



Laparoscopic Gastric Cancer Surgery: An Early Experience from a Developing World Country

Authors

Dr Tanveer Ahmad Yattoo, Dr Abdul Rashid Ganaie, Prof. Iqbal Saleem Mir, Dr Zahida Akhter, Prof. Farooq Ahmad Reshi, Dr Zaheem, Dr Aftab Akbar, Dr Yaqoob, Dr Yasir Rehman

Post graduate, Department of General Surgery
Government Medical College, Srinagar, India

Introduction

Gastric cancer is one of the most common cancers worldwide. Asian countries like Japan, China, and South Korea have a high incidence; those with a low incidence include India, Pakistan, and Thailand¹. Gastric cancer is the fourth common cancer and the second leading cause of cancer related deaths worldwide². The age adjusted stomach cancer incidence among Kashmiri males was 36.7/100,000 and among Kashmiri females was 9.9/100,000 in a study from 1986-1989. It indicated that there is a high rate of gastric cancer in Kashmiri population compared to other parts of the country³.

The first laparoscopy-assisted distal gastrectomy (LADG) for early gastric cancer (EGC) was reported in 1994. Since then there have been major breakthroughs in the field of gastric cancer surgery⁴. Understanding the comparative effectiveness of laparoscopic and open approaches to resection of early-stage gastric cancer is an important issue in the surgical management of this condition⁵. There has been a tremendous improvement in laparoscopic approach with the use of endoscopic staplers making intracorporeal

anastomosis feasible and much easier than before. Many studies showed long term results of laparoscopic gastric surgeries are comparable with those of open gastrectomy⁶⁻⁸.

Objectives

The aim of this study was to evaluate the results of laparoscopic surgeries in gastric carcinoma in a selected Kashmiri population.

Material and Methods

This prospective study was conducted in the Department of General Surgery, Government Medical College, Srinagar over a period of 3 years. Patients were given free choice to undergo either laparoscopic or open resection. Patients were excluded from study if metastasis was detected preoperatively or intra-operatively.

A total number of 30 patients who underwent laparoscopic gastric surgeries for carcinoma stomach were enrolled in the study after a written informed consent in local language.

Surgical Procedure: Stomach washes and bowel preparation was given to all patients. Procedure was carried out under general anaesthesia. The

patients were placed on table in supine position with legs apart and 20° head up tilt. Chief Surgeon operated the patients by standing between the legs with camera assistant on his left. Pneumoperitoneum was created by using veress needle by closed method. Diagnostic laparoscopy was done to rule out adjacent organ invasion and peritoneal seeding. Three other trocars of varying sizes were inserted through the abdominal wall, one upper left quadrant, one right upper quadrant and one in the midline just below the xyphoid process. After assessing the resectability, operative choice was based on location of tumour in stomach. Twenty seven patients underwent laparoscopic assisted distal partial gastrectomy with 5-6 cm tumor free resection margin grossly in distal gastric carcinoma and bilroth II type gastrojejunostomy reconstruction was done. Laparoscopic assisted total gastrectomy with Roux-en-Yoesophagojejunostomy was done in two patients for growth located in body of stomach and laparoscopic assisted proximal gastrectomy with oesophagogastrostomy in one patient for growth at cardia.

Procedures were performed with due respect to oncological principle and standard methods of dissection and ligation of major vessels using haemolockclips and harmonic scalpel where-ever needed. The resected specimen was extracted by extension of port site incision, taking due care not to spill the malignant cells during the extraction by using wound protectors and double glove technique.

For stage grouping current tumor node metastasis system classification was used.

Follow Up: All complications were closely monitored and in-hospital mortality, i.e. death within 30 days of procedure or during hospital stay were noted.

The patients were assessed for time to first flatus and time to first soft diet and postoperative hospital stay.

The patients who were discharged alive were followed after 1st week, 1 month, then 3 monthly for 1st year and 6 monthly thereafter.

Results

In our study, out of a total of 30 patients 23 (76.66%) were males and 7 (23.33%) were females. Majority of our patients i.e. 17 (56.66%) were 61-70 years of age, followed by 10 (33.3%) aged 51-60 years while as 3 (10%) patients aged ≤50 years. Abdominal pain / discomfort were the symptoms at presentation in majority of our patients i.e. 21 (70%) followed by weight loss in 18 (60%) and post prandial fullness in 16 (53.33%). Early satiety and anorexia were found in 14 (46.66%) patients and haematemesis/malena constituting 11 (36.66%) patients. In general physical examination pallor was present in 12 (40%) patients with oedema in 2 (6.66%) patients.

Patient Characteristics		
Gender	Male	7 (23.33%)
	Female	23 (76.66%)
Age±SD (Years)		62.7±7.89
Presenting symptoms	Abdominal pain	21 (70%)
	Weight loss	18 (60%)
	Postprandial fullness	16 (53.33%)
	Early satiety / anorexia	14 (46.66%)
	Hematemesis / malena	11 (36.66%)
Signs	Pallor	12 (40%)
	Edema	2 (7.66%)

On esophagogastroduodenoscopy (EGD), polypoid growth in stomach was seen in 17 (56.66%) patients, ulcerative lesion in stomach was seen in 13 (43.33%) patients. On CECT abdomen 23 (76.66%) were found to have stomach growth, 7 (23.3%) had stomach thickening while as 13 (43.33%) patients was having perigastric lymphnodes. In our study, tumor was located in antrum in 17 (56.66%) patients. Six (20%) patients had tumour in pylorus, followed by 4 (13.33%) in mid body, followed by 2(6.66%) in proximal body and one at gastroesophageal junction. Laparoscopic distal partial gastrectomy was the procedure done in 23 (76.66%) of our patients while as 4 (13.33%) patients under subtotal gastrectomy. Bilroth II reconstruction was done in these patients. Total gastrectomy with Roux-en-Y

esophagojejunostomy was done in 2(6.66%) patients with growth in proximal body and proximal gastrectomy with esophagogastrostomy was done in 1 (3.33%) patient.

Operative Procedure	
Laparoscopic distal partial Gastrectomy with Bilroth II reconstruction	23 (76.66%)
Laparoscopic subtotal distal Gastrectomy with Bilroth II reconstruction	4 (13.33%)
Laparoscopic assisted total Gastrectomy with Roux-en-Y esophagojuenostomy	2 (6.66%)
Laparoscopic assisted proximal Gastrectomy with oesophagogastrostomy	1 (3.33%)

Mean volume of blood loss (ml) was 109.6±41.72. None of our patient's required intraoperative blood transfusion while as one (3.33%) patient needed blood transfusion postoperatively. Mean duration of surgery (min) was 221.8±17.03. In took a mean 3.1 days for our patients to first flatus. Liquid diet was started in(mean) 3.7 days while they resumed soft diet in (mean) 5.3 days. The complications noted were intra-luminal bleeding in 1 (3.33%) patients, myocardial infarction in 1 (3.33%), gastric stasis in 2 (6.66%). Only one of our patient died in hospital. Out of a total of 29survived patients, 26 (89.65%) required hospital stay for more than or equal to 7 days while as 3 (10.34%) patients needed <7 days hospital stay. Papillary adenocarcinoma, tubular adenocarcinoma, mucinous adenocarcinoma, signet ring adenocarcinoma were the morphology of tumour in 11 (37.93%), 15 (51.72%), 2 (6.89%) and 1 (3.44%) patients. Surgical margin free (RO) was obtained in all cases with an average 17 number of dissected lymphnode ranging from 12-29 nodes.

Recurrence of disease was seen in 5 (17.24%) patients within one year. Peritoneal metastasis was found in 3 (10.34%) patients on followup CECT abdomen with distant or haematogenous spread in 1 (3.44%) patient. Esophagogastroduodenoscopy (EGD) was suggestive of recurrence at anastomosis in 1 (3.44%) patient.

Outcome		
Operative time (mean±SD)		221.8±17.03 min.
Intraoperative blood loss (mean±SD)		109.6±41.72 ml
Resumption of orals (mean)	Liquid diet	3.7 days
	Soft orals	5.3 days
Intraluminal bleeding		1 (3.33%)
Gastric stasis		2 (6.66%)
Hospital stay in days	<7	3 (10.34%)
	≥7	26 (89.65%)
In-hospital mortality		1 (3.33%)

Follow up (n=29)		
Histopathology	Tubular adenocarcinoma	15 (51.72%)
	Papillary adenocarcinoma	11 (37.93%)
	Mucinous adenocarcinoma	2 (6.89%)
	Signet ring cell	1 (3.44%)
Surgical free margins		29 (100%)
Median lymph node dissected		17 (12-29)
Recurrence (n=5)	Peritoneal metastasis	3 (10.34%)
	Distant metastasis	1 (3.44%)
	Anastomosis recurrence	1 (3.44%)
Staging	Stage I	3 (10.34%)
	Stage II	14 (48.27%)
	Stage III (A)	10 (34.48%)
	Stage III (B)	2 (6.89%)

Discussion

Since the first published report regarding laparoscopic gastrectomy for early gastric cancer⁹, many retrospective studies and small randomized clinical trials have shown the short-term benefits of laparoscopic gastrectomy over open conventional surgery and long-term outcomes that are comparable between the two¹⁰⁻¹⁵. Several meta-analyses also confirm that laparoscopic gastrectomy is an equivalent method to conventional open surgery¹⁶⁻¹⁹. Laparoscopic gastrectomy for gastric adenocarcinoma has evolved due to the advent of new technologies and improved surgical techniques.

In our study majority of our patients were 61-70 years. Males were more than females. Abdominal pain / discomfort were the main symptoms at presentation followed by weight loss and post prandial fullness. On general physical examination pallor was present in majority of patients followed by oedema. On

esophagogastroduodenoscopy (EGD), polypoid growth in stomach was seen in majority of patients. On CECT abdomen stomach growth was found in majority of cases followed by stomach thickening. Our findings were consistent with several other studies²⁰⁻²⁶.

Several authors have reported successful laparoscopic subtotal or total gastrectomy, demonstrating the important postoperative advantages of this procedure²⁷⁻³⁵. Radical surgical resection of the tumor is the only hope for cure in these patients.³⁶ Total gastrectomy has been advocated for proximal and middle stomach cancer. However, for distal gastric cancer, results have been similar for total and subtotal gastrectomy and the latter is now the operation of choice when the tumor is located in the distal part of the stomach.^{37,38} In our study, in majority of cases (23 patients) distal gastrectomy was the procedure done, while as subtotal gastrectomy was done 4 patients, total gastrectomy in 2 patients and proximal gastrectomy in 1 patient.

Mean volume of blood loss (ml) was 109.6 ± 41.72 . None of our patients required intraoperative blood transfusion while as one (3.33%) patient needed blood transfusion postoperatively. Mean duration of surgery (min) was 221.8 ± 17.03 . Junhyun Lee et al (2012)³⁹ in a study determined an estimated blood loss (ml) of 131.0 ± 77.6 and the estimated period of surgery in minute was 212.5 ± 43 , which is comparable to our study.

Liquid diet was started in (mean) 3.7 days while they resumed soft diet in (mean) 5.3 days. Feng LM et al (2013)⁴⁰ conducted a clinical analysis of 25 gastric cancer cases undergoing totally laparoscopic distal gastrectomy and found that mean time to the first flatus was (2.8 ± 1.2 days) and mean time liquid diet to resume was (3.5 ± 0.9 days). Intra-luminal bleeding was seen in 1 (3.33%) patients, myocardial infarction in 1 (3.33%), gastric stasis in 2 (6.66%). Only 1 of our patient died in hospital. Junhyun Lee et al (2012)³⁹ in their study observed that intraluminal bleeding was the complication in 4 (3.1%), gastric stasis in 2 (1.5%). Out of a total of 29 studied patients, 26

(89.66%) required hospital stay for more than or equal to 7 days while as 3 (10.34%) patients needed <7 days hospital stay. Hospital stay in days was 9 days (range 7-12 days) in a study done by Han SM et al (2004)⁴¹. Surgical margin free (RO) was obtained in all the cases with 17 number of dissected lymphnode (median). Recurrence of disease was seen in 5 (16.66%) patients. Peritoneal metastasis was found in 3 (10%) patients on follow up CECT abdomen with distant or haematogenous spread in 1 (3.3%) patient. Esophagogastro-duodenoscopy (EGD) was suggestive of recurrence at anastomosis in 1 (3.3%) patient. Pan H et al (2017)⁴² in their study observed recurrence in 153 (13%) patients. Out of 23 patients in D1 group, 6 patients developed recurrence. EGD detected anastamotic recurrence in all 6 patients.

Conclusion

Our experience suggests that laparoscopic gastric surgeries has several advantages including less surgical trauma, less intraoperative blood loss, less pain, early postoperative recovery, decreased hospital stay without compromising the oncological principles with better cosmesis and patient compliance.

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