T3 and T4a stage accounted for the highest proportion, together 28.9%, followed by T1 (8.9%). There were 2 cases of Tis stage, accounting for 4.4%. This result is equivalent to domestic and Western studies, lower than Japan and Korea study. When analyzing the complication rate between T4a group and below T4a group, we found no statistically significant (p=0.146).

In our study, there were 2 cases of Tis stage tumor. The first case had preoperative CT results showing a T4 tumor, measuring 1.5x6.1cm at the lesser curvature of the stomach. During surgery, we assessed that distal gastrectomy did not achieve a safe resection margin. Therefore, the indication for total gastrectomy in this case was reasonable. The second case is a male patient who had surgery in November 2019. This patient had a history of endoscopic submucosal dissection (ESD) due to severe dysplasia 3 months before admission. Endoscopy results at admission showed that in addition to the lesion at the old ESD site that showed biopsy results as adenocarcinoma, a new lesion in the body of the stomach measuring 1.5x2cm was suspected of being malignant. At that time, we did not have much experience with ESD, especially recurrent ESD after recurrence. Therefore, to achieve a safe resection margin, we performed total gastrectomy in this patient.

Regarding lymph node metastasis, 51.1% of patients had lymph node metastasis. In particular, the rate was nearly equivalent between lymph node metastasis groups. According to this study, stage IIIA accounted for the highest proportion with 24.4%, followed by stage IIA with 17.8%. Our results are also similar to other studies.

- Level of differentiation: Poor differentiation accounted for the majority with 37.8%, followed by well differentiation 20%, moderate differentiation and ring cells accounted for 17.8%. This result is similar to other studies.

4.2.2. Surgical outcomes

- Reconstructon: end-to-side esophagojejunostomy with small incision was done in 82.2% of cases and using staplers to perform anastomosis was in 82.2% of cases. The choice of method and means of performing the anastomosis depends entirely on the surgeon's preference and experience. Although the method and means of reconstruction did not affect the amount of surgical blood loss, flatus time, hospital stay and postoperative complications, the operative time in the stapler group was statistically shorter compared to the hand-sewn group (p=0.023).

- Average duration of operation: 218.8 ± 69.3 minutes, median was 210 minutes, the shortest was 105 minutes and the longest was 510 minutes. Athough there is no difference in operation time between T4a group and below T4a group, pathological stages, tumor location, tumor size and method of reconstruction, the operation time was significantly longer in hand sewn group compared with the stapler group (p=0.023). The factors thought to influence surgical time are experience, learning curve and coordination between surgeons. This result is quite similar to other studies.

- Amount of surgical blood loss: in 2019, the study of Jaramillo showed that among current blood loss calculation formulas, Lopez-Picado's formula is the most accuracy compared other formulas. In our study, when using Lopez-Picado's formula, the average amount of surgical blood loss was 431.6 ± 426.5 ml, the median was 308.9 ml, the highest was 1991.2 ml. Most blood loss during surgery comes mainly from lymph node dissection due to damage to blood vessels, especially in obese patients. Our results are much higher than other authors. However, all these studies calculated blood loss by estimating from suction and surgical gauze. A systematic review and meta-analysis of Tran in 2021 showed that observational estimates of blood loss tend to underestimate true blood loss and often produce results with low precision. Additionally, while it is nearly impossible to completely accurately assess blood loss, the advantage of estimating blood loss using a formula is that it minimizes the reliance on inter-rater reliability.

- Number of dissected and metastatic lymph nodes: The average number of dissected lymph nodes was 17.1 ± 9.3 lymph nodes, the maximum was 47, the least was 1. The average number of metastatic lymph nodes was 3.9 ± 6.6 lymph nodes, with a maximum of 30 lymph nodes. The lymph node metastasis ratio is 0.2 ± 0.3. This result is less than some other studies partly because the surgeons participating in

this study had different experience in lymph node dissection, and the specimens were analyzed and read by many pathologist. When analyzing related factors, we found that the number of dissected lymph nodes was no significantly different between T stages, tumor size and BMI groups. The rate of lymph node metastasis in below T4a stage (13/32) is significantly lower than that in T4a stage (10/13) (p=0.027). Similarly, the number of metastatic lymph nodes in T4a stage (6.7) was significantly greater than that in below T4a stage (2.8) (p=0.028). This result is similar to other studies.

4.2.3. Outcomes after surgery

- Average time of recovering bowel movement: 4.2 ± 1.4 days, the earliest was 1 day, the latest was 7 days. The duration of flatus was not related to the method and means of reconstruction. This result is similar to other studies.

- Average hospital stay: 11.6 ± 3.7 days, the shortest was 8 days, the longest was 24 days. In 5 cases of over 15 days hospital stay, the majority of patients had postoperative complications that required reoperation or hospital care. These results vary between studies. In 2021, Amari's study evaluated the factors that influence length of hospital stay in gastric cancer patients. The results showed that surgery time, number of days the patient can walk independently and vital capacity are the factors affecting the length of hospital stay.

- Postoperative complications

The complications rate after gastrectomy was differently reported across studies. The variability in complications after gastrectomy was due to the fact that complications are defined in different ways across studies. In 2019, the Gastrectomy Complications Consensus Group consisting of 34 European gastric cancer experts, created a list of 27 complications after gastrectomy due to cancer (3 intraoperative, 14 postoperative general and 10 postoperative surgical complications) and specific definitions for each complication. In our study, the number of complications was 10 cases occurring in 8 patients, accounting for 22.2%. Among them, anastomotic leak was the most common complication, with 3 cases accounting for 6.7%. According to the Clavien-Dindo classification, there were 4 cases of grade III complications, accounting for 8.9%. We had 2 patients with 2 postoperative complications, 1 patient with anastomotic leak and post-operative bleeding, 1 patient with anastomotic leak and pleural effusion both requiring reoperation. The complication rate in our study is similar to other studies. When analyzing related factors, we found that age, BMI,

comorbidities, ASA, pT stage, pStage, methods and means of reconstruction had no statistically related to the rate of postoperative complications ($p>0.05$). This result is similar to some studies.

+ Postoperative bleeding:

According to the international consensus, postoperative bleeding requires both urgent transfusion and invasive treatment. In our study, there was 1 case of postoperative bleeding. The patient underwent laparoscopic total gastrectomy and lymphadenectomy due to pT2N0M0 adenocarcinoma. The patient developed a fever on the 3rd postoperative day. The drain was removed on the 7th postoperative day. On the 8th day after surgery, the patient suddenly suffered from hemorrhagic shock. Abdominal ultrasound showed a large amount of free fluid in the peritoneal cavity. The patient received an urgent blood transfusion and had reoperation. During surgery, an additional fistula was discovered at the esophagojejunal anastomosis, 1cm in size and blood was leaking from the anastomosis and the cutting edge. The surgeon treated it by suturing the anastomosis, stopping the bleeding, rinsing the abdomen and placing drainage. The patient was discharged after 21 days. Corrosion of blood vessels and damage to the artery wall during lymphadenectomy are the two main causes of late bleeding outside the gastrointestinal tract (after 6 days). On the other hand, most cases of late extra-gastrointestinal bleeding are related to anastomotic leaks. According to some studies, 42% of gastric cancer patients with late bleeding had previous intraperitoneal infection and 62% had anastomotic fistula or pancreatic fistula. This result is similar to our study, the patient had fever and an esophagojejunal anastomotic leak was discovered during surgery.

+ Anastomotic leak:

According to the consensus, anastomotic leak is defined as a full-thickness defect of esophagojejunal, gastrojejunal, jejunojejunal anastomoses irrespective of (i) presentation, (ii) method of indentification, (iii) clinical consequences and (iv) treatment. An abscess close to the anastomosis should also be recorded in this group. In our study, there were 3 cases of anastomotic leakage, accounting for 6.7%, all of which were esophagojejunal anastomosis. Among them, 1 patient had a fever on the 5th postoperative day. Abdominal ultrasound detected a collection of fluid in the epigastric area leaking to the skin. This patient was successfully conservative treatment with antibiotics and discharged after 22 days. The 2 remaining cases required reoperation. In these 2 case, 1 case was discovered

accidentally when the patient was reoperated due to post-operative bleeding (described above), and 1 case had a pleural effusion immediately after surgery, had pleural drainage, discovered anastomotic leak on the 3rd postoperative day, had surgery to remove the esophagus to the skin and was discharged from the hospital after 24 days. The rate of anastomotic leakage in our study is higher than that of some studies. Large domestic studies have not recorded any cases of anastomotic leakage.

Most studies showed that the anastomotic leak rate is significantly higher in laparoscopic surgery compared to open surgery. Total gastrectomy is still technically challenging. Regarding risk factors, GIRCG research showed that comorbidities (especially respiratory diseases), tumor stage, extensive lymph node dissection and anastomosis technique are significant risk factors for anastomotic leakage. Successful treatment of anastomotic leak depends on early detection and appropriate management. Treatment of anastomotic leakage after gastrectomy includes: conservative treatment (with or without percutaneous drainage), endoscopic treatment and surgery. Currently, there is still no standard treatment regimen for anastomotic leak due to lack of evidence from randomized studies.

+ Abdominal collection: there were 2 cases of abdominal collection after surgery, accounting for 4.4%. In the first case, on the 10th postoperative day, the patient had epigastric pain, white blood cell count increased by 20.6 K/μL, and abdominal ultrasound detected a 16x8cm fluid collection in the epigastrium. The patient was given the 4th generation Cefalosporin antibiotic and was discharged after 20 days. In the another case, on the 7th postoperative day, the patient had no symptoms but abdominal ultrasound accidentally discovered a fluid collection measuring 2.4 x 4.2cm under the left liver. The patient did not receive any treatment and was discharged after 9 days. This result is similar to other studies.

+ Surgical wound infection

Most of the cases in our study combined a small midline incision about 5cm for reconstruction and all were used incision protection devices. The rate of surgical wound infection is 4.4%. All were successfully treated medically. This result is similar to other studies. In 2020, Qiao's study evaluated the risk factors of surgical site infection after radical gastrectomy for cancer in China. Gender, total gastrectomy, albumin (day 3 after surgery) <30 g/L and complete IV nutrition after surgery were independent risk factors for surgical site

infection.

+ Intestinal obstruction due to adhesions after surgery: there was 1 case of intestinal obstruction due to adhesions occurring in the 7th month after surgery, accounting for 2.2%. This is a female patient with pT4aN1 signet ring cell cancer who did not receive adjuvant treatment after surgery. The patient received successful medical treatment with gastric tube placement, fasting, and intravenous fluids. Intestinal obstruction due to postoperative adhesions are relatively rare. The largest study on complications of intestinal obstruction after gastrectomy is the 2021 Pan study in 3025 patients. The proportion of patients with at least 1 intestinal obstruction was 10.9%, the average time from gastrectomy to the first intestinal obstruction was 18.2 months. Of these, 9.4% of patients had recurrent intestinal obstruction, 82.7% were treated conservatively, 13.3% were treated surgically without bowel resection, and 4% had bowel resection. The authors found that previous abdominal surgery, open gastrectomy, no Bilroth I anastomosis, D2/D2+ lymphadenectomy, resection of other organs, and intraperitoneal complications are independent risk factors for intestinal obstruction.

4.2.4. Metastasis, recurrence, survival

- Metastasis, recurrence

In our study, the metastasis rate was 20% and the average metastasis time was 10.7 months. Of these, 50% of patients were in T4a stage, all of which had lymph node metastases. The recurrence rate was 2.2% and the median time to recurrence was 23 months. The largest and most recent study specifically on recurrence rates after total gastrectomy for advanced gastric cancer was conducted by Jiao in 2020 in 299 patients. Metastatic and recurrent rate was 22.7% with a median time of 17.7 months (3-74 months). Of these, the rates of local recurrence, peritoneal metastasis and distant metastasis are 43.5%, 76% and 82.8%, respectively. T stage and histological type were independently associated with peritoneal metastasis. Lymph node metastasis was the only predictive factor for distant metastasis.

- Survival

According to Kaplan Meier, the average overall survival is 35.4 ± 2.6 months and the average disease-free survival time is 34.6 ± 2.8 months. In addition, the 1- and 3-year overall survival rates were 91.1% and 59.9%, respectively. This result is equivalent to other studies.

Currently, Feng's multicenter study is the only study comparing the technical and oncological safety of laparoscopic and open total

gastrectomy for advanced gastric cancer, with 5-year survival rate were 48.9% and 50.6%, respectively (p=0.134).

When analyzing related factors, the survival in the group with a full course of adjuvant therapy was statistically longer than in the group with insufficient treatment and with indications but no treatment (p<0.001). Similarly, the survival in the below T4a stage group was statistically longer than the T4a group (p=0.047).

In our study, at 1 year, the survival rate in stage 0-1 (92.3%) was higher than stage II (85.7%) and lower than stage III (94.4%). However, by 3 years, the survival rates in stages 0-I, II and III were 68.4%, 65.5% and 48.3%, respectively. However, this difference is not statistically significant (p=0.418).

4.3. ASSESSING THE QUALITY OF LIFE AND SOME RELATED FACTORS OF PATIENTS AFTER LAPAROSCOPIC TOTAL GASTRECTOMY USING THE POSTGASTRECTOMY SYNDROME ASSESSMENT SCALE PGSAS-45.

4.3.1. The quality of life at studied time points

In our study, total symptoms score after laparoscopic total gastrectomy at 1, 6 and 12 months were 1.7 ± 0.4, 1.4 ± 0.3 and 1.3 ± 0.2, respectively. Meal-related distress was the most complained symptom, followed by indigestion, abdominal pain, esophageal reflux, diarrhea, and dumping. Constipation was the least common symptom. In terms of living status, the daily food consumption was 70–80% of that before the surgery, and a snack was necessary. Apart from three main meals, patients often ate 2–3 snacks daily. The quality of the ingestion subscale and the ability to work subscale slightly diminished. Patients rarely reported their appetite, hunger, or gastroparesis. Most patients could work normally (≥70–80% of the previous work- load). In terms of the quality of life, the dissatisfaction in daily life is mostly related to symptoms rather than meals and the ability for working. Besides, the mental component summary was higher than the physical component summary at three studied time-points.

Most studies showed that meal-related distress is the symptom that mostly affects the quality of life of patients after gastrectomy, and dissatisfaction in daily life is mainly related to symptoms. Besides, except for constipation, the remaining main outcome measures were the worst at 1 month after surgery, then gradually recovered at 6 and 12 months. In particular, the outcome measures of esophageal reflux, abdominal pain, meal-related distress,

indigestion, total symptom score, quality of ingestion, dissatisfaction for daily life and physical health gradually improved with statistical significance ($p<0.05$). In other words, most QoL recovered over time. Although there was a decrease at 6 months compared to 1 month, the mental group was better at 12 months, even higher than at 1 month ($p=0.411$).

The mental component summary had a decrease at 6 months compared to 1 month and recovered at 12 months. This may be explained by the fact that after surgery, patients are worried when being informed about the stage of the disease, survival rate, and especially the risks of postoperative adjuvant treatment. After completing adjuvant treatment and stabilizing health, the patient's spirit gradually recovered, better at 12 months than at 1 month. This result is similar to some studies. In general, gastrectomy for cancer temporarily impairs QoL. For most outcome measures, QOL generally improved over time. Therefore, surgeons should discuss with patients about the temporary decrease in QoL before gastrectomy and reassure them that most symptoms will recover after surgery.

Compared with partial gastrectomy, most studies showed that QoL after total gastrectomy is significantly worse. In 2020, Park's study compared QoL after total gastrectomy and distal gastrectomy at 1, 2, and 3 years after surgery. Symptoms of pain, reflux, food restriction, anxiety, taste, and poorer body image were statistically worse in the total gastrectomy group. Physical function, role function, and fatigue were significantly better in the partial gastrectomy group at 2 and 3 years after surgery. Another study by Brenkman in 2018 was conducted on 222 gastric cancer patients after gastrectomy. Multivariate analysis showed that subtotal gastrectomy was better in terms of general QoL, symptoms, and functional groups.

4.3.2. Some factors related to quality of life

In our study, symptoms in the ≤60 years old group were statistically better than the >60 years old group at 1 and 12 months ($p=0.030$ and $p=0.028$). At 12 months, symptoms in the group with comorbidities were statistically worse than those in the group without comorbidities ($p=0.002$). The physical and mental component summary of the male group was statistically better than the female group at 6 months ($p=0.021$). At 6 months, the total symptom score in the end-to-side esophagojejunostomy group was statistically worse than the side-to-side group ($p=0.044$) and the physical and mental component summary in the group with no complications were

statistically better compared to the group with complications (p=0.048). In addition, symptoms, physical and mental factors were similar between BMI groups, pT stage, pN stage, pStage and adjuvant treatment. QoL after total gastrectomy in this study was related to age, gender, comorbidities, esophagojejunostomy method and complications.

Some studies also showed that age and gender greatly affect QoL in patients after gastric cancer surgery. Multivariate analysis in Takahashi's study confirmed the type of gastrectomy (total/partial), time after surgery, age, gender, approach (laparoscopic/open surgery) and condition of the vagus nerve. These are factors related to quality of life. Another study by Dang on 182 gastric cancer patients in Vietnam showed that many factors affect QoL, including age, occupation, education, disease stage, treatment and time since diagnosis. The older you are, the greater your chances of having comorbidities, leading to poorer quality of ingestion, ability for working and ability to cope with changes. Regarding gender, perhaps most women are more sensitive to restrictions after gastrectomy.

Besides patient-related factors, in our study, the group with side-to-side esophagojejunal anastomosis and no complications had better quality of life than the group with end-to-side anastomosis and with complications. In addition, other surgery-related factors did not affect the patient's symptoms, physical and mental health. In current studies, the approach, the method of reconstruction, the preservation of the vagus nerve and the volume of the remaining stomach are the factors related to surgery impacting on quality of life. According to Terashima, esophageal reflux symptoms after Billroth I reconstruction were significantly higher than Roux-en-Y ($p<0.0001$). In addition, Kinami's research showed that the factor affecting symptoms isthe remaining stomach volume, the factors affecting vital status and quality of life are age, extent of lymphadenectomy and approach. The laparoscopic group had better ability for working and mental component than open surgery. The author also affirmed that the quality of life after gastrectomy does not depend on the pathological stage of gastric cancer. A study by Yan in 2023 comparing QoL between end-to-side and side-to-side anastomosis groups after total gastrectomy showed that the side-to-side anastomosis group was worse on reflux and diarrhea subscales but better on dyspepsia and food restriction subscales.

Age, gender and comorbidities are fixed factors that cannot be changed before surgery. Therefore, influencing these factors to improve quality of life is impossible. More studies are needed to confirm the QoL benefits of performing a side-to-side esophagojejunostomy.

CONCLUSIONS

Our study in 45 gastric adenocarcinoma patients undergoing laparoscopic total gastrectomy with lymphadenectomy from 1/2019 to 2/2022 gave conclusions as follows:

1. Surgical outcomes of laparoscopic total gastrectomy

The average operative time was 218.8 ± 69.3 minutes, median 210 minutes. The average amount of surgical blood loss was 431.6 ± 426.5ml, the median was 308.9ml. The average number of dissected lymph nodes was 17.1 ± 9.3 lymph nodes. The average number of metastatic lymph nodes was 3.9 ± 6.6 lymph nodes. The lymph node metastasis rate was 51.1%.

The average time of bowel movement was 4.2 ± 1.4 days. The average postoperative hospital stay was 11.6 ± 3.7 days. The rate of postoperative complications was 22.2%, of which anastomotic leak accounted for the highest rate of 6.7%. The rate of complications of grade III or higher according to Clavien-Dindo was 8.9%.

Overall survival was 35.4 ± 2.6 months, disease-free survival was 34.6 ± 2.8 months. Overall survival rates after 1, 2, 3 and 4 years were 91.1%, 70.3%, 59.9% and 52.4%, respectively. Disease-free survival rates after 1, 2, 3 and 4 years were 77.4%, 67.7%, 56.7% and 56.7%, respectively.

2. T**he quality of life and some related factors after laparoscopic total gastrectomy using the Postgastrectomy Syndrome Assessment Scale PGSAS-45.**

Total symptom scores at 1, 6, and 12 months were 1.7 ± 0.4, 1.4 ± 0.3, and 1.3 ± 0.2. Meal-related distress was the most complained symptom. Constipation was the least common symptom. Living status: The daily food consumption was 70–80% of that before the surgery. The number of snacks was 2-3 snacks per day. Most patients could work ≥70-80% of previous activities. Quality of life: the dissatisfaction in daily life was mostly related to symptoms. The physical and mental component summary were good, in which the total score of the mental component was higher than the physical component.

Most QoL was good and recovered over time. Quality of life was statistically worse in patients over 60 years old, female, with comorbidities, end-to-end esophagojejunostomy and with postoperative complications.

RECOMMENDATIONS

1. Applying laparoscopic total gastrectomy and lymph node dissection in gastric cancer

Laparoscopic total gastrectomy and lymphadenectomy have been proven to be safe, effective, ensuring aesthetic and oncological aspects. However, this is still a technically challenging surgery, especially in lymph node dissection and performing the esophagojejunostomy. Therefore, laparoscopic total gastrectomy and lymphadenectomy should be applied in the treatment of gastric cancer in centers with full laparoscopic equipment and a team of well-trained and experienced surgeons.

2. Improving quality of life is the main goal in gastric cancer treatment in addition to survival time

The role of improving QoL after gastrectomy is increasingly respected in the world. However, in Vietnam, there are still few studies that include QoL in the final results. Therefore, regularly assessing the patient's functions and manifestations can help patients improving their QoL through accurate intervention and consultation. In addition, it is necessary to periodically assess QoL and consider improving QOL as an essential goal in cancer treatment in addition to survival time. Studies with larger sample sizes and longer follow-up periods are needed to evaluate QoL more clearly and provide methods to help improve QoL after gastrectomy.

PUBLICATIONS

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