

# CARCINOMA ESOPHAGUS

Dr. AJIT JADHAV

# ESOPHAGUS

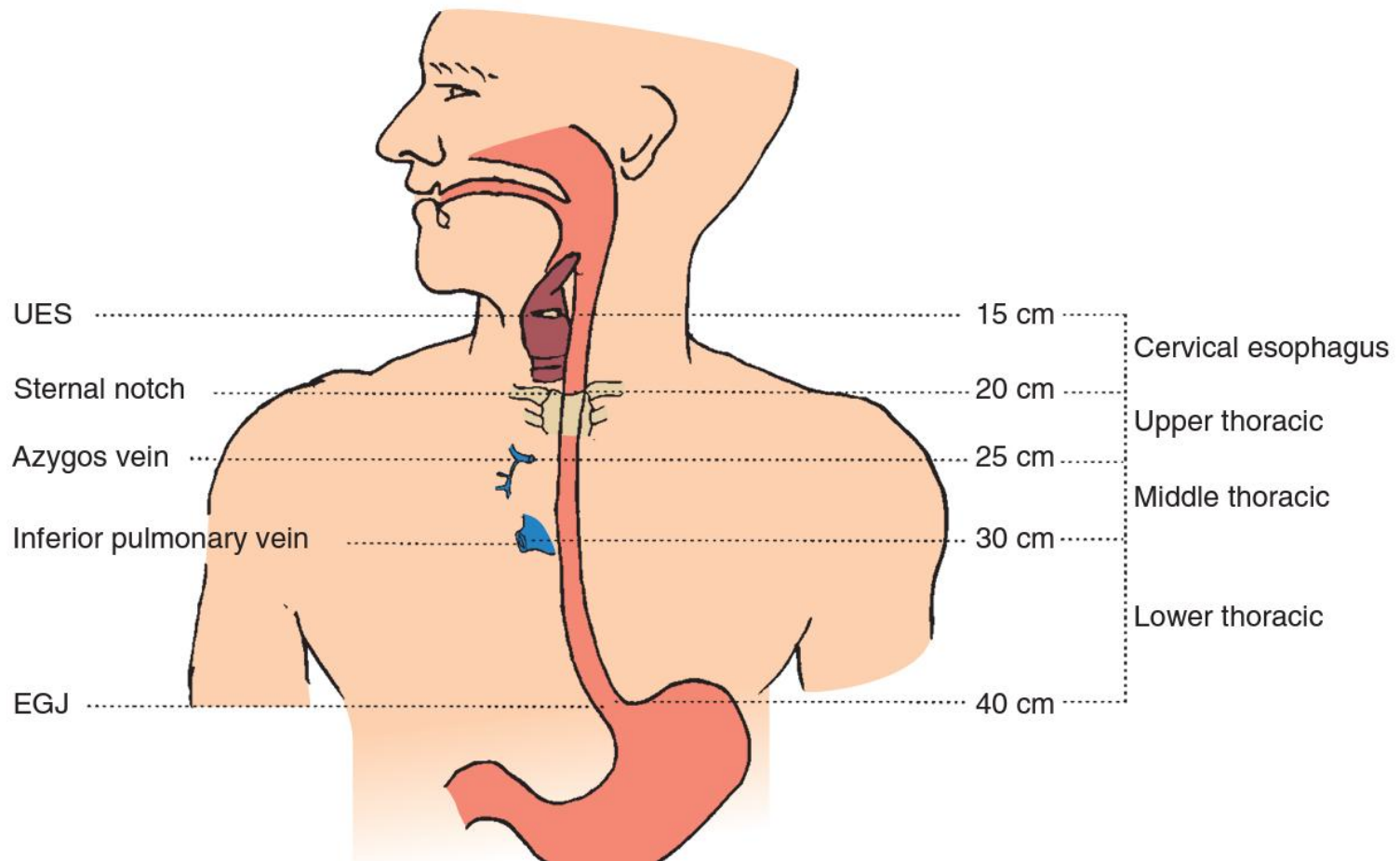
Four regions of the esophagus:

**Cervical** = cricoid cartilage to thoracic inlet (15–20 cm from the incisor).

**Upper thoracic** = thoracic inlet to azygos vein (20–25cm)

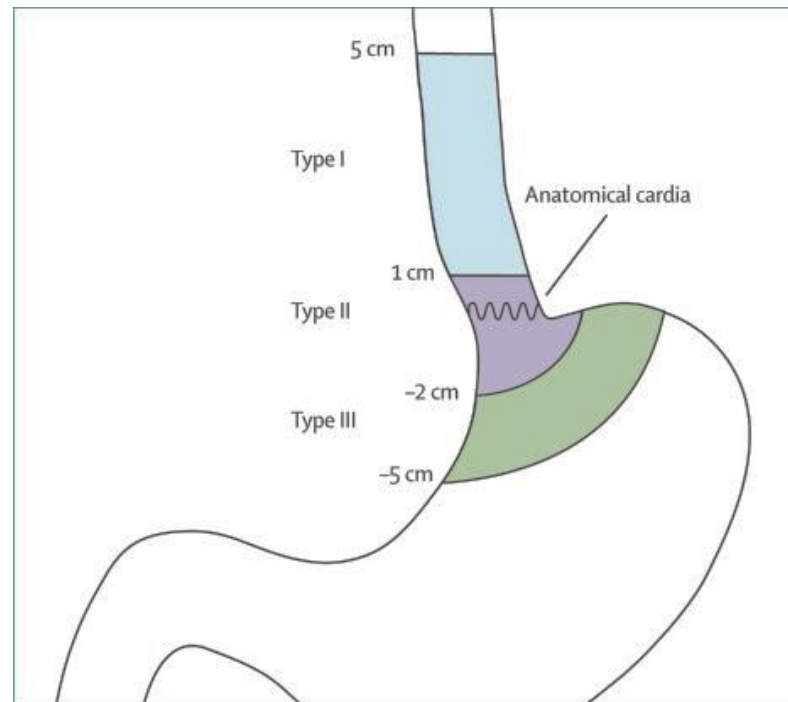
**Midthoracic** = azygos vein to Inf.pulmonary vein (25–30 cm).

**Lower thoracic** = Inf.pulmonary vein to GE junction (30–40 cm).



## Primary site of esophageal cancer based on proximal edge of tumor

Anatomic name	Esophageal location	Anatomic boundaries	Endoscopic distance from incisors
Cervical	Upper	Hypopharynx to sternal notch	15 to <20 cm
Thoracic	Upper	Sternal notch to azygos vein	20 to <25 cm
	Middle	Lower border of azygos vein to inferior pulmonary vein	25 to <30 cm
	Lower	Lower border of inferior pulmonary vein to esophagogastric junction	30 to <40 cm
Abdominal	Lower	Esophagogastric junction to 5 cm below esophagogastric junction	40-45 cm

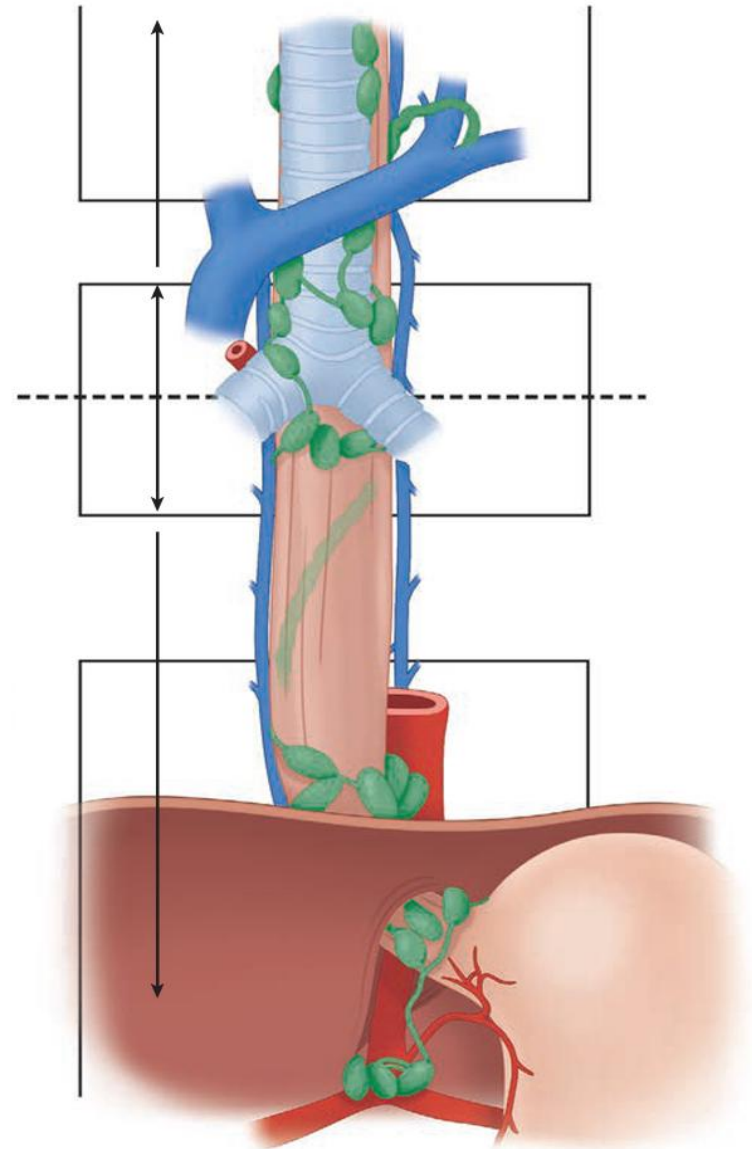
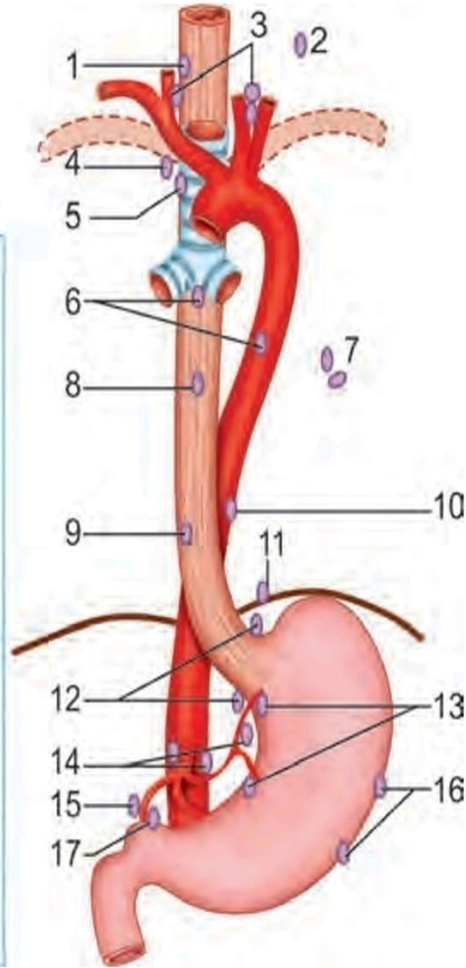


# LYMPHATIC DRAINAGE

- Rich mucosal and submucosal lymphatic system
- Longitudinal arrangement of lymphatics
- The submucosal plexus drains into the regional lymph nodes in the cervical, mediastinal, paraesophageal, left gastric, and celiac axis regions.

# Lymphatic drainage

1. Cervical group
2. Lateral cervical group
3. Deep cervical group
4. Upper thoracic group
5. Paratracheal group
6. Subcarinal group
7. Hilar group
8. Middle thoracic group
9. Lower thoracic group
10. Posterior mediastinal (para-aortic) group
11. Diaphragmatic group
12. Paracardial group
13. Lesser curvature group
14. Coeliac left gastric group
15. Common hepatic group
16. Greater curvature group
17. Suprapyloric group



# Epidemiology

- Eighth most common malignancy worldwide.
- Squamous cell carcinoma –most common histological type ,worldwide.
- Adenocarcinoma incidence is more in western countries over the past 20 yrs.
- Middle east ,central asia and china have highest rates of SCC.

# Etiology & predisposing factors

## Squamous cell carcinoma

- Smoking
- nitrates
- Lye ingestion
- Chronic achlasia
- Alcohol
- HIV
- Radiation strictures
- Plummer Vinson syndrome
- Tylosis palmaris et plantaris
- Deficiency of molybdenum, zinc and vitamin

## Adenocarcinoma

- Barrett's esophagus
- Chronic GERD
- Smoking



## Squamous cell carcinoma

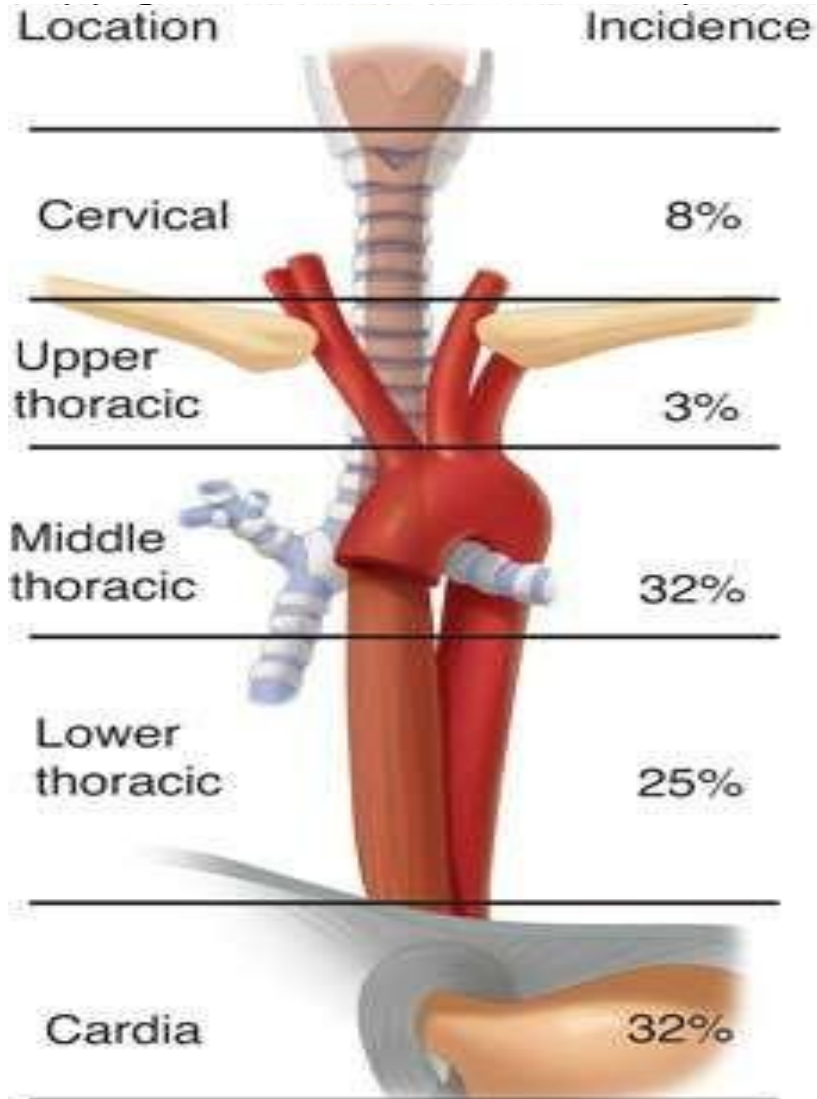
- Upper two third
- Smoking & alcohol
- Less aggressive
  
- Achlasia cardia is a predisposing factor

## Adenocarcinoma

- Lower one third
- Smoking
- Obesity
- Barrett's esophagus/GERD
- More aggressive
  
- Achlasia cardia is not a predisposing factor

- H.pylori infection and ca esophagus
- Inversely associated with the risk of adenocarcinoma.
- Presence of gastric atrophy and H.pylori increase the risk of SCC.

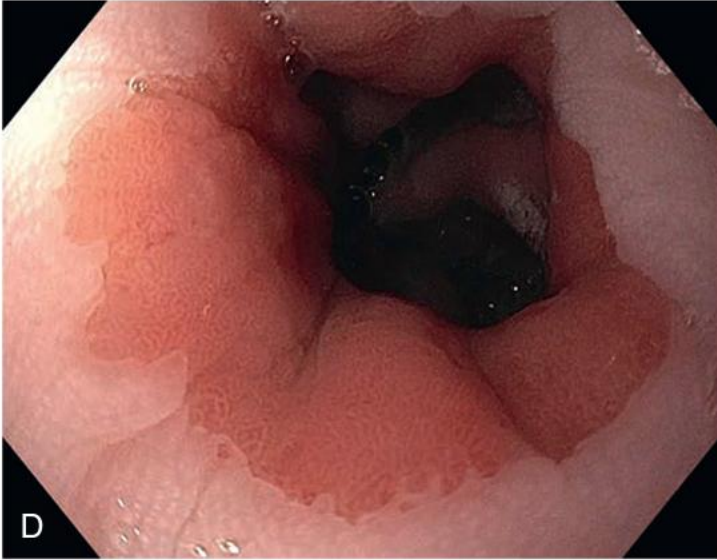
# Incidence



# Pattern of spread

- No serosal covering, direct invasion of contiguous structures occurs early.
- Commonly spread by lymphatics (70%)
- Lymph node involvement increases with T stage.  
T1 – 14 to 21%  
T2 – 38 to 60%
- 25% - 30% hematogenous metastases at time of presentation.
- Most common site of metastases are lung, liver, pleura, bone, kidney & adrenal gland

# Barrett esophagus



- Normal squamous epithelium is replaced by metaplastic, columnar or glandular epithelium .
- Predispose to adenocarcinoma
- 11 fold more risk than non Barrett esophagus.

# Barrett esophagus

Dysplasia arising in Barrett esophagus characterised by cytologic malignant changes

- Atypical nuclei
  - Increased mitoses
  - lack of surface maturation
- ✓ High grade dysplasia shows more prominent cytologic or architectural derangements.

# Clinical features

- Dysphagia- most common symptom (74%)
  - Progressive in nature
  - Difficulty to swallow solids>liquids
- Weight loss –seen in 90% of squamous cell carcinoma .
  
- GERD/ Reflux symptoms
- Fatiguability
- Dull retrosternal pain

# Clinical features

- In advanced stage /metastasis
  - RLN --Hoarseness of voice
  - Tracheo esophageal fistula –pneumonia
  - Aortic invasion –exsanguinating hemorrhage
- Cervical /supracalvicular lymph node enlargement .



# Contd..

- Esophageal cancers usually manifests at an advanced stage (80%)
- Early stage tumour –asymptomatic  
diagnosed during endoscopy for barrett  
esophagus

# DIAGNOSIS

- Endoscopic Biopsy

endoscopy should be done in any patient with dysphagia.

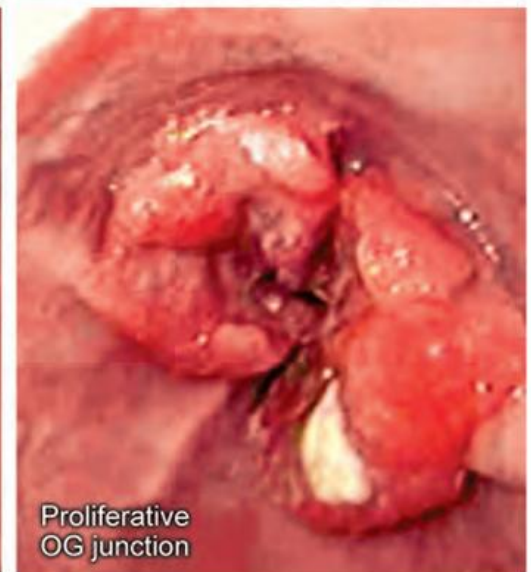
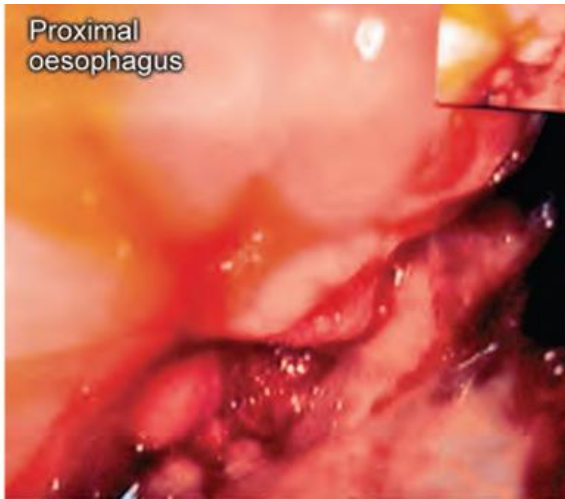
## Endoscopic features of malignancy

- early stage –ulcerations/small nodules
- advanced stage – friable masses,  
stricture,  
ulcerations.

Features to be looked for in endoscopy:

- Location of tumour relative to incisors & GEJ
- Length of the tumour –proximal and distal extent
- Degree of obstruction

# Endoscopy



Investigations for staging :

- Endoscopic ultrasound .  
to assess T and N stage

Accuracy

T staging 85%

N staging 75%.

Superior to CT /PET for assessment of T and N staging

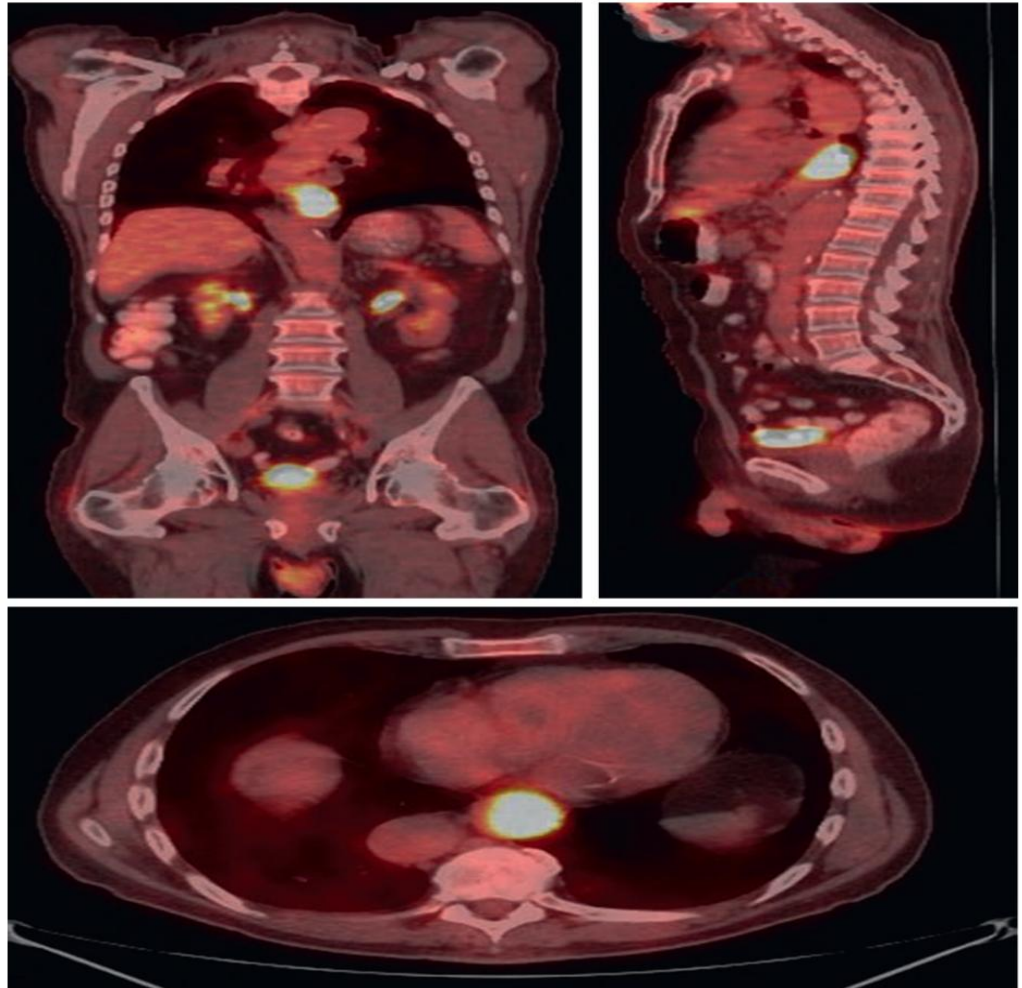
# Endoscopic ultrasound

- High frequency transducer (5-30MHz ) is used
  - To determine the depth of spread through the esophageal wall
  - Involvement of adjacent organs
  - Metastasis to lymph node
  - Also detects contiguous spread downward into cardia
  - Can detect metastasis in the liver
  - Can also detect small lymph nodes which are <5mm

# FDG PET

- FDG PET is widely applied both for staging and and to assess response to preoperative treatment.
- FDG PET is superior to CT in detection of distant metastasis .
- Sensitivity 80% specificity 90%
- PET CT fusion. / hybrid FDG-PET/CT improves specificity and accuracy of noninvasive staging .

# FDG PET





Barium esophagram(barium swallow)

shows irregular narrowing,

rat tail appearance

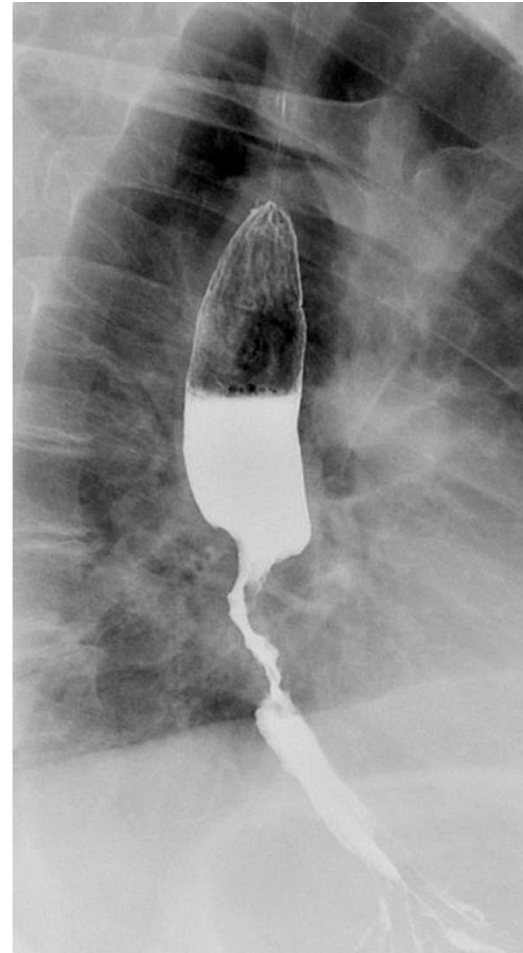
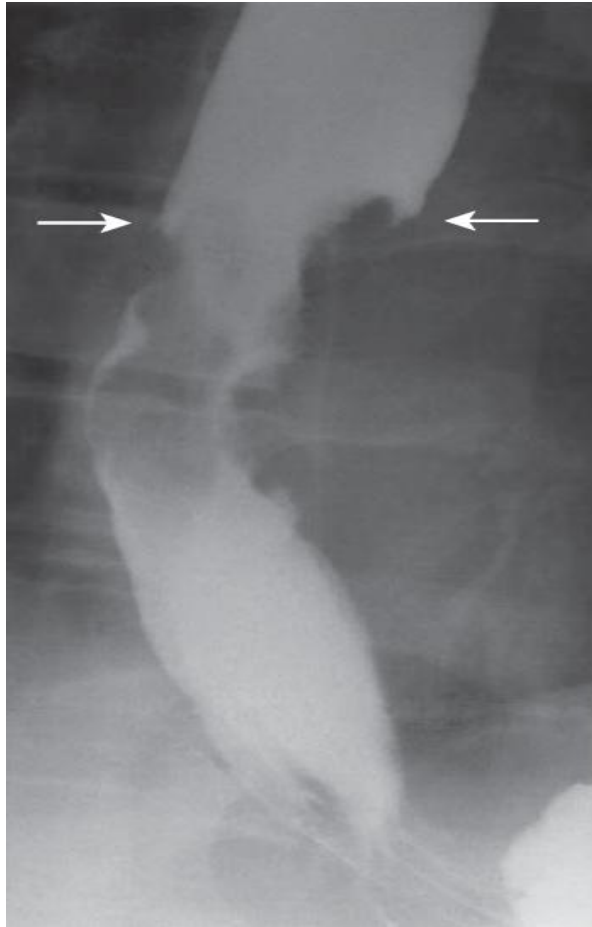
apple core appearance

shoudering effect

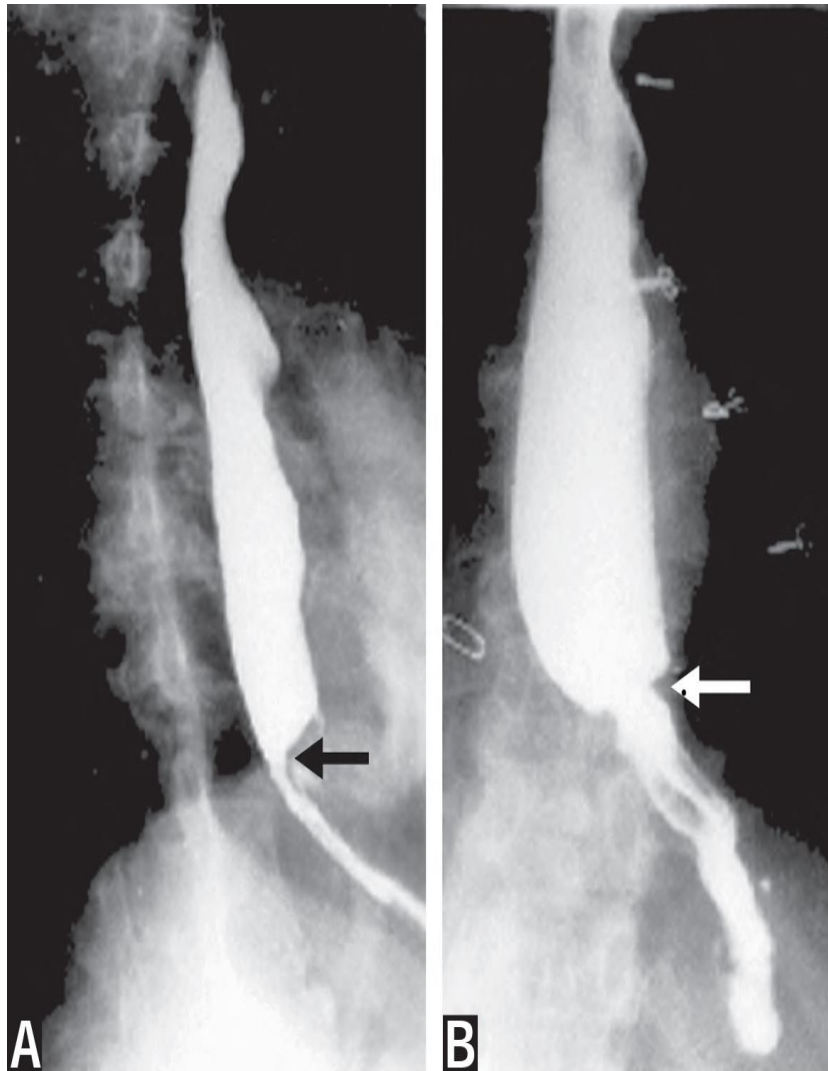
Bronchoscopy for tumour above carina

to assess for direct tracheal invasion .

# Barrium swallow



# Barium swallow



# work up -SUMMARY

- History & physical examination
- Upper GI scopy and biopsy
- Chest /abdominal CT with oral and iv contrast
- FDG-PET/CT if no clinical evidence of metastasis
- Endoscopic ultrasound ,if no evidence of unresectable disease
- Endoscopic resection for early stage.

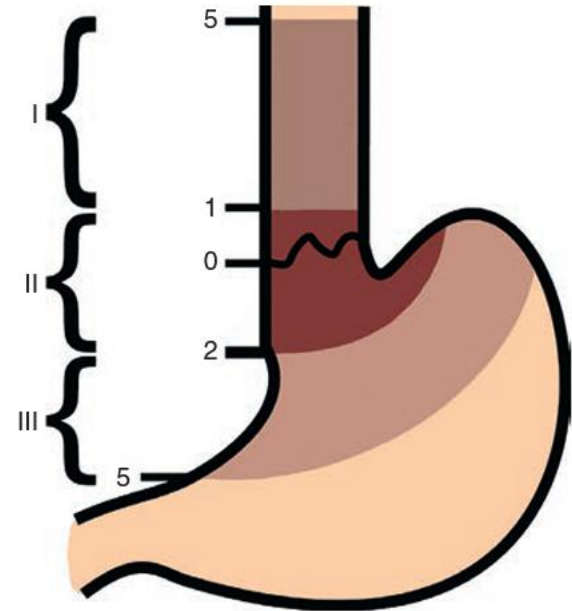
# Gastro esophageal junction tumours

## SIEWERT CLASSIFICATION

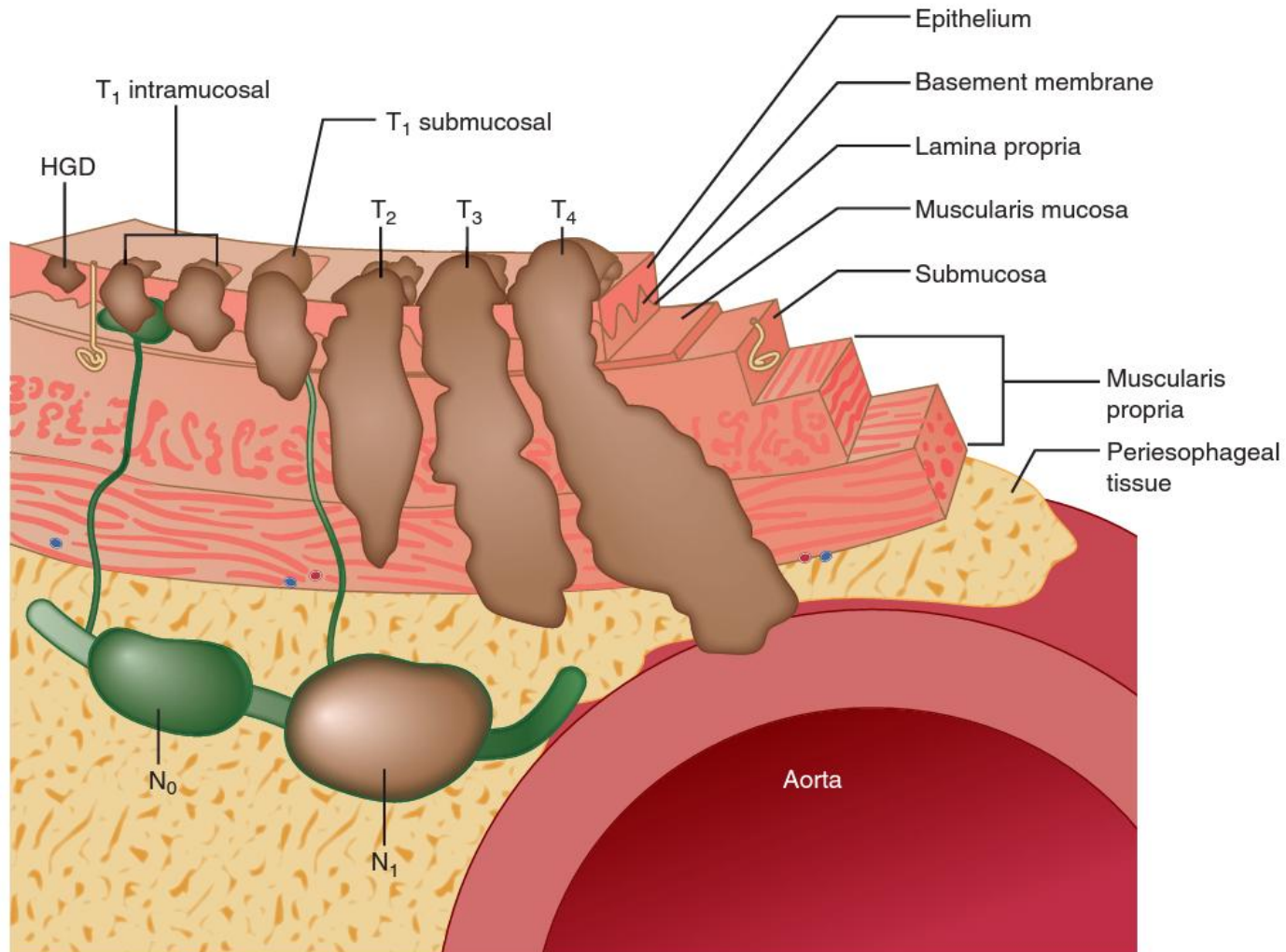
**Type I** carcinoma barret's esophagus / true esophageal adeno carcinoma (epicentre located between 1-5cm above the anatomic OGJ ) extending t GE junction

**Type II** adenocarcinoma of the real cardia (epicenter located within 1cm above and 2cm below the OGJ)

**Type III** adenocarcioma of the subcardial stomach (epicenter located 2- 5cm below OGJ)



- AJCC 8<sup>th</sup> edition
- Siewart types 1 & 2 (tumor epicenter located within 2cm of the proximal stomach )
  - staged as Esophageal adenocarcinoma
- Siewart type 3 (epicenters located >2cm into the stomach ) staged as Gastric cancer .



# Early stage esophageal cancer

- Includes High grade dysplasia and superficial cancer
- Surgery plays a smaller role
- Endoscopic ablation techniques are treatment of choice



# Treatment options

- Ablative methods
- Endoscopic mucosal resection

# Endoscopic mucosal resection

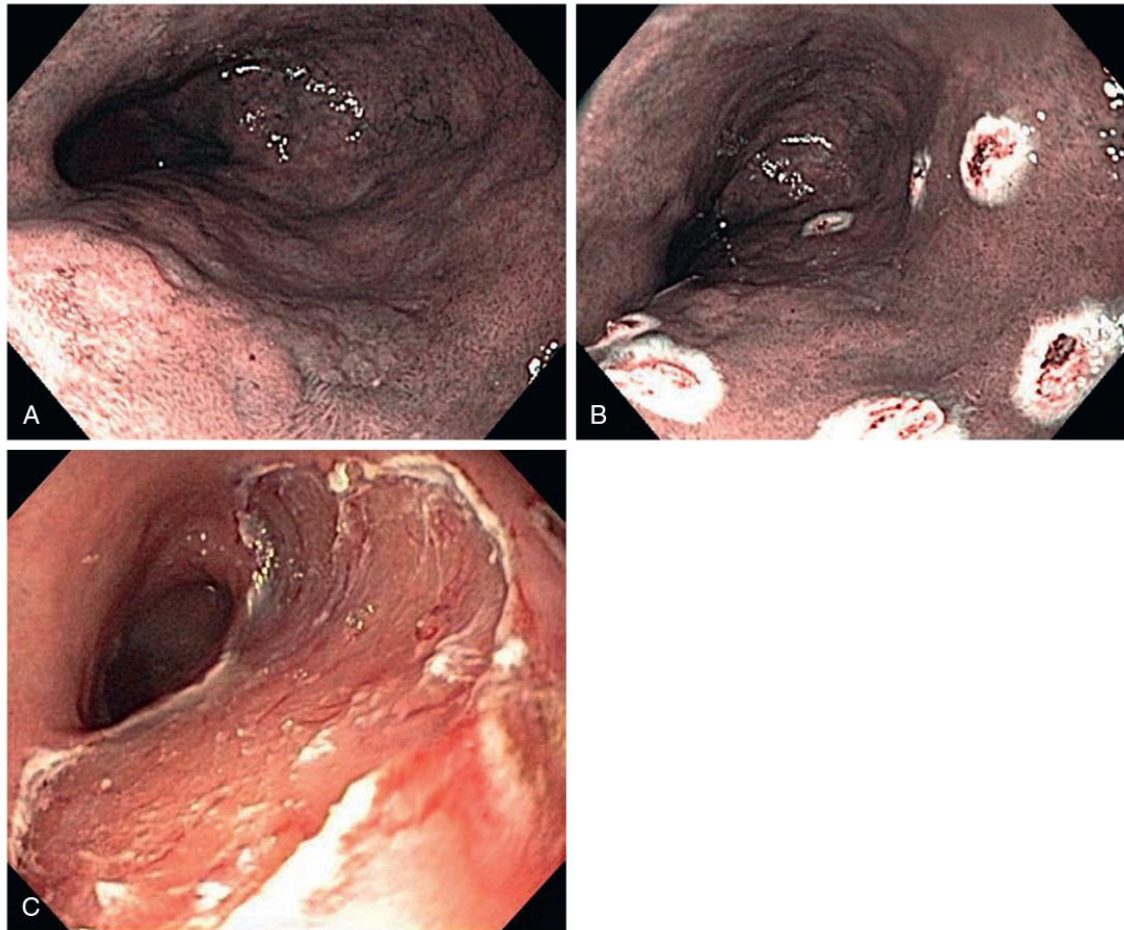
Indicated in

- Nodular /raised barrett esophagus
- Superficial esophageal cancer /T1a lesions

EMR provides adequate staging for Tumour and Nodal status.

EMR not adequate for T1b lesions

# Endoscopic mucosal resection



# Surgical Treatment

Choice of surgical approach depends upon many factors:

- Tumor location, length, submucosal extension, and adherence to surrounding structures
- The type or extent of lymphadenectomy desired
- The conduit to be used to restore GIT
  
- The preference of the surgeon

# Tumors of cervical esophagus

- Cervical esophageal cancer is frequently unresectable because of early invasion of the larynx, great vessels, or trachea.
- Radical surgery including esophagolaryngectomy may occasionally be performed for these lesions.
- High morbidity.
- Stereotactic radiation with concomitant chemotherapy is the most desirable treatment.

# Tumors of middle third esophagus

- Squamous carcinomas most commonly and are frequently associated with LN metastasis (thorax, neck or abdomen)
- Midthoracic ca + abdominal LN mets → incurable with surgery.
- Isolated cervical LN metastases can be resected.
- T1 and T2 cancers without LN metastases are treated with resection only.
- LN involvement or transmural cancer (T3) → neoadjuvant chemoradiation therapy followed by resection.

# Tumors of the lower esophagus

- Tumors of the lower esophagus and cardia are usually adenocarcinomas.
- If possible, resection in continuity with a LN dissection should be performed.
- Local recurrence at the anastomosis can be prevented by obtaining a 10-cm margin of normal esophagus above the tumor

- Considering that the length of the esophagus and the length of the lesser curvature of the stomach, a curative resection requires a cervical division of the esophagus and a >50% proximal gastrectomy in most patients with carcinoma of the distal esophagus or cardia.



- Factors that make surgical cure unlikely include
  - advanced stage of carcinoma,
  - Tumor >8 cm in length,
  - Abnormal axis of the esophagus on a barium radiogram,
  - >4 enlarged LNs on CT,

- Advanced stage of ca esophagus
  - recurrent laryngeal nerve paralysis,
  - Horner's syndrome,
  - persistent spinal pain,
  - paralysis of the diaphragm,
  - fistula formation, and
  - malignant pleural effusion.

# Preoperative evaluation

- Pulmonary function tests
- Cardiac testing
- Nutritional assessment
- Nasoduodenal /jejunostomy tube for nutritional support
- Laparoscopic staging in adenocarcinoma/GEJ tumour

# ESOPHAGECTOMY

Transthoracic esophagectomy

Ivor Lewis esophagectomy

McKeown esophagectomy

Transhiatal esophagectomy

Transthoracic or thoracoabdominal

Minimally invasive

# IVOR-LEWIS TRANSTHORACIC ESOPHAGECTOMY

- Most common surgical approach
- Two phased procedure
- Right thoracotomy with upper midline laparotomy
- After laparotomy stomach is mobilised –through rt. 5<sup>th</sup> space thoracotomy esophagus with growth is mobilised –partial esophagectomy and oesophago gastric anastomosis done in the thorax.
- Lymph node dissection
  - upper abdominal and mediastinal lymph node dissection done.

- Complications
  - Abdominal and thoracic incisions compromise cardiopulmonary function in comorbid patients.
  - Intrathoracic anastomotic leak—  
mediastinitis
  - Esophagitis due to bile reflux .

# TRANSHIATAL ESOPHAGECTOMY

- Distal esophagus and EGJ cancers.
- Upper midline laparotomy incision and a left neck incision.
- Blunt dissection of thoracic esophagus.
- Cervical anastomosis with a gastric pull-up.
- Disadvantages: Limited thoracic lymphadenectomy and blind midthoracic dissection.

# TRANSHIATAL ESOPHAGECTOMY

- Avoidance of thoracotomy incision
- Minimises pain and postop pulmonary complications
- Elimination of mediastinitis associated with intrathoracic anastomotic leak



# MCKEOWN THREE PHASE ESOPHAGECTOMY

- Includes right thoracotomy followed by laparotomy and cervical anastomosis.
- Applicable for tumours in the upper, middle and lower thoracic esophagus.
- Eliminates complication of Intrathoracic esophagogastric anastomosis.

## Lymph node dissection

- Allows a complete 2-field (mediastinal and upper abdominal) lymphadenectomy under direct vision.