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RESEARCH ARTICLE

COMPARISON BETWEEN STAPLED ANASTOMOSIS AND HAND SEWN FOR RESTORATION OF GI CONTINUITY IN GASTROESOPHAGEAL JUNCTION MALAGNANCIES.

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Abstract

BACKGRUOND: Tumors of the gastroesophageal junction (-GEJ) are classified as gastric cancers, however their natural behavior and their therapeutic modalities are very much similar to the tumors of the esophagus. Radical surgical resection alone is the only established curative treatment of cancers of the esophagus and gastric cardia.⁶⁻⁸ only supplemented by chemoradiation. Radical resection of gastroesophageal junction cancers with adequate proximal and distal margins and restoration of esophagogastric/esophagojejunal anastomosis is the main aim of surgical treatment, however restoration of gastro intestinal continuity by means of conventional suturing technique sometimes proves technically challenging and circular stapling devices have been found to be very safe and efficient and technically easy alternative to hand sewn suturing technique in these cases.

MATERIALS AND METHODS: From March 2010 to February 2012 a prospective randomized comparative study entitled "Comparison Between Stapled Anastomosis And Hand Sewn Anastomosis in Gastroesophageal Junction Cancers" patients divided randomly into two groups was conducted in Post Graduate Department Of General Surgery Government Medical College Srinagar. All the patients entitled for the study belonged to Seiwert Class 2 and 3. 62 patients were randomly divided into two groups, Group A and Group B, 31 in each group. Among the 31 patients in Group A, total gastrectomy was done in 14 patients and proximal gastrectomy was done in 17 patients. Among the 31 patients in Group B, total gastrectomy was done in 13 patients and proximal gastrectomy was done in 18 patients. Restoration of gastrointestinal continuity was achieved by stapled technique in group A patients and hand sewn technique in group B patients. All the patients entitled to our study received postoperative chemoradiation as per Macdonald's regimen.

RESULTS: Variables analysed were, mortality, anastomotic stricture formation, anastomotic leak, recurrence at one year, mean operating time, mean duration of hospital stay. Two patients in postoperative period died among 31 patients in group A, one due to anastomotic leak and one due to postoperative respiratory complications and one patient died in group B due to anastomotic leak. Anastomotic leak was seen in 7 (22.5%) patients in Group A and 5 (16.1%) patients in Group B, recurrence within one year was seen in 5 (16.1%) patients in group A and 6 (19.3%) patients in group B. Anastomotic stricture formation was seen in 6 (19.3%) patients in group A and 2 patients (6.4%) in hand sewn group. Mean operating time was 130 ± 15 minutes in group A with proximal gastrectomy and 160 ± 20 minutes in group A patients with total gastrectomy where as it was 160 ± 20 minutes in group B patients with proximal gastrectomy and 180 ± 15 minutes

in group B patients with total gastrectomy. Mean duration of postoperative hospital stay was 9 days in both groups.

CONCLUSION: This study showed that stapled anastomosis is very efficient, safe, technically easy and less time consuming technique for restoration of gastrointestinal continuity in Gastroesophageal junction malignancies. Thus Stapled anastomosis in restoration of gastrointestinal continuity in Gastroesophageal junction malignancies can be done with almost same results of morbidity and mortality as hand sewn anastomosis and in cases where anastomosis is technically very difficult and restoration of gastro-intestinal continuity is difficult to achieve with hand sewn technique.

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Introduction

BACKGROUND:

Adenocarcinoma of the esophagus and the gastro-esophageal junction is the fast rising malignancy remains a significant clinical problem that is increasing in incidence¹ and associated with a poor prognosis.²⁻⁴ It has multiple etiological factors with a marked variation in incidence, more than for any other tumor, according to sex, geographical area, racial and economical background and patterns of incidence of histological subtypes. Most frequent histologic types are squamous cell carcinoma and adenocarcinoma. Adenocarcinomas arise from glandular epithelioma and most adenocarcinomas arise from Barrett metaplasia or from glandular metaplasia in the esophageal mucosa. Adenocarcinomas mainly arise in the distal third and gastroesophageal junction. A conference of the International Gastric Cancer Association (IGCA) and the International Society Diseases of the Esophagus (ISDE) defined and described adenocarcinomas of the GE junction as those tumors having their center within 5 cm proximally and distally of the anatomic cardia⁵. and these tumors are differentiated into the following three distinct entities

Type I: Adenocarcinoma of the distal esophagus, arising from an area with specialized intestinal metaplasia of the esophagus (ie, Barrett's esophagus); it may infiltrate the esophagogastric junction from above with epicenter between 1-5cm proximal to the anatomic cardia.

Type II: True carcinoma of the cardia, arising from the cardiac epithelium or short segments of intestinal metaplasia at the gastroesophageal junction; often referred to as "junctional carcinoma" with epicenter from 1 cm proximal to the anatomic cardia to 2cm distal

Type III: Subcardial gastric carcinoma that infiltrates the esophagogastric junction and distal esophagus from below with epicenter between 2-5 cm distal to the anatomic cardia.

The Siewert classification breaks GE junction tumors down into these three categories. Type I are GE junction tumors with most of the tumor in the esophagus. Type II tumors straddle the GE junction, where as type III tumors are basically cardia cancers with some involvement of the GE junction.

Tumors of the gastroesophageal junction (-GEJ) are classified as gastric cancers, however their natural behavior and their therapeutic modalities are very much similar to the tumors of the esophagus. Radical surgical resection alone is the only established curative treatment of cancers of the esophagus and gastric cardia.⁶⁻⁸ only supplemented by chemoradiation. One of the final goals of staging is to evaluate the possibility of a complete so called R₀ resection that is removal of microscopic and macroscopic tumor which is an important prognostic indicator for survival and leaving behind the microscopic (R₁) or macroscopic (R₂) tumor precludes any chance of curative treatment. The main aim of surgical treatment is to achieve balance between radical oncosurgical resection and need to preserve the function and maintain quality of life. The surgery for gastroesophageal junction cancers with a curative intent is very extensive and there is considerable risk of serious complication. Lymphnode status seems to be the most important prognostic factor in these cancers with involvement in 30 to 80% of reported series. Meticulous extended lymphadenectomy is aimed at a so-called R₀ situation i.e. no residual microscopic or macroscopic tumor because either R₁ (microscopic) or R₂ (macroscopic) residual tumor leaves the patient with virtually no chances for cure. Carcinoma of the esophagus and GEJ have a tendency to extend submucosally in the longitudinal axis and for the same oncologic reasons resection of the lesser curvature of the stomach is advocated to obtain a negative distal resection plane and to resect potentially positive lymphnodes at the level of the lesser curvature. The operative

approaches to patients with GEJ malignancy vary widely ranging from esophagectomy via transthoracic (TTE) or transhiatal (THE) approaches, total gastrectomy (TG) or proximal gastrectomy via laparotomy or left thoracoabdominal incisions.^[9-10] Studies have not shown superior oncologic outcomes for total gastrectomy compared with proximal gastrectomy for proximal gastric and GEJ cancers,^[11] and nor has esophagectomy been found to improve outcome over extended gastrectomy for GEJ cancers.^[3] For tumors extending more than 5 cm towards the stomach as a rule a total gastrectomy is usually recommended to achieve adequate resection.

Restoration of GI Continuity after radical resection of GE junction malignancies is technically challenging and of vital importance and can be done either manually or with use of stapling devices. Radical resection of gastroesophageal junction cancers with adequate proximal and distal margins and restoration of esophagogastric/esophagojejunal anastomosis is the main aim of surgical treatment, however restoration of gastrointestinal continuity by means of conventional suturing technique some times proves technically challenging and circular stapling devices have been found to be very safe and efficient alternative to hand sewn suturing technique in these cases. The factors that influence anastomotic security^[12] relate both to systemic characteristics of individual patient together with local and technical factors such as importance of adequate blood supply, freedom from tension at anastomotic site, absence of active disease or distal obstruction. The need for edge to edge opposition and adequate luminal patency are self evident^[13]. Despite the wealth of circumstantial evidence to suggest that manual suturing and stapling are essentially equivalent in terms of their safety there have been very little scientific activity to critically examine the comparative features of each technique.^[14-19] Various possible benefits that apply to stapled anastomosis such as less tissue manipulation, trauma, bleeding, oedema and with a more rapid return of GI function and patient recovery, ease of performing anastomosis and decreased operating time^[20-21] where as cost factor, increased stricture formation and tumour recurrence are possible drawbacks^[22-25].

The present study has been undertaken with main aim of assessing onco surgical outcome of patients treated with radical resections of gastroesophageal junction cancers with esophago-gastric/esophago jejuna anastomosis by either stapled or hand sewn technique in terms of in terms of mortality, anastomotic leak /dehiscence, recurrence within two years and mean operating time

MATERIALS AND METHODS :

From March 2010 to January 2012 a prospective randomized comparative study entitled "Comparision Between Stapled Anastomosis And Hand Sewn Anastomosis in Gastroesophageal Jnction Cancers" patients divided randomly into two groups was conducted in Post Graduate Department Of General Surgery Government Medical College Srinagar. All the patients entitled for the study were histopathologically documented, resectable cases of adenocarcinoma of Gastroesophageal junction. All the patients entitled for the study belonged to Seiwert Class 2 and 3.

Patients entitled for the study were thoroughly investigated to determine the stage of disease and lymph node status and to exclude metastasis. Patients excluded from the study included patients with tumours infiltrating to pancreas, lung or major vessels, tumours belonging to Seiwert class 1, T₄ lesions, patients with distant metastasis, patients with portal hypertension. 62 patients were randomly divided into two groups, Group A and Group B, 31 in each group. There was no significant difference in patients in two groups with regard to age, gender, basic anthropometric data, preoperative variables, distance of tumour from GE Junction, tumour grade and stage and use of neo-adjuvant /adjunct chemo-radiation. Surgery in patients entitled for the study included two types of procedures a. total gastrectomy with minimum of 3 cm proximal esophageal margin, with roux-en Y Esophagojejunostomy in Siewert type 3 tumours b. proximal gastrectomy with removal of distal esophagus taking minimum of 3.5 to 4 cm of proximal margin with esophagogastronomy in Siewert type 2 tumours. Among the 31 patients in Group A, total gastrectomy was done in 14 patients and proximal gastrectomy was done in 17 patients were as 31 patients in Group B total gastrectomy was done in 13 patients and proximal gastrectomy was done 18 patients. Restoration of gastrointestinal continuity was achieved by stapled technique in group A patients and hand sewn technique in group B patients.

. Among the 62 patients in our study who underwent curative resection with anastomosis by either of the two mentioned techniques, age of patients varied from 42 years to 62 years, 44 patients were males and 28 patients were females. All the anastomosis were made in abdomen taking recommended proximal and distal margins for GE junction cancers. Patients successfully treated by surgery received postoperative adjuvant chemoradiation. Five variables were analysed [mortality, anastomotic leak, recurrence within 2 years, mean operating time, mean hospital stay]. Results were recorded and analysed and statistically significant difference calculated.

PREOPERATIVE ASSESSMENT AND PREPARATION: Patients entitled for the study were thoroughly evaluated. History, Examination and all routine baseline as well as specific investigations were done which included

CBC,KFT,Na/K,Blood Sugar,LFT, PT/INR,CXR ,ECG,,EGD with biopsy of lesion,USG abdomen and pelvis ,CECT Abdomen with lower chest cuts and Skeltal Profile for metastatic disease. Patients were build up for surgery and preoperatively blood was given to raise Hb ≥ 11 mg/dl Patients received complete bowel preparation and antibiotic prophylaxis before surgery .

SURGERY: Patients were thoughtfully prepared preoperatively. Patients were positioned in spine position and were catheterised. All the cases in our study were done under General Anesthesia .Midline upper abdominal incision was used in all the patients. Surgery included two types of procedures a. total gastrectomy with Roux-en Y esophagojejunostomy for Seiwert Type 3 tumours b. proximal gastrectomy with esophagogastrostomy for Siewert type 2 tumours .Restoration of gut continuity was achieved by circular stapler in Group A patients and Hand Sewn technique in Group B. Size of Circular Staplers used were from 19 and 25 mm sizes. Anastomotic site drain was kept in all the patients to drain any collection and to look for any anastomotic leak. 18 F Nasogastric tube was inserted across the anastomosis. Feeding jejunostomy was done in all the patients to allow early enteral feeding .All the patients were kept nil per oral with Ryles tube for 6 days. Feeding via jejunostomy was started on 2nd POD .Ryles tube was removed on 6th POD except in those patients who developed complications and oral sips were allowed on same day. Drain was removed on 8-9th POD on average after patients tolerated orals except in those cases who developed anastomotic leak. Patients were discharged from hospital after tolerating orals, moving bowel and taking drain out on 9 -10th POD on an average except those few cases who developed complications .3 patients were reoperated for anastomotic leak out of 7 cases of total anastomotic leak. Patients were followed postoperatively weekly for 1 month, fortnightly for next 2 months ,monthly for next 3 months ,3 monthly for next 18 months and 6 monthly afterwards.

All the patients in our study received chemoradiation 6 weeks after surgery as per Macdonald,s regimen.

SURGICAL PROCEDURE	GROUP A	GROUP B
a.TOTAL GASTRECTOMY WITH ESOPHAGOJEJUNOSTOMY	14	13
b.PROXIMAL GASTRECTOMY WITH ESOPHAGOGASTROSTOMY	17	18

STATISTICAL METHODS: All the data was collected , analysed and comparison between two groups was made . P Value of variables calculated and Statistical significant difference if any noted .

RESULTS

:Variables analysed in our study included mortality, anastomotic leak, anastomotic stricture formation, recurrence at 1 year postoperatively, mean operating time , mean hospital stay .Two patients in postoperative period died among 31 patients in group A one due to anastomotic leak and one due to postoperative respiratory complications and one patient died in group B due to anastomotic leak. Anastomotic leak was seen in 7(22.5%) patients in Group A and 5 (16.1%) patients in Group B , recurrence within one year was seen in 5 (16.1%) patients in group A and 6(19.3%) patients in group B. Anastomotic stricture formation was seen in 6 (19.3%) patients stapled group and 2 patients (6.4%) in hand sewn group . Mean operating time was 130 $\pm$ 15 minutes in group A with proximal gastrectomy and 160 $\pm$ 20 minutes in group A patients with total gastrectomy where as it was 160 $\pm$ 20 minutes in group B patients with proximal gastrectomy and 180 $\pm$ 15 minutes in group B patients with total gastrectomy. Mean duration of postoperative hospital stay was 9 days in both groups .

VARIABLE	GROUP A	GROUP B	P VALUE
MORTALITY	2	1	1.000
ANASTOMOTIC LEAK	7	5	.749
ANASTOMOTIC STRICTURE FORMATION	5	2	.425
RECURRENCE	5	6	1.000
MEAN DURATION OF HOSPITAL STAY	9	9	1.000

DISCUSSION:

Restoration of GI CONTINUITY after radical resection of GE junction malignancies is technically challenging and of vital importance and can be done either manually or with use of stapling devices. Radical resection of gastroesophageal junction cancers with adequate proximal and distal margins and restoration of esophagogastric/esophagojejunal anastomosis is the main aim of surgical treatment, however restoration of gastrointestinal continuity by means of conventional suturing technique some times proves technically challenging and circular stapling devices have been found to be very safe and efficient alternative to hand sewn suturing technique in these cases. Despite the wealth of circumstantial evidence to suggest that manual suturing and stapling are essentially equivalent in terms of their safety, there has been very little scientific activity to critically examine the comparative features of each technique¹⁴⁻¹⁹. James Dochery et al²⁶ have described that use of surgical stapling instruments is comparable to that of conventional suturing in terms of efficacy, applicability and safety. In certain situations staplers offer the facility to achieve reconstructions that will be difficult to achieve manually. The factors that influence anastomotic security¹² relate both to systemic characteristics of individual patient together with local and technical factors such as importance of adequate blood supply, freedom from tension at anastomotic site, absence of active disease or distal obstruction. Various possible benefits that apply to stapled anastomosis such as less tissue manipulation, trauma, bleeding, oedema and with a more rapid return of GI function and patient recovery, ease of performing anastomosis and decreased operating time²⁰⁻²¹ where as cost factor, and tumour recurrence are possible drawbacks²²⁻²⁵.

On analysing results in our study, it was noted that there was no statistical significant in rates of anastomotic leak, recurrence rate within one year of surgery, and duration of hospital stay. Anastomotic stricture formation was seen more with use of staplers where as mean operating time was less with stapling technique than with hand sewn technique.

Pernilla Viklund²⁷ et al conducted a study on risk factors for complications after esophageal cancer resection and demonstrated that comparison of hand-sewn anastomoses with stapled anastomoses did not reveal any clear difference in the risk of anastomotic leakage. Results in our study also did not reveal any statistical significant difference in anastomotic leak in two techniques of stapled versus hand sewn anastomosis in gastroesophageal junction malignancies. Sina A Ercan²⁸ et al demonstrated that there is no statistical significant difference in anastomotic leak between stapled versus hand sewn anastomosis in esophageal anastomosis and median hospital stay was 10 days for both groups, same results were noted in our study.

Luechakietisak P²⁹ et al conducted a study of comparison between hand sewn and stapled anastomosis after esophageal cancer resection and demonstrated that anastomotic leak (6.7%) was more in hand sewn (6.7%) group compared to stapled (3.4%)

) anastomosis and anastomotic stricture formation was more in stapled (36.5%) compared to hand sewn (19.2%) group and there was no significant difference in mortality in two groups. In our study no difference in anastomotic leak was noted while as anastomotic stricture formation was seen more in stapled anastomosis.

Law S³⁰ et al showed that operating time with hand sewn anastomosis and was 214 and 217 minutes in esophagogastric anastomosis with no statistical significant difference however results in our study showed statistically significant difference in mean operating time in two techniques with stapled anastomosis taking significantly less time compared to hand sewn technique and technically very easy. Leakages rate in two groups were 1.6% and 4.9% in hand sewn and stapled anastomosis. Anastomotic stricture formation was seen in 9.1% in hand sewn group and 40% in stapler group concluding that stricture formation was more in stapled anastomosis compared to hand sewn anastomosis, same conclusion regarding stricture formation was noted in our results.

CONCLUSION:

Restoration of Gastrointestinal continuity after radical resection of GE junction tumours can be achieved either manually or with use of stapling devices. On analysing results in our study, it was noted that there was no statistical significant in rates of anastomotic leak, recurrence rate within one year of surgery, and duration of hospital stay. Anastomotic stricture formation was seen more with use of staplers where as mean operating time was significantly less with stapling technique than with hand sewn technique.

This study showed that stapled anastomosis is very efficient, safe, technically easy and less time consuming technique for restoration of gastrointestinal continuity in Gastroesophageal junction malignancies. Thus Stapled anastomosis in restoration of gastrointestinal continuity in Gastroesophageal junction malignancies can be done with almost same results of morbidity and mortality as hand sewn anastomosis and in cases where anastomosis is technically very difficult and restoration of gastro-intestinal continuity is difficult to achieve with hand sewn technique.

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