

A Dissertation on
A STUDY OF CARCINOMA OESOPHAGUS
A SURGICAL AUDIT

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CERTIFICATE

This is to certify that this dissertation in **A STUDY OF CARCINOMA OESOPHAGUS A SURGICAL AUDIT** is a work done by **Dr.M.D.THENMOZHI**, under my guidance during the period 2003 - 2006. This has been submitted in partial fulfillment of the award of M.S. Degree in General Surgery (Branch - I) by the Tamil Nadu Dr.M.G.R. Medical University, Chennai.

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INTRODUCTION

Cancer oesophagus is the ninth most common gastrointestinal tract malignancy and among the most prevalent cancer worldwide. The oesophageal cancer are highly lethal malignancies. The overall survival from Oesophageal carcinoma is 13%. Unfortunately the incidence is rising in our country. It is well known for its marked variation by geographic area, ethnic group and sex.

Despite the understanding of the risk factors and cellular rearrangement associated with oesophageal cancer, the current treatment modalities has changed little and long term survival remains poor. The incidence of lower oesophageal and gastro oesophageal junction tumours are increasing recently due to gastro oesophageal reflux disease.

Mostly the newly diagnosed patients have either locally advanced disease or have distant metastasis at presentation. As with all other tumours, the outcome for patient with oesophageal carcinoma is associated with the stage of the disease at presentation. Still now no single modality can optimally stage the local disease and distant metastasis. The late presentation is due to the factor that symptoms usually occur after three fourth occlusion of the lumen of the oesophagus and involvement of adjacent structures. Hence the management of these patients is a challenging problem.

Despite ongoing advances in chemo therapy and radio therapy oesophagectomy continues to play a vital role in the management of the patient with oesophagus cancers both as curative and palliative treatment. With

multimodal diagnostic and therapeutic approach it will be possible to improve the prognosis of the tumour. The depiction of carcinoma esophagus in one of the ancient Chinese literature was "One suffers in autumn and does not live to see the coming summer", is no more considered true, due to recent diagnostic and therapeutic advances that have improved the short term and to some extent the long term prognosis of these patient.

Also esophageal malignancy is potentially curable disease with a good survival rate, provided it has been diagnosed and treated early before submucosal lymphatic spread and satellite nodules have occurred.

The selection of optimal operative procedure depends upon the extent of the disease and physiological status of the patient. Unfortunately no replacement organ able to replace a healthy oesophagus. Despite this, available replacement organ will make the patient to lead a reasonably good quality of life.

HISTORICAL BACKGROUND

Oesophageal carcinoma is not a new malady, having been described by the Chinese as a cause of "Dyspepsia" more than 2000 years ago.

"No patients with malignancy are more miserable than those suffering from unrelieved malignant obstruction of the oesophagus, because ultimately die of slow starvation" as described by Lymen A. Brewer III in 1980 has paved the way for many historical milestones in oesophagectomy for cancer.

- First described in Western literature by Galen in the 2nd century¹⁷.
- Avicenna documented dysphagia due to carcinoma oesophagus in 10th century.
- The earliest descriptions of oesophageal surgery are provided by the, "Smith surgical papyrus" as early as 2500 B.C., whose recordings of the anatomic, physiological and pathologic aspects of the repair of the perforation of "Gullet" were unearthed by the American Egyptologist Edwin Smith.
- The first milestone towards esophagectomy began in 1868 when Kussmaul first passed a lighted tube through entire esophagus into the stomach, thus allowing for the first time, a direct vision of the esophageal lumen.
- Surgery for oesophageal cancer began in 1877 by Czerny¹⁷.

- Torck credited with first resection of thoracic oesophagus in 1913. He opened the "thoracic door" performing the 1st successful trans thoracic excision of mid esophagus carcinoma²⁸.
- Martin Kirschner devised a technique, by which esophagus anastomosed with stomach after resecting it. He mobilised stomach after cutting most of its blood supply²⁸.
- First successful one stage resection for thoracic oesophageal cancer and reconstruction using whole stomach by Onsaue in 1933¹⁷.
- Trans Abdominal or trans thoracic oesophagectomy with oesophagogastrostomy was done in 1946.
- 1954 Mahoney and Sherman reported colon replacement following total oesophagectomy.
- Brain reported jejunum interposition by 1965.
- 1978, Orringer revised the technique of Transhiatal esophagectomy without thoractomy.
- Currently multimodality treatment is under evaluation⁶.

Epidemiology

Cancer of the oesophagus represent 1% of all cancers diagnosed in the united states and accounts for 2.1% of all deaths due to cancer.

It accounts for 5.4% of all carcinomas of all digestive tract and account for 9.1% of all deaths due to these cancers.

Numerous geographic variation occurs in the incidence of Esophageal cancer throughout the world.

In Asia and Africa, esophageal carcinoma is much more prevalent and is 6th most common cases of cancer death in Adult males.

Highest incidence in Northern China & Japan¹⁵.

The incidence of oesophageal carcinoma is uniformly high in the Indian subcontinent and in other countries, which fall within the, "Asian esophageal cancer belts" which have common epidemiology¹⁷.

In India oesophageal carcinoma occurs more common in Kashmir 43-60 per lakh population which falls in the cancer belt and in costal Karnataka, Orissa and North eastern states. Various common epidemiological factors are responsible for occurrence of oesophageal carcinoma in the Asian oesophageal cancer belt²⁸.

Common epidemiological factors

- Occurrence of chronic esophagitis in the absence of reflux disease.
- Consumption of hot beverages and the attendant possible thermal injury to the oesophagus mucosa (Dejong et al., 1974)¹⁷.

- Regular consumption of dietary items containing substantiate amount of N-nitroso compounds such as preserved fish and pickled vegetables²⁴.
- Dietary deficiency of Vit A, B₁₂, Zinc Vit C, Vit E (Graham et al., 1990, Brown et al., 1998).

In our madras city the observations are as follows (MMTR).

- ❖ Cancer esophagus is among the top 4 cancers among male and top six cancers in females since 1982. Recently it ranks 4th among the malignancies noted in the males and 6th in the females (2002).
- ❖ Incidence among males makes is two fold higher in ratio than females.
- ❖ The cumulative risk of getting carcinoma esophagus in lifetime is more for males
- ❖ Squamous cell carcinoma is the most commonly encountered malignancy in 86% next comes adenocarcinoma 5.8%
- ❖ The incidence is more among 65 yrs. of age (age standard ratio)
- ❖ Increase occurrence in lower 3rd followed by middle third.
- ❖ Radiotherapy is afforded for more patients.
- ❖ Of the total cases of malignancies encounterd, the incidence for carcinoma oesophagus is 5%.

SURGICAL ANATOMY

The oesophagus is a muscular tube approximately 25cm long occupying the posterior mediastinum and extending from the cricopharyngeal sphincter to the cardia of the stomach. 2 cms of this tube lies below the diaphragm¹⁵.

This tube is flattened anteroposteriorly and the lumen is kept collapsed. It dilates only during the passage of food bolus. It is anterior to vertebral column and posterior to the trachea. Upper end is closed by cricopharyngeus muscle lower and closed by lower oesophageal sphincter.

Parts

1. Cervical oesophagus
2. Thoracic oesophagus
3. Abdominal oesophagus

Constrictions

Normally the oesophagus shows 4 constrictions at the following levels.

1. At its beginning-15cm from the incisor teeth
2. Where it is crossed by aortic arch - 22.5cm from incisor teeth
3. Where it is crossed by left bronchus: 27.5cm from incisor teeth
4. Where it pierces the diaphragm - 37.5cm from the incisor teeth.

Arterial supply

Cervical part	:	Inferior thyroid artery-direct, through collaterals, branches from common carotid and subclavian arteries.
Thoracic part	:	Oesophageal branches of aorta, Bronchial arteries, ascending branch of left gastric and inferior phrenic artery .
Abdominal part	:	Oesophageal branches of left gastric artery and branches from inferior phrenic arteries.
Belsey's Artery	:	Communicating branch between inferior phrenic and left gastric arteries.
Others	:	Bronchial arteries, Branches of left phrenic artery.

Arterial supply

The blood supply is extensive through intramural arterial collaterals. Virtually entire oesophagus can be adequately perfused via the named vessels. All the major vascular trees that supply the oesophagus divide into minute branches, for some distance from the oesophagus. The capillary network extend into musculature and form an extensive capillary plexus into the submucous plane forming a 'T' type configuration. Because of its rich blood supply, oesophagus can be mobilised to any extent and can still remain viable. Hence poor blood supply causing anastomotic leak is very rare. Great care must be exercised during the mobilisation of distal oesophagus beneath through the pleurooesophageal membrane because of inadvertent injury to the vessels. It is very important with left thoracotomy approach¹⁸.

Venous drainage

- Cervical part : Inferior thyroid veins
- Thoracic part : Azygos and hemiazygosveins
- Abdominal part : Veins which join left gastric vein which in turns ends in the portal vein.

Venous drainage

It is similar to arterial system. They have an extensive intramural venous plexus in the submucosa. These veins drainout through the circular and longitudinal muscle layers into a series of veins on the outer surface of oesophagus. Venous drainage thus continuos via veins that parallel the arteries in a more or less segmental fashion.

Nerve supply

- Cervical part : Branches from recurrent laryngeal branches (Parasympathetic), middle and inferior cervical sympathetic ganglion (sympathetic.)
- Thoracic part : Branches from vagi (para sympathetic), greater splanchnic nerves from thoracic sympathetic chain (Sympathetic).
- Abdominal part : Branches from sympathetic-greater and lesser splanchnic nerves.
- Branches from parasympathetic - vagi

Lymphatic drainage

Cervical part : Deep cervical nodes

Thoracic part : Posterior mediastinal nodes

Abdominal part: Left gastric nodes

Lymphatic drainage

A dense network of lymph vessels within the mucosa and submucosa communicate freely with the lymphatic channels in the muscular layer with the periadventitial lymph nodes.

This rich submucosal lymphatic network is responsible for skip lesions and satellite lesions that occur in areas away from the primary tumour without much involvement of the muscular layer. The absence of a serosal coat also facilitates early dissemination of the tumour thereby necessitating a clearance of 10cm in order to give adequate tumour free margins.

Based on the embryological development, lymphatic drainage like venous drainage, flows away from tracheal bifurcation. Because of this extrinsic lymphatic spread above and below it is appropriate to give adequate clearance during surgery¹⁸.

In spite of extensive mapping of lymph nodes for patients with oesophageal carcinoma demonstrating areas of involvement there are overlaps at different levels within the esophagus. Hence proper staging is important. This is especially true for nodes below the diaphragm²⁰.

Histology

1. Outermost - Fibrous coat
2. Muscular coat - Upper 5% striated
(inner circular) middle: 40% striated /smooth
(outer-longitudinal) distal 55% smooth muscle
3. Submucous coat
4. Mucous coat - Stratified squamous epithelium
Last 3cm-columnar epithelium

Embryology:

It starts to develop in the fourth week of embryonic development from the foregut immediately caudal to the primordial pharynx and extends to the fusiform dilatation in the foregut. Muscle develops from mesoderm.

Anatomical specialities

1. Lacks serosa
2. Two different types of muscles-striated and smooth
3. Two different epithelium
4. Segmental blood supply
5. Only part of GIT-donot have meissner's plexus
6. Longitudinal arrangement of veins and lymphatics.

Physiology

Swallowing is a complex series of events that have been divided radiologically into six regions. These types of contractions are seen in oesophagoscopy. Primary peristalsis is progressive and triggered by voluntary swallowing. Secondary peristalsis is also progressive, but it is gradual by distension or contractions. Tertiary contractions are non progressive. Simultaneous contraction that may occur either after voluntary swallowing or spontaneous between swallowing.

AIM OF THE STUDY

- To assess the modes of presentation
- To evaluate the patient in details with the help of available investigations as best as possible.
- To analyse Pre surgical optimisation.
- To analyse available Surgical strategy.
- To analyse Outcome of the surgical procedure.

METHODS AND MATERIALS

Forty five cases of carcinoma oesophagus were treated in Kilpauk Medical College-Govt. Royapettah Hospital with Surgery as primary modality of treatment for cure and also palliative procedure.

The duration of study of 3 years from June 2003 to April 2006.

These cases were studied from the time of admission till discharge and followed up till now in the out patient department.

A detailed clinical history was made and thorough clinical examination was done before arriving at the diagnosis. The diagnosis was confirmed with the help of investigation available in our hospital. All details are meticulously recorded after review in the case sheets. Any treatment approach contemplated or executed was duly recorded.

All variable pertaining to the patients investigation and treatment were recorded in preformed work sheets to ensure uniformity in recording and to eliminate any bias.

All information was recorded in a master chart so as to enable early comparison and for critical analysis. The details of the patients and the procedure are given in the master chart.

Methods adopted

1. Clinical evaluation
2. Investigations-Invasive and non invasive = UGI Scopy with biopsy, CECT Abdomen, Thorax, Bronchoscopy, USG Abdomen, Pelvis

3. Assessment of co-morbidity diseases
4. Staging done accurately
5. Treatment modality decided as per staging and physical status of the patients.

Follow up

1. General condition
2. Improvement in swallowing capacity
3. To look for evidence of anastomotic stricture
4. To look for evidence of recurrence.
5. Evidence of distant metastasis

Depending upon post operative histopathological report post operative OP RT/CT given.

MODES OF PRESENTATION

Usually the patients with carcinoma esophagus presents with difficulty with swallowing as the main complaint. The duration is usually of shorter period and it progress from solid to liquid foods and finally to saliva.

The patients usually presents late because the difficulty with swallowing occurs only after occlusion of more than three fourth's of the lumen. Early presentation is very rare.

Some patients may present with retrosternal discomfort due to involvement of adjacent structures.

Some patient may present with cough while taking food due to occlusion of lumen or due to recurrent laryngeal nerve involvement.

Other modes of presentation may also be the following ways.

1. GORD
2. Anorexia
3. Loss of weight
4. Early satiety
5. Hoarseness of voice

But mostly more than 90% is associated with dysphagia. Based on the degree of dysphagia grading can be done.

EVALUATION

Almost 50% of cases are diagnosed outside and referred to our hospital.

In the evaluation process, it begins with the thorough clinical examination of the patient first. Associated co-morbid conditions are analysed in detail.

UGI scopy forms the gold standard initial investigation of choice as it provides virtual presentation and histopathological analysis.

The extent of disease and involvement of adjacent structures and distant metastasis is analysed with the help of CECT-Abdomen and chest.

Proper staging should be done with all the available investigations. Because staging can give the plan for treatment modality selected.

Apart from staging, the physical fitness should be analysed because it also determines the treatment outcome.

In spite of the fact that almost all cases are presented in late stages in our setup, it is treated to provide a reasonably good cure or palliative treatment.

In many patients symptoms control and palliation are real therapeutic goals and quality of life should be take into consideration.

Other evaluation modalities

EUS/MRI / PETScan / Diagnostic Laparoscopy / thoracoscopy.

PRE OPERATIVE OPTIMISATION

Preoperative optimisation is necessary to improve the outcome of surgery. Because most of the patient of oesophageal cancer are underweight and anaemic and have low body mass index or history of recent weight loss due to dysphagia.

These patients with nutrition deficiencies have high complications and mortality rates and morbidity rates following surgery. The effects of undernutrition are loss of immunity, delayed wound healing, loss of gut integrity, decreased muscles strength and delayed in post operative cure. It therefore seems logical that perioperative nutrition will improve outcome.

All patients admitted in the ward are thoroughly evaluated for anaemia and undernutrition. Patients are provided with acute special diet from the time of admission either orally if possible or thorough feeding jejunostomy at the earliest or through hyper caloric total parental nutrition for 7-10 days preoperatively 2500-3000 calories/day.

Anaemic patients are transfused with blood. Adequate respiratory exercises are given to improve post operative respiratory function. Stop smoking atleast 10 days prior.

Cardiac status should be thoroughly evaluated as the procedures are long and the patients cardiac condition should be suitable to withstand the procedure.

PREOPERATIVE NUTRITION ASSESSMENT

Hb%, total proteins / serum-albumin / lymphocytes count
/Anthropometry.

Respiration²⁴ : FEV, 2 L or more

< 1.25L- poor candidate for surgery

Cardiovascular²⁴ : EF > 40% <40% increases cardiac risk for surgery.

REVIEW OF LITERATURE

Carcinoma oesophagus

It is the ninth most common cancer in the world⁶. It is common in tropical countries. In general it is a disease of mid and late adulthood with a poor survival rate⁶. The incidence of oesophageal cancer varies more than any other cancer. In recent years with an improved standard of surgical technique and perioperative care, substantial reduction in operative morbidity and mortality has been achieved.

Etiology

Dietary : Pickled vegetables, preserved meat, salted dry fish, food contamination by fungus

Micronutrient deficiency : Vitamin A, B12, C, E Beta Carotene.

Alcohol

Smoking

Trace element deficiency : Cobalt, copper, Molybdenm, Zinc.

Malnutrition

Anaemia

Human-Papilloma virus infection.

Hereditary:

Tylosis

Nutrition

Worldwide nutrition deficiency have been implicated in the pathogenesis of oesophageal cancer. Generally poor nutrition was a positive predictor of risk for esophageal cancer. Deficiency of Vit A, B12, C, E and B-cartotene is said to be one of the etiology²⁸.

Alcohol

Ethanol was extended to be causative agent in approximately 80% of cases²⁴. Relative risk increases with the amount of consumption of the three varieties of liquors, quoted the incidence is more for liquor, intermediate for wine and less for beer²⁸.

Hard liquor and home brewed alcohol are associated with increasing risk in India. In west 80-90% alcohol and smoking forms the etiology.

Mechanism

- ❖ metabolic activation of N-nitroso compounds.
- ❖ decreased destruction of potential carcinogens
- ❖ Increasing activation of potential procarcinogens

Dietary

1. Consumption of hot beverages is said to produce injury to the mucosa forming a predisposing factor (Dejang, et al., 1987)²⁸.
2. Improperly preserved foods and salted food and salted dry foods are said to be the predisposing factors.

3. Betel chewing: Chewing of Betel nuts with or without lime said to increase the risk of squamous cell carcinoma by mechanical irritation and by the release of epoxides.

Smoking

- ❖ Contains polycyclic aromatic compounds and N-nitroso derivatives increases the incidence of atypia²⁴.
- ❖ Increase use of tobacco and increasing number of cigarettes said to increase the incidence²⁴.
- ❖ Increase duration of smoking is said to increase the risk
- ❖ Ex-smokers have reduced risk when compared to current smokers and after 10 years the risk is similar to risk of non smokers.

Predisposing conditions

1. Achalasia
2. Reflux esophagitis
3. Barrett's oesophagus
4. Radiation oesophagitis
5. Caustic burns
6. Plummer vinson syndrome
7. Lye corrosive stricture(5%)²⁸
8. Chronic dysplasia
9. Ectopic gastric mucosa
10. Other aerodigestive malignancy

Sex Incidence

More common in males when compared to females¹⁵. However post cricoid growth in patients with Plummer Vinson syndrome occur more commonly in females at a risk of 3:7 (Skinner et al., 1983).

Age incidence

The highest incidence are found in the age groups between 40-60 yrs. The incidence begins in the adulthood increasing gradually⁶. But in western countries, the incidence is more in 60-70 yrs. Cancer in female is reported more frequently in the age group of 30-50 yrs (Das et al., 1971).

Site

Middle third : 50% SCC

Lower third : 33% AC

Upper third : 17% SCC

Lower 3cm of oesophagus lined by columnar epithelium, so adenocarcinoma is common here

Macroscopic types¹⁸:

1. Annular 15% - Schirrous, flat, diffuse, infiltrative
2. Ulcerative : 20% excavated, burrowing into the muscular layer.
3. Fungating - Cauliflower like 60% (protruded)

Histology

Carcinoma¹⁵

Squamous : >90% SCC

Adenocarcinoma : 5-8% AC

Others : 2%

But nowadays increasing incidence of adenocarcinoma are reported
(Blot et al., 1991).

Squamous cell variation¹⁵

Verrucous carcinoma

Basiloid squamous carcinoma (adenoid cystic carcinoma)

Carcinoma sarcoma

Based on depth of invasion - Early and advanced form

Early

Carcinoma in situ
Superficial spreading
Intra mucosal
Intra submucosal

Advanced

Involvement of muscular layer
Involvement of periadvential tissue

Adenocarcinoma variants

Muco epidermoid carcinoma

Adenosquamous carcinoma

Others

Oat cell carcinoma

Melanoma

Sarcoma

Leiomyosarcoma

Rhabdomyosarcoma

Fibro sarcoma

Lymphoma

Spread

1. Direct - Lack of serosa favour local extensions
2. Lymphatic spread - by permeation and embolization
3. Blood spread - Liver, lungs
4. Longitudinal spread - spreads along the submucosa and intramuscular lymph nodes for a distance 5-6cm from the primary tumour²⁴.
5. Radial spread - Radial diffusion into adjacent structures like aorta tracheobronchial nodes, recurrent laryngeal nerve.

Factors responsible for early spread and aggressive behaviour

- Lack of serosal layer
- Proximity of vital structures
- Extensive mediastinal lymphatic drainage

Squamous cell carcinoma

It accounts for 90% oesophageal cancer. Occur throughout the length of oesophagus and equally common in the middle and lower third 60% & 30% but less frequent in the upper third.

Arises from mucosa of oesophagus

Macroscopy: Fungating/ulcerating/infiltrative/polypoidal

Depending upon degree of keratinisation and cytological atypia the histological appearance can be well, moderately or poorly differentiated.

Sensitive to radiotherapy⁶.

Adenocarcinoma

Increasing in incidence in recent time. Majority originate from Barretts epithelium following longstanding GORD¹⁵. More common in distal oesophagus and invades adjacent gastric cardia. Sequence of progression intestinal metaplasia-dysplasia-insitu carcinoma -invasive carcinoma . Appears as flat or raised patch or any one of macroscopic form.

Predisposing factors²⁸

- Barrett's esophagus
- Heterotropic islands of columnar epithelium
- Submucosal glands of esophagus

Barretts esophagus found in 12% of patients who undergo UGI scopy for GORD. Prospective evaluation has suggested that the incidence of adenocarcinoma is 40 times with Barretts esophagus when compared to general population²⁴.

The overall prevalence of Adenocarcinoma at the diagnosis of Barretts oesophagus is approximately 10%¹⁵.

Microscopically most tumours are mucin producing glandular tumour. Prognosis is poor. Insensitive to RT.

Classification of Oesophagogastric junctional tumours¹⁵

Type I: Adenocarcinoma of distal oesophagus that usually arises from an area with specialised intestinal metaplasia of the oesophagus and may infiltrate the oesophago gastric junction from above.

Type II: Cancer of the true cardia arising from the cardiac epithelium or short segments with intestinal metaplasia at the oesophago gastric junction.

Type III: Subcardiac gastric cancer which infiltrates the oesophago gastric junction and distal oesophagus from below.

Common symptomatology

Dysphagia	Cough on swallowing
Regurgitation	Dyspnea
Weight loss	Neck mass
Cough	Hemoptysis
Pain	Hematemesis
Hoarseness of voice	Tarry stools
Anorexia	

Progressive dysphagia : Most common symptoms for carcinoma oesophagus 85.4%

Functional grades of dysphagia	Incidence at diagnosis
Grade I Eating normally	11%
Grade II Regurgitation with meals	21%
Grade III Able to take semisolids but unable to take solid food	30%
Grade IV Able to take liquids only	40%
Grade V Unable to take liquids, but able to swallowing saliva	7%
Grade VI Unable to swallow saliva	12%

Clinical signs

Anaemia	Palpable lump
Cachexia	Enlarged liver
Dehydration	Ascites

INVESTIGATIONS

Oesophagoscopy	*	Visualisation of entire oesophagus
	*	Site and extent of lesion
	*	Type of lesion
	*	Degree of occlusion
	*	Extent of spread
	*	Tissue biopsy can be taken

Barium swallow	*	Double contrast barium swallow
	*	Degree of stricture
	*	Level of obstruction
	*	Length of the tumour
	*	Angulation of oesophageal lesion

- * Assessment of proximal stomach as a conduit for reconstruction after esophagectomy.
- * Fluoroscopy guided films-early lesions.
- * Sensitivity 74-97%¹⁷.

CECT

- * Location of tumour
- * Local tumour burden
- * Lymph node involvement (accuracy 50%¹⁷)
- * Invasion of adjacent structures (accuracy 80%²⁸)
- * Mediastinal involvement
- * Distant metastasis (accuracy 87-100%)

(Normal CT oesophagus wall thickness 5mm)

Less sensitive for lymphnode invasion detection.

MRI

No discreditable advantage over CT in detecting either oesophageal spread of primary tumour or Regional lymphnode invasion. It can only delineate margin between adjacent esophagus and mediastinal fat. It can view axial, sagittal, coronal plane.

EUS

Accurate estimation for T staging (70-80%)²⁸

Lymphnodes invasion can be made out (accuracy 73-93%)¹⁷

FNA can be done

Can identify adjacent organ involvement

Pit falls

Tissue invasion >5cms-accuracy becomes less, 2) not useful to study intra abdominal lymph node involvement, 3) when lumen occluded, the EUS cannot be done to assess the extent because of limited tissue invasion.

PET

Non invasive

Detects primary, nodal and distant metastasis

Here mainly to detect distant metastasis

Minimal invasive surgical staging

Video assisted thoracoscopy

Laparoscopy

Broncho scopy

Thoracoscopy

- ❖ Visualises the thoracic cavity
- ❖ Biopsy from lesion
- ❖ Adjacent structures involvement-can be made out diagnostic

Diagnostic laparoscopy

- Used for evaluation of patients with carcinoma of distal oesophagus
- Biopsy from cardiac lesion can be taken
- Peritoneal metastasis can be made out
- Liver surface involvement can be made out
- Lap ultrasonography - visualises nodes <3mm

Bronchoscopy

- Especially done for upper and middle third tumours
- Mobility of vocal cords can be assessed
- Edema and erythema of airway can be made out
- Mobile protrusion of posterior tracheal wall shows tracheal involvement.

CXR: To look for aspiration pneumonia

- Left lateral views show subcarinal involvement.
- For anesthetic assessment
- to work for metastasis

Staging

Staging should be done with the help of investigation mentioned above. Staging of the disease is essential to choose the best therapeutic options for the patient and for assessing tumour resectability²⁸. Staging of the disease at the time of diagnosis is the single most important prognostic factor¹⁵.

TNM Staging	Primary Tumour (T)
Tx	: Primary tumour cannot be assessed
To	: No evidence of primary tumour
Tis	: In situ carcinoma
T1a	: Tumour invades lamina propria
T1b	: Tumour invades submucosa
T2	: Tumour invades muscularis propria
T3	: Tumour invades Adventitia

T4 : Tumour invades adjacent structures

Regional lymphnodes (N)

Nx : Regional lymphnodes cannot be assessed

No : No regional lymphnodes metastasis

N1 : Regional lymphnodes metastasis

Distant Metastasis

Mx : Presence of distant metastasis cannot be assessed

Mo : No distant metastasis

M1 : Distant metastasis

Stage Grouping

Stage O	T _{1s}	N ₀	M ₀	
State I	T ₁	N ₀	M ₀	
Stage IIA	T ₂	N ₀	M ₀	
	T ₃	N ₀	M ₀	
Stage IIB	T ₁	N ₁	M ₀	
	T ₂	N ₁	M ₀	
Stage III	T ₃	N ₁	M ₀	
	T ₄	any N	M ₀	
Stage IV	anyT	any N	M ₁	(AJCC)

Treatment

Curative

Palliative

Curative

Curative efforts include surgery / chemotherapy, radiotherapy. But retrospective studies shows that no treatment modality alone has proved superior. Current modalities focused on radiotherapy and chemotherapy with or without surgery. Therapy for oesophageal carcinoma is influenced by the knowledge that in most of these patients local tumour involvement or distant metastasis precludes cure. Infact 85-95% have lymphnode involvement at the time of presentation. Less than 10% with lymphnodes-survive for 5 years.

Palliative

It is appropriate when patients are too debilitated to undergo surgery or have a tumour that is unresectable because of extensive invasion of vital structures, recurrence of resected or irradiated tumour or metastasis. The goal of palliation is to use the most effective and least invasive measures possible to relieve dysphagia and discomfort to support nutrition and to limit complication. Depending on the perceived life expectancy, palliation includes dilatation, intubation, photodynamic therapy, radiation therapy with or without chemotherapy, surgery and laser therapy.

Treatment modalities available

Surgery

Radio therapy

Chemo therapy

Surgery

Gold standard primary treatment for local and regional tumour of the oesophagus in resectable disease and in patients fit for major surgery¹⁵. Primary objective is to provide macroscopic and microscopic removal of tumour. Secondary objective is to provide palliation of dysphagia. Mostly 30-40% resectable. At operation a few are found to be inoperable and in some there is residual tumour after resection. Mortality rate is 5-10%.

There are numerous variation in how resection is performed in terms of approach, extent of lymphadenectomy and reconstruction. All this variation are variable according to the physical status and extent of the disease of the patient and surgeons preference. Recognition of the patients who may be at increasing risk of complication is important for several reasons.

1. Rational of resection whether cure or palliation can provide a good quality of life.
2. Surgical approach can be modified (Ex: Tranhiatal approach is best for patient in whom thoracotomy approach may be increasing morbidity due to COPD).
3. Obtaining informed consent regarding procedure and complication.
4. Stratification of risk enable comparative audit between individual events.

Surgical modalities available

1. Standard esophagectomy
2. Radical en block esophagectomy
3. Minimally invasive esophagectomy
4. Lymph adenectomy - three field

Esophagectomy may be

- Transthoracic
- Total thoracic
- Trans hiatal
- Radical enblock
- Minimal invasive

	Advantages	Disadvantages
Trans thoracic	Standard resection Good visualisation for tumour and LN dissection	Requires repositioning of patient Requires thoracotomy Less than maximal resection Thoracic anastomosis
Trans hiatal	No thoracotomy Cervical Anastomosis Maximal Reconstruction Anastamotic leak early management	Learning curve is long and difficult Mediastinal LN dissection Thoracic complications need thoroctomy

Choice of surgery¹⁷

Resection

Cervical oesophagus	Pharyngolaryngoesophagectomy free jejunal transfer
Superior mediastinal	Split sternum oesophagectomy Three phase oesophagectomy

Middle and Lower third

Lewis - Tanner operation

Trans hiatal oesophagectomy

Three phase oesophagectomy

Oesophagectomy - Left thoracotomy approach

Cardiac

Trans hiatal oesophagectomy

Esophagectomy - Left thoraco abdominal approach

Esophagogastrectomy - Abdominal right chest approach

Abdominal gastrectomy

Bypass

Kirschner gastric bypass

Colon bypass

Jejunum bypass

Reconstruction

Organ : Stomach

Left colon

Jejunum

Organs selection	Advantages	Disadvantages
Stomach	Single anastomosis Reliable blood supply Adequate length Convenient location	Long suture lines Acid production Aperistalsis Diameter mis match
Jejunum	Best diameter match Peristalsis No acid production Preservation of gastric reservoir	Multiple anastomosis Least reliable blood supply Inadequate length
Left colon	No acid production Preservation of gastric reservoir Adequate length	Multiple anastomosis Least reliable blood supply

Palliative bypass

1. Reversed gastric tube
2. Gastroesophagectomy proximal to the tumour
3. Colon bypass
4. Jejunal bypass

Post operative complications¹⁸

Pulmonary	:	Pneumonia, ARDS
Cardiovascular	:	Myocardial infarction arrhythmia
Gastrointestinal	:	Anastomotic leak, gastric stasis or outlet obstruction
Infection	:	Emphysema, subphrenic Abscess
Others	:	Vocal cord palsy, chylothorax

Radiotherapy

1. Primary radiotherapy
2. Preoperative radiotherapy
3. Postoperative radiotherapy
4. Preoperative chemo radiotherapy
5. Postoperative chemo radiotherapy
6. Brachy therapy (radiotherapy)
7. Palliation
8. Primary chemo radiotherapy

Primary RT given if the lesion is <5 cm non obstructing, non circumferential. Dose : 60-64 Gy at 1.8-2.0 Gy/day.

When chemo radiotherapy is use: The standard RT dose is 50Gy. External RT can improve swallowing function in a significant proportion of patient. Radiation alone improves dysphagia in approximately 46-84% of patients. Radical RT-dose 50-60 Gy, delivered in 25-30 fractions of 200 each.

Palliative RT- 40-50 Gy, Aim is to slow down tumour growth, to palliate dysphagia and pain. Dysphagia improves in 50-80%, improves after 1-3 weeks.

Radiotherapy : External beam radio therapy (EBRT)

Brachy therapy : irridium¹⁹²

EBRT relieves dysphagia in approximately 80% of patient who undergo therapy. Mostly recurrence occurs within 6 months after radiotherapy is completed.

Pain relief may improve with increasing dosage. Intracavitary RT does not effect the radiosensitive adjacent structures-lung, spinal cord. Which are affected by EBRT. This therapy is also desirable for palliation in patients who have maximum cure by EBRT but limited because of side effects.

Fractionating the dose of radiotherapy may increase the tolerance and effectiveness. Dysphagia free survival can last upto 12 months in 20-40% of patients.

Chemotherapy

- Preoperative chemo radiotherapy
- Postoperative chemo radiotherapy
- Pre op chemo therapy

Drugs used

5FU / Cisplatinum / Mitomycin / bleomycin / Vinblastine / vincristine

- a. Kies et al. CDDP 100mg/m² D1 and 5FU 1000mg/m² on Day 1-10 repeat every 3 weeks for 3 cycles.
- b. Bleiberg et al. - CDDP 100mg/m²+5 FU 1000 mg/m² as a continuous infusion Day 1-5 repeated every 3 weeks for 3 cycles.

- c. Levarel and Pouligum et al., 1998 5 FU 1000mg/m² infused over 24 hrs during 5 days CDDP given either as one dose of 100mg/m² or as 20ng/m² over three hours for 5 days.

Palliative procedure

- Photodynamic therapy
- Laser canalization
- Surgical bypass
- Electro coagulation
- Ethanol injection
- Intubation
- Dilatation
- SEMS-Self expanding metallic stents
- Brachytherapy

Photodynamic therapy

A photosensitive agent such as dihematoporphyrin ether given intravenously and after 2-3 days this agent get retained in the tissue in a much higher concentration¹⁵. Then a low power laser system that produces red light is delivered to the tumour by a flexible endoscope. The photosensitiser assess the red light and produces oxygen radicals to destroy the tumour. Two to three days after therapy UGI scopy repeated necrotic tumour tissue removed. This is repeated monthly. Complications- Fistula formation, aspiration pneumonia, Edema of face and head

Laser therapy

- Endoscopic Nd: Yag laser therapy can be used for palliation¹⁵
- It is expensive form of treatment

- It vaporises tumour tissue and reduces the obstruction
- Sequential dilation or single treatment.

Indications

1. Tumour size <5cm
2. Fungating polypoidal tumours
3. Non infiltrating
4. Non circumferential
5. Non stenosing tumour

Dilatation

Dilatation of malignant strictures for palliative dysphagia and to allow evaluation. Unfortunately relief is measured only in weeks. Patients with high grade malignant strictures are present with advanced stages. Hence dilatation done guardedly¹⁵.

Stents

Positioning of a stent between the obstruction in oesophagus to allow luminal patency primarily to control saliva and secondly for nutrition. The stents are flexible and are constructed in two layers of super alloy^{6,15} meshed wire with a layer of silicon between them. The silicon sandwiched between the layers delays tumour in growth through the holes in the wire mesh. Placement under LA or GA, stricture dilated to 42-45 French. Once inserted and expanded. The flanges at the end are anchored to the wall of the oesophagus.

Patient notes chest discomfort following insertion due to expansion. The insertion of SEMS does not preclude further treatment with chemotherapy and Radiotherapy.

Average survival after palliative intubation for oesophageal carcinoma is less than 6 months. This method is also suitable for malignant tracheo oesophageal fistula to occlude it and provide oral alimentation⁶.

SEMS

Types	Internal diameter
Oesophageal	16mm
Ultra flex ¹⁵	17mm
Wall stent	18mm
Z stent	18mm

Advantages

1. Non collapsible
2. Reduces tumour in growth
3. Less risk of migration
4. Deliver radial outward force

Intubation

1. Atkinson tube
2. Celestin tube-Soutter tube
3. Monsseau barbin tube

Intubation

Endoscopic dilatation and intubation has been successful in providing a temporary relief in patients with advanced cancer with short life expectancy. Peroral dilatation of oesophagus was done in the part with Ederpaston dilators which provide symptomatic temporary relief. Recently used tubes are mentioned above.

BICAP Tumour probe

Bicap electrocoagulation is a recent and inexpensive technique which allows the tumour to be electrocoagulated at 180⁰ to 360⁰ by means of tumour probe¹⁵.

Feeding gastrostomy and jejunostomy

Should be limited only to situations when there is no other therapeutic alternative since they do not allow oral feeding and actually worsen the patients quality of life.

Terminal events in carcinoma esophagus

1. Cancer Cachexia
2. Sepsis, mediastinitis
3. Immuno suppression
4. Malignant tracheo asophageal fistula
5. Erosion into major blood vessel bleeding.

ANALYSIS OF STUDY

AGE INCIDENCE

Age	Male	Female	Total	Percentage
<30	2	-	2	4.6
30-40	2	4	6	13.3
40-50	11	4	15	33.3
50-60	10	1	11	24.4
>60	10	1	11	24.4
Total				100

The cases recorded in this study are between 30-70 years. Only 2 cases occurred less than <30 years. The age incidence noted in females are comparatively earlier when compared to males. The age incidence correlates with the literature. Highest incidence among 40-50 yrs. Above 50 yrs. the incidence remains same.

SEX INCIDENCE

Sex	Total No. of cases	Percentage
Male	35	77
Female	10	23
Total		100

Among the studied case increase incidence found among male patients which correlates with literature. But Plummer Vinson syndrome which is said to be predisposing factors is common in female.

Here the ratio of incident between the male and female is about 2.5:1 (M:F).

PREDISPOSING FACTORS

predisposing factors	Total No. of cases	Percentage
Smoking(s)	40	89%
Alcohol (a)	30	67%
S+A	28	62.2%
Non alcoholic smoker	2	4.6%
Non smoker alcoholic	3	6.6%
GORD	4	8.8%
Non alcoholic & smoker	4	8.8%

Among the patients studied smoking and alcohol forms a major predisposing factors. GERD forms the predisposing factors for the GE junction tumours. Almost all cases study alcohol uses takes tobacco (Smoking) along with it. The relative risk for getting the malignancy in smokers in 8 times compare to normal individuals.

MODE OF PRESENTATION

Symptoms	Total No. of cases	Percentage
Dysphagia	43	95
Weight loss	20	44.4
Retrosternal discomfort	7	15.5
Pain	20	44.4
Hoarseness voice	2	4.6
Cough	2	4.6
Others	2	4.6

Almost all cases are presented with dysphagia. The other mentioned symptoms are associated with dysphagia. Only 7 cases presented primarily as symptoms of Retrosternal discomfort. Early the approach of the patient will help to diagnosis the condition and provide the way for cure.

Two cases presented in an acute manner. First case presented with UGI bleed, for which emergency surgery was done. Second one is due to perforation occurred during dilatation of stricture.

GRADING OF DYSPHAGIA

Dysphagia	Total No. of cases	Percentage
Solid	20	44.4
Semisolid	23	51.1
Liquid	2	4.5
Saliva	-	-
Nil	-	-

Most of the cases presented with dysphagia for semisolid diet. It occurs when the occlusion is about half the lumen of oesophagus. Only few cases reported with difficulty in swallowing liquids. No cases reported with difficulty in swallowing saliva.

CO-MORBID CONDITIONS

Co-morbid diseases	Total No. of cases	Percentage
Diabetic mellitus	3	6
CAHD	6	13.3
Pulmonary diseases	6	13.3
Anemia	15	33.3

As most patients are elderly the occurrence of age related diseases are common. These age related diseases, further aggravate the preexisting disease and delay the preoperative optimisation. Preoperative respiratory exercises are necessary to improve the post operative outcome. Pre operative anaemia should be corrected by pre operative transfusion to reduce post operative morbidity.

HISTOPATHOLOGY

Histopathology	Total No. of cases	Percentage
Squamous carcinoma	27	60
Adenocarcinoma	16	35.5
Others	2	4.5

Squamous carcinoma said to be the most noted malignancy among the cases studied which correlates well the literature. In our study the incidence of adenocarcinoma is increasing is noted which also correlate well with the literature.

Pre-operative stay	Total No. of cases	Percentage
< 10 days	4	8.8
< 20 days	20	44.6
< 30 days	16	35.5
< 40 days	5	11.1
> 40 days	-	-

The average duration of stay pre operatively is about 15-20 days as most of the patients are coming late with increase burden of disease, the investigation and pre operative preparation should be done as early as possible. Longer the duration of preparation will further aggravate the disease process. Aim to be motivated to start the early treatment.

Procedure performed	Post op. outcome	Remarks
Oesophgogastrectomy	34	75.5
Palliative coloplasty	1	02.2
Non therapeutic laparotomy	10	22.3

Oesophagogastrectomy is most common surgery performed for oesophageal carcinoma. Stomach form the commonest organ of replacement with less post operative morbidity and mortality and a good quality of life. In spite of effective pre operative evaluation 10 cases posted for definitive procedure can not be proceeded because of intra operative finding. In two more cases tumour broken during the procedure which resulted in positive margin which needed post operative radiotherapy and chemotherapy. One case there is extensive blood loss which is replaced. The average loss of blood during the procedure is above 750 to 1000ml. Nowadays it is less, we don't transfuse routinely unless it is necessary. One case develop anastomotic leak because of extensive adhesions which resulted in microscopic presence of malignancy. Coloplasty done in one case as a bypass procedure. One case pre operative radiotherapy given and taken for surgery. But intra operative course is stormy due to extensive peri oesophagitis.

Post op. stay	Total no. of cases	Percentage
<10 day	10	22.2
>10 days <20	25	55.6
>20 days <30	10	22.2

The average duration of stay post operatively is about 10-15 days. With improve pre operative evaluation and good technical skills and good post operative care the duration can be minimised.

Site	Total no. of cases	Percentage
Upper	-	-
Middle	25	55.55
Lower	20	44.45

The incidence is more in middle third of oesophagus which correlates well with the literature. Next comes the lower third malignancies, the incidence of which increasing off date due to GORD. We did not encountered any upper third malignancy in this duration of study. The policy of the department is to consider non-surgical options for upper third malignancies.

Post operative complications	Total no. of cases	Percentage
Wound infection	2	4
Anastamotic leak	4	8
Respiratory complications	4	8
Cardiac complications	4	8
RLN-palsy	-	-
Anastomotic strictures	-	-

Mostly trans hiatal route is preferred for surgery. Thoracotomy done in four cases due to difficulty in mobilising the tumour and due to the location of the tumour.

Almost all cases of gastric pull up underwent pyloroplasty as a routine. We preferred mostly midline abdominal incisions and a left neck incision for anastomosis. 96% cases are started with feeding jejunostomy on the 3rd post operative day. Average duration for beginning of oral feeds on 5th post operatively. It is delayed in 2 cases because of suspicion of neck leak.

Inspite of effective pre-operative evaluation, about 9 cases of posted for definitive procedure deferred because of intra operative findings of inoperability. They are:

1. Involvement of aorta
2. Carinal involvement
3. Peritoneal metastasis
4. Extensive pleural involvement
5. Pancreatic involvement

Hand sewn neck anastomosis is equally found to be effective like staplers. Morbidity is less with hand sewn anastomosis. Less evidence of neck leak with hand sewn anastomosis. End to side neck anastomosis which is practiced in our procedures are associates with less post operative morbidity and good quality of life post operatively.

DISCUSSION

Esophageal carcinoma forms the second most common tobacco related cancer next to oral cancers. With peak age incidence between 40-60 years. And ratio between male and female incidence is 2.5.

The incidence is also more common among low socio economic status and alcohol and smoking forms the major etiological factors.

Dysphagia forms for the most common presenting complaints. Squamous cell carcinoma forms the most common type of tumour studied.

As the cure of the disease is strongly associated with the stage of the disease at the time of presentation, the management varies.

As most of the patients are presenting late in carcinoma esophagus, the management of the disease becomes a challenge to the treating surgeon.

Based on adequate an appropriate investigation the disease staged. The benefits and pitfalls of the treatment modalities are analysed adequately. Before deciding the treatment, the physical status of the patient is analysed. Age of the patient which was said to be a relative contra indication is not taken into consideration now.

In our study, there are various factors which delayed the planned modality of treatment. This is especially true when the patients are prepared for surgery.

In spite of multiple investigations available, it is sometimes not possible to stage the disease accurately. It is found out because the case posted for definitive procedure is deferred due to intraoperative findings.

Apart from that not all modalities are available in a single institution and the cost factor is a limiting factor.

Stomach forms the best organ of reconstruction with less postoperative complications and improved quality of life in the postoperative period.

The selection of palliative treatments are

- Advanced stage of disease
- Poor general condition
- Patient not willing for surgery

Surgery as a treatment modality depends on

- Site of tumour
- Burden of tumour
- Histopathological evaluation
- Stage of the disease
- Extent to which it provides either cure or palliation

Oesophageal carcinoma

A curable and preventable disease. Best way to cure is to treat it early. It can be identified by : 1) active screening of high risk patients; 2) Screening for chronic smoker/tobacco/Alcoholic patients; 3) Evaluation the patient early with dyspepsia; 4) Creating public awareness about the disease.

No disease is adequately treated until it is prevented from future occurrence. The problem of oesophageal carcinoma is tackled by improving the public awareness about the demerits of smoking and early evaluation for dyspepsia and adequate early reporting to the speciality centre nearby.

Now the evolving investigations will provide adequate staging when used in combination. The pitfalls of one investigation is nullified by the other. But cost is the limiting factor.

Recently the evolving multimodality treatment is said to improve the quality of life in patients with oesophageal cancers.

Knowledge is never complete, but we strive to make it more so. Auditing to improve clinical practice is similar to this. Perfect practice is never achieved, but the audit process gives us a systemic methods of striving towards perfection.

"Surgery without audit is like playing cricket without keeping the score"

- H.B.DEVLIN.

Here the audit cycle which compared with the standard revealed the above findings.

One of the major considerations in the plan of operation is the site of tumour, after resection what is the level of anastomosis required to obtain an 8-10cm segment of normal esophagus proximal to the carcinoma.

Unfortunately, in more than 75% of patients with carcinoma of oesophagus, local tumour invasion or distant metastasis makes a curative resection impossible. Therapy for most of these patients is therefore palliative. Palliation mainly relieves the difficulty in swallowing and pulmonary sepsis from aspiration of food and saliva.

Palliative resection in these patients with acceptable risk remains a valuable means of treatment. Although survival is not greatly prolonged, the ability to continue oral intake maintains hydration and improves nutrition.

Although cure of oesophageal carcinoma is seldom achieved by any of the treatment currently available, surgery provides the most efficient and expedited palliation in these patients.

Ability to swallow comfortably for 12-24 months is generally achieved with oesophageal resection and reconstruction.

The leading cause of mortality after these operations is respiratory insufficiency which considers thoracoabdominal operation in a debilitated patients and sepsis from an intrathoracic anastomotic leak are avoided by transhiatal oesophagectomy with a cervical oesophagogastric anastomosis.

By positioning the oesophageal substitute in the posterior media stinum in the original oesophageal bed, one utilises the shortest and most direct route between neck and abdominal cavity.

Should an anastomotic stricture develop, subsequent dilatation is much easier when one does not have to contend with the anterior angulation of the cervical esophagus, which has been anastomosed to a retrosternal graft. Because of the stomach's resilience and excellent blood supply, it remains the best organ for esophageal replacement. By resecting the entire intrathoracic oesophagus, regardless of the level of carcinoma and by performing cervical oesophageal anastomosis, the surgeon minimizes the risk of tumor recurrence along the suture line. Postoperative gastroesophageal reflux is seldom a problem, and if an anastomotic disruption does occur, it is easily managed with drainage and local wound care. We believe that transhiatal oesophagectomy with cervical oesophagogastric anastomosis, performed through an upper abdominal and left cervical incisions, provides the best palliation for oesophageal carcinoma currently available with the least possible operative morbidity.

REFERRED QUOTES

- The most important risk factor for carcinoma esophagus in developing countries-cigarette (IARC: 1986) and alcohol (IARC, 1988).
- Day and Monoz in 1982 and Schottenfield 1984 have shown an association between oesophageal carcinoma and low socio economic status.
- Low intake of fruits particularly citrus fruits and vite intake have been respectively associated with increasing risk of esophageal carcinoma (Dacerti et al. 1981).
- Deficiency of various mineral elements such as Se, Zn, Mo also have be cited as possible etiologic factors. The deficiency are believed to make the susceptibility to the carcinogenic effects of exogenic factors (Francheschi et al., 1990).
- Risk of tobacco use appears to increase with the number and duration of usage - (Tayns et al, 1979; Ross et al., 1982; Ya et al., 1988).
- Elderly patient (Perachie et al., 1998) length of the tumour and associated child A-Liver cirrhosis (Feluk et al., 1987) as not considered contra indication for surgery.

CONCLUSION

- ❖ Most common among males. Most common between 40-60 yrs age.
- ❖ Squamous cell carcinoma forms the most noticed malignancy.
- ❖ Increasing incidence of Gastroesophageal junction tumour due to increasing incidence of GORD.
- ❖ UGI scopy and CECT are gold standard to asses local and distal burden of disease.
- ❖ Combinations of investigations will accurately stage the disease to avoid unnecessary surgery.
- ❖ Surgery forms the best and most efficient cure and palliative mode of treatment.
- ❖ Preoperative optimisation is necessary to reduce post operative morbidity and mortality.
- ❖ Stomach is the best organ of oesophageal replacement.
- ❖ Transhiatal esophagectomy with cervical esophagogastric anastomosis provides the best palliation for esophageal carcinoma currently available with least possible operative morbidity.
- ❖ Surgical options according to the intra operative findings and surgeon preference.

ABBREVIATIONS

A	-	Alcoholic
AC	-	Adenocarcinoma
CT	-	Chemotherapy
CAHD	-	Coronary artery heart disease
COPD	-	Chronic obstructive pulmonary disease
DOA	-	Date of admission
DOS	-	Date of Surgery
DOD	-	Date of discharge
D	-	Dysphagia
DM	-	Diabetes mellitus
GEjn	-	Gastro esophageal junction
GORD	-	Gastro oesophageal reflux disease
IHD	-	Ischemic heart disease
Lap	-	Laprotomy
Mid	-	Middle third
N	-	No evidence of extensive metastasis forming contraindication for surgery.
OGA	-	Oesophagogastric anastamosis
RD	-	Retrosternal discomfort
RFD	-	Reflux disease
RT	-	Radiotherapy
SCC	-	Squamous cell carcinoma
S	-	Stromach
S	-	Smoker
THO	-	Transhiatal oesophagectomy
TTO	-	Transthoracic oesophagectomy
WL	-	Weight loss

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PROFORMA

Name	Case No.	Diagnosis	Ward
Age	DOA		
Sex	DOS	Staging	
IP No.	DOD	Plan	

Presenting complaints

1. Dysphagia
2. Weight loss
3. Pain
4. Regurgitation
5. Hoarseness of voice
6. Cough
7. Retrosternal discomfort

Past History

APD	Gastric surgeries
Corrosive ingestion	Endoscopic procedure
Irradiation	

Personal History

Appetite			
Weight loss			
Alcohol	Duration	Type	Amount
Smoker	Duration	Number	Type
Betel nut			
Veg/Non-Veg	Smoked food	preserved food	

Treatment history	UGI scopy
	Previous surgery

General Examination

Nourishment
Performance status
Pallor
Icterus
Clubbing
Cyanosis
Pedal edema

Lymphadenopathy

Vital signs

Pulse rate
Blood pressure
Temperature
Respiratory rate

Local examination

Per rectal/vaginal examination

Other systems

Respiratory system
Cardiovascular system

Speciality opinion

Investigations

Hb%	PCV
TC	DC
BT	CT
ESR	Ps

Blood-grouping and typing

Blood : Urea	Sugar
Serum : Creatine	Electrolytes

Liver function tests :	Bilurubin - Direct/Indirect
	SAP
	SGOT
	SGPT
	SR proteins

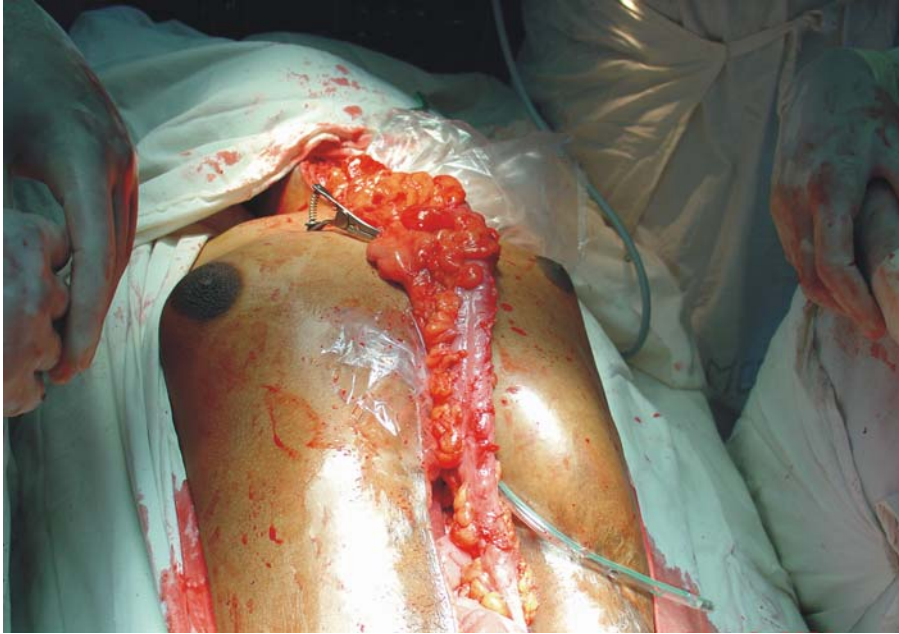
CXR-Chest x-ray - PA view
AXR-X-ray abdomen - Erect

USG - Abdomen
Pelvis

Special investigation

UGI scopy with biopsy
Barium swallow
CECT-Chest/Abdomen
MRI
Endoluminal ultra sonography
Bronchoscopy
HPE
Diagnostic Laparoscopy

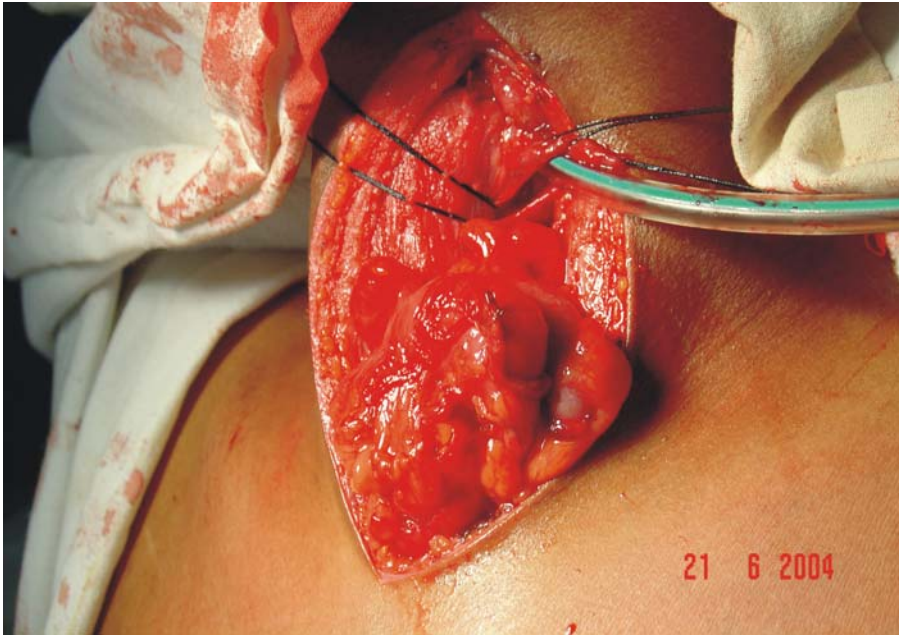
DIAGNOSIS:**STAGE:****PRE OPERATIVE PREPARATION:****NOP:****TREATMENT:****POST OPERATIVE MANAGEMENT:****FOLLOW UP:****REFERAL:**



Coloplasty



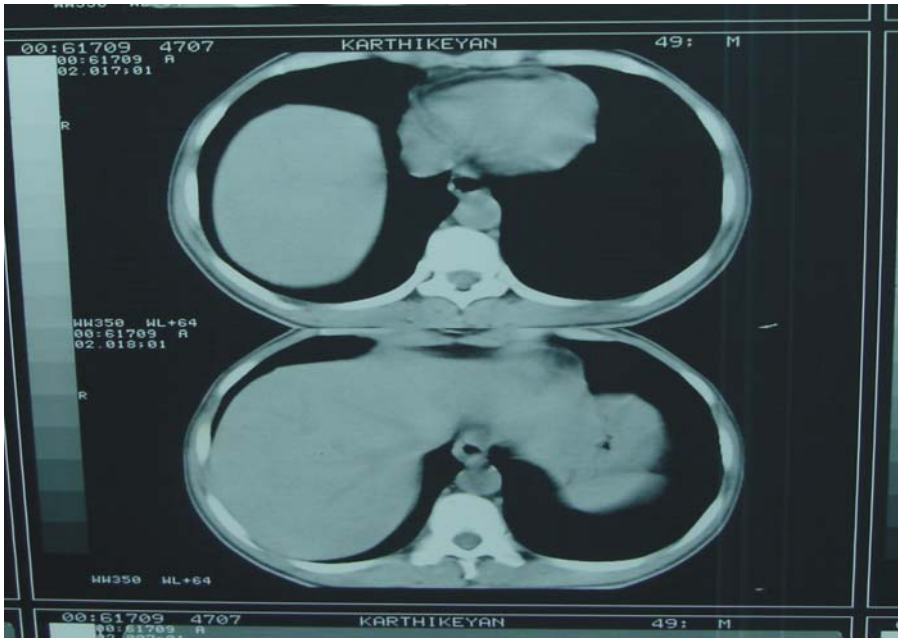
Colon mobilisation



Oesophageal mobilisation in neck



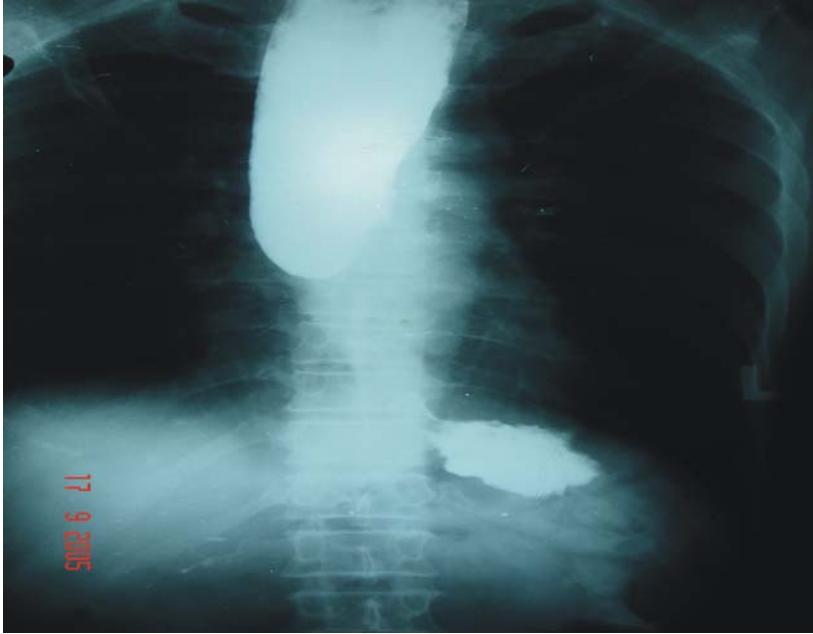
CA oesophagus lower third resected specimen



CECT thorax - CA oesophagus middle third



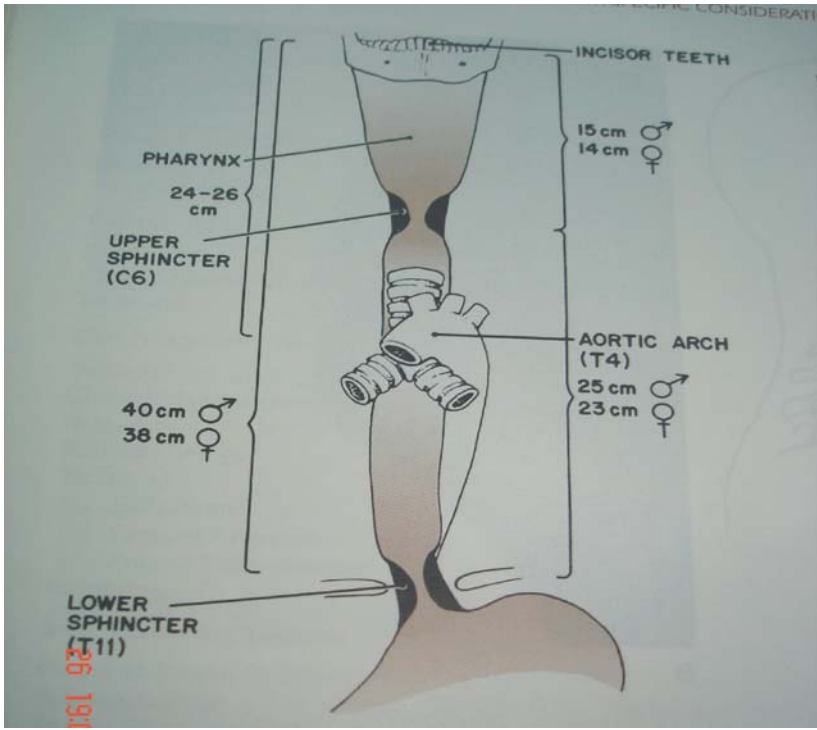
CECT abdomen - CA oesophagus lower third



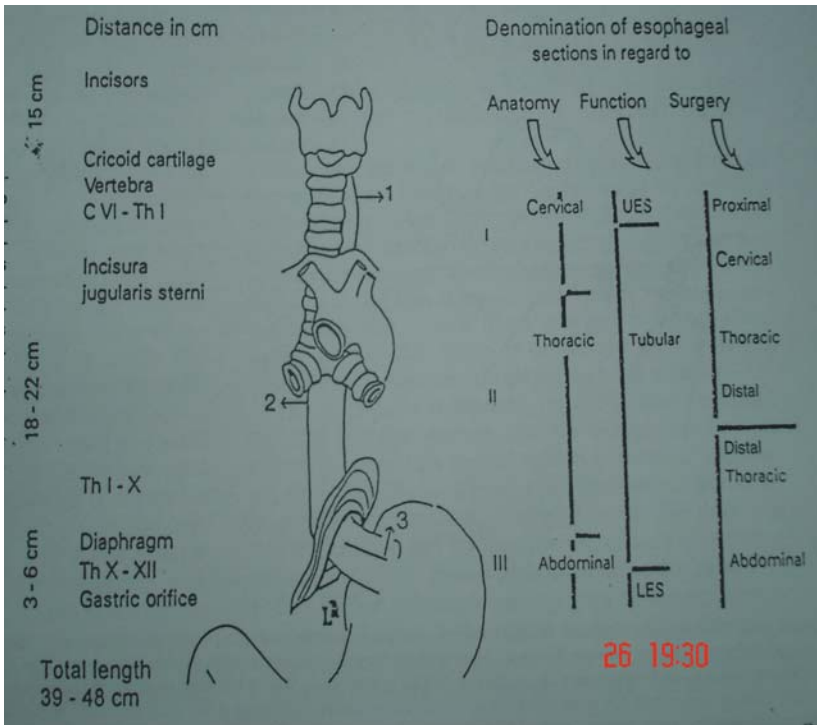
CA oesophagus barium swallow lower third



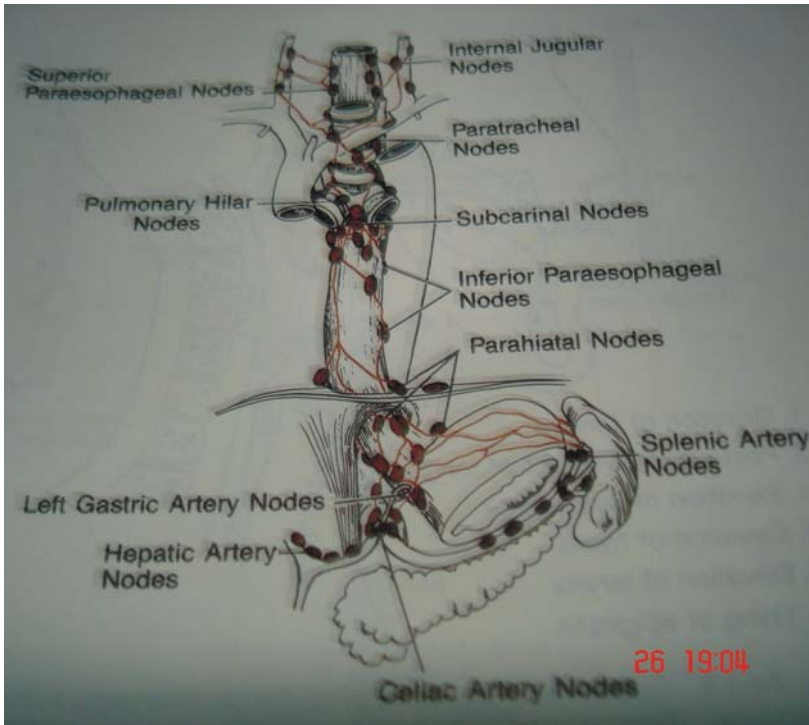
CA oesophagus barium swallow lower third



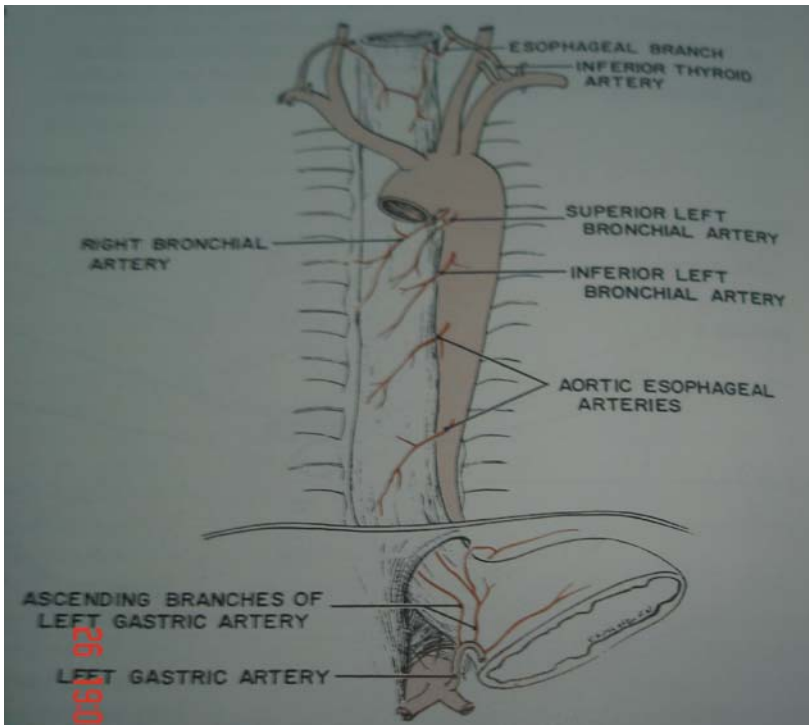
Oesophagus clinical endoscopic measurement



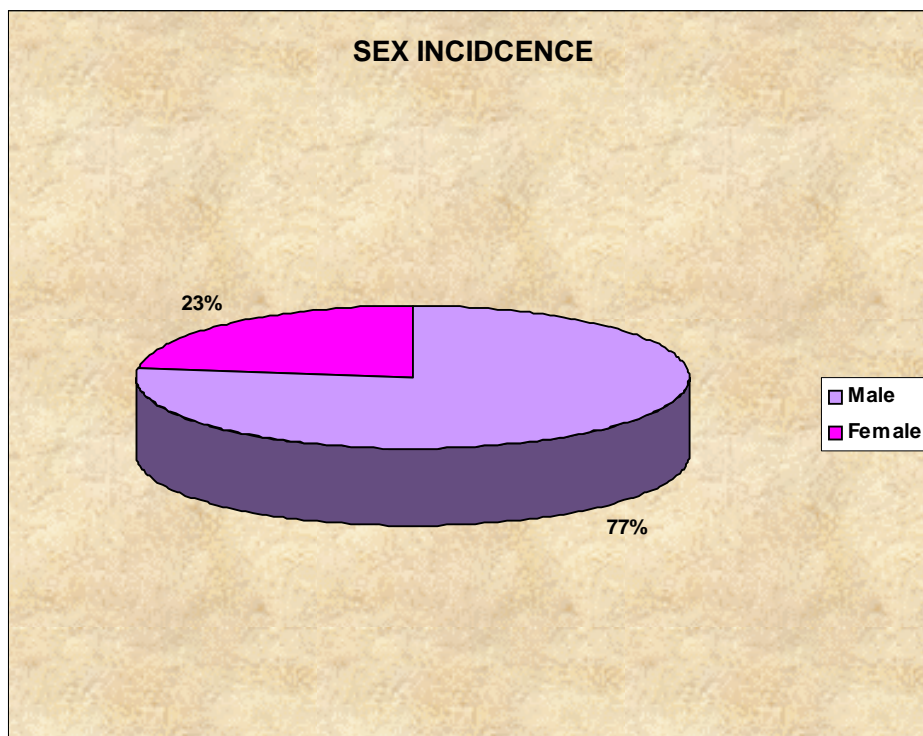
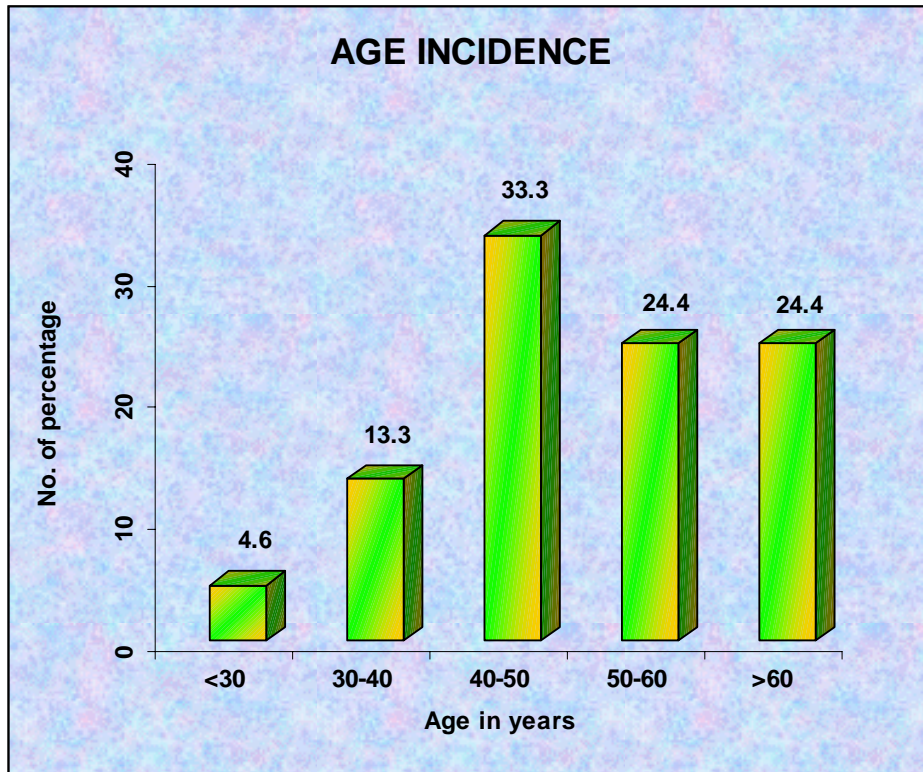
Anatomical functional and surgical measurement

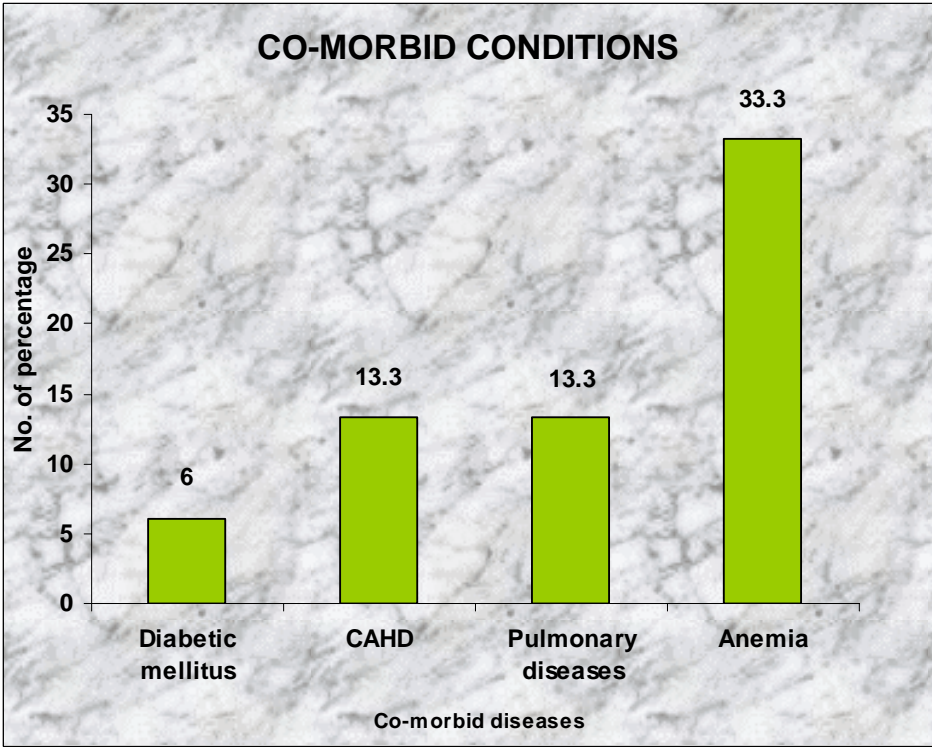
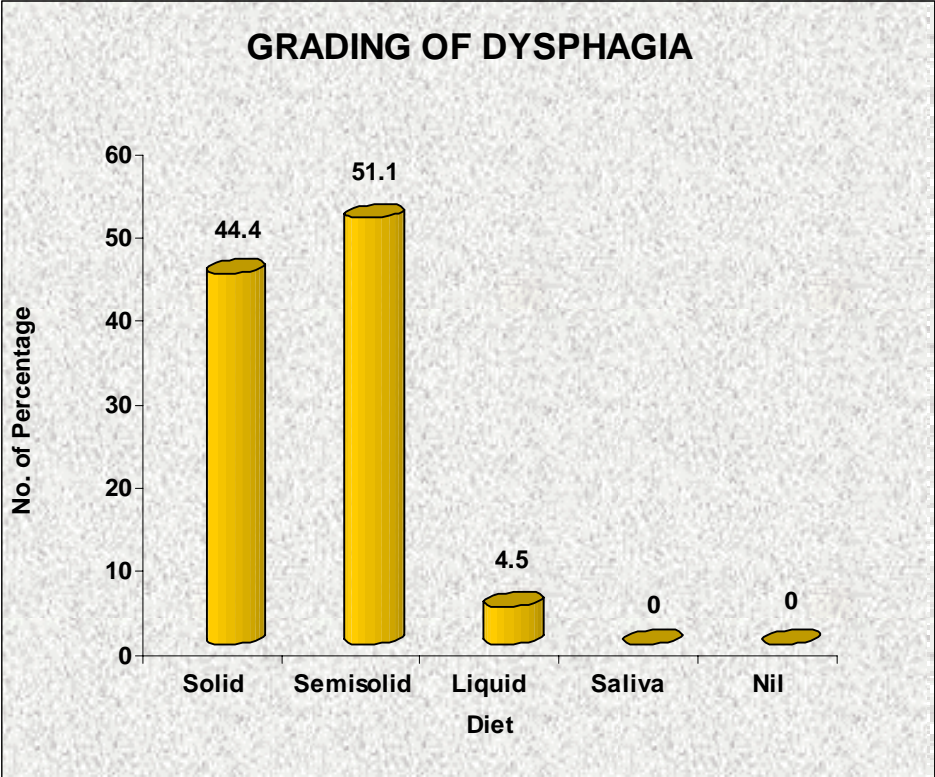


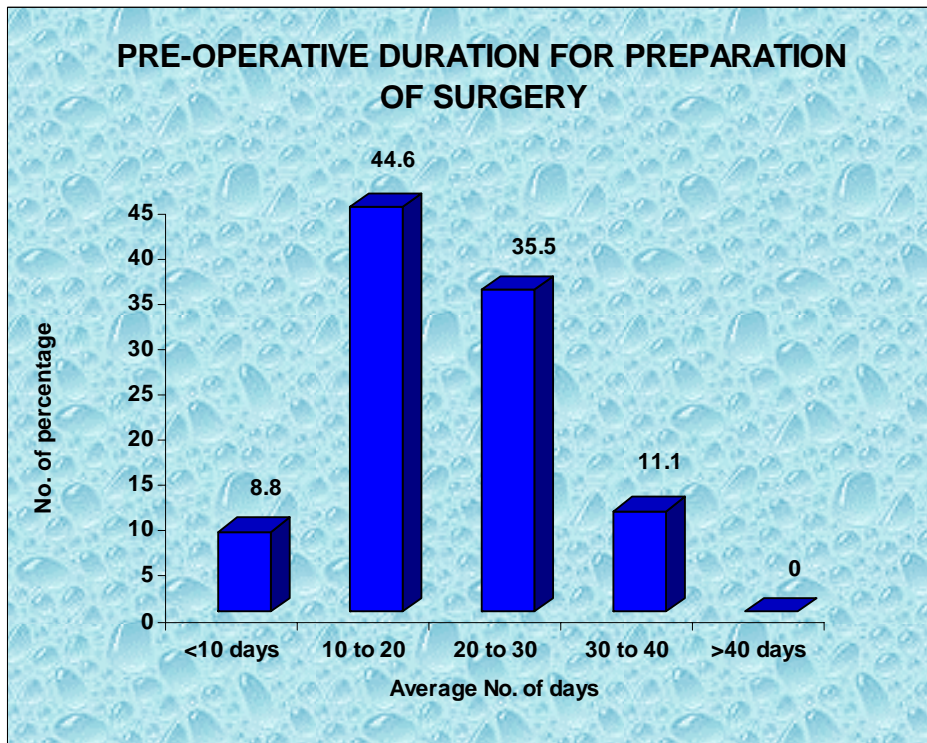
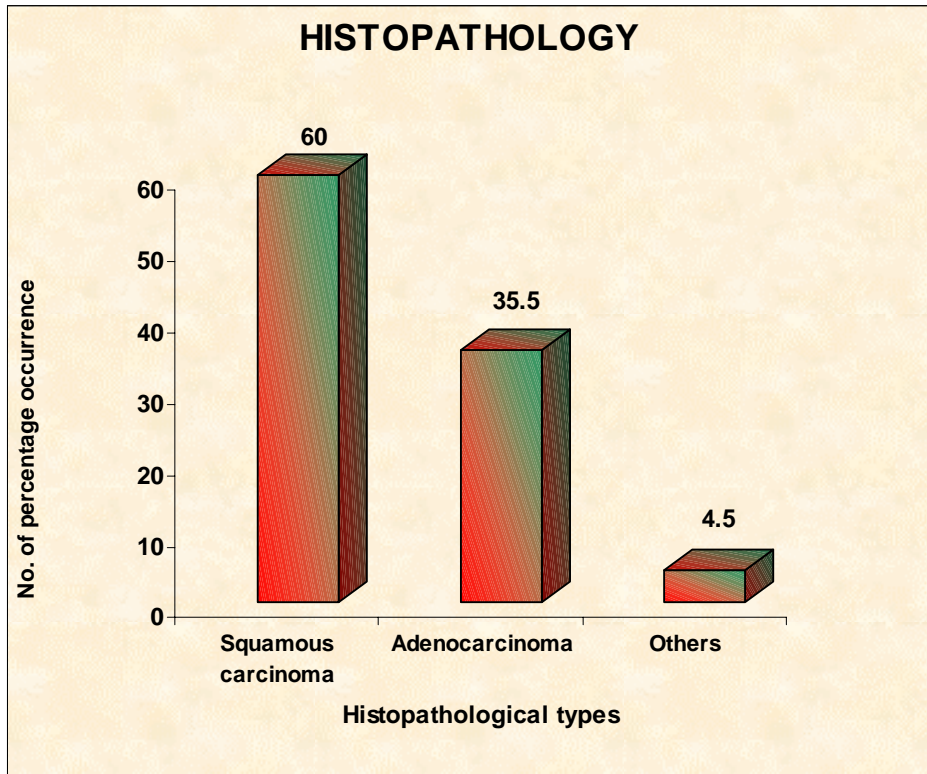
Oesophagus lymphnode station



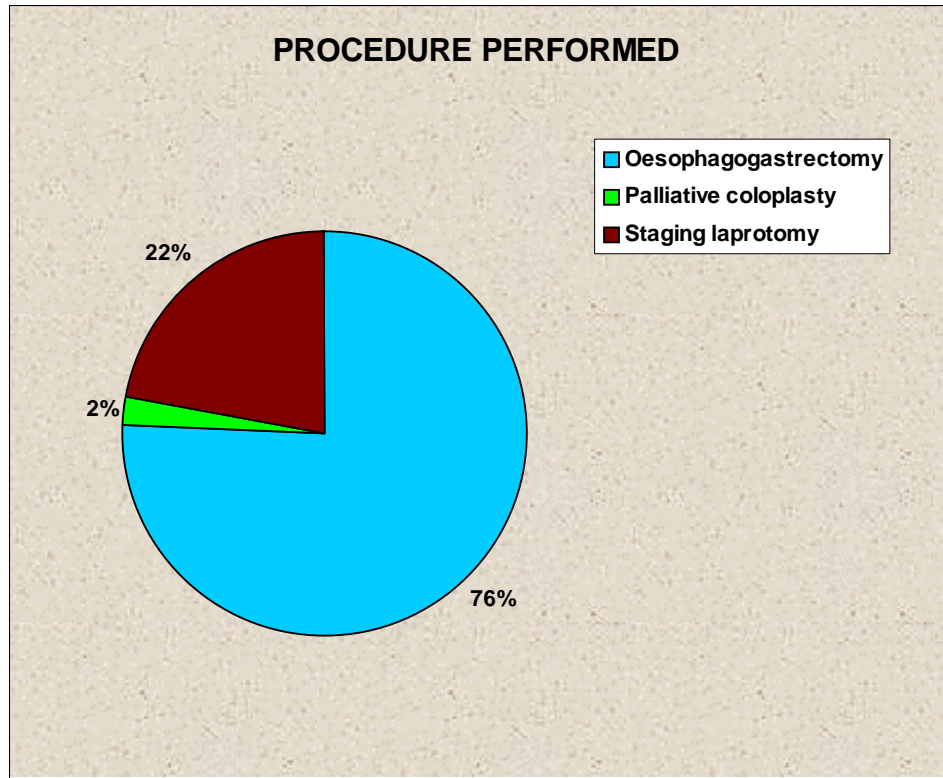
Oesophagus blood supply







PROCEDURE PERFORMED



POST OPERATIVE DURATION OF STAY

