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**STUDY ON THE OUTCOMES OF LAPAROSCOPIC DISTAL
GASTRECTOMY WITH D2 LYMPHADENECTOMY IN THE
TREATMENT OF GASTRIC CANCER**

Specialization: Surgery

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LIST OF PUBLICATIONS RELATED TO THE DISSERTATION

1. Dang Dinh Khoa, Nguyen Van Huong, Pham Van Duyet, Clinical and paraclinical characteristics of patients undergoing laparoscopic distal gastrectomy with D2 lymph node dissection, *Vietnam Journal of Community Medicine, Vol. 66, Special Issue 11, August 2025*: 341 – 346.
2. Dang Dinh Khoa, Nguyen Van Huong, Pham Van Duyet, Laparoscopic distal gastrectomy with D2 lymphadenectomy and Billroth II reconstruction for gastric adenocarcinoma, *Vietnam Journal of Community Medicine, Vol. 66, Special Issue 11, August 2025*: 333 – 340.
3. Dang Dinh Khoa, Nguyen Van Huong, Pham Van Duyet, Outcomes of laparoscopic distal gastrectomy with D2 lymphadenectomy and Billroth II reconstruction in the treatment of gastric adenocarcinoma, *Vietnam Journal of Community Medicine, Vol. 66, Special Issue 9, August 2025*: 364 – 369.

INTRODUCTION

Gastric cancer is one of the most common malignancies, ranking fifth in incidence and third in mortality worldwide. In Vietnam, it is the third most frequent cancer, posing a significant public health burden. Histologically, adenocarcinoma is the most common type, progressing silently with nonspecific symptoms. As a result, most patients are diagnosed at an advanced stage, making treatment more complicated and prognosis less favorable. Among treatment modalities, tumor resection combined with radical lymphadenectomy remains the mainstay, offering the only chance of cure for patients without distant metastasis.

With medical advances, laparoscopic surgery has become an important breakthrough in gastric cancer treatment. Since its first application in Japan, this technique has shown many advantages compared with open surgery, including minimal invasiveness, less postoperative pain, faster recovery, and shorter hospital stay, while still ensuring oncological effectiveness. A key factor determining surgical success is lymph node dissection. According to international guidelines, D2 lymphadenectomy is considered the gold standard for locally advanced gastric cancer, as it reduces recurrence rates and improves survival outcomes compared with less extensive dissection.

In Vietnam, laparoscopic distal gastrectomy with D2 lymphadenectomy has been implemented in many hospitals, demonstrating feasibility and safety, with adequate lymph node harvest and favorable postoperative recovery. Among reconstruction techniques, Billroth II anastomosis is commonly applied due to its simplicity and shorter operative time. At Nghe An Friendship General Hospital, this technique has been routinely performed; however, no comprehensive study has systematically evaluated the clinical and paraclinical features, surgical techniques, and treatment outcomes. Therefore, it is both necessary and practical to conduct a study addressing these issues. We carried out the research: “*Study on the outcomes of laparoscopic distal gastrectomy with D2 lymphadenectomy in the treatment of gastric cancer*” with two objectives:

1. To investigate the clinical, paraclinical characteristics, and surgical techniques of laparoscopic distal gastrectomy with D2 lymphadenectomy and Billroth II reconstruction for gastric adenocarcinoma.
2. To evaluate the outcomes of laparoscopic distal gastrectomy with D2 lymphadenectomy and Billroth II reconstruction in the treatment of gastric adenocarcinoma at Nghe An Friendship General Hospital.

GENERAL INFORMATION ABOUT THE DISSERTATION

1. Structure of the dissertation

The dissertation consists of 145 pages, including:

- Introduction: 2 pages
- Chapter 1: Literature review, 37 pages
- Chapter 2: Subjects and methods, 24 pages
- Chapter 3: Research results, 32 pages
- Chapter 4: Discussion, 47 pages
- Conclusion: 2 pages
- Recommendations: 1 page

The dissertation contains 41 tables, 42 figures and charts, and 152 references (both English and Vietnamese sources).

2. Novel contributions of the dissertation to the specialty

The study analyzed 90 cases of gastric cancer treated with totally laparoscopic distal gastrectomy, D2 lymphadenectomy, and Billroth II reconstruction.

The dissertation demonstrated that totally laparoscopic surgery with stapler anastomosis and afferent loop suspension achieved a 100% success rate, with no conversions to open surgery and no intraoperative mortality. This clearly confirms the feasibility and safety of the technique in provincial-level clinical practice.

The mean number of dissected lymph nodes was 25.9, meeting international standards for accurate staging. Lymph node metastases were found in 64.5% of cases, predominantly in stations 6, 4, and 3—contributing unique data on Vietnamese patient populations.

Intraoperative complications (3.3%) and early postoperative complications (5.6%) were low, with no early mortality. Recovery was rapid, with a mean hospital stay of 8.5 days, underscoring the clinical benefits of the procedure.

In terms of long-term outcomes, overall survival rates at 1, 2, and 3 years were 98.9%, 89.9%, and 78.8%, respectively. Adjuvant chemotherapy significantly improved survival, highlighting the importance of multimodal treatment strategies.

Quality of life was assessed using the Spitzer Index, showing that >85% of patients scored ≥ 7 at follow-up visits, particularly in the domains of “Activities” and “Support.” This confirms that laparoscopic surgery not only prolongs survival but also enhances the quality of life of patients.

CHAPTER 1: LITERATURE REVIEW

1.1. Anatomical position and structure of the stomach

The stomach is located in the epigastric region, representing the dilated portion of the digestive tract, connecting the esophagus above with the duodenum below. The distal stomach, consisting of the antrum and pylorus, plays an important role in gastric grinding and emptying and is also a common site of gastric cancer. In surgery, the stomach is often divided vertically into three parts: the upper, middle, and lower thirds, to facilitate localization of lesions.

Regarding blood supply, the distal stomach receives arterial blood from the right gastric artery and right gastroepiploic artery, which anastomose with the left-sided vessels to form a rich vascular network. Venous drainage is mainly into the portal and superior mesenteric systems, with the prepyloric vein serving as an important surgical landmark. Neural innervation is primarily via the vagus nerve, sympathetic fibers, and enteric nervous system, ensuring motility and secretory functions. The lymphatic system is highly developed, closely related to the pathways of cancer spread, and forms the basis of lymphadenectomy strategies, in which D2 dissection is considered the gold standard for achieving curative treatment.

1.2. Pathophysiology of gastric cancer

Gastric cancer results from the interaction of multiple factors, the most important being the accumulation of genetic mutations in mucosal epithelial cells. Chronic *Helicobacter pylori* infection, together with environmental and hereditary factors, contributes to long-term mucosal injury, leading to malignant transformation. Oncogenes and tumor suppressor genes are frequently altered, disrupting the balance between proliferation and apoptosis, thus creating conditions for tumor development.

As the disease progresses, cancer cells can infiltrate adjacent tissues, blood vessels, and lymphatics, subsequently spreading to lymph nodes and distant organs. The tumor induces angiogenesis to sustain its growth. In parallel, cancer cells develop immune evasion mechanisms, enabling long-term survival. Abnormalities in intracellular signaling pathways, particularly the PI3K–AKT–mTOR pathway, play an essential role in promoting proliferation and driving the metabolic reprogramming characteristic of gastric cancer.

1.3. Diagnosis of gastric adenocarcinoma

Clinical symptoms

In the early stages, gastric adenocarcinoma often presents with no specific symptoms and can easily be mistaken for benign gastritis or peptic ulcer disease. Patients may complain of discomfort, bloating, or dull epigastric pain. With disease progression, symptoms become more pronounced, including poor appetite, weight loss, anemia, vomiting of retained food due to pyloric stenosis,

or upper gastrointestinal bleeding. In some advanced cases, a palpable epigastric mass or supraclavicular lymphadenopathy may be detected.

Paraclinical investigations

A variety of diagnostic modalities are employed. Conventional radiography can detect lesions in advanced disease. Endoscopy with biopsy remains the gold standard and has been increasingly improved by magnifying endoscopy with narrow-band imaging (ME-NBI) and artificial intelligence applications, enhancing early and accurate detection. Endoscopic ultrasonography is valuable for assessing tumor invasion depth and locoregional lymph nodes, while CT and MRI provide information on local invasion and distant metastasis. Diagnostic laparoscopy can reveal occult peritoneal metastases, whereas PET/CT aids in evaluating systemic spread and refining treatment strategies. Additionally, biomarker testing—including HER2, MSI, and PD-L1—supports the selection of targeted therapies and immunotherapy.

1.4. Classification of gastric cancer

According to the TNM system:

The TNM classification plays a central role in evaluating the stage of gastric cancer, based on tumor size, lymph node status, and the presence of distant metastases. The 8th edition introduced three types of staging (cTNM, pTNM, ypTNM) and further divided pN3 into pN3a and pN3b for better prognostic stratification. In addition, classification of tumors at the esophagogastric junction was clearly refined. For accurate staging, at least 16 lymph nodes should be dissected, with the ideal number being more than 30, to reduce staging errors and guide appropriate treatment.

In clinical practice, TNM classification is applied at different stages: preoperatively based on imaging (EUS, CT, MRI, PET-CT), intraoperatively via laparoscopy or direct exploration, and postoperatively based on pathological specimens (pTNM). Each provides critical information for selecting the optimal treatment strategy. Among them, pTNM is regarded as the gold standard as it accurately reflects disease status, but its reliability depends on surgical quality and the number of nodes retrieved. Correct staging is crucial for survival prognosis and for determining adjuvant chemotherapy or radiotherapy.

According to the World Health Organization 2019:

The 2019 WHO pathological classification is more updated and detailed than the 2010 version, providing a broader description of gastric adenocarcinoma subtypes. The main groups include papillary, tubular, mucinous, poorly cohesive (including signet-ring cell), mixed types, and rare forms such as hepatoid, micropapillary, and fundic-gland type. These updates reflect histological complexity and the different prognostic implications of each subtype.

The revision also provided clearer criteria for distinguishing poorly cohesive and signet-ring cell carcinomas. Each type is further described in terms

of invasive characteristics, potential for lymph node or liver metastasis, and its prognostic relevance. Thus, the WHO 2019 system not only improves diagnostic accuracy but also supports personalized treatment, allowing clinicians to tailor management according to histopathological features.

1.5. Treatment of gastric cancer

History and Billroth II method:

Surgery has been the cornerstone of gastric cancer treatment since the 19th century, with the two classic procedures being Billroth I and Billroth II. A major breakthrough occurred when Kitano (1994) successfully performed laparoscopic distal gastrectomy for early gastric cancer, ushering in the era of minimally invasive surgery. Currently, laparoscopy, robotic surgery, and fluorescence-guided lymph node navigation using indocyanine green (ICG) have proven effective, optimizing lymphadenectomy and reducing complications.

Billroth II was developed as an improvement over Billroth I to minimize complications such as duodenal stump leakage. This method connects the remnant stomach to the jejunum, bypassing the duodenum when direct anastomosis is not feasible. It is considered technically simple and widely applicable, especially in complex cases, but its drawback is a higher risk of bile reflux and stump gastritis. Compared with Roux-en-Y, Billroth II is less physiological but remains a reliable option in many clinical situations.

Treatment protocols and surgical techniques:

According to the Japanese Gastric Cancer Association, treatment is based on TNM staging. Very early cancers (cT1a) may be treated with endoscopic mucosal resection, while T2–T4 or node-positive cases generally require gastrectomy with D2 lymphadenectomy. Patients with distant metastases are managed with palliative chemotherapy or radiotherapy. Adjuvant chemotherapy is recommended after surgery for stage II–III disease to reduce recurrence.

Radical surgery requires achieving an R0 resection with systematic lymph node dissection. Distal gastrectomy is applied for tumors in the lower two-thirds of the stomach, while total gastrectomy is indicated for proximal or diffuse tumors. D2 lymphadenectomy is now the standard, as long-term studies have shown it improves survival and reduces recurrence compared with limited dissections. Digestive reconstruction can be achieved with Billroth I, Billroth II, or Roux-en-Y. Among these, Roux-en-Y provides better prevention of reflux but is technically more complex. Extended resections, palliative surgery, and reoperations for recurrence also play roles depending on disease status and patient condition.

1.6. Laparoscopic distal gastrectomy with D2 lymphadenectomy and Billroth II reconstruction

Laparoscopic distal gastrectomy with D2 lymphadenectomy has proven safe and effective for gastric cancer treatment, especially in Japan and Korea. Compared with open surgery, laparoscopy offers advantages such as less blood

loss, reduced postoperative pain, and faster recovery while maintaining oncological principles. Indications usually include tumors in the lower two-thirds of the stomach, staged cT1–T4a, M0, in patients with good performance status; contraindications include extensive invasion, distant metastasis, or poor general condition.

Multiple surgical approaches exist, ranging from conventional lateral access to systematic regional dissection, particularly practiced in China. The suprapancreatic area is the most technically challenging, requiring either left-sided or inside-out approaches to safely control major vessels and minimize complications. For reconstruction, Billroth II can be modified with jejunal limb suspension, pouch interposition, or Braun anastomosis to reduce reflux. Billroth II is simple and efficient for laparoscopy, though prone to bile reflux, whereas Roux-en-Y is more physiological but technically demanding and carries a risk of Roux stasis.

1.7. Advances in detecting lymph node metastases

Techniques to identify metastatic nodes have advanced considerably. Methylene blue dye is inexpensive and simple but has a high false-negative rate. Technetium-99m allows detection of “hot nodes” with higher accuracy, especially in early disease, though it requires nuclear medicine facilities. The dual method, combining dye and radioisotope, overcomes limitations and achieves nearly 99% accuracy, becoming the new “gold standard” in research.

Recently, fluorescence imaging with indocyanine green (ICG) combined with near-infrared visualization has represented a major breakthrough. This technique allows real-time visualization of lymphatic flow and node detection, particularly useful in laparoscopic and robotic surgery. The detection rate is nearly absolute, safe, and minimally invasive, though its effectiveness decreases in T2–T3 stages. Currently, ICG is recommended for early gastric cancer, with promising potential for broader clinical adoption.

1.8. Postoperative treatment

Adjuvant chemotherapy is the cornerstone after surgery, aimed at eliminating microscopic residual disease, reducing recurrence, and improving survival. Standard regimens include XELOX, FOLFOX, or S-1. Targeted therapy has introduced a new era, with trastuzumab for HER2-positive patients and ramucirumab as second-line treatment. These therapies extend survival and support individualized management.

Immunotherapies such as nivolumab and pembrolizumab have demonstrated efficacy in advanced or recurrent disease, especially in PD-L1-high or MSI-H subgroups. Radiotherapy is not routinely used after D2 dissection but plays a role in cases with R1 resection, inadequate lymphadenectomy, or palliative symptom control. With these advances, postoperative strategies are increasingly diverse, aiming to optimize survival outcomes and quality of life.

1.9. Research outcomes of laparoscopic surgery

Globally, multiple studies have shown that laparoscopic gastrectomy provides long-term survival outcomes comparable to open surgery, while offering short-term benefits such as reduced blood loss, less pain, and faster recovery. The KLASS-02 trial in Korea and the JLSSG0901 trial in Japan both demonstrated equivalent 5-year survival rates compared with open surgery, with lower late complication rates. Comparisons between Billroth II and Roux-en-Y reconstructions indicate differences mainly in operative time and reflux complications, while oncological results remain similar.

In Vietnam, studies since 2008 have confirmed the feasibility of this technique. Reports highlight low blood loss, rapid recovery, low complication rates, and favorable survival outcomes. Recent studies recorded 5-year survival rates exceeding 70% in patients who underwent D2 dissection, comparable with international data. Multicenter analyses further validated the safety and efficacy of laparoscopic gastrectomy, paving the way for wider application in major hospitals.

1.10. Quality of life after surgery

Worldwide, quality of life (QoL) declines immediately after gastrectomy but gradually improves over 6–12 months. However, some symptoms such as diarrhea, reflux, dysphagia, and taste alterations may persist. Comparative studies show that patients undergoing total gastrectomy have the lowest QoL, whereas pylorus-preserving procedures help reduce certain symptoms but still present other challenges. Factors such as sex, age, postoperative time, and surgical method significantly affect long-term QoL.

In Vietnam, research is still limited but initial findings indicate relatively high QoL among gastric cancer patients compared with other malignancies. However, variables such as educational level, occupation, disease stage, and presence of metastasis strongly influence outcomes. The evidence highlights the need for long-term follow-up programs and comprehensive support, focusing not only on survival but also on physical, psychological, and social recovery after surgery.

CHAPTER 2: SUBJECTS AND METHODS

2.1. Subjects, study site, and study period

The study population consisted of patients with adenocarcinoma of the gastric antrum–pylorus region, without distant metastases, who underwent totally laparoscopic distal gastrectomy with D2 lymphadenectomy and Billroth II reconstruction at Nghe An Friendship General Hospital between January 2021 and April 2024.

Inclusion criteria were: patients aged ≥ 18 years; tumor stage T1–T4a, M0; ASA physical status \leq III; BMI between 16–30 kg/m²; no prior neoadjuvant chemotherapy; and informed consent to participate. Exclusion criteria included:

stage T4b or M1 disease, non-adenocarcinoma gastric cancer, ASA IV or higher, and cases not undergoing totally laparoscopic surgery.

The study was conducted at Nghe An Friendship General Hospital over 40 months. All medical records and clinical–paraclinical data were collected and systematically followed, providing the basis for analyzing surgical outcomes and prognostic factors.

2.2. Study design

This was a prospective, descriptive, longitudinal study conducted to document clinical, paraclinical, surgical, and treatment outcomes in patients with gastric adenocarcinoma. The study process was structured into four stages: preoperative assessment, which included TNM staging evaluation; intraoperative observation, focusing on surgical techniques and operative parameters; early postoperative follow-up, recording complications, recovery, and hospital stay; and long-term follow-up, evaluating recurrence, survival, and quality of life. The sample size was calculated using the single-proportion formula based on 1-year survival rates reported in previous studies, with a minimum of 78 patients required. To account for potential dropouts, the sample size was increased by 10%, resulting in 87 cases. Ultimately, 90 patients who met the inclusion criteria were enrolled. A convenient sampling method was applied, including all eligible patients within the study period.

2.3. Surgical equipment and procedure

Laparoscopic surgery was performed using Stryker and Karl-Storz systems with specialized instruments such as ultrasonic scalpel, electrocautery, Endo-stapler, and standard trocars. Patients were placed in the supine, head-up position with legs apart. The main surgeon stood on the left, the camera assistant between the legs, and the first assistant on the right. This setup facilitated laparoscopic access to distal gastrectomy.

The surgical procedure consisted of 10 steps: trocar placement; lesion assessment; liver retraction; omentectomy; sequential lymphadenectomy (stations 4d, 4sb, 6, 7, 8a, 9, 11p, 5, 12a, 1, 3); gastric resection; Billroth II reconstruction; duodenal stump closure; peritoneal lavage; specimen retrieval; and drain placement.

Postoperatively, patients were closely monitored, drains were removed after 3–4 days, and oral intake was resumed gradually between postoperative day 2–5. Adjuvant chemotherapy was prescribed when indicated.

2.4. Variables and study indicators

For Objective 1, variables included demographics such as age, sex, occupation, and place of residence, along with medical history, clinical characteristics, paraclinical findings, imaging results, surgical technique, and intraoperative parameters. Each variable was clearly defined and collected from medical records, physical examinations, and operative reports. For Objective 2, variables were categorized into early, pathological, and long-term outcomes.

Early outcomes comprised time to first flatus, timing of nasogastric tube removal, hospital stay, and postoperative complications. Pathological outcomes included the number of lymph nodes retrieved, resection margin status, and postoperative staging. Long-term outcomes assessed recurrence, metastasis, overall survival (OS), disease-free survival (DFS), and quality of life. All variables were standardized and evaluated at multiple follow-up intervals to ensure comprehensive assessment of both immediate and long-term efficacy.

2.5. Data collection methods and tools

Data were collected using a structured questionnaire divided into: general information, clinical–paraclinical data, surgical details, early postoperative outcomes, and long-term follow-up. Quality of life was assessed using the Spitzer Index (0–10 points). The tool was piloted, refined, and standardized before official use.

Data collection was performed by experienced surgeons and surgical nurses under supervision of the principal investigator. Sources included medical records, operative reports, laboratory and pathology results, and patient interviews. Data collection was continuous from preoperative assessment through postoperative follow-up visits.

2.6. Data processing and statistical analysis

Data were entered and managed in Excel, and analyzed with SPSS 26.0. Normally distributed quantitative variables were expressed as mean \pm SD; non-normally distributed variables as median and interquartile range. Qualitative variables were expressed as frequency and percentage. Group comparisons were made using t-test, ANOVA, Chi-square, or Fisher’s exact test as appropriate.

OS and DFS were analyzed with the Kaplan–Meier method and compared using the log-rank test. Multivariate Cox regression was applied to identify prognostic factors. A significance level of $p < 0.05$ was adopted. This approach enabled comprehensive evaluation from baseline characteristics to short-term results and long-term survival.

2.7. Ethical considerations

The study was approved by the Scientific Council of Hai Phong University of Medicine and Pharmacy and the Board of Directors of Nghe An Friendship General Hospital. Patients were fully informed about the study’s objectives, benefits, and risks, and provided written consent. Participation was voluntary, and patients could withdraw at any time without affecting their treatment.

Personal data were coded, strictly confidential, and used only for research purposes. The study posed no additional risks beyond standard treatment protocols. All procedures adhered to international biomedical ethics standards, ensuring patient safety and maximum protection of rights.

CHAPTER 3: STUDY RESULTS

From January 2021 to April 2024, a total of 90 patients were enrolled in the study. The analyzed results are presented below.

3.1. Clinical, paraclinical characteristics and laparoscopic distal gastrectomy with D2 lymphadenectomy and Billroth II reconstruction in gastric adenocarcinoma

3.1.1. General characteristics of the study population

The mean age of the cohort was 65.5 ± 10.0 years, ranging from 36 to 86 years. The most common age groups were 60–69 years (34.4%) and 70–79 years (32.2%), while patients under 50 accounted for the lowest proportion (6.7%). Male patients predominated, with a male-to-female ratio of 1.8:1. Regarding occupation, the majority were farmers (38.9%) or housewives/caregivers (28.9%), followed by retirees (26.7%), with self-employed workers making up the smallest group (5.6%). In terms of residence, most patients lived in rural areas (73.3%), while 14.4% resided in cities/towns and 12.2% in mountainous regions.

Most patients were admitted through routine outpatient examinations (64.4%), while emergency admissions accounted for 35.6%. The mean BMI was 20.57 ± 2.03 kg/m², ranging from 16 to 26.2. The majority had a normal BMI (81.1%), 16.7% were underweight, and only 2.2% were overweight. These findings indicate that the study population mainly consisted of elderly, male, rural residents with physically demanding occupations, generally presenting with lean or average body habitus.

3.1.2. Clinical and paraclinical characteristics

3.1.2.1. Medical history

Among the 90 patients, 42.2% had a history of gastritis, 31.1% had peptic ulcers, and 2.2% had experienced gastrointestinal bleeding, while about one-third had no history of gastric disease. This highlights the strong association between pre-existing gastrointestinal disorders and gastric cancer as a risk factor.

With respect to comorbidities, most patients had none (64.4%). Cardiovascular diseases were the most frequent comorbidity (22.2%), followed by endocrine disorders (5.6%) and respiratory diseases (3.3%). Other conditions accounted for 7.8%. Overall, 32.2% had one chronic comorbidity, while only 3.3% had two or more. This suggests that most patients were in a relatively stable condition suitable for surgery.

Regarding surgical history, 95.6% had not undergone prior abdominal surgery. Only four patients (4.4%) had previous operations: one case of perforated gastric ulcer, two appendectomies, and one laparoscopic drainage of an appendiceal abscess. According to ASA classification, most patients were ASA II (46.7%) or ASA III (43.3%), reflecting moderate systemic conditions; only 10% were ASA I. Overall, the study population mainly consisted of patients with gastrointestinal histories, few severe comorbidities, and adequate

general condition for laparoscopic gastrectomy.

3.1.2.2. Clinical manifestations

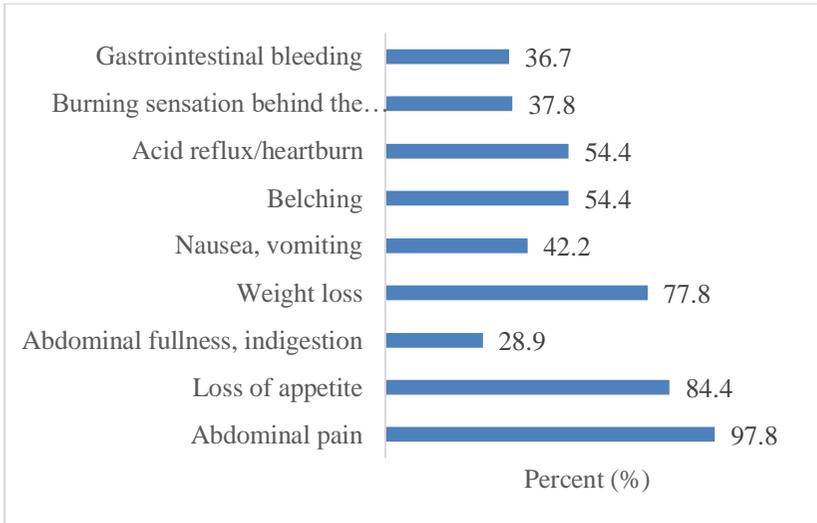


Figure 3.1. Clinical symptoms of the study population (n = 90)

Abdominal pain was the most common symptom, reported in 97.8% of patients. Other frequent symptoms included anorexia (84.4%), weight loss (77.8%), belching (54.4%), acid regurgitation (54.4%), and nausea/vomiting (42.2%). Gastrointestinal bleeding was observed in 36.7% of patients. The least common symptom was bloating/indigestion, present in 27.8%.

3.1.2.4. Paraclinical characteristics

Among 90 patients who underwent gastroscopy, lesions were predominantly located in the antrum (82.2%) and less frequently in the pylorus (17.8%). In terms of morphology, the ulcerative type was most common (58.9%), followed by the proliferative type (28.9%), while infiltrative ulcer and infiltrative types accounted for 8.9% and 3.3%, respectively. Regarding lesion margins, the lesser curvature was the most frequently involved site (64.4%), compared with 5.6% at the greater curvature, 15.6% at the anterior wall, and 14.4% at the posterior wall. CT scan findings revealed that 92.2% of patients had gastric wall thickening, 10.0% had a small amount of ascites, and no cases of organ invasion or distant metastasis were observed.

Table 3.1: Disease staging on CT (n = 90)

Characteristic	Group	Frequency (n)	Percent (%)
T	T1	3	3.3
	T2	17	18.9
	T3	52	57.8
	T4a	18	20.0
N	N0	63	70.0
	N1	14	15.6
	N2	10	11.1
	N3a	3	3.3
	N3b	0	0.0
Stage	I	17	18.9
	IIA	38	42.2
	IIB	20	22.2
	III	15	16.7

On CT imaging, T3 stage accounted for the majority (57.8%), followed by T4a (20.0%), whereas T1 was least common (3.3%). Most patients had no lymph node metastasis (N0, 70%), with the highest rate of nodal involvement at N1 (15.6%), less frequent at N2 (11.1%) and N3a (3.3%). By overall stage grouping, IIA dominated (42.2%), followed by IIB (22.2%), while IIIB and IA were the least frequent.

Preoperative histopathology showed that tubular adenocarcinoma was overwhelmingly predominant (96.6%), while signet-ring cell carcinoma and mucinous adenocarcinoma were rare (2.2% and 1.2%, respectively). Regarding differentiation, most tumors were moderately (44.8%) or poorly differentiated (52.9%), with only 2.3% well differentiated.

3.1.3. Surgical technique characteristics

All patients (100%) underwent totally laparoscopic distal gastrectomy with D2 lymphadenectomy and Billroth II reconstruction, performed using staplers, left hepatic suspension, afferent loop fixation, and duodenal stump closure. Five standard trocars were used, and duodenal transection was carried out after gastrojejunostomy. No conversions to open surgery or intraoperative deaths occurred.

Table 3.2: Technical details of surgery (n = 90)

Characteristic	Group	Frequency (n)	Percent (%)
Gastric tube placement into afferent loop	Inserted	90	100,0
	Not inserted	0	0,0
Number of staplers used	4	82	91,1
	5	8	8,9
Use of Hem-o-lok reinforcement	Yes	10	11,1
	No	80	88,9

In all 90 cases, the gastric tube was introduced into the afferent loop before closing the gastrojejunostomy opening. Most operations required 4 staplers (91.1%), while only 8 cases (8.9%) required 5 staplers. The majority did not need Hem-o-lok reinforcement (88.9%), with only 11.1% requiring it.

Overall, the surgical process was smooth, although 7 cases (7.7%) encountered technical difficulties. Among these, 2 cases had excessive abdominal fat that interfered with dissection steps 3–8; 4 cases had T4a tumors at the pylorus (3 posterior wall, 1 lesser curvature) that complicated dissection of groups 5 and 12a nodes during step 6; and 1 case had a narrow abdominal cavity that made anastomosis in step 8 challenging.

3.2. Evaluation of outcomes of totally laparoscopic distal gastrectomy with D2 lymphadenectomy and Billroth II reconstruction for gastric adenocarcinoma at Nghe An Friendship General Hospital

3.2.1. Surgical outcomes

3.2.1.1. Disease stage

Postoperative findings showed that T3 accounted for the highest proportion (54.4%), followed by T2 (24.4%) and T4a (20%), while T1 was seen in only 1.1% of cases. Regarding nodal status, 35.5% of patients had no nodal metastasis (N0), while N2 metastasis was the most common (26.7%), followed by N3a (17.8%) and N1 (16.7%). For overall staging, stage IIIA was most frequent (27.8%), followed by IIA (26.7%) and IIIB (16.7%), whereas early stage IA and advanced stage IIIC were the least common, both under 5%.

Histopathology revealed that tubular adenocarcinoma was the predominant type (84.4%), followed by mucinous adenocarcinoma (8.9%) and signet-ring cell carcinoma (6.7%). Among the 76 cases of tubular adenocarcinoma, the majority were moderately differentiated (47.4%) or poorly differentiated (46.0%), while well-differentiated tumors accounted for only 6.6%.

3.2.1.2. Operating time

The mean operating time was 174.4 ± 19.4 minutes, ranging from 140 to 210 minutes. Patients with T4a stage disease had significantly longer operating times compared with those in stages T1–T3 ($p < 0.05$).

3.2.1.3. Intraoperative complications

Three patients (3.3%) experienced intraoperative complications: one case of mesocolon tear (sutured), one case of minor liver injury from the retractor (no intervention required), and one case of small bowel muscular tear during anastomosis (sutured immediately). Overall, 96.7% of patients had no intraoperative complications, confirming the procedure's safety.

3.2.1.4. Lymph node dissection and metastasis

The mean number of lymph nodes retrieved was 25.9 ± 5.9 (range 16–42), meeting international standards. The mean number of metastatic nodes was 3.7 ± 4.4 (range 0–18). Metastatic rates were highest in stations 6 (51.7%), 4 (37.9%), and 3 (29.3%), while lower in stations 9 (13.8%), 1 (8.6%), and 12a (8.6%).

By T stage, the mean number of metastatic nodes increased with tumor depth: 0.91 (T1–T2), 3.6 (T3), and 7.5 (T4a). The proportion of patients with nodal metastasis also rose significantly, from 39.1% (T1–T2) to 94.4% (T4a) ($p < 0.05$).

By histology, mucinous adenocarcinoma had the highest nodal metastasis rate (75%), followed by tubular adenocarcinoma (67.1%), and signet-ring cell carcinoma had the lowest (16.7%). Although the mean number of metastatic nodes did not differ significantly, the proportion of cases with nodal metastasis showed a statistically significant difference ($p < 0.05$).

3.2.1.5. Tumor size

Most tumors measured 3–5 cm (70%). Tumors ≤ 2 cm accounted for 26.7%, and only 3.3% were ≥ 6 cm. The mean tumor size was 3.2 ± 1.2 cm (range 1–6 cm), indicating that most patients were diagnosed when tumors had reached medium to large size.

3.2.1.6. Resection margins

The mean proximal margin was 5.5 ± 0.6 cm (range 5–7 cm). Importantly, all 90 patients (100%) achieved negative margins both proximally and distally, with no residual tumor cells, ensuring R0 resection.

3.2.2. Early postoperative outcomes

Recovery of gastrointestinal function was favorable. The mean time to first flatus was 47 ± 11 hours (range 24–72), and the nasogastric tube was removed after 42.4 ± 17.3 hours. The mean time to drain removal was 3.8 days, to start oral/enteral feeding was 2.5 days, and mean hospital stay was 8.5 days (range 5–36). Patients with stages T1–T3 resumed feeding significantly earlier than those with T4a ($p < 0.05$).

Postoperative complications occurred in only 5 patients (5.6%), including one pulmonary infarction, three residual abscesses, and one incisional hernia. No early postoperative deaths were recorded.

After surgery, 77.8% of patients received adjuvant chemotherapy. Among the 20 patients who did not, 2 were elderly with underlying diseases, and four declined treatment despite indication. This indicates that the majority of advanced-stage patients were still treated with adjuvant chemotherapy to improve outcomes.

3.2.3. Long-term postoperative outcomes

3.2.3.1. Follow-up

Of the 90 patients, 7 were followed for less than 13 months, 23 for 13–24 months, 37 for 25–36 months, and 23 for more than 36 months.

3.2.3.2. One-year postoperative endoscopy

At one-year follow-up, gastritis was the most frequent finding (69.4%), followed by bile reflux (27.1%) and gastric stasis (11.8%). Twenty-three patients (27.1%) had normal endoscopic findings.

3.2.3.3. *Recurrence and Metastasis After Surgery***Table 3.3. Recurrence and metastasis status (n = 90)**

Recurrence/Metastasis		Frequency (n)	Percent (%)
No recurrence or metastasis		75	83.3
Anastomotic recurrence		1	1.1
Metastasis		14	15.6
Number of sites (n=14)	1 site	10	71.4
	2 sites	4	28.6
Organ (n=14)	Colon	2	14.3
	Liver	7	50.0
	Lung	1	7.1
	Spine	1	7.1
	Pancreas	1	7.1
	Lymph nodes	2	14.3
	Bone	1	7.1
	Small intestine	1	7.1
	Peritoneum	2	14.3

In this study, several cases of recurrence and metastasis were recorded after surgery: one patient experienced anastomotic recurrence at 16 months and died at 25 months; two patients developed lymph node metastases (supraclavicular, abdominal, and hepatic) and died within 15–34 months; two patients with colonic metastases underwent colostomy and died at 21 and 33 months; and multiple cases of multi-organ metastases (lung, spine, liver, peritoneum, and small intestine) were reported, most of whom died within 11–34 months, except for one patient with liver metastasis at 35 months who remains alive. The mean time from surgery to recurrence or metastasis was 18.5 ± 9.1 months, ranging from 4 to 35 months.

3.2.3.4. *Survival time*

The mean time to death from gastric cancer was 23.1 ± 7.4 months (range 11–34 months), with a total of 16 deaths (17.8%). Among these, 14 patients (15.6%) died due to recurrence or metastasis, while 2 patients (2.2%) died of unrelated causes. The unrelated cases included a 75-year-old with cardiovascular disease and prior stroke who died of multiple organ failure after chemotherapy, and an 85-year-old with extensive cardiovascular comorbidities who died at 10 months without recurrence. The most frequent time of death was between 24–35 months (7 cases), followed by 12–23 months (6 cases).

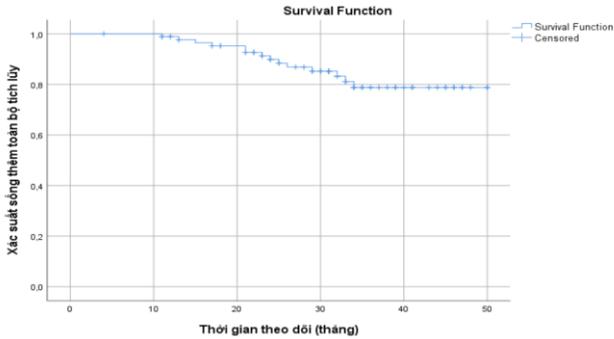


Figure 3.1. Cumulative overall survival probability

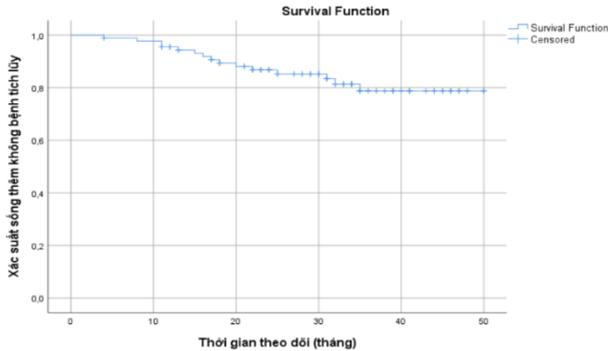


Figure 3.2. Cumulative disease-free survival probability

The cumulative overall survival (OS) rates at 12, 24, and 36 months after surgery were 98.9%, 89.9%, and 78.8%, respectively. The cumulative disease-free survival (DFS) rates at the same intervals were 95.5%, 86.8%, and 78.8%. The mean OS was 44.6 ± 1.3 months, while the mean DFS was 43.8 ± 1.5 months.

Survival time by disease stage

The overall survival probability after surgery at 1 year and 2 years in stage I patients was 100% and 100%, respectively. Stage II: 100% and 100%. Stage III: 97.6% and 80.3%. The mean overall survival time in stage III was significantly shorter with $p < 0.05$ compared to stages I and II. The disease-free survival probability after surgery at 1 year and 2 years in stage I patients was 100% and 100%, respectively. Stage II: 100% and 100%. Stage III: 90.5% and 73.2%. The mean disease-free survival time in stage III was lower than in stages I and II. The difference was statistically significant with $p < 0.05$.

Overall survival time by lymph node metastasis status

The mean overall survival time in the group without lymph node metastasis was significantly longer compared to the group with lymph node metastasis, $p < 0.05$.

Overall survival time by histological type

The mean overall survival time across different histological types was similar. The difference was not statistically significant with $p > 0.05$.

Overall survival time by tumor size

The mean overall survival time after surgery in the group with tumor size ≤ 3 cm and > 3 cm was 46.9 ± 1.3 months and 41.3 ± 2.5 months, respectively. This difference was statistically significant, with the ≤ 3 cm group showing markedly better survival compared to the > 3 cm group ($p < 0.05$).

Overall survival time by age group

The mean overall survival time in the ≤ 60 years and > 60 years groups was comparable. The difference was not statistically significant with $p > 0.05$.

Overall survival time in the group with adjuvant chemotherapy The mean overall survival time after surgery in the group with adjuvant chemotherapy was 46.0 ± 1.3 months, significantly higher compared to 38.6 ± 3.2 months in the group without chemotherapy ($p < 0.05$).

Disease-free survival time in the group with adjuvant chemotherapy The mean disease-free survival time after surgery in the chemotherapy group was 45.2 ± 1.5 months, higher than 37.7 ± 3.5 months in the non-chemotherapy group. The difference was not statistically significant with $p > 0.05$.

Multivariate Cox regression analysis

The analysis showed that the non-chemotherapy group had a higher risk of death compared to the chemotherapy group. The difference was statistically significant with $p < 0.05$.

3.2.3.5. Quality of life after surgery

The total QoL score of patients after surgery at 1 month, 6 months, 12 months, 24 months, and beyond 24 months was 7.5 ± 1.0 , 7.8 ± 0.9 , 8.1 ± 1.7 , 8.1 ± 1.8 , and 8.3 ± 0.8 points, respectively. At all five time points, the aspects of Daily activity and Support had the highest mean scores, with most patients achieving 2 points. The mean score for each aspect tended to remain stable or increase over time.

Most patients showed improvement in quality of life after surgery, with over 85% achieving a score of ≥ 7 at all follow-up points (the lowest being 87.5% at 24 months after surgery). As early as 1 month postoperatively, 94.2% of patients had QoL scores ≥ 7 . The proportion of patients with QoL scores of 9–10 increased at 12 and 24 months compared to 1 and 6 months, but showed a declining trend beyond 24 months.

Table 3.4. Factors related to quality of life (n = 90)

Yếu tố	Total score of symptoms				
	1 month (n=86)	6 months (n=80)	12 months (n=87)	24 months (n=64)	>24 months (n=29)
Gender					
Male	7,47 ± 1,07	7,82 ± 0,98	8,05 ± 1,91	8,38 ± 1,74	8,56 ± 0,86
Female	7,48 ± 0,77	7,73 ± 0,83	8,19 ± 1,12	7,6 ± 1,83	8,0 ± 0,63
p	0,867	0,605	0,545	0,024	0,086
Age group					
≤ 60 years	7,61 ± 0,83	7,96 ± 0,74	8,34 ± 1,23	8,04 ± 1,64	8,44 ± 0,53
> 60 years	7,41 ± 1,03	7,69 ± 1,0	7,98 ± 1,83	8,1 ± 1,91	8,3 ± 0,92
p	0,41	0,083	0,651	0,765	0,449
Comorbidities					
Yes	7,29 ± 0,71	7,59 ± 0,69	7,47 ± 1,76	8,25 ± 1,03	8,0 ± 0,68
No	7,57 ± 1,06	7,89 ± 1,01	8,44 ± 1,51	7,98 ± 2,14	8,67 ± 0,82
p	0,053	0,031	0,001	0,484	0,038
Disease stage					
I (1)	7,79 ± 0,98	7,92 ± 0,64	8,71 ± 0,73	8,89 ± 0,93	8,5 ± 0,76
II (2)	7,53 ± 0,84	7,87 ± 0,72	8,44 ± 1,11	8,64 ± 1,05	8,3 ± 0,82
III (3)	7,33 ± 1,05	7,67 ± 1,15	7,63 ± 2,08	7,48 ± 2,17	8,27 ± 0,91
p	0,496	0,927	0,096	p ₂₁ > 0,999; p ₃₁ = 0,104; p ₃₂ = 0,12	0,824
Adjuvant chemotherapy					
No	7,58 ± 0,9	7,88 ± 0,6	7,7 ± 2,2	7,91 ± 2,34	8,5 ± 0,76
Yes	7,45 ± 0,99	7,76 ± 1,0	8,22 ± 1,46	8,11 ± 1,7	8,29 ± 0,85
p	0,936	0,87	0,693	0,69	0,535

QoL at different time points showed no significant association with age group, disease stage, or adjuvant chemotherapy. At 24 months postoperatively,

QoL scores were significantly higher in males compared to females ($p < 0.05$). At 6, 12, and beyond 24 months, patients without comorbidities had significantly higher QoL scores than those with comorbidities ($p < 0.05$).

CHAPTER 4: DISCUSSION

4.1. Clinical, paraclinical characteristics, and surgical techniques of totally laparoscopic distal gastrectomy with D2 lymphadenectomy and Billroth II reconstruction in the treatment of gastric adenocarcinoma.

4.1.1. General characteristics of the study population

In this study, the mean age of patients was 65.5 years, with the majority aged ≥ 60 , indicating that gastric cancer is more common in the elderly. Males accounted for 64.4%, nearly twice the rate of females, and most were farmers (38.9%) or housewives (28.9%). Patients mainly lived in rural areas (73.3%), and many were admitted after routine health check-ups (64.4%), although 35.6% were admitted through emergency with acute symptoms. Regarding nutritional status, most had a normal BMI (81.1%), while 16.7% were underweight and only 2.2% were overweight.

Compared with international data, the mean age of onset in this study was higher than in Japan, Korea, and China but similar to Europe and the US. The predominance of males is consistent with many studies and may be related to sex hormones and lifestyle factors. The fact that most patients came from rural areas reflects risk factors such as high-salt diets and low socioeconomic conditions. The obesity rate was very low compared to Western countries, where obesity is considered an adverse prognostic factor, suggesting epidemiological and dietary differences.

4.1.2. Clinical and paraclinical characteristics

Regarding medical history, 42.2% of patients had chronic gastritis, 31.1% had peptic ulcers, and 2.2% had prior gastrointestinal bleeding. A total of 35.6% had comorbidities, most commonly cardiovascular disease (22.2%). Most patients were classified as ASA II (46.7%) and ASA III (43.3%). Abdominal pain was the most common presenting symptom (97.8%), followed by anorexia (84.4%), weight loss (77.8%), belching or acid reflux (54.4%), and gastrointestinal bleeding (36.7%). Endoscopy revealed lesions mainly in the antrum (82.2%), with the ulcerative type being most frequent (58.9%), while CT showed gastric wall thickening in 92.2% but no cases of distant metastasis.

When compared with studies in Vietnam and abroad, typical symptoms and tumor locations were fairly similar, but the proportion of weight loss was higher, possibly because patients presented late. CT findings in our study showed higher

sensitivity than some domestic reports, reflecting differences in sample size and disease stage. Most patients were diagnosed at an advanced stage, consistent with the situation in Vietnam. Preoperative histopathology was predominantly tubular adenocarcinoma, with the majority being moderately or poorly differentiated, confirming the high malignancy and need for radical treatment.

4.1.3. Surgical techniques

Surgery was performed following a 10-step protocol, modified to suit provincial hospital conditions. Notably, the anastomosis was created before gastric and duodenal resection to facilitate manipulation and reduce stapler use. We used five trocars, strategically positioned to ensure stable handling. The left lobe of the liver was retracted using a suture suspension technique onto the diaphragm, which provided effective exposure at low cost. Systematic lymphadenectomy was carried out, especially focusing on station 6 and nodes along the celiac trunk. Gastrointestinal continuity was restored with Billroth II reconstruction combined with afferent loop fixation, mostly using four staplers, helping to reduce costs and limit bile reflux.

Compared with the literature, our protocol was largely similar but included some adjustments to fit local resources. Using five trocars instead of three or four allowed the surgical team at the provincial level to better master the technique, while liver suspension suturing proved effective and safe without the need for specialized instruments. Lymphadenectomy and Billroth II with loop fixation demonstrated comparable efficacy to international reports regarding radicality and complication rates, though bile reflux remains a potential risk. This confirms that the method can be widely applied in provincial hospitals with favorable outcomes.

4.2. Evaluation of surgical outcomes of totally laparoscopic distal gastrectomy with D2 lymphadenectomy and Billroth II reconstruction in gastric adenocarcinoma at Nghe An Friendship General Hospital

4.2.1. Tumor staging characteristics

In this study, most patients were diagnosed at advanced stages. Specifically, T3 accounted for the highest proportion (54.4%), followed by T2 (24.4%) and T4a (20.0%), with only one case of T1 (1.1%). Regarding nodal status, 64.5% had lymph node metastasis, most frequently N2 (26.7%), while N3b was least common (3.3%). These results reflect the late diagnosis of gastric cancer in Vietnam, where screening programs remain limited outside major cities. Compared with some domestic studies, the lymph node metastasis rate here was higher, highlighting the urgent need for early detection programs.

By overall stage, stage IIIA accounted for the largest group (27.8%), followed by stage IIA (26.7%). Early stages (I and IB) were very limited at only 15.5%, while stages II and III made up 84.5%. Histologically, tubular adenocarcinoma predominated (84.4%), with nearly all being moderately or poorly differentiated, and only a small proportion being well-differentiated (6.6%). Mucinous (8.9%) and signet-ring (6.7%) adenocarcinomas were less common but generally associated with poorer prognosis. These findings are consistent with both domestic and international reports, where tubular adenocarcinoma is the most common type.

4.2.2. Surgical outcomes

The mean operative time was 174.4 ± 19.4 minutes (range 140–210). This was shorter than some domestic reports but consistent with distal gastrectomy and Billroth II, which is less complex than total gastrectomy. Intraoperative complications were recorded in three patients (3.3%): mesocolon tear, left liver injury, and seromuscular tear of the small intestine during anastomosis, all managed intraoperatively without severe sequelae. This complication rate was low and comparable to literature data.

The mean number of lymph nodes retrieved was 25.9 ± 5.9 (range 16–42), meeting the JGCA standard (≥ 15). The mean number of positive nodes was 3.7 ± 4.4 . The most commonly involved nodes were stations 6 (51.7%), 4 (37.9%), and 3 (29.3%), consistent with the spread pattern from the antral-pyloric region. Both the number and rate of nodal metastases increased with higher T stage, a difference that was statistically significant ($p < 0.05$). Histologically, mucinous adenocarcinoma had the highest nodal metastasis rate (75%), followed by tubular (67.1%), and lowest in signet-ring type (16.7%). These findings confirm that totally laparoscopic distal gastrectomy with D2 lymphadenectomy can ensure oncological adequacy.

4.2.3. Early postoperative outcomes

Recovery of digestive function was favorable. The mean time to first flatus was 47.0 ± 11.0 hours (range 24–72), consistent with other reports. The mean drain removal time was 3.8 ± 1.3 days, and oral feeding resumed at 2.5 days. The mean hospital stay was 8.5 ± 3.8 days (range 5–36), comparable to both domestic and international studies. These results highlight the minimally invasive benefits of laparoscopy, allowing faster recovery and shorter hospitalization.

Postoperative complications were noted in five patients (5.6%): one pulmonary infarction, three intra-abdominal abscesses, and one incisional

hernia. There were no deaths or severe complications such as anastomotic leakage or intra-abdominal bleeding. This low complication rate, mainly mild and manageable, supports the safety of the procedure. Regarding adjuvant therapy, 77.8% of patients received postoperative chemotherapy, mainly in stage II–III, in line with international guidelines. A few stage I cases or patients with severe comorbidities did not undergo chemotherapy.

4.2.4. Long-term outcomes

One-year follow-up endoscopy showed gastritis in 69.4%, bile reflux in 27.1%, and gastric stasis in 11.8%. However, 27.1% had normal endoscopic findings, indicating variable adaptation. One case (1.1%) of anastomotic recurrence was recorded at 16 months, consistent with recurrence patterns in advanced cases.

During follow-up, 14 patients (15.6%) developed metastases, mainly in the liver, lymph nodes, and colon, with a mean time to recurrence of 18.5 ± 9.1 months (range 4–35). Compared with other Vietnamese studies, this rate was acceptable and consistent in trend. These results confirm that laparoscopic distal gastrectomy with D2 and Billroth II reconstruction can achieve long-term oncological effectiveness, though strict follow-up is necessary in advanced-stage patients.

4.2.5. Survival outcomes

The mean overall survival was 44.6 ± 1.3 months. The cumulative survival rates at 12, 24, and 36 months were 98.9%, 89.9%, and 78.8%, respectively. The mean disease-free survival was 43.8 ± 1.5 months, with corresponding rates of 95.5%, 86.8%, and 78.8%. These results were similar to or better than some domestic reports, especially at the two-year mark. Stage and nodal status were the most important prognostic factors, while age and histological grade had less impact.

Adjuvant chemotherapy significantly improved survival, with patients receiving chemotherapy achieving a mean survival of 46.0 months compared to 38.6 months in those who did not ($p < 0.05$). This reinforces the essential role of adjuvant chemotherapy in stage II–III gastric cancer. Additionally, tumor size ≤ 3 cm was associated with longer survival, underscoring the importance of early detection.

4.2.6. Quality of life

Patients' quality of life (QoL) improved over time, from a mean score of 7.5 at one month to 8.3 beyond 24 months. The highest-scoring domains were daily activity and social support, reflecting patient adaptation and the critical

role of family. The proportion of patients with QoL ≥ 7 was always above 85% at all time points. Notably, the percentage of patients achieving QoL 9–10 was highest at 12–24 months, indicating significant recovery.

Factors influencing QoL included gender (higher in males), comorbidities (higher without comorbidities), and type of surgery (distal gastrectomy better than total gastrectomy). Age and stage had little effect. Compared with international studies, our results were consistent, as QoL generally recovers within the first 6–12 months and remains stable thereafter. This demonstrates that laparoscopic distal gastrectomy not only ensures oncological outcomes but also enhances quality of life, affirming its comprehensive advantages.

CONCLUSION

Through the study of 90 cases of gastric cancer treated with totally laparoscopic distal gastrectomy and D2 lymphadenectomy at Nghe An Friendship General Hospital from January 2021 to April 2024, we draw the following conclusions:

1. Clinical, paraclinical characteristics, and surgical techniques of totally laparoscopic distal gastrectomy with D2 lymphadenectomy and Billroth II reconstruction in gastric adenocarcinoma

The most common symptoms were abdominal pain, anorexia, and weight loss. Endoscopy revealed lesions mainly located in the antrum, predominantly ulcerative in type. On CT, stage T3 accounted for the majority, and most patients had no lymph node metastasis at presentation.

All patients underwent totally laparoscopic distal gastrectomy with D2 lymphadenectomy and Billroth II reconstruction using staplers, without prior gastric transection, combined with afferent loop suspension. There were no conversions to open surgery or intraoperative deaths. The mean operative time was 174 minutes, longer in the T4a group.

2. Surgical outcomes of totally laparoscopic distal gastrectomy with D2 lymphadenectomy and Billroth II reconstruction in gastric adenocarcinoma at Nghe An Friendship General Hospital

The mean number of lymph nodes retrieved was 25.9, meeting international staging standards. Lymph node metastasis was found in 64.5% of patients, most frequently in stations 6, 4, and 3. Postoperatively, stage IIIA was the most common (27.8%).

The intraoperative complication rate was low (3.3%), early postoperative

complications occurred in 5.6%, and there were no early deaths. Gastrointestinal recovery was rapid, with an average hospital stay of 8.5 days.

The cumulative overall survival rates at 1, 2, and 3 years were 98.9%, 89.9%, and 78.8%, respectively. Patients receiving adjuvant chemotherapy after surgery had significantly better survival outcomes compared to those without chemotherapy.

Quality of life progressively improved over time, with more than 85% of patients scoring ≥ 7 points at all assessment times. The domains “Daily activity” and “Support” maintained the highest and most stable scores.

The study confirms that totally laparoscopic distal gastrectomy with D2 lymphadenectomy, Billroth II reconstruction, and afferent loop suspension is safe, feasible, oncologically sound, and contributes to improved survival and quality of life in gastric cancer patients.

RECOMMENDATIONS

Totally laparoscopic distal gastrectomy with D2 lymphadenectomy and Billroth II reconstruction has demonstrated safety, feasibility, and adherence to oncological principles. It should be considered for wider adoption in provincial hospitals, provided that surgeons receive specialized training and adequate surgical equipment is available.

The study underscores the essential role of postoperative chemotherapy in improving survival; therefore, adjuvant chemotherapy should be more strongly recommended and strictly followed, especially for patients with stage II–III disease.

Greater attention should be given to monitoring and assessing patients’ quality of life after surgery, incorporating nutritional support, functional rehabilitation, and psychological care to optimize long-term treatment outcomes.