International Journal of Multidisciplinary and Current Research ISSN: 2321-3124
Research Article Available at: http://ijmcr.com

To Study the Correlation of Imaging and Resection Margin in Determining the Post Operative Morbidity and Mortality in Oesophagealgastric Juction Tumour

Dr.S. Anbazhagan*, MS.; Dr.P.Ganesh Kumar, MS. and V.S.Iniyan

Government Villupuram Medical College, India

Received 07 Sept 2019, Accepted 08 Nov 2019, Available online 13 Nov 2019, **Vol.7 (Nov/Dec 2019 issue)**

Abstract

Obective:*1. To study the radiological correlation in operability of the tumors; 2. To study the length of resection margin pre operatively and marginal status in histopathological examination; 3. To study postoperative morbidity and mortality.*
Methods: *The patients with GE junction tumors complaints are admitted and evaluated. The evaluation process begins with careful history taking and clinical examination. Comorbid illness is encountered in each patient and evaluated accordingly. Later, these patients are investigated. The main investigations includes: Contrast radiogram; OGD scopy; Contrast enhanced computed tomography chest and abdomen; USG abdomen*
The above said investigationsgives tissue diagnosis and helps in staging the disease. According to the stage the treatment is planned. The operable patients are approached with operative procedure with curative intent or to attain locoregional control. The procedure commonly done are transhiatal esophagectomy with reconstruction and total gastrectomy. In inoperable patients, the palliative procedure like feeding gastrostomy, feeding jejunostomy,etc are done. The patients are classified according to Siewert's classification from the investigations and proceeded accordingly. OGD scopy gives macroscopic appearance and tissue diagnosis for histopathological examination. CECT abdomen and thorax and USG abdomen helps in staging and metstatic work up of the disease.
Results: *The common OGD scopy findings of type of lesions are ulceroproliferative (59.64%) and ulceronodular (19.29%). Significant percentage of patients (38.6%) present with metastasis. The common site of metastasis are liver (59.09%) and lung (45.45%). The common postoperative complications are respiratory complications (26.7%), wound infection (26.7%) anastomotic related problem (20%). The early postoperative mortality rate is 6.7%*

Keywords: *Esophagealgastric junction tumor, operability, metastasis*

Introduction

Gastroesophageal junction growth is mostly the difficult entity faced by the surgeons. These tumors are associated with high mortality rate. The reasons are:

- Late stage of the disease at initial evaluation
- Challenges associated with treatment

Despite recent progress, esophageal cancer remains a high lethal malignancy. The overall 5-year survival rate increases from 4% in the past to 14% at present. After surgical resection of the tumor, 4-year survival rate for various stages are as follows:

- Stage I -59% to 80%
- Stage IIA -30%to40%,
- Stage IIB -10% to 30%
- Stage III -10% to 15%

Chest Radiography

Chest radiography was abnormal in patients with locally advanced esophageal cancer, with nonspecific findings such as soft tissue mass or mediastinaladenopathy. The patients with obstructive symptoms may show air-fluid level. In advanced disease, it may reveal lung metastases or pleural effusion.

Barium Esophagography

A contrast esophagogram provides information about location and length of the tumor, and reveals an irregular mucosal abnormality with dilatation of the proximal esophagus.

*Corresponding author's ORCID ID: 0000-0002-2036-7876
DOI: https://doi.org/10.14741/ijmcr/v.7.6.6

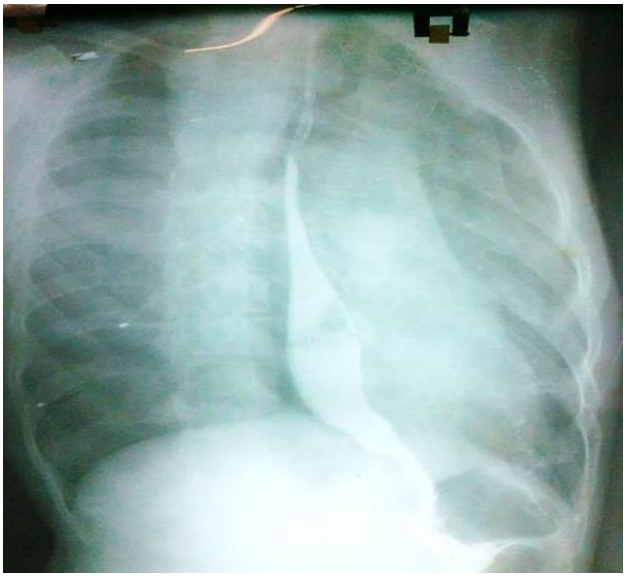


Fig 1: Barium study showing mucosal irregularity near OG junction

Upper Gastrointestinal Endoscopy

The tumor is easily recognizable and biopsy can be performed using UGI scopy. The length of the tumor and likelihood of lymph node involvement in correspondence with tumor length can be assessed. [33] The macroscopic appearance and grade of luminal stenosis provides the information of locally advanced tumor. [34] Measurement of the distance between the tumor and the incisors gives useful information for planning the treatment. Retroflexion maneuver by flexible endoscopy can assess the fundus and cardia of the stomach, which is useful in distal third cancer.

Endoscopic Ultrasound

Endoscopic ultrasound helps in staging the disease. The tumor invasion and nodal spread can be assessed. The accuracy of detecting invasion of adjacent structures approaches 100%, [35]but less accurate in early stage disease regarding tumor penetration.

Computed Tomography -Chest and Abdomen

Computed tomography (CT) scan plays very important role in pretreatment staging of the disease, thus guiding surgeons to treat the patients appropriately and provides prognostic data. They accurately detects peritoneal carcinomatosis and metastasis to liver and lung. [36]The invasion of trachea and aorta are accurately detected exceeding 90 %. [37] Thus, CT helps in avoiding unnecessary surgeries.

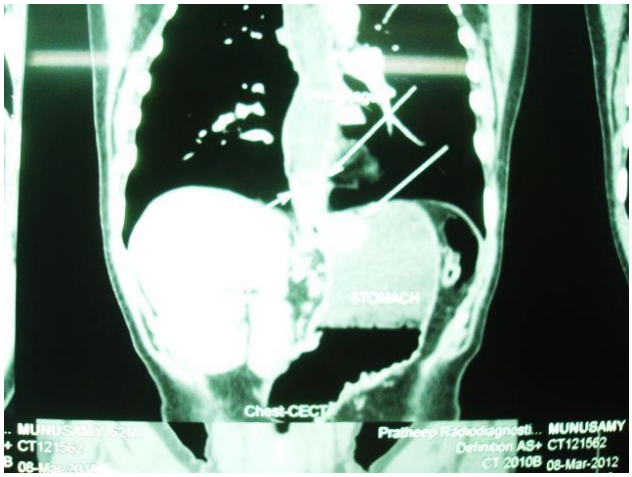


Fig 2.CT scan showing OG junction tumor

Positron Emission Tomography

PET scan availability lead to an improved ability to detect occult metastasis and can alter the stage of the disease in 20% of esophageal cancer patients.The nodal staging is more accurately done by PET scan than CT scan, but less accurate than EUS .

Staging

Primary tumor(T)	
TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Tis	Carcinoma in situ
T1	Tumor invades the lamina propria or submucosa
T2	Tumor invades the muscularispropria
T3	Tumor invades the adventitia
T4	Tumor invades adjacent structures
Regional Lymph Nodes(N)	
NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastases
N1	Regional lymph node metastases
Distant metastases(M)	
MX	Distant metastases cannot be assessed
M0	No distant metastases
M1	Distant metastases

Esophageal canceris staged by using the tumor, nodal and metastasis (TNM) system of categorization according to the AJCC.

Stage Groupings

Stage 0	Tis	N0	M0
Stage I	T1	N0	M0
Stage IIA	T2	N0	M0
	T3	N0	M0
Stage IIB	T1	NI	M0
	T2	NI	M0
Stage III	T3	NI	M0
	T4	Any N	M0
Stage IVA	Any T	Any N	MIa
Stage IVB	Any T	Any N	MIb

Classification

For planning the treatment strategy for the tumors of esophagogastric junction, proper classification is mandatory. Siewert, Stein and Feithgave the most accepted classification of OGJ tumors. It is based on morphological and anatomical landmarks. Adenocarcinoma of the esophagogastric junction (AEG) is classified into 3 types as follows:

Type I : Tumor involving the distal esophagus infiltrating into OGJ
Type II: Tumor involving OGJ- true cardia
Type III: Tumor involving subcardial region infiltrating into OGJ

This classification was worldwide accepted at the consensus conference during the second International gastric cancer Congress held at Munich, in April 1997. This classification has made drastic changes in the management of different types of tumors.

Treatment

Optimal treatment of carcinoma of gastroesophageal junction varies according to the stage of the disease. The options available are surgical therapy, chemotherapy, radiotherapy and combined modality therapy. For tumors penetrating into submucosaand beyond irrespective of tumor involvement, surgery is the best modality of treatment. Considering the high mortality and morbidity associated with esophageal resection, newer therapeutic approaches such as mucosal ablation and EMR are considered for early stage disease. Recently, chemoradiotherapy is offered as primary therapy[38] in some centers.

Surgical Therapy

Surgical resection remains the primary modality of treatment for patients with esophageal cancer in the absence of systemic metastases.

The treatment options available for early stage cancer confined to mucosa, are surveillance, ablative methods, endoscopic mucosal resection, vagal sparing esophagectomy and minimally invasive esophagectomy.

Type I tumors

For the localized, resectable GEJ tumor, surgery remains the treatment of choice. The surgery for resection of esophagus is through transthoracic and transhiatal approach.

This approach has gained advantage with concurrent increasing incidence of the distal esophageal carcinoma because it is easily approached with ease and effective dissection is done through hiatus of diaphragm. The technique is as follows:

First, laparoscopic exploration is necessary to rule out disseminated disease because it avoids unnecessary celiotomy. Incising the abdomen through midline, the stomach mobilization is done after dividing all its vascularity except for right gastroepiploic and right gastric vessels, through which reconstructive stomach conduit survives. The duodenum is completely mobilized by Kocher's maneuver. Then, drainage procedure, pyloroplasty is done to reduce stasis and prevents complications like aspiration .By cautery, the diaphragmatic crus is divided to dissect the middle and lower third of esophagus. The cervical part is exposed through cervical incision on left side and upper third of esophagus is dissected, taking care of recurrent laryngeal nerve. Later, the dissection at the carina level and superior to it, is done by bluntly through hiatus.

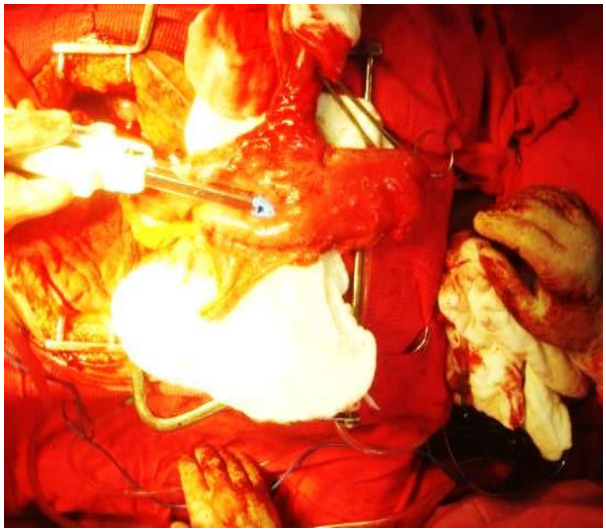


Fig.3 Intraoperartive picture of THE after mobilization of esophagus

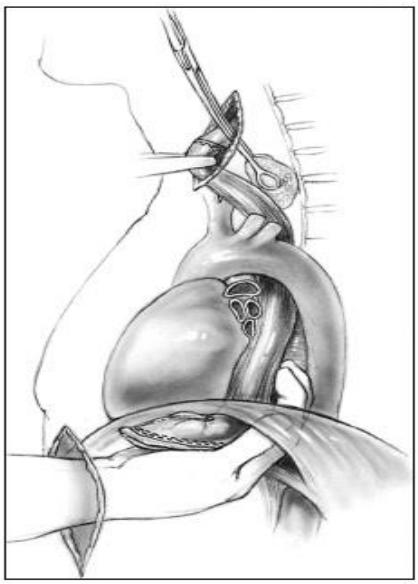


Fig 4: Blunt dissection of esophagus through diaphragmatic hiatus

The cervical part is divided and the gastric and the resected segment of esophagus is delivered through abdomen wound. The reconstructive gastric conduit tube is constructed with multiple linear stapler. The conduit is taken through mediastinum posteriorly to the wound at the cervical site and proceeded with gastroesophageal anastomosis through the cervical wound. The gastric conduit is reconstructive choice for the surgeons.

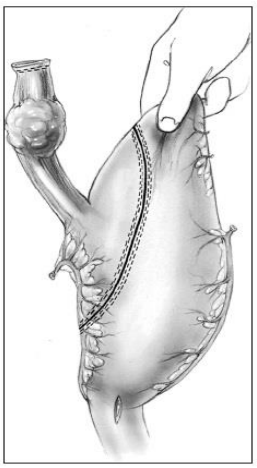


Fig 5: Preparation of gastric conduit

The alternative is the ascending branch of inferior mesenteric artery based colonic segment can be used. Although complete node dissection is not possible, two field lymphadenectomy (abdominal and lower mediastinal) can achieved through THE. If surgeon needs radical dissection, he can proceed with radical en bloc resection as performed by Bumm et al.

The advantages of THE are

- Shorter duration of hospital stay
- Lesser morbidity and mortality [39]
- Avoidance of thoracotomy incision
- Minimizes postoperative pulmonary complications and lethal complications like mediastinitis
- Decreased intra-thoracic anastomotic leak.

The disadvantages are

- Anastomotic stricture
- Recurrent laryngeal nerve palsy
- Poor visualization of upper and middle thoracic esophagus
- Chylothorax

A study by Orringer et al [41]involving 800 patients with 74.5% of the patients having lower third esophageal cancer, 22% and 4.5% of the patients with middle and upper third esophagus respectively, underwent transhiatalesophagectomy. The leading complications are leak of anastomotic site (13%) and palsy of recurrent laryngeal nerve (7%) and in-hospital mortality was 4.5%.The same results was revealed by other series of study.[42]The recurrent laryngeal nerve palsy resolves spontaneously in 99% of patients.

Transthoracic Esophagectomy

It is the standard procedure to resect the esophageal cancer. Left thoracotomy approach gives better access to the tumor of distal esophagus, where through right thoracotomy approach entire thoracic esophagus can be accessed. Right thoracotomy with upper midline laparotomy (Ivor-Lewis esophagectomy) is most commonly used for esophageal resection .This approach helps in better extent of lymph node dissection than THE.
Extent of lymph node dissection

AEG type I tumors spread to the lymph nodes both cranially and caudally. The extent of dissection lymph nodal basins are either three field lymphadenectomy (cervical, mediastinal and abdominal) or two field lymphadenectomy (mediastinal and abdominal) . En bloc esophagectomy achieves better radical node dissection with periesophageal adjacent tissue. At least 15 lymph nodes have to be dissected for better survival. Extended esophagectomycan benefit the patients with limited number of nodes are positive in their resected specimen.

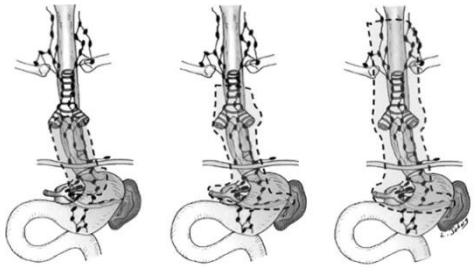


Fig.6 A. Standard lymphadenectomy; B. Two field lymphadenectomy; C. Three field lymphadenectomy

Type II and III tumors

The surgical options available for these tumors are transhiatally extended gastrectomy, total gastrectomy with R-Y construction and proximal subtotal gastrectomy. In many studies, extended resection doesn't show any survival benefit compared to limited resection.

Fig.7 Total gastrectomy specimen with circular stapler and intact donuts

These tumors harbors metastases in the paracardial nodes, nodes along greater and lesser curvatures, nodes along principal vessels, nodes at splenic hilum, andnodes along pancreaticsuperior border ,lymph nodes of low posterior mediastinum ,left adrenal gland and left renal vein.

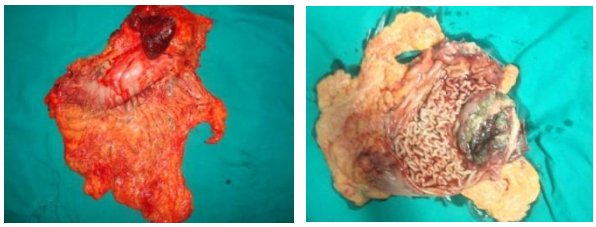


Fig.8 Total gastrectomy resected specimen with Siewert's type III tumor

The extent of lymph node dissection are D1 (1-6 station nodes) and D2 (7-15 nodes) dissection. D2 dissection gives better clearance but should not include splenectomy, as practiced before because of higher morbidity and mortality and also on differences in survival benefit.

Neoadjuvant Therapy

Gastroesophageal junction growth tumors present as advanced stage tumors. So, neoadjuvant therapy has some theoretical benefits. Possible explanations in favour of neoadjuvant therapy are:

- Decreases the size of tumor and improves R0 resection.
- Reduces the micrometastasis.
- Decides about postoperative adjuvant therapy.

Some chemotherapeutic agents, because of its radiosensitivity properties and high oxygen content of normal tissue in bed oft tumor enhances preoperative radiotherapy.But, significant morbidity occurs with these regimens.

Neoadjuvant therapy is usually recommended to the patients with doubtful R0 resection for the locally advanced tumors. Neoadjuvant therapy produces extended disease free and overall survival.

There are various regimens for oesophagogastric junction tumors. The polychemotherapy based on Cisplatin followed by resection procedure improves the survival. The additional chemotherapeutic drugs of importance are: Fluorouracil, Mitomycin, Epirubicin, Methotrexate, and Doxorubicin. Some of the regimens used are:

-Fluorouracil, Doxorubicin, Mitomycin
- Epirubicin, Cisplatin, Fluorouracil (ECF)
- Fluorouracil, Doxorubicin, Methotrexate (FAMTX)

Combination regimen therapy is better than monotherapy.

Multimodality treatment with chemotherapy and radiotherapy is better than radiotherapy alone because chemotherapy treats occult metastasis and also radiosensitizes thus enhancing radiotherapy. Studies show that response to Fluorourcil based chemotherapy in combination with radiotherapy is better for gastroesophageal adenocarcinoma.

Florica et al performed 6 randomised control trials meta-analysis of preoperative chemo-radiotherapy for the resectable tumors. It shows chemo- radiotherapy followed by surgery when comparing to surgery alone, decreases the 3 year mortality rate significantly.

Adjuvant Theapy

There is significant difference in 10 year survival rate in advanced disease when compared to early stage disease after surgical resection. There is more chance of local recurrence even after surgery in tumor bed, anastomotic site,etc. Studies show that locally directed adjuvant therapy has significant role in advanced stage disease of oesophagogastric junction growth. Adjuvant therapy in the form of multimodality treatment involving leucovorin modulated fluorouracil therapy and radiotherapy show possible benefit postoperatively.

Palliative Therapy

The treatment modalities are emerging to palliate the patient with advanced stage disease. The endoscopic treatment modalities like laser therapy and stent placement helps to palliate dysphagia and prevent aspiration. Feeding jejunostomy and feeding gastrostomy are last resort of palliation with inoperable tumors.

Based on our single institution experience, here we present our experience on management of esophagogastric junction growth.

The aims of the study are

1. To study the radiological correlation in operability of the tumors.
2. To study the length of resection margin pre operatively and marginal status in histopathological examination.
3. To study postoperative morbidity and mortality.

Materials and Methods

The patients with GE junction tumors complaints are admitted and evaluated. The evaluation process begins with careful history taking and clinical examination. Comorbid illness is encountered in each patient and evaluated accordingly.

Later, these patients are investigated. The main investigations includes

- Contrast radiogram
- OGD scopy
- Contrast enhanced computed tomography chest and abdomen
- USG abdomen

The above said investigations gives tissue diagnosis and helps in staging the disease. According to the stage the treatment is planned. The operable patients are approached with operative procedure with curative intent or to attain locoregional control. The procedure commonly done are transhiatal esophagectomy with reconstruction and total gastrectomy. In inoperable patients, the palliative procedure like feeding gastrostomy, feeding jejunostomy,etc are done.

The patients are classified according to Siewert's classification from the investigations and proceeded accordingly.

OGD scopy gives macroscopic appearance and tissue diagnosis for histopathological examination.

CECT abdomen and thorax and USG abdomen helps in staging and metstatic work up of the disease.

Preoperative preparation of the patient includes

- Encountering the comorbid illness of the patient and corrected
- Improving the nutritional status and hydration of the patient
- Careful cardiorespiratory assessment like improving the pulmonary function test and cardiorespiratory reserve.

Then surgery is planned according to tumor location and Siewert's type. Transhiatal esophagectomy with partial gastric resection and reconstruction is the procedure done in Siewert's type I tumors and type II tumors. Total gastrectomy is the common procedure done in type III tumors. Neck anastomosis is preferred in transhiatal esophagectomy in our institution.

Then, postoperative course is followed during the hospital stay and in hospitality complications and mortality are noted. Then, subsequently during hospital visits,follow up is done.

Study type

This study was conducted in the Department of General surgery and Surgical Gastroenterology, Government Royapettah hospital attached to Government Kilpauk Medical College during the period of May 2010 to November 2012.

Type of study: Descriptive study
Type of analysis: Clinical data analysis done

Observation

OGD SCOPY findings

OGD findings of growth	*No. of Patients*	*Percentage*
Ulceroproliferative	34	59.64%
Ulceronodular	11	19.29%
Infiltrative	5	8.77%
Ulcerative	4	7.01%
Proliferative	3	5.26%

The endoscopic findings are the most important investigation in OG junction growth. It gives macroscopic view and also gives access to tissue biopsy. Of macroscopic view, the endoscopic finding of ulceroproliferative lesions (59.64%) are the most common OGD scopy finding. The ulceronodular lesions (19.29%) are second common findings. The infiltrative , ulcerative and proliferative lesions constitute considerable percentage.

Biopsy Report

	SCC	*AC*	*ASCC*
S I	22	2	1
S II	1	13	0
S III	0	18	0
Total	23	33	1

SCC - Squamous cell carcinoma
AC – Adenocarcinoma
ASCC- Adenosquamous cell carcinoma

Distribution of Grade of the Tumors

	SCC	*AC*	*No. of cases*	*Percentage*
G1	3	2	5	10.71%
G2	10	18	28	48.21%
G3	10	13	23	41.07%
Total	23	33	56	

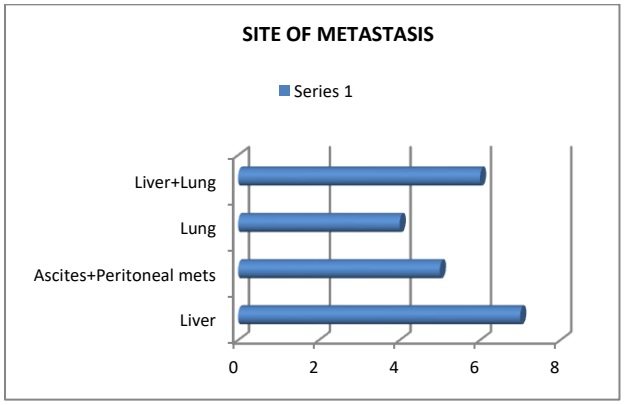
Site of Metastasis

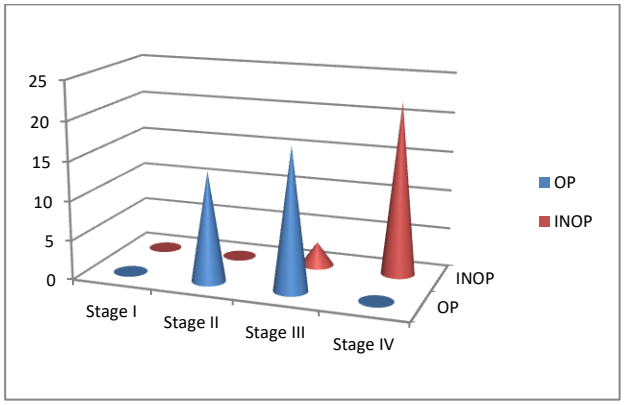
The common site of metastasis in our study is liver. 7 of 22 patients presenting with metastasis had liver metastasis alone constituting 31.81%. In addition, 6 of 22 patients presented with both liver and lung metastasis constituting 27.27%. As a whole 13 of 22 patients (59.09%) with metastasis presented with liver metastasis.

The next common site of metastasis presented in our study is lung. 4 patients out of 22 patients(18.18%) with metastasis presented with isolated lung metastasis and 6 of 22 patients (27.27%) presented with combined lung and liver metastasis.

As a whole 10 of 22 patients (45.45%) with metastasis presented with lung metastasis.

The patients presenting with ascites and peritoneal metastasis are 5 patients out of 22 patients with metastasis. These patients constitute 22.72% of the patients with metastasis.





Operability of Tumors

Operability	*No. of patients*	*Percentage*
Inoperable	25	43.85%
Operable	32	56.14%

Of 25 inoperable patients in our study,
7 of 25 patients S I type - 28%
9 of 25 patients S II type - 36%
9 of 25 patients S III type - 36% of inoperable tumors.

Of 32 operable patients in our study,
18 of 32 patients S I - 56.25%
5 of 32 patients S II -15.62%
9 of 32 patients S III -28.12%

Thus, the chance of operability is more in S I type tumors and least in S II type tumors. The chance of inoperability is more in S II than S III type. So, fast work up should be done in diagnosing and managing the patients with type II and III tumors.

Inoperability Vs Stage of Disease

In our study, the operable tumors are distributed in stage II and stage III tumors. All 14 patients of stage II are operable in our study. In patients with stage III tumors, 18 of 21 patients are operable in our study. They constitute 85.71% of stage III tumors.

In our study, all patients of stage IV (22 patients) are inoperable cases. 3of 21 patients in stage III tumors (14.29%) are inoperable.

In stage IV tumors, the inoperability is mostly attributed to distant metastasis to liver, lung, etc. But in stage III tumors inoperability in our study is mostly due to adjacent structures invasion, adherent lymph nodes, posterior fixity of the tumor.

Here, the inoperable stage III tumors gains more importance than stage IV tumors. These patients should be evaluated soon with special interest to make them operable. Neoadjuvant therapy plays important role in this situation.

Causes of Inoperability

Causes	*No. of patients*	*Percentage*
Local causes	3	12%
Lung metastasis	4	16%
Liver metastasis	7	28%
Peritoneal metastasis	5	20%
Liver +Lung metastasis	6	24%
Total	25	

Of 25 inoperable patients in our study, 22 patients (88%) had distant metastasis. Most of these patients have liver (28%), lung (16%) and peritoneal metastasis (20%). 24% of inoperable patients have both liver and lung metastasis.

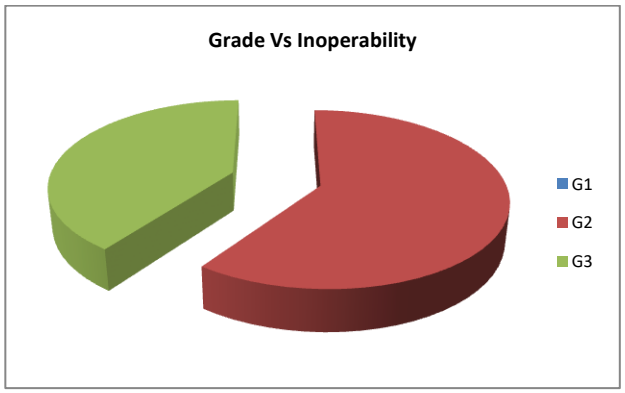
The local causes of inoperability constitute 12% of inoperable patients. Infiltration into adjacent structures, adherent lymph nodes and posterior fixity of the tumor are the local causes of inoperability in our study.

Grade of Tumors Vs Inoperability

In our study, all the inoperable tumors belong to G2 and G3 tumors. 15 of 25 patients with inoperable tumors are grade 2 tumors. They constitute 60% of inoperable tumors. The remaining 40% of inoperable patients have grade 3 tumors. Thus, high grade tumors have high propensity to become inoperable.

Fig.10 Esophagogastrectomy specimen

In our study, out of 57 patients 32 patients underwent resection procedure. Of these patients, 21 patients underwent trans-hiatal esophagectomy constituting 50% of patients who underwent resection procedure. 3 of 32 patients underwent laparoscopy assisted transhiatalesophagectomy (9.37%). Thus, 24 patients underwent transhiatalesophagectomy with reconstruction procedure constituting 75% of operable patients in our study. Reconstruction is usually through gastric conduit with esophagogastric anastomosis at the neck site. But in 2 patients, coloplasty is done after esophagogastrectomy.



Resection Margin Vs Margin Positivity

Res .margin	*Pos / Neg*	*< 3 cm*	*3-5 cm*	*>= 5 cm*
Upper margin	Positive	2	1	0
	Negative	1	14	14
Lower margin	Positive	0	0	0
	Negative	1	2	29

In operable cases in our study, lower margin status in all resected specimen is negative. But, in 3 resected specimen upper margin is positive. Thus, 9.37% of patients who underwent resection have margin positivity in the upper margin.

The margin positivity is mostly seen in resected specimen whose margin is less than 5 cm from tumor site. Of these patients, 2 of 3patients have less than 3 cm resection margin and remaining 1 patient falls into group with resection margin 3-5 cm.

There is no margin positivity in the resected specimen whose resection margin is more than 5cm in our study.

Thus, margin positivity is common in patients with less than 5 cm resection margin. There is less chance of margin positivity in patients with more than 5 cm resection margin.

Recurrence of Tumors

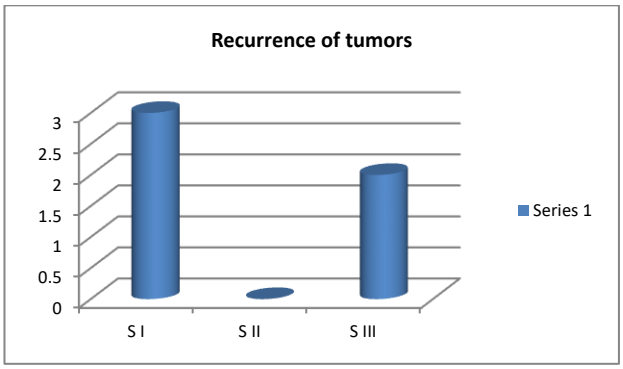
The tumor recurrence occurs in 5 patients who underwent resection procedure in our study. Totally, 32 patients underwent resection procedures in our study. Thus, 5 of 32 operable patients have tumor recurrence constituting 15.62% of patients who underwent resection in our study.

3 of 5 patients with recurrence are of S I type constituting 60% of patients with recurrence in our study. Of these patients, one patient has margin positivity and other two patients have their margins negative. These patients have considerable length of resection margin of around 5 cm (upper and lower margin- 4, 5, 6 cm and 6, 5, 5 cm respectively in each specimen). Still, these patients have recurrence, inspite of adequate margin.

Since most of the S I type tumors in our study are squamous cell carcinoma, they are known for submucosal spread, multricentricity and extensive lymphatic spread. Probably, this could explain recurrence in S I tumors inspite of adequate margin, in our study.

2 of 5 patients with recurrence are of S III type constituting 40% of patients with recurrence in our study. Of these patients, one patient has margin positive and the other is negative in our study. Since, these patients usually undergo total gastrectomy as treatment in our institution, there could be compromise in giving adequate proximal margin .This could explain recurrence in S III type tumors in our study.

None of the S II type tumors in our study presented with recurrence. Probably, this could be explained by loss of follow up of the patients.



Risk Factors Vs Tumor Type

Risk Factors	*S I*	*S II*	*S III*
Smoking	12	6	6
Alcohol	12	5	7
GERD	11	3	3
Obesity	5	1	2

Smoking as a risk factor in our study is mostly distributed among patients with S I type tumors. 50% of smoking patients in our study are of S I type. The remaining smoker patients in our study are distributed equally among patients with S II and S III type (25%).

Alcohol is a risk factor in 24 patients in our study. Of alcoholic patient in our study, 12 patients are of S I type (50%), 5 patients are of S II type (20.83%) and 7 patients are of S III type (29.16%).

Thus, smoking and alcohol are significant risk factors in S I type tumors in our study. They are known risk factors of squamous cell carcinoma. This explains the more incidence of squamous cell carcinoma in S I type tumors in our study.

GERD and obesity are other important risk factors in our study. They are common in S I type tumors.

Surgical Procedure

Surgical Procedure	*No. of Patients*
Transhiatalesophagectomy	21
Lap assisted THE	3
Total gastrectomy	8
Diagnostic Laparoscopy	4
Feeding jejunostomy	22
Feeding gastrostomy	3

Total gastrectomy with Roux-en – Y esophagojejunostomy was done in 8of 32 operable patients. This procedure was done in Siewert's type III patients. This procedure constitutes 25% of operable patients in our study.

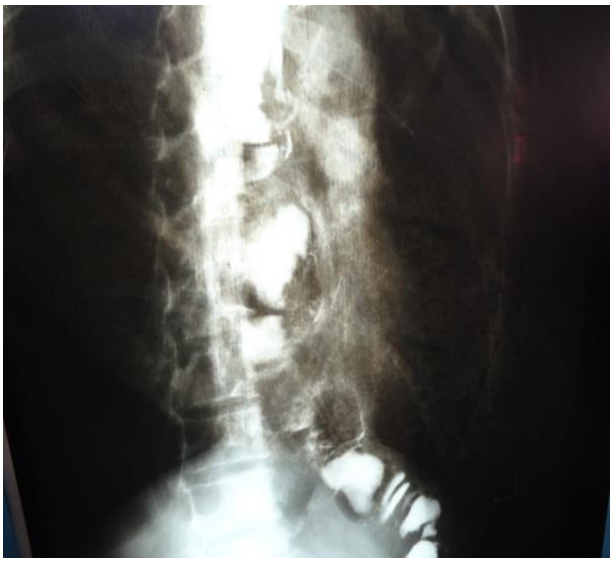


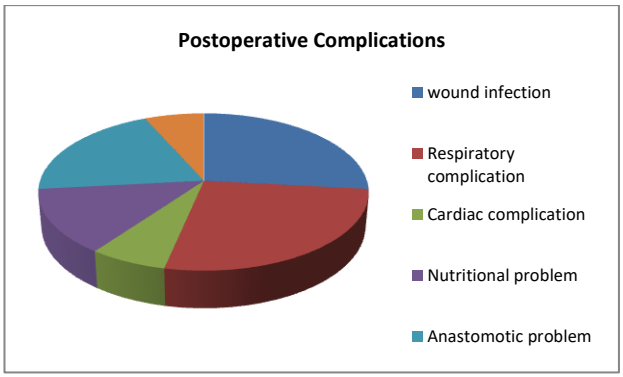
Fig.11 Barium study done in a patient after coloplasty

Diagnostic Laparoscopy was done in 7 patients in our study. Of these patients, 4 patients underwent trans-hiatal esophagectomy and 3 patients underwent palliative procedure like feeding jejunostomy.

Palliative procedure in the form of feeding jejunostomy or gastrostomy was done in 25 patients in our study. Of these patients, 22 patients underwent feeding jejunostomy constituting 88% of inoperable patients. The remaining 3 patients underwent feeding gastrostomy (12%) .

Post Operative Course

The postoperative complications encountered 30 days after surgery in our patients are studied. Out of 32 patients who underwent resection procedure, 15 patients had complications postoperatively. The common complications encountered are cardiac complications (26.7%) and respiratory complication (26.7%). Anastomotic problem in the form of leak or stricture is seen in 3 patients constituting 20% of complications. The other complications seen in our study are nutritional problem (6.7%), wound infection (13.33%) and death (6.7%). The 30 days mortality 6.7% encountered in our study was due to myocardial infarction.



Discussion

Adenocarcinoma is the most common histopathologic finding in our study. They constitute 57.89% in our study. Adenocarcinoma are common in Siewert's type II (92.85%) and III (100%) tumors .

Type II - 13 of 14 patients - 92.85%
Type III - 18 of 18 patients – 100%

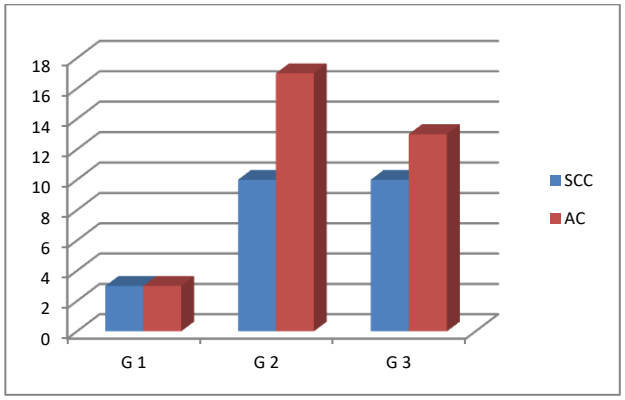
Squamous cell carcinoma is common in type I tumors in our study. 22 of 25 patients with type I tumors show squamous cell carcinoma. Surprisingly, squamous cell carcinoma is seen in one patient with type II tumors in our study. As a whole, 23 patients are with squamous cell carcinoma constituting 40.35% of patients.

Although adenocarcinoma are common in OG junction growth, in our study squamous cell carcinoma constitutes most of the type I tumors. This differs from the western literature, as in our study the distal esophageal squamous cell carcinoma is common. Probably this could be attributed to smoking in our patients with type I tumors as most of them are smokers.

Adenosquamous carcinoma is seen in one patient with type I tumor.

Most of the tumors in our study fall into grade II (48.21%) and grade III tumors (41.07%). Undifferentiated carcinoma (G3 tumors) is of surgical importance in regard to operability of the tumors. Most of the tumors in our study are moderately differentiated carcinoma (G 2 category).These G2 tumors are almost surgically feasible.

J.Rudiger Siewert et al conducted Adenocarcinoma of Esophagogasteic junction ,Results of Surgical therapy Based on Anatomical/ Topogrphic classification in 1002 consecutive patients.This study shows the prevalence of G3 tumor as 60.2 revealing the high prevalence of high grade tumors. In our study, G2 tumors are more common than G3 tumors.



SCC-Squamous cell carcinoma
AC-Adenocarcinoma
G1-Well differentiated tumors
G2-Moderately differentiated tumors
G3-Poorly differentiated tumors

Grade of Tumors in Siewert's Classification

	S I	S II	S III	Total
G1	3	1	1	5
G2	13	7	8	28
G3	9	6	9	24
Total	25	14	18	57

Well differentiated carcinoma (G1 category) forms the least group (10.71%) in our study. Of G1tumors, (3 of 5patients) 60% falls into S I type.

Among G2 tumors , 13 of 28 patients (46.42%) fall into S I type. Next comes

S III type (8 of 28 patients) 28.57% of G 2 tumors. The remaining patients with G2 tumors (7 of 28 patients) are of S II type.

There is equal incidence of G3 tumors (9 of 24 patients) in S I and S III type tumors (37.5%). Rest of the patients with G3 tumors (6 of 24 patients) fall into S II type in our study.

The patients with possible operability of the tumors are 32 patients out of 57 patients in our study. These patients constitute 56.14% in our study.

The patients with inoperability in our study are 25 of 57 patients constituting 43.85%. This shows considerable number of patients presents with advanced stage.

This emphasis the importance of working up in patients with OG junction growth to diagnose the disease at earlier stage.

Operability of Tumors in Siewert's Classification

Types	Operable	Inoperable	Total
S I	18	7	25
S II	5	9	14
S III	9	9	18
	32	25	

In Siewert's type I tumors, 18 of 25 patients are operable contributing 72% of patients with S I type tumors. 7 patients with S I type tumors are inoperable constituting 28% of S I type tumors in our study. Thus, operable tumors are more in patients with S I tumors in our study.

In our study, 5 of 14 patients with Siewert's type II tumors are operable. They constitute 35.71% of patients with S II tumors. The remaining patients, 9 of 14 patients constituting 64.28% of S II tumors are inoperable. Thus, inoperable tumors are more among S II type tumors in our study.

Among S III type patients in our study, 9 patients out of 18 patients constituting 50% are inoperable. The remaining 50% of S III patients are operable.

Barbour et al in 2001 conducted a study involving 505 patients who underwent resection procedure R0/R1 gastrectomy (n=153) or esophagectomy (n=352) without neoadjuvant therapy[27]. Univariate analysis found that proximal resection margin more than 5 cm is most predictive of improved survival. This substantiates the finding in our study.

Portale G et al[9] conducted a study on perioperative complications in patients who underwent resection for gastroesophageal junction adenocarcinoma in 263 consecutive patients and observed the following:

Portale study	Our study
Respiratory complications - 23%	26.7%
Anastomotic complications – 14%	20%
Cardiovascular complications – 17%	26.7%
Wound infection - 4%	13.33%

The common complications in both studies are respiratory and cardiac complications. But, wound infection is high in our study.

Conclusion

The common OGD scopy findings of type of lesions are ulceroproliferative (59.64%) and ulceronodular (19.29%).

Adenocarcinoma are more common (57.89%). But, squamous cell carcinoma contributes significant percentage (40.35%) and most of them are Siewert's type I.

Significant percentage of patients (38.6%) present with metastasis. The common site of metastasis are liver (59.09%) and lung (45.45%).

The upper resection margin positivity is common in our study. This occurs in patients whose resection margin is less than 5 cm.

The common postoperative complications are respiratory complications (26.7%), wound infection (26.7%) anastomotic related problem(20%). The early postoperative mortality rate is 6.7%

References

[1]. Sampliner RE, Jaffe P: Malignant degeneration of Barrett's esophagus: The role of laser ablation and photodynamic therapy. *Dis Esophagus* 1995; 8:104-108.

[2]. Bosset JF, Gignoux M, Triboulet JP, et al: Chemoradiotherapy followed by surgery compared with surgery alone in squamous-cell cancer of the esophagus. *N Engl J Med* 1997; 337:161-167.
[3]. Apinop C, Puttisak P, Preecha N: A prospective study of combined therapy in esophageal cancer. *Hepatogastroenterology* 1994; 41:391-393.
[4]. Sabik JF, Rice TW, Goldblum JR, et al: Superficial esophageal carcinoma. *Ann ThoracSurg* 1995; 60:896-901.
[5]. Takeshita K, Tani M, Inoue H, et al: Endoscopic treatment of early oesophageal or gastric cancer. *Gut* 1997; 40:123-127.
[6]. Le Prise EL: [Cancer of the esophagus: Outcome of neoadjuvant therapy on surgical morbidity and mortality.]. *Cancer Radiother* 1998; 2:763-770.
[7]. Nygaard K, Hagen S, Hansen HS, et al: Pre-operative radiotherapy prolongs survival in operable esophageal carcinoma: A randomized, multicenter study of pre-operative radiotherapy and chemotherapy. The second Scandinavian trial in esophageal cancer. *World J Surg* 1992; 16:1104-1109.discussion 1110
[8]. Orringer MB: Transhiatalesophagectomy without thoracotomy for carcinoma of the thoracic esophagus. *Ann Surg* 1984; 200:282-288.
[9]. Portale G, Hagen JA, Peters JH, et al: Modern 5-year survival in resectable esophageal adenocarcinoma: Single institution experience with 263 patients. J Am CollSurg 202:588-596.
[10]. Skinner DB, Dowlatshahi KD, DeMeester TR: Potentially curable cancer of the esophagus. *Cancer* 1982; 50(11 Suppl):2571-2575.
[11]. Torek F: The first successful case of resection of the thoracic portion of the esophagus for carcinoma. *SurgGynecolObstet* 1913; 16:614.
[12]. Ohsawa T: The surgery of the esophagus. *Arch JpnChir* 1933; 10:605.
[13]. Adams W, Phemister D: Carcinoma of the lower esophagus. *J ThoracSurg* 1939; 7:621.
[14]. ANNALS of Surgery Vol. 232, No 3, 353-361 @2000
[15]. Pisani P, Parkin DM, Bray F, Ferlay J: Estimates of the worldwide mortality from 25 cancers in 1990. *[erratum appears in Int J Cancer 1999 Dec 10;83(6):870-3.] Int J Cancer* 1999; 83:18-29.
[16]. Jemal A, Murray T, Ward E, et al: Cancer statistics, 2005. *CA Cancer J Clin* 2005; 55:10-30.
[17]. SEER Statistical Database. *Esophageal cancer statistics* 2004.
[18]. Walsh TN, Noonan N, Hollywood D, et al: A comparison of multimodal therapy and surgery for esophageal adenocarcinoma. *N Engl J Med* 1996; 15:462-467.
[19]. Hesketh PJ, Clapp RW, Doos WG, Spechler SJ: The increasing frequency of adenocarcinoma of the esophagus. *Cancer* 1989; 64:526-530.
[20]. Urba SG, Orringer MB, Turrisi A, et al: Randomized trial of preoperative chemoradiation versus surgery alone in patients with locoregional esophageal carcinoma. *J ClinOncol* 2001; 19:305-331.
[21]. Kabat GC, Ng SK, Wynder EL. Tobacco, alcohol intake, and diet in relation to adenocarcinoma of the esophagus and gastric cardia. Cancer Causes Control 1993;4(2):123.
[22]. Devita, Hellman, Rosenberg's CANCER Principles & Practice of Oncology 8 th edition
[23]. Shackelford's Surgery of the Alimentary tract 6 th edition
[24]. Munoz N DN. Esophageal Cancer. 2nd ed. New York: Oxford University Press, 1996.
[25]. Lagergren J, Bergstrom R, Lindgren A, Nyren O. Symptomatic gastroesophageal reflux as a risk factor for esophageal adenocarcinoma. N Engl J Med 1999;340:825.
[26]. Cameron AJ. Management of Barrett's esophagus. Mayo ClinProc 1998;73(5):457.
[27]. Barbour et al, Adenocarcinoma of esophago gastric junction tumours; Department of Surgery, Memorial Sloan-Kettering Cancer Center, New York, NY 10021, USA.
[28]. Drewitz DJ, Sampliner RE, Garewal HS. The incidence of adenocarcinoma in Barrett's esophagus: a prospective study of 170 patients followed 4.8 years. Am J Gastroenterol 1997;92(2):212.
[29]. Endo M, Yoshino K, Kawano T, et al: Clinicopathologic analysis of lymph node metastasis in surgically resected superficial cancer of the thoracic esophagus. *Dis Esophagus* 2000; 13:125-129.
[30]. Odze R, Goldblum J, Crawford J: *Surgical Pathology of the GI Tract, Liver, Biliary Tract and Pancreas*, Philadelphia, Elsevier, 2004.
[31]. Nigro JJ, DeMeester SR, Hagen JA, et al: Node status in transmural esophageal adenocarcinoma and outcome after en bloc esophagectomy. *J ThoracCardiovascSurg* 1999; 117:960-968.
[32]. Maley C. Multistage carciogenesis in Barrett's esophagus. Cancer Lett 2007;245:22.
[33]. Bhutani MS, Barde CJ, Markert RJ, Gopalswamy N: Length of esophageal cancer and degree of luminal stenosis during upper endoscopy predict T stage by endoscopic ultrasound. *Endoscopy* 2002; 34:461-463.
[34]. Van Dam J, Rice TW, Catalano MF, et al: High-grade malignant stricture is predictive of esophageal tumor stage. Risks of endosonographic evaluation. *Cancer* 1993; 71:2910-2917.
[35]. Kienle P, Buhl K, Kuntz C, et al: Prospective comparison of endoscopy, endosonography and computed tomography for staging of tumours of the oesophagus and gastric cardia. *Digestion* 2002; 66:230-236.
[36]. Lea JW, Prager RL, Bender HW Jr. The questionable role of computed tomography in preoperative staging of esophageal cancer. Ann ThoracSurg 1984;38(5):479.
[37]. Becker CD, Barbier P, Porcellini B. CT evaluation of patients undergoing transhiatalesophagectomy for cancer. J Comput Assist Tomogr 1986;10(4):607.
[38]. Bedenne L, Michel P, Bouche D, et al: Randomized phase III trial in locally advanced esophageal cancer: Radiochemotherapy followed by surgery versus radiochemotherapy alone (FFCD 9102) [abstract]. Paper presented at a meeting of The American Society of Clinical Oncology, Orlando, Fla, 2002.
[39]. Park JO, Posner MC. Standard surgical approaches in the management of esophageal cancer. SurgOncolClin N Am 2002;11(2):351.
[40]. Bumm R, Feussner H, Bartels H, et al. Radical transhiatalesophagectomy with two-field lymphadenectomy and endodissection for distal esophageal adenocarcinoma. World J Surg 1997;21(8):822.
[41]. Orringer MB, Marshall B, Iannettoni MD. Transhiatalesophagectomy: clinical experience and refinements. Ann Surg 1999;230(3):392â€"400; discussion 400.
[42]. Vigneswaran WT, Trastek VF, Pairolero PC, et al. Transhiatalesophagectomy for carcinoma of the esophagus. Ann ThoracSurg 1993;56(4):838.