

www.downstatesurgery.org

Surgical Management of Esophageal Cancer

Sophia L Fu, MD

Long Island College Hospital
SUNY Downstate Medical Center,
Brooklyn, NY

03/27/2009



➤ The T and N status of esophageal carcinoma is most accurately assessed by?

- A. Upper gastrointestinal series
- B. Computed tomographic scan of the chest with double contrast
- C. Endoscopic ultrasound (EUS)
- D. Positron emission tomography (PET scan)
- E. Magnetic resonance imaging (MRI)

- Which of the following statements about the incidence, location, and type of esophageal cancer is TRUE?
 - A. The overall rate is decreasing
 - B. Proximal squamous cell lesions are increasing
 - C. Proximal adenocarcinomas are increasing
 - D. Distal adenocarcinomas are increasing
 - E. Distal squamous cell cancers are decreasing

- When mobilizing the stomach in an esophagectomy, which vessel is preserved?
 - A. Left gastric artery
 - B. Short gastric arteries
 - C. Left gastroepiploic artery
 - D. Right gastroepiploic artery

- In a patient without metastatic disease who completes neoadjuvant chemotherapy and radiation therapy, the 5-yr survival after complete resection would be?
 - A. 5%
 - B. 10%
 - C. 35%
 - D. 50%
 - E. 75%

- Substantial mortality from anastomotic leakage
 - A. Transthoracic (Ivor Lewis) esophagectomy
 - B. Transhiatal esophagectomy
 - C. Both
 - D. Neither

History & Physical

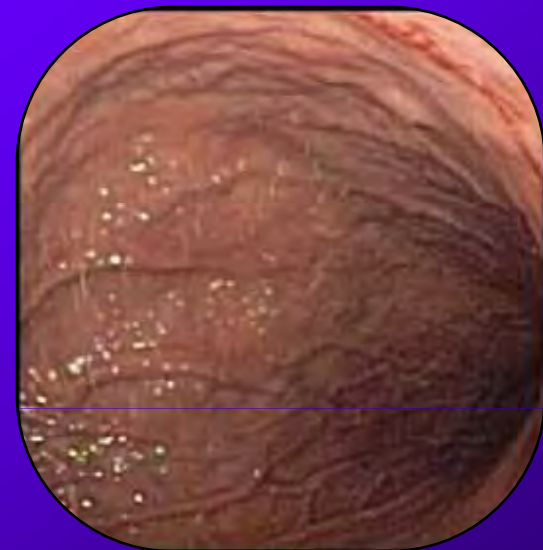
- 48 yo female c/o dysphagia since 5/2008, primarily solid foods then progressing to liquids w/100 lb wt loss over 10 months. Pt c/o post-prandial vomiting.
- PMH: htn, DM, asthma
- PSH/ FHx: denies
- SocHx: 1 ½ ppw x30yrs; occ etoh 3-4/wk

- Physical Exam: No significant findings

Esophageal CA

www.downstatesurgery.org

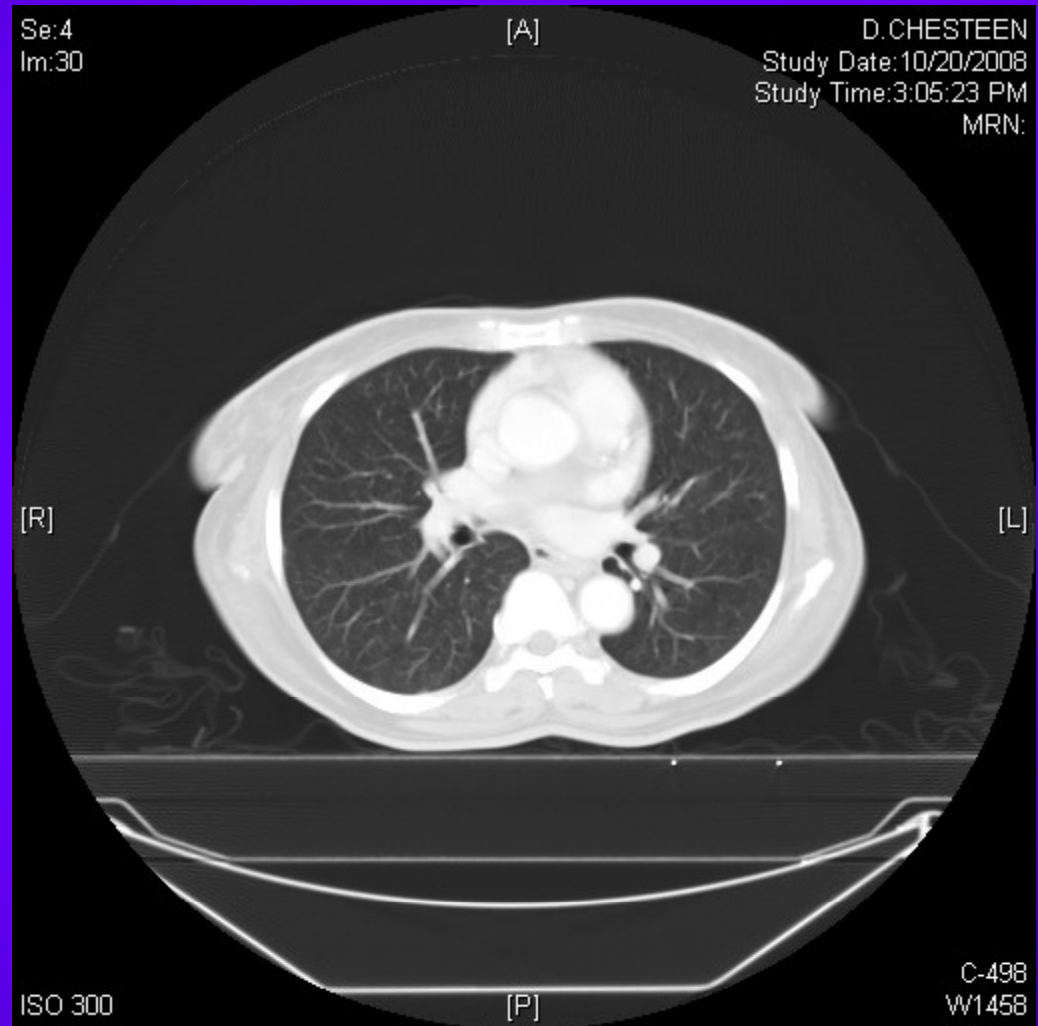
EGD 10/14/2008



CT Scan

➤ CT chest/abd/pelvis

10/15/2008 – mass mid-esophagus w/proximal dilatation @aortic arch & extending to low pulmonary vein (4.2x2.7cm)



Esophageal CA

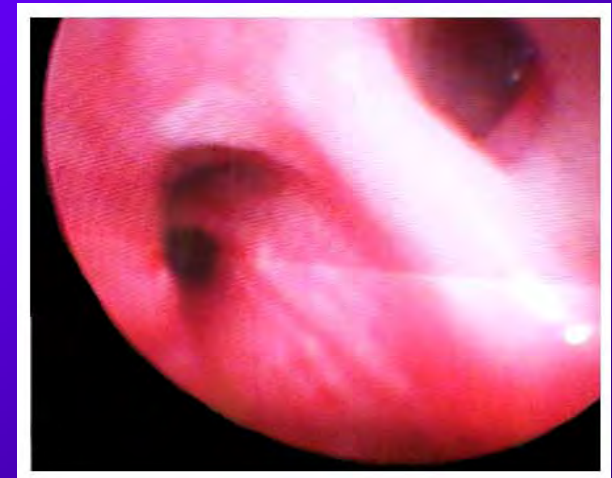
www.downstatesurgery.org

Esophagogram



Studies

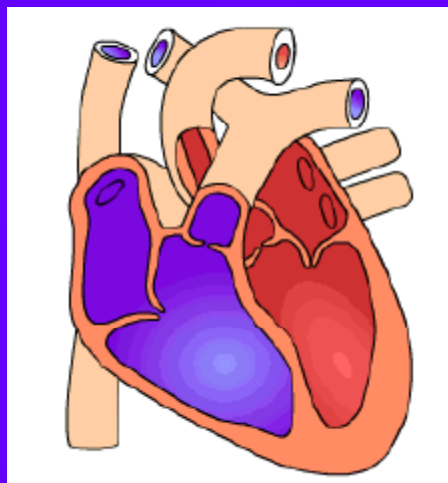
- Bronchoscopy 10/16/2008 –
 - Whitish lesion post tracheal wall above carina, histo neg
- ENT laryngoscopy –
 - No vocal cord paralysis/involvement
- PET scan –
 - Neg



Cardiopulmonary Function

➤ PFTs 10/17/2008 –

- FEV₁ 2.06 (64%);
- FEV₁/FVC 77%;
- DLCO 17.9 (78%)



➤ Echo –

- EF 60%, nl LVSF & wall motion, PAP 34, mild MR/TR

➤ Stress echo –

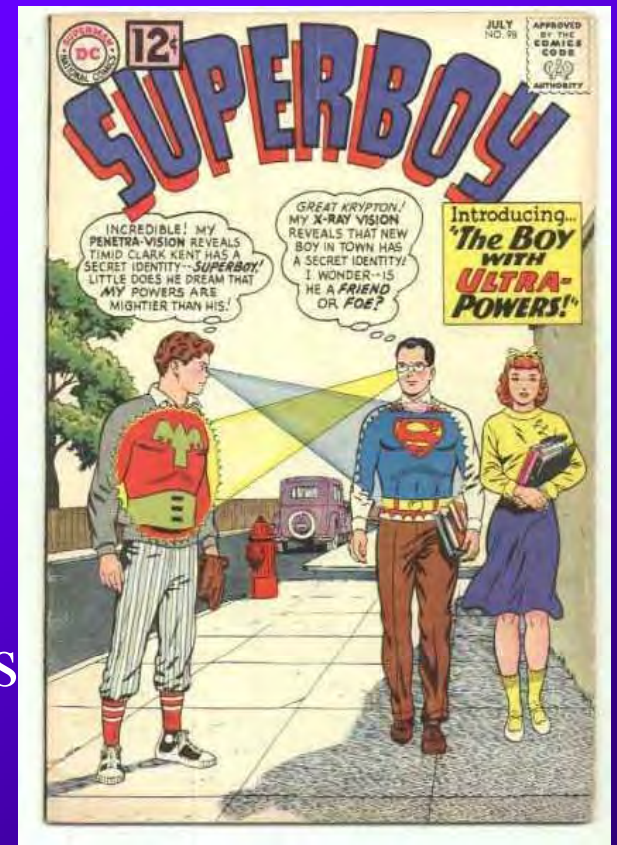
- peak stress EF 75%

EUS – 10/27/2009

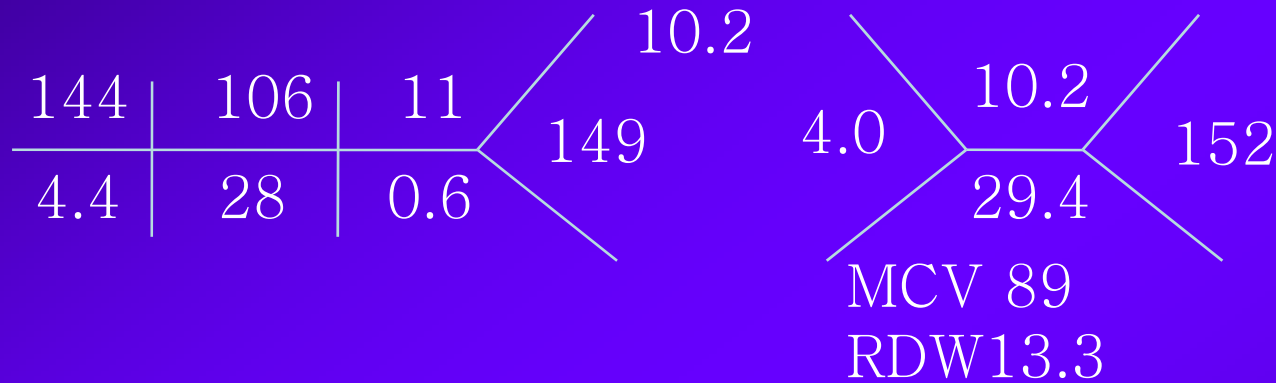
- Friable tumor 70% circumference upper 1/3 esophagus w/ulcerated narrowing & severe obstruction
- T3 Nx Mx



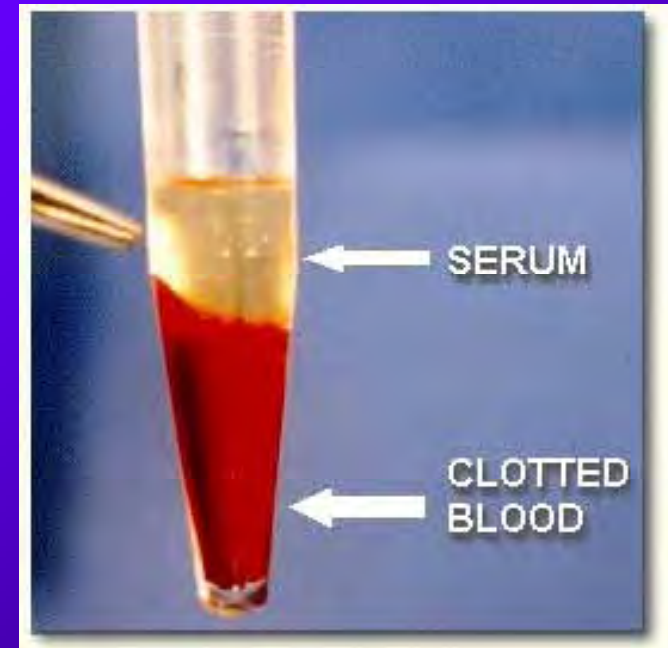
- Radiation 11/17/2008 – 12/19/2008
 - 3960 cGy to esophagus & supraclavicular region
- Chemotherapy
 - Cisplatin & 5-FU
- Sx improved
- Re-gained 50 lbs w/appetite simulants



Laboratory work-up



TP 6.6	AST 43	CEA 2.3
Alb 3.3	ALT 30	
Tbili 0.2	AP 84	
Dbili 0	AMY 52	
	Lip 91	



Operative Report – 2/10/2009

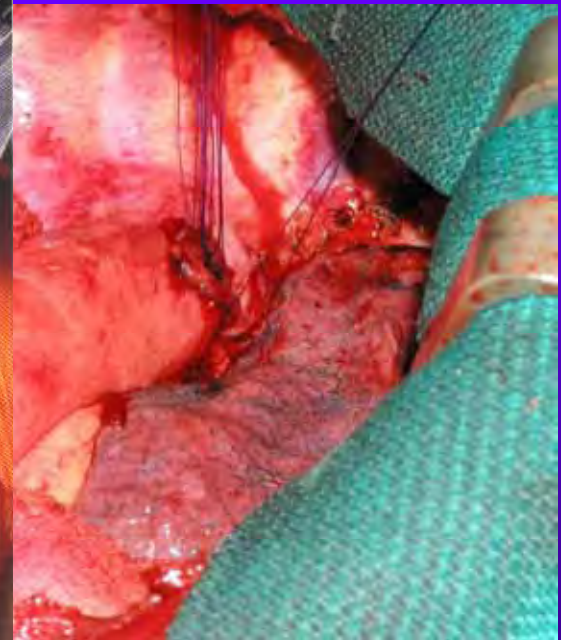
- Exploratory laparotomy, gastric mobilization, pyloromyotomy, feeding jejunostomy
- Esophagoscopy
- Right thoracotomy, esophagectomy w/esophagogastric anastomosis

Time	IVF	PRBCS	EBL	UO
13.5 hrs	11.5 L	2 Units	700 mL	1200 mL

Esophageal CA

www.downstatesurgery.org

Ivor Lewis Esophagectomy



Esophageal CA

www.downstatesurgery.org

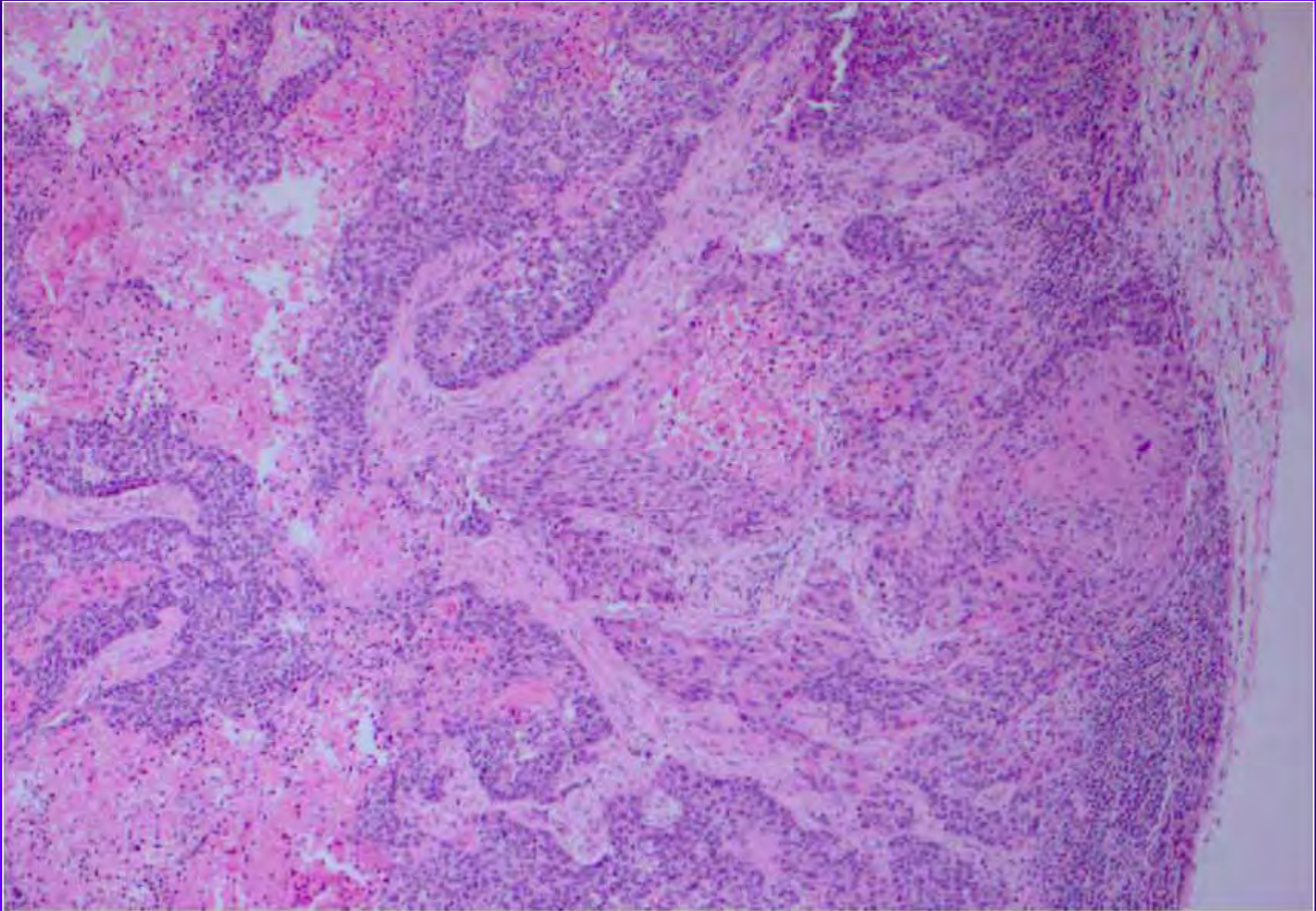
Gross Specimen



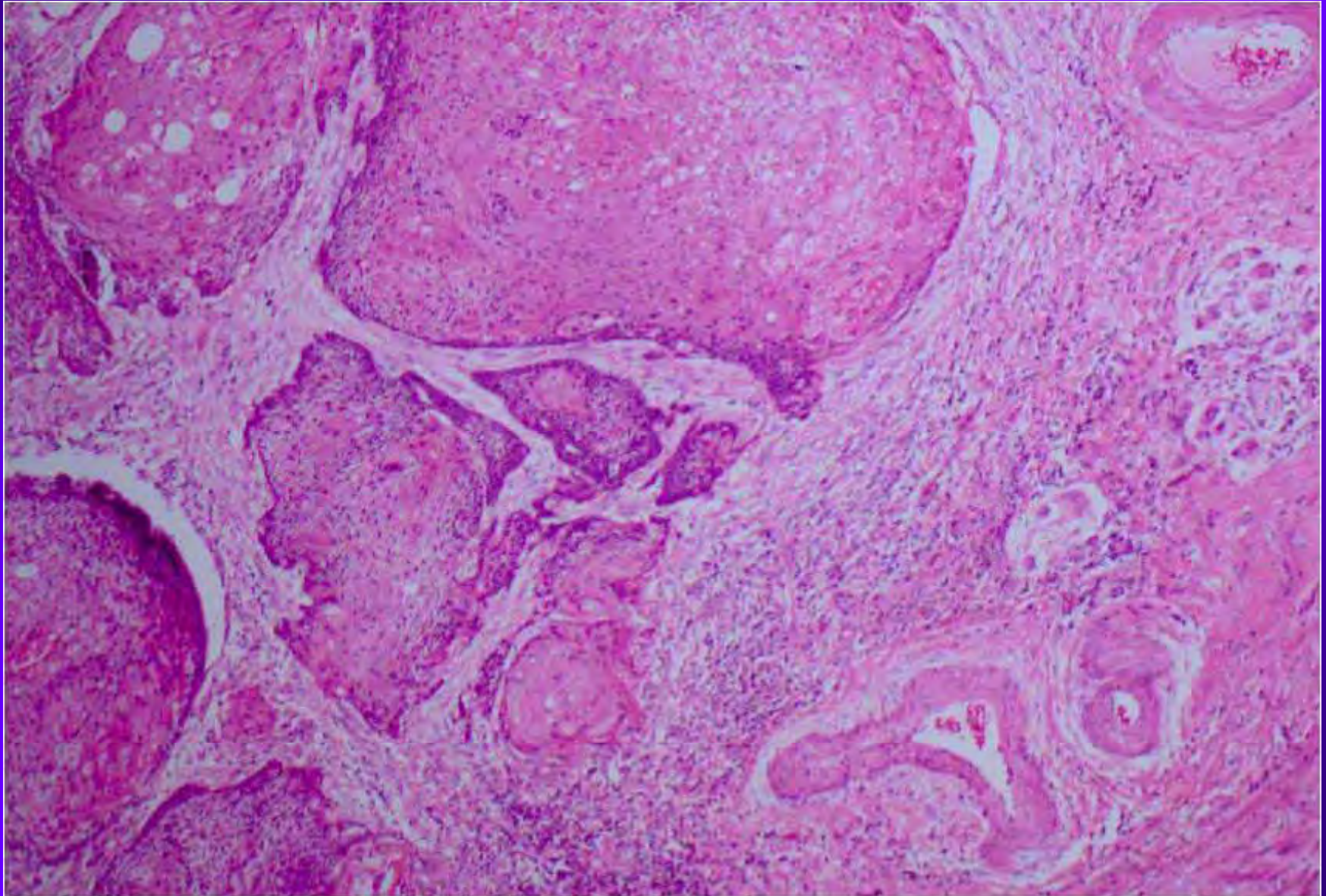
Esophageal CA

www.downstatesurgery.org

Celiac Node



Esophagus



Hospital Course

➤ POD#2

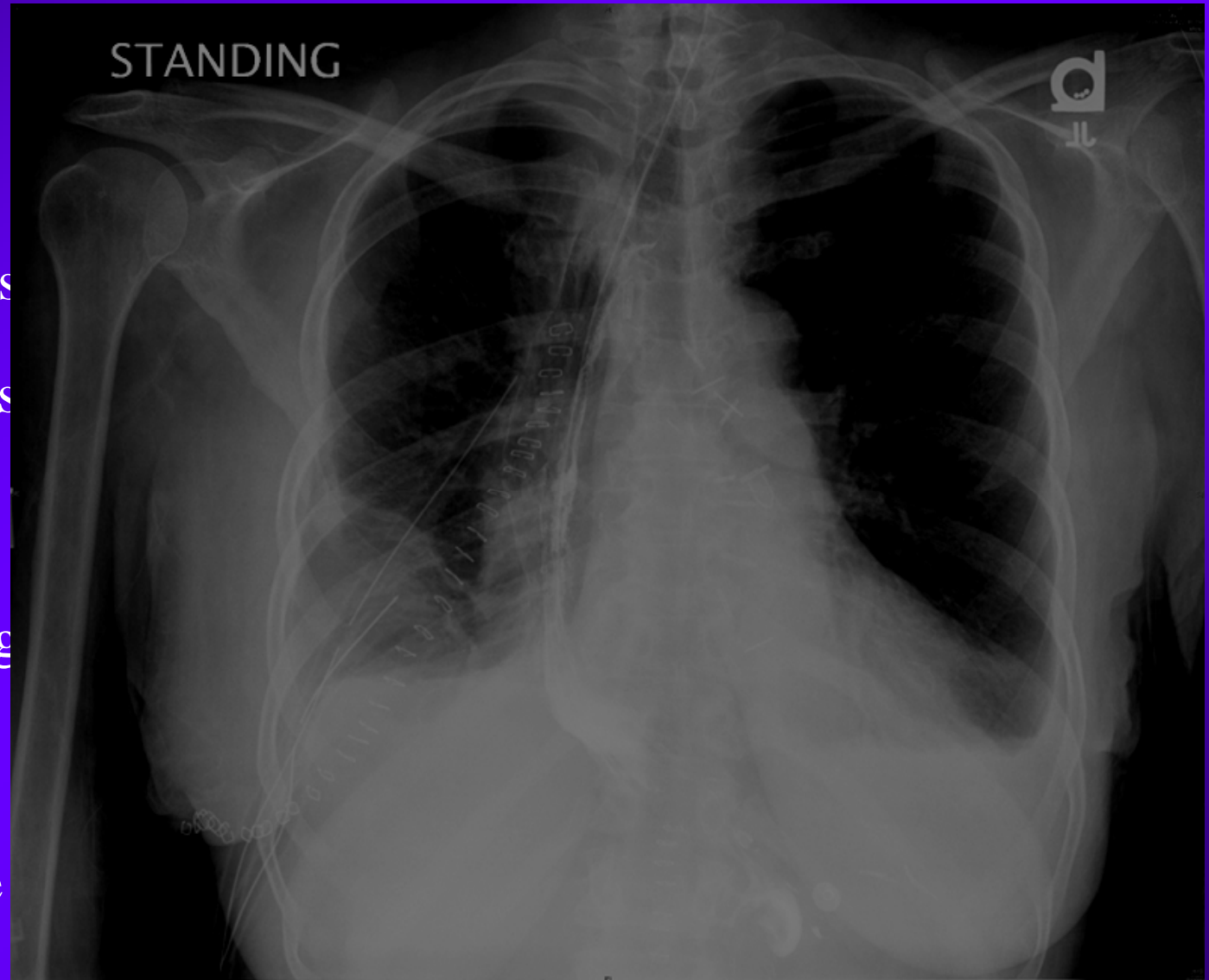
- Extubated
- 2U PRBCs
- Tube feeds

➤ POD#7

- Esophagog

➤ POD#9

- D/C home



www.downstatesurgery.org

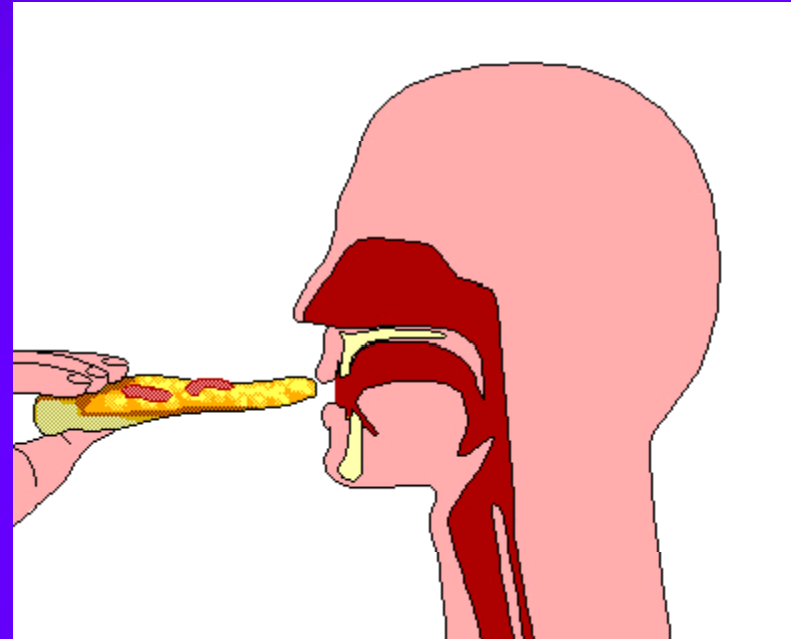
Esophageal Cancer

Introduction

- Incidence increasing
- 4% of all cancers dx'd each year
- Overall poor rate of survival
- Adenocarcinoma has risen 6x over last quarter century
- Squamous cell carcinoma
 - Smoking & ETOH
- Adenocarcinoma
 - Barrett's Esophagus
 - Long-standing GERD

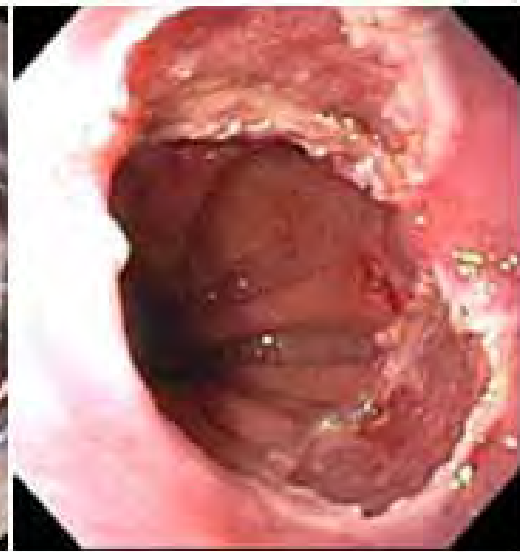
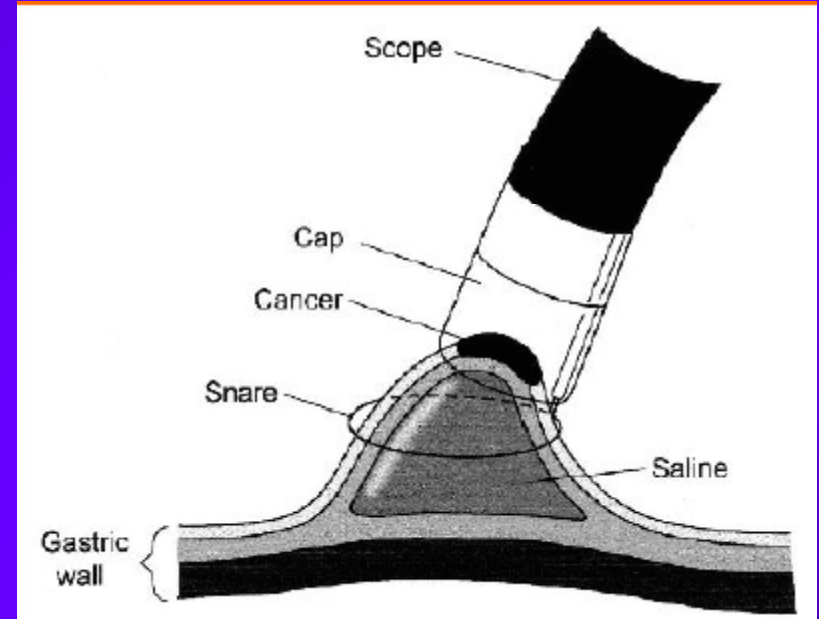
Presentation

- Dysphagia
- Endoscopy:
 - Chronic GERD
 - BE surveillance
- Bleeding (anemia or hematemesis)
- Chest or abd pain



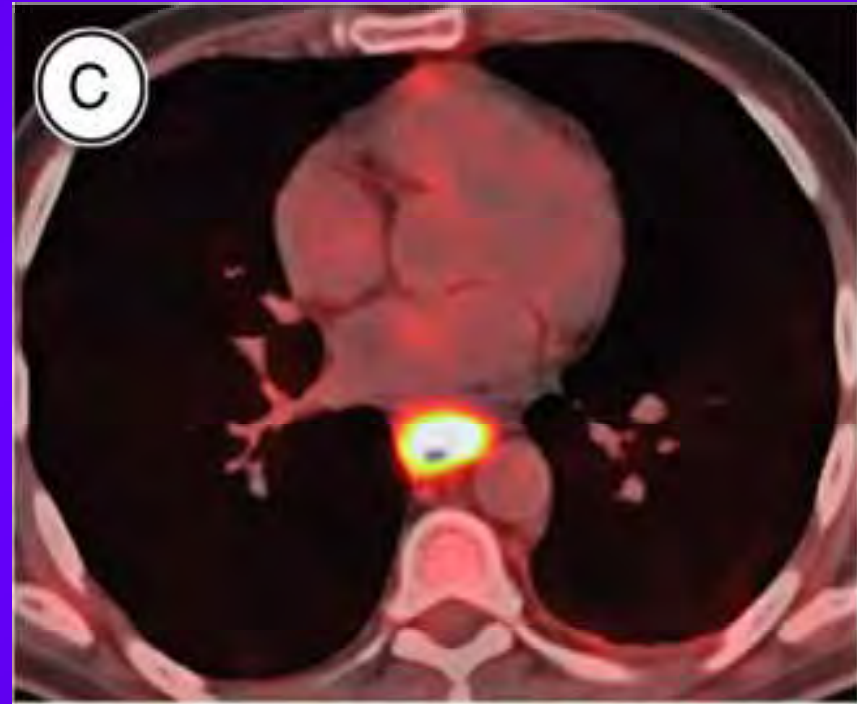
Diagnosis

- Confirm dx: Bx
- EsophagoGastroDuodenoscopy
- Endoscopic US
- Endoscopic Mucosal Resection



Resectability

- Determine extent of dz
 - Local, regional & systemic
 - CT chest
 - PET scan
 - PET-CT



PET CT

Pre-operative Assessment

- Evaluate physiologic status
 - Cardiac & pulmonary reserve
 - PFTs
 - Noninvasive cardiac stress eval
 - Nutritional status



Principles of Esophagectomy

- Standard of care for non-metastatic esophageal CA
- 1° goal: complete (R_0) resection of tumor & surrounding lymph nodes
 - Maximize opportunity for cure
 - Minimize incidence of local recurrence
- Earlier lesions: more physiologic outcome
- Advanced locoregional dz w/good cardiopulmonary reserve: extended lymphadenectomy

Neoadjuvant Therapy

- Candidates for resection
 - Neoadjuvant chemotherapy
 - Concurrent radiation therapy
- Good performance status & bulky disease
- 20-30% rate of complete response
- Afterwards, re-stage w/barium swallow & CT
- Resection in 2-3 wks after Chemo/XRT

Different Surgical Approaches

➤ Transhiatal

➤ Blind dissection in chest

➤ Cervical

esophagogastrostomy

➤ Ivor-Lewis

➤ Abdominal/thoracic

dissection

➤ Intra-thoracic

esophagogastrostomy

➤ En bloc esophagectomy

➤ Left thoracoabdominal

➤ Cervical

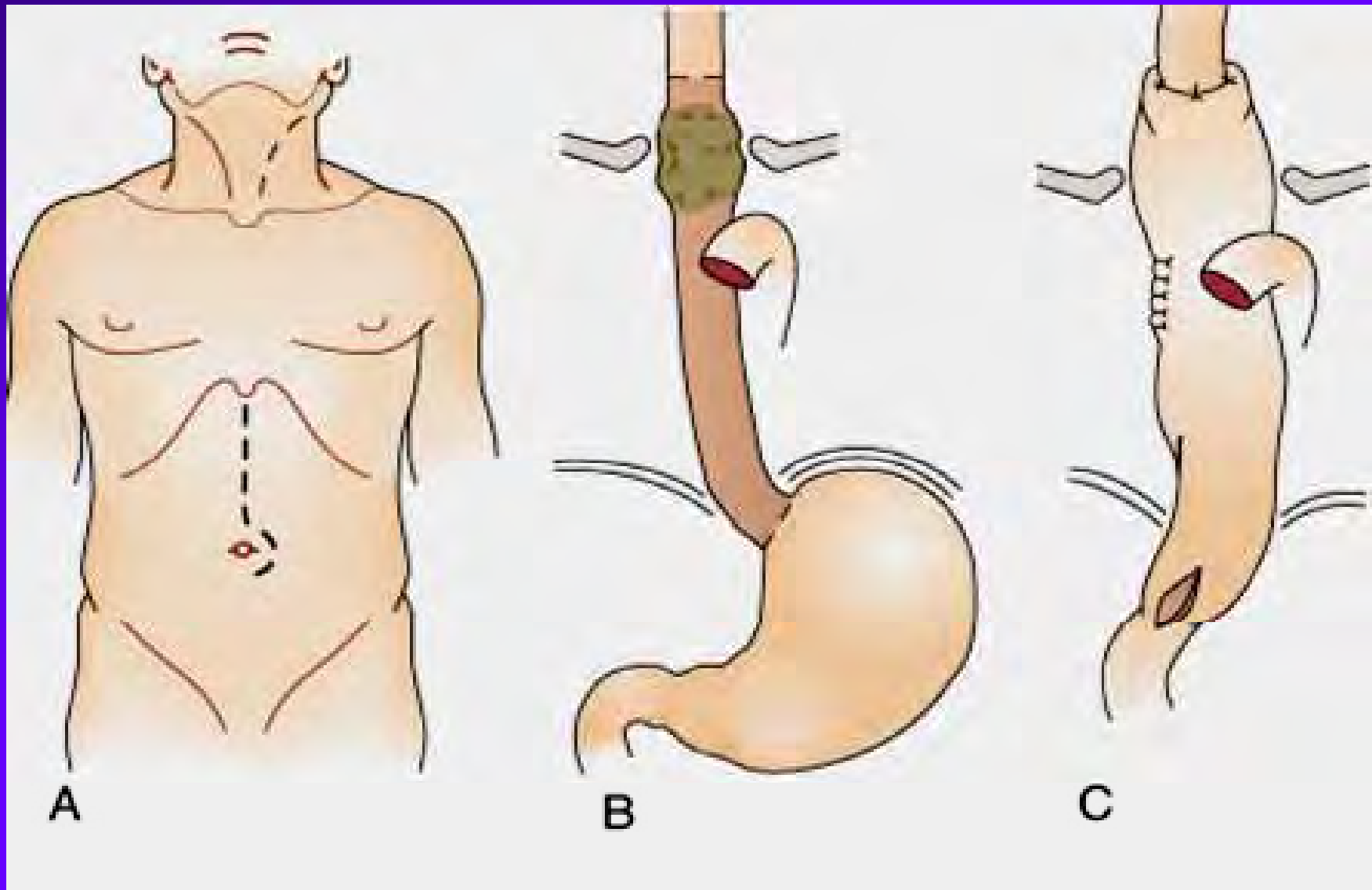
esophagogastrostomy

➤ Minimally invasive

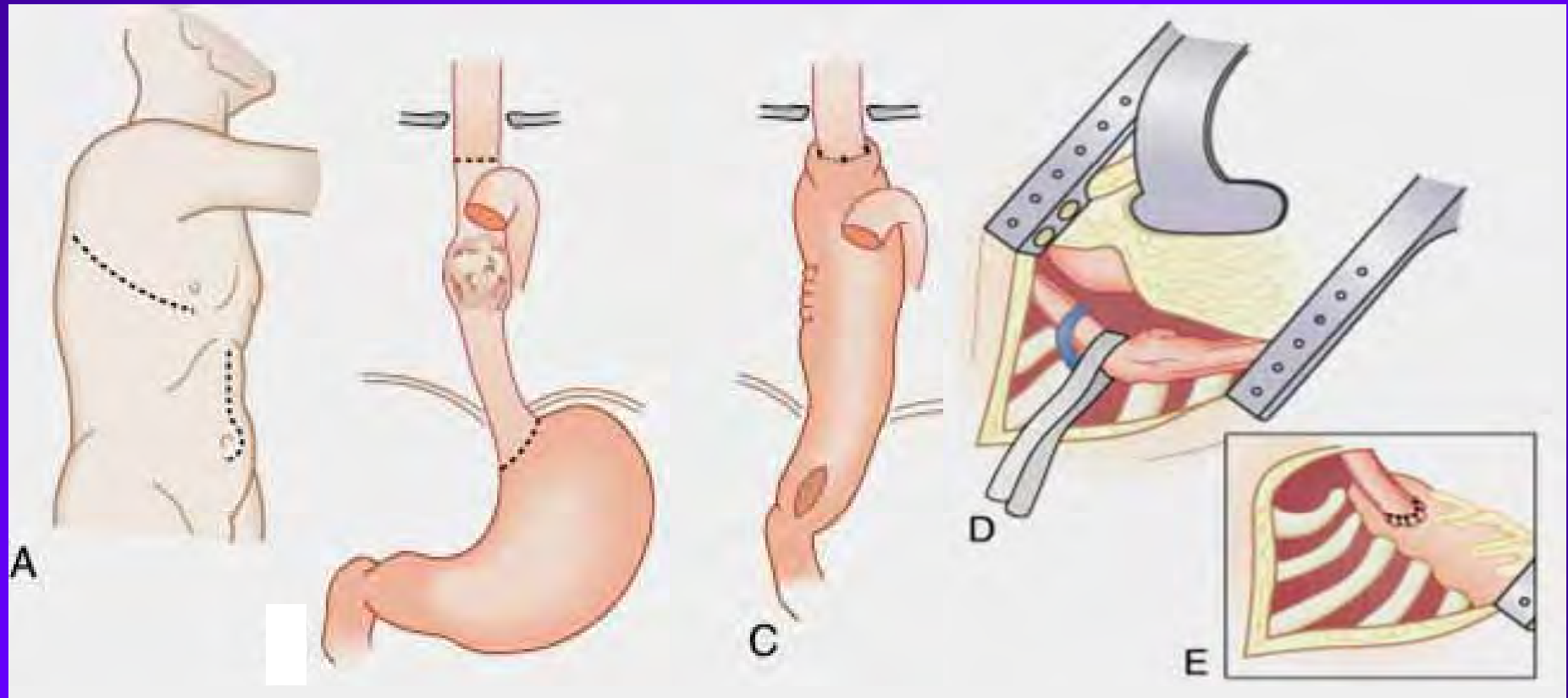
➤ Laparoscopic

➤ ± thoracoscopic

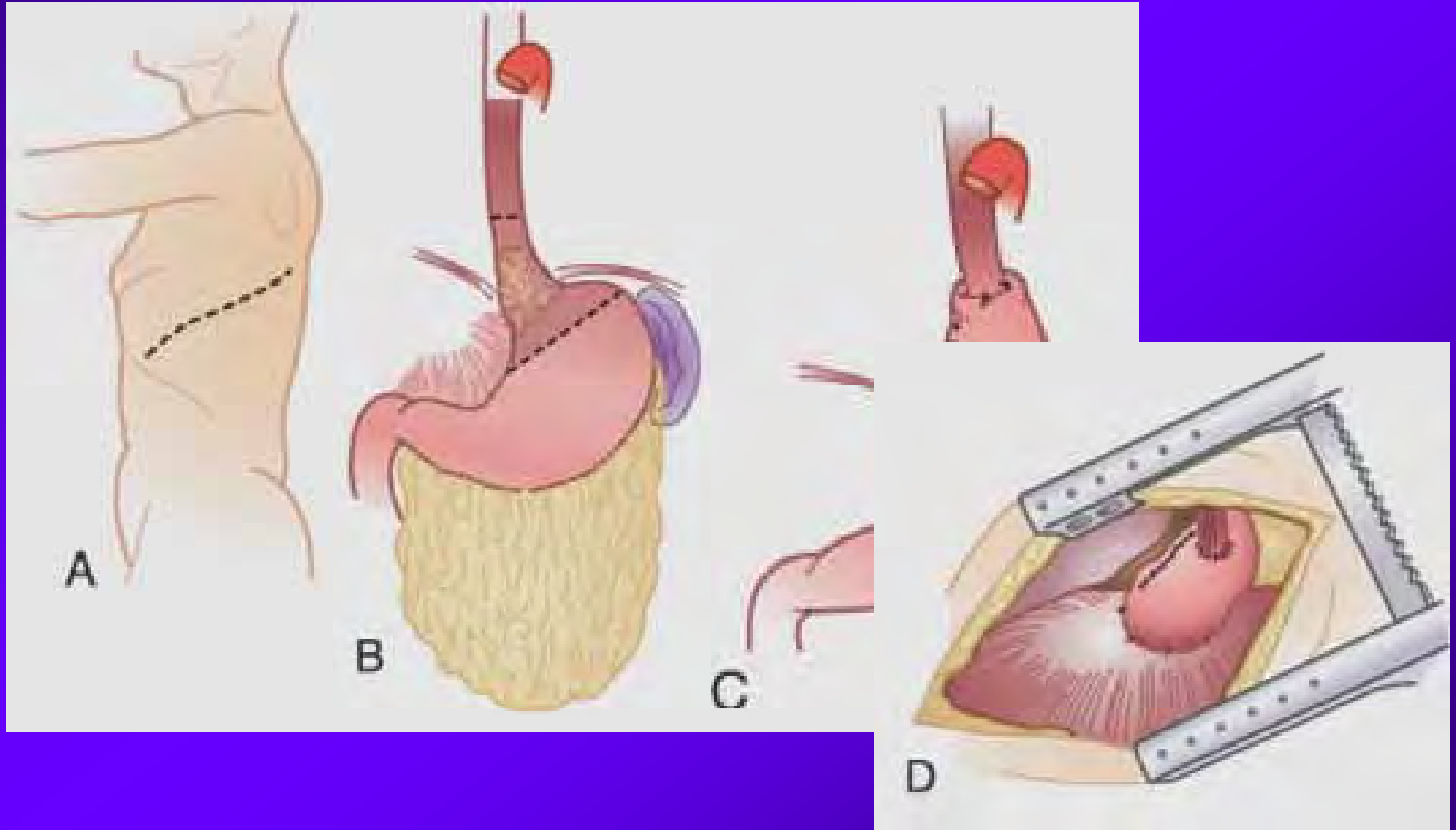
Transhiatal Esophagectomy



Ivor-Lewis Esophagectomy



En Bloc esophagectomy



Reconstruction

➤ Tubularized or whole

stomach

- Easiest
- Single anastomosis
- Enough length for neck
- Effective alimentary

conduit

➤ Colon

➤ Unusable stomach

- Prior Surgery
- Extensive tumor

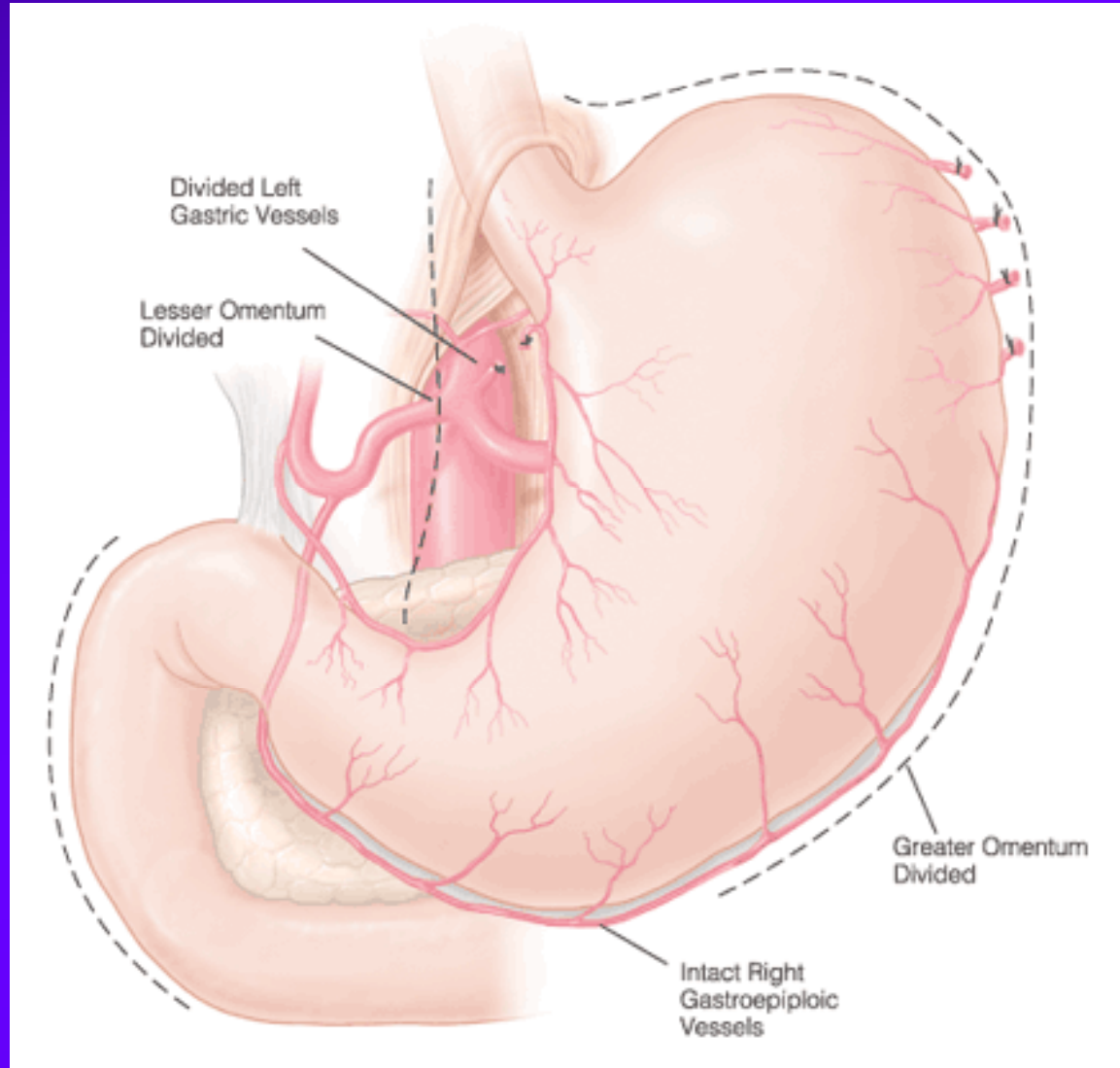
➤ Intestine

- Most complex
- Last resort

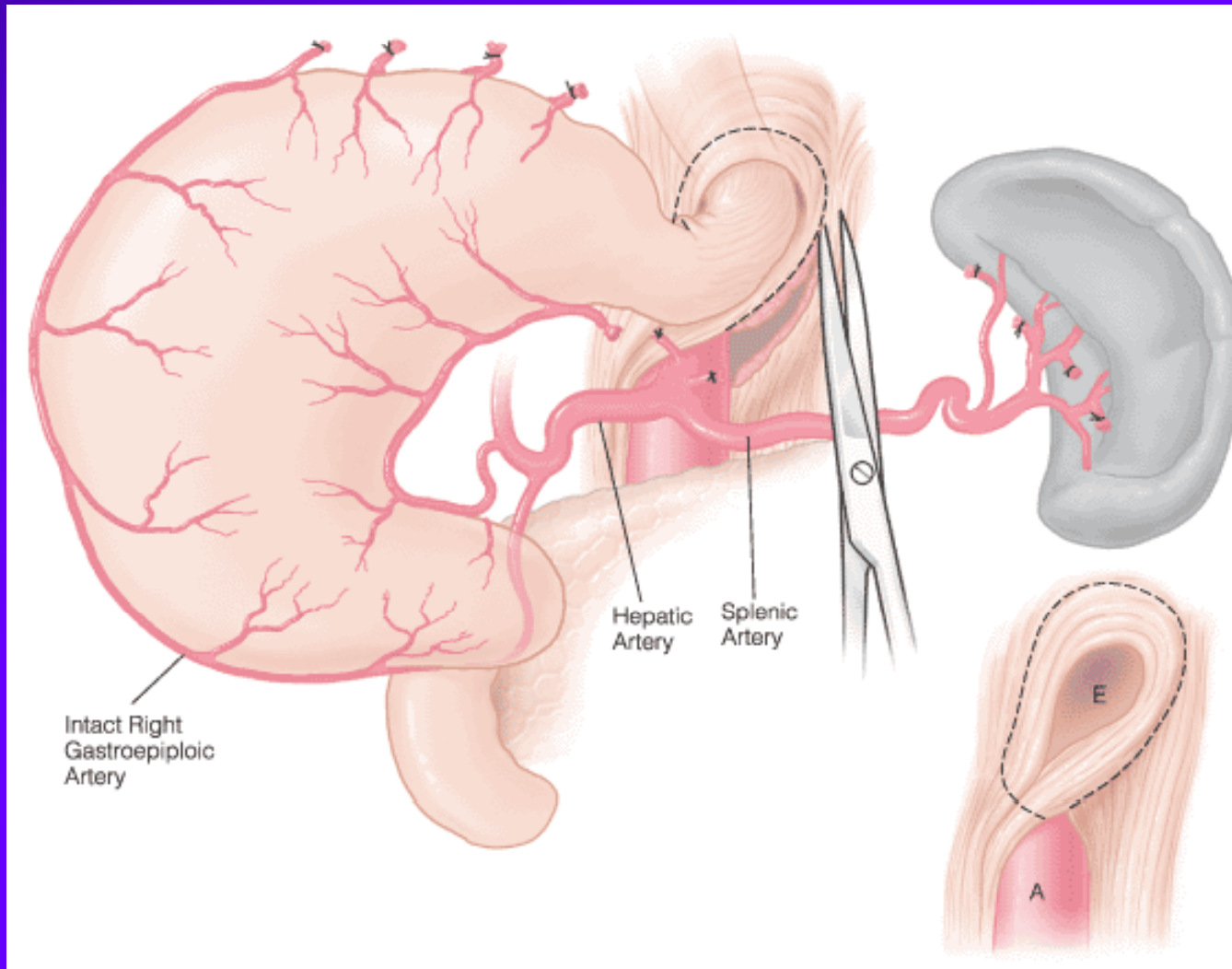
Esophageal CA

www.downstatesurgery.org

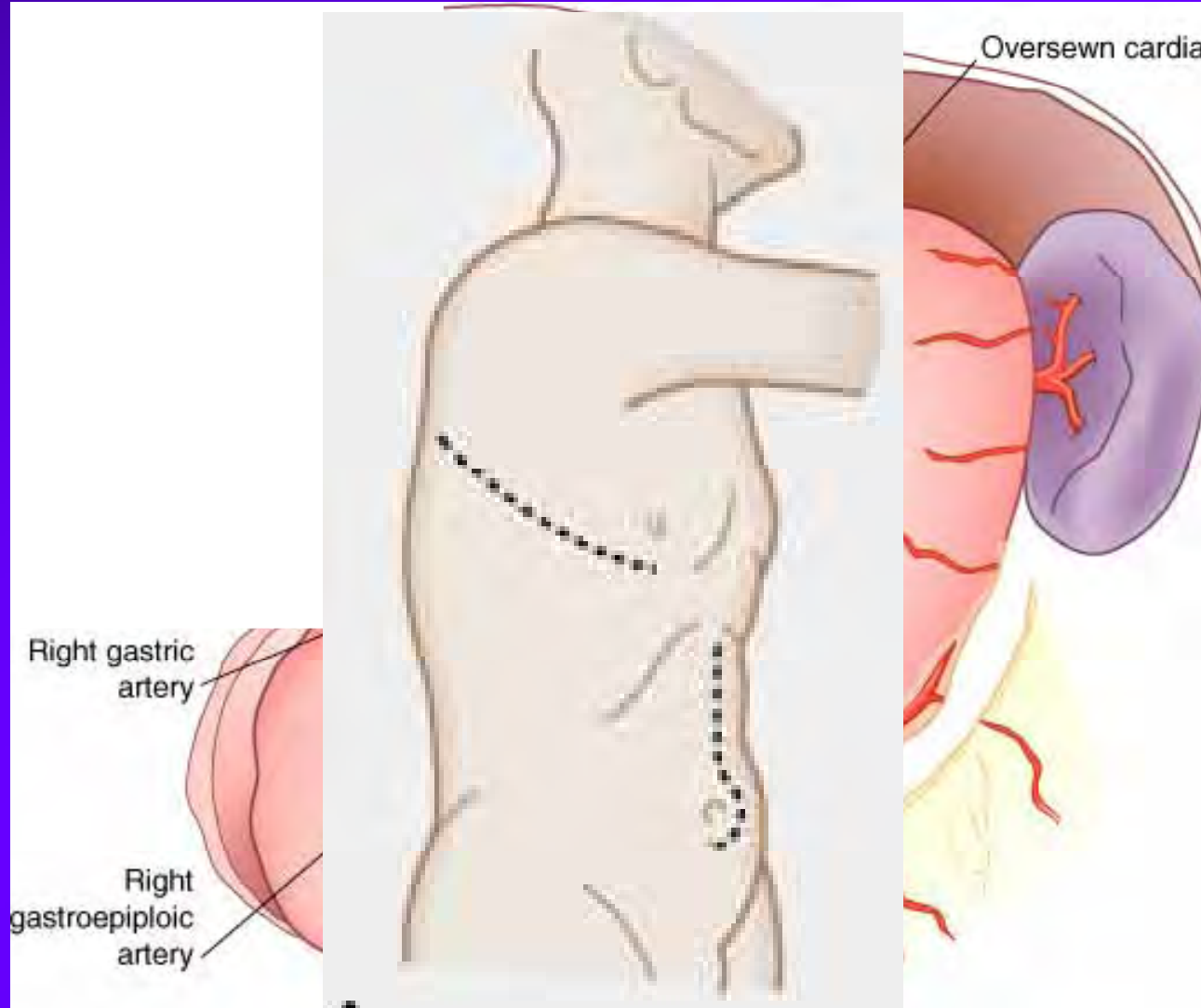
Division of Gastrohepatic Ligament & Mobilization of Distal Esophagus



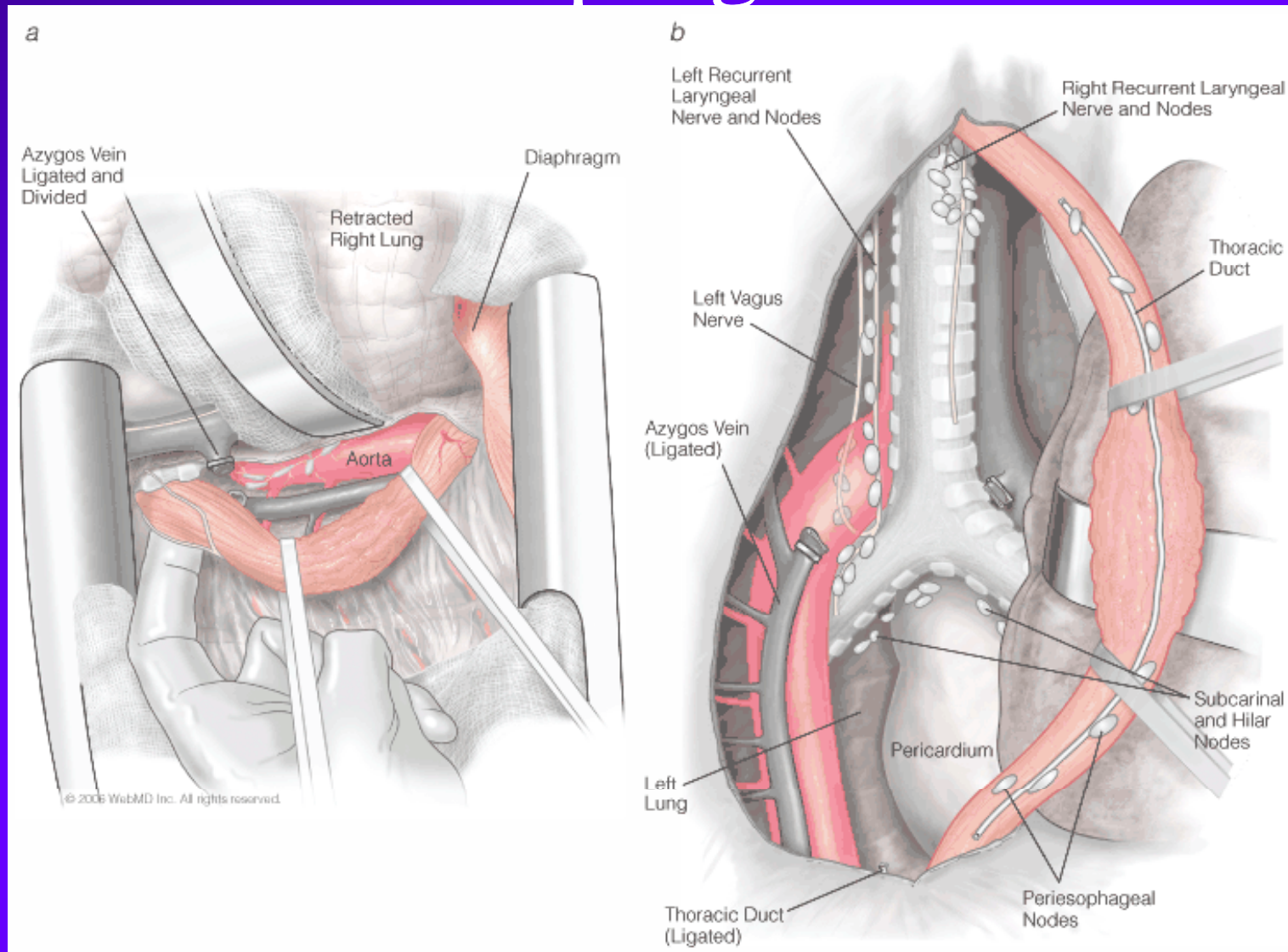
www.downstatesurgery.org
Mobilization of Stomach
& Duodenum



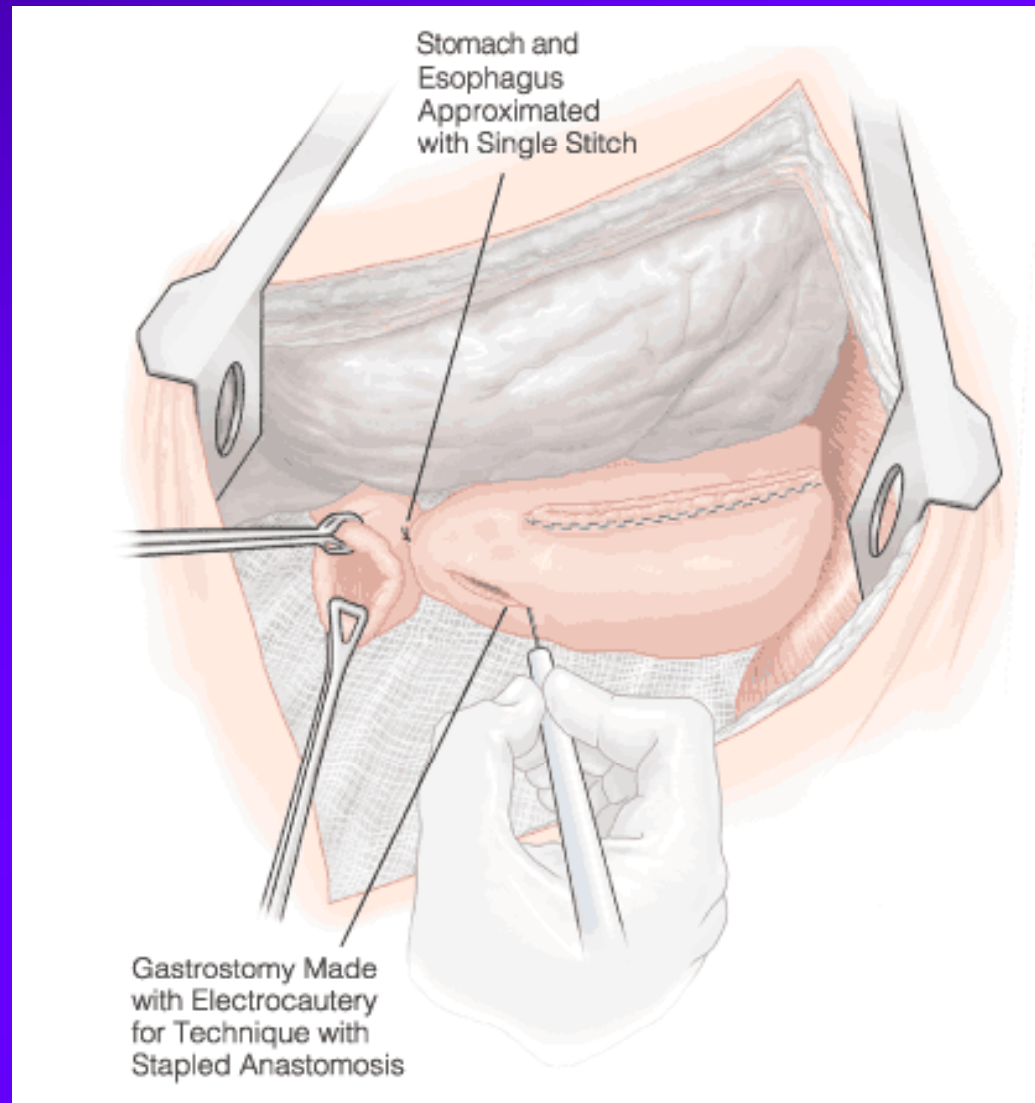
Feeding Jejunostomy



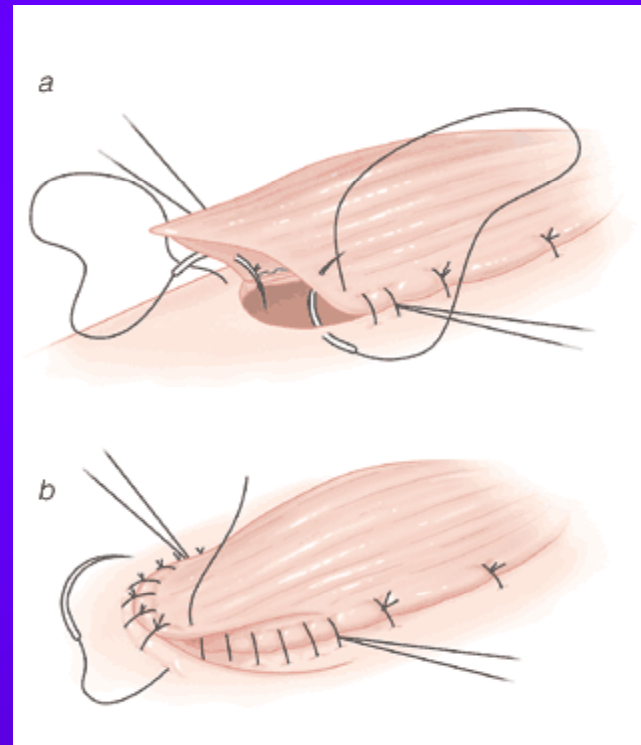
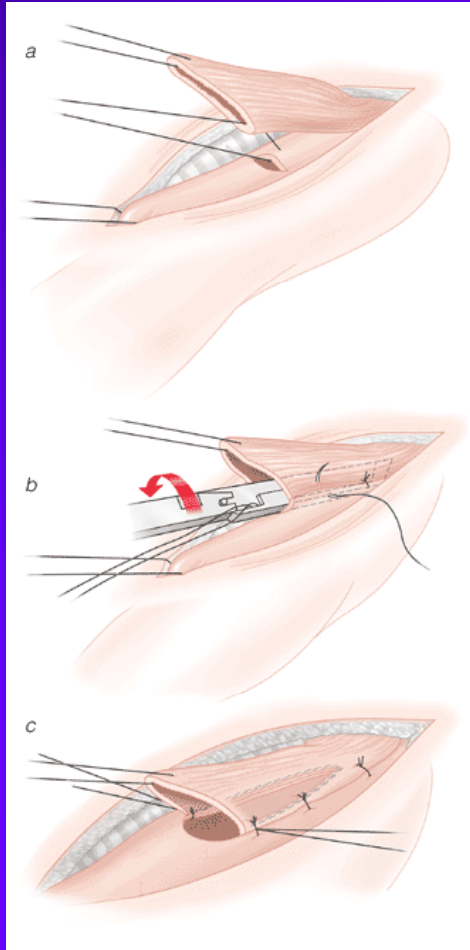
Exposure & Mobilization of Esophagus



Excision & Removal Specimen



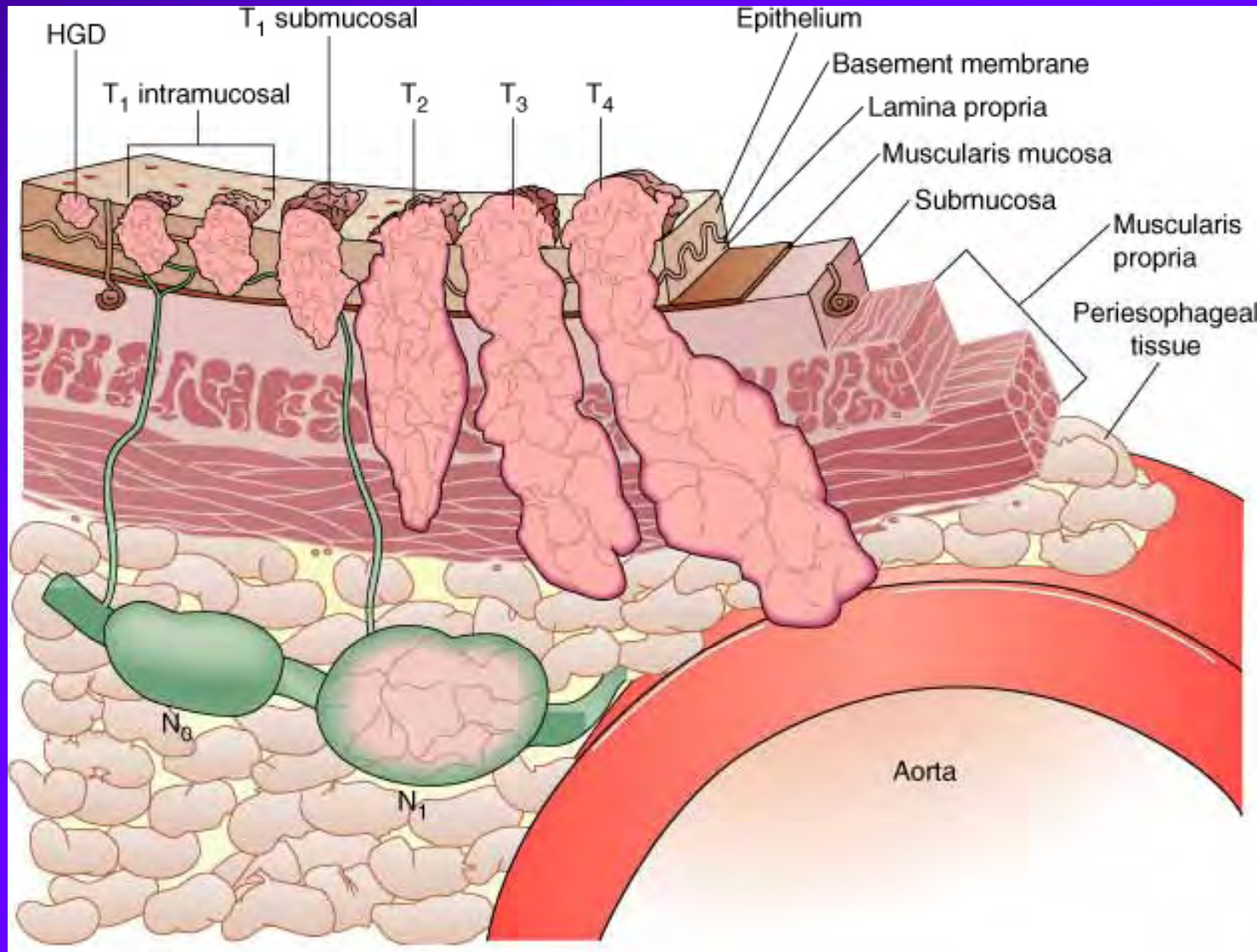
Esophagogastric Anastomosis



www.downstatesurgery.org

How to determine which
procedure?

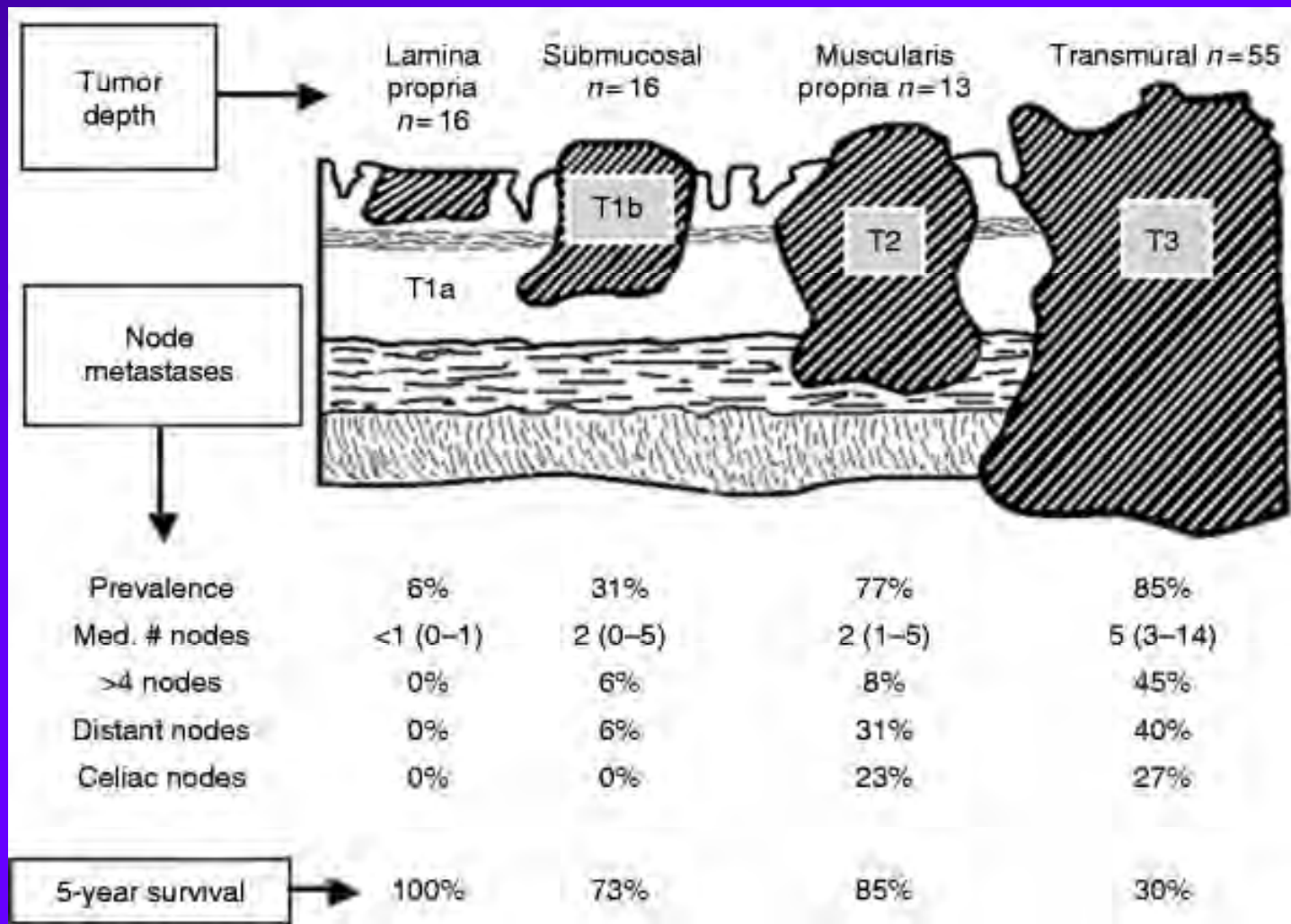
Tumor Depth



Nodal metastasis

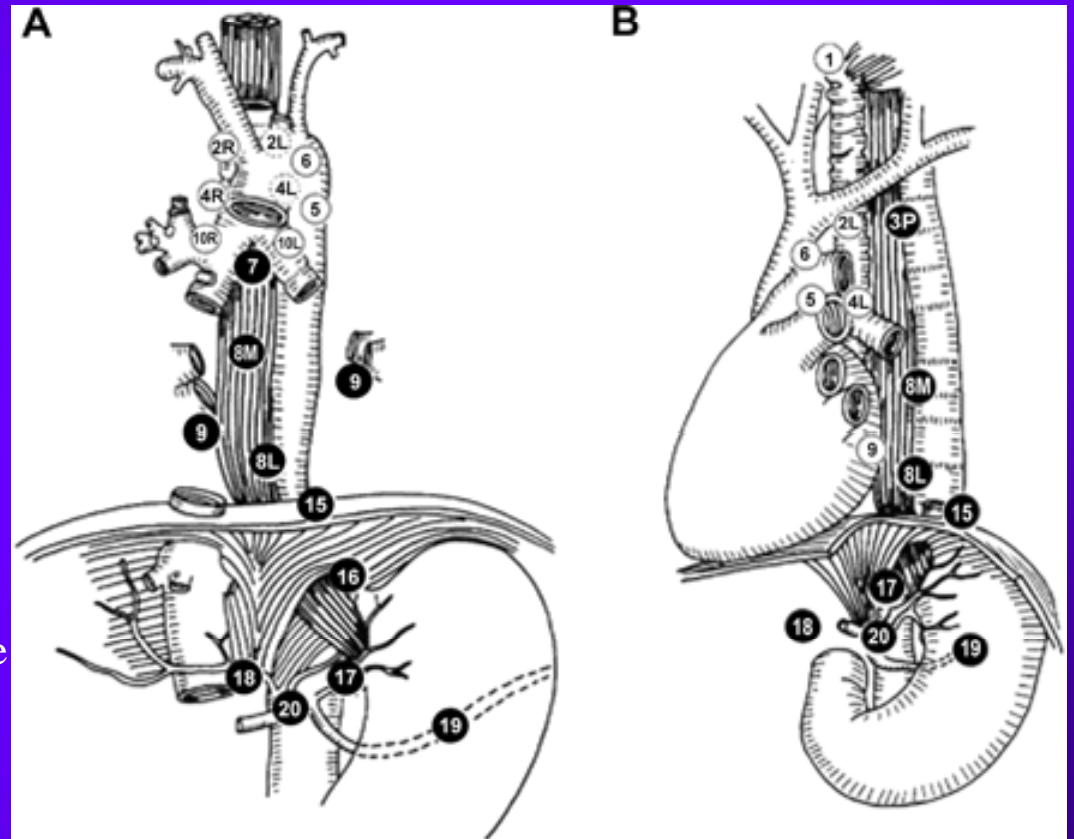
- Exceedingly rare in CA limited to lamina propria
- Increases in incidence w/deeper penetration
 - Recent analysis of 23 pts w/complete lymphadenectomy for intramucosal CA, 1020 LNs examined:
 - 1 LN (0.09%) in 1 pt (4%) detected w/metastasis
 - Lamina propria (0 of 13; 0%)
 - Superficial muscularis mucosa (1 of 10; 10%)

Prevalence of nodal metastases & 5-yr Survival by depth of tumor penetration



AJCC Nodal Staging

- Regional lymph nodes (N)
 - Nx cannot be assessed
 - N0 No regional node metastasis
 - N1 Regional node metastasis
- Distant metastasis (M)
 - Mx cannot be assessed
 - M0 No distant metastasis
 - M1a Celiac or supraclavicular node
 - M1b Nonregional nodal metastasis or distant metastasis



Proposed Modification of Nodal Status in AJCC Staging

➤ Retrospective study: 1027 pts (1970-2005)

➤ **Location** (30%)

➤ Nonregional

➤ Regional:

➤ Celiac: 23%

➤ **Revised nodal status (3yr survival):**

➤ pN0: 0 nodes – 63% (n=496)

➤ pN1: 1-3 nodes – 32% (n=292)

➤ pN2: >3 nodes – 14% (n=222)

➤ pN3: nonregional nodes – 0% (n=17)

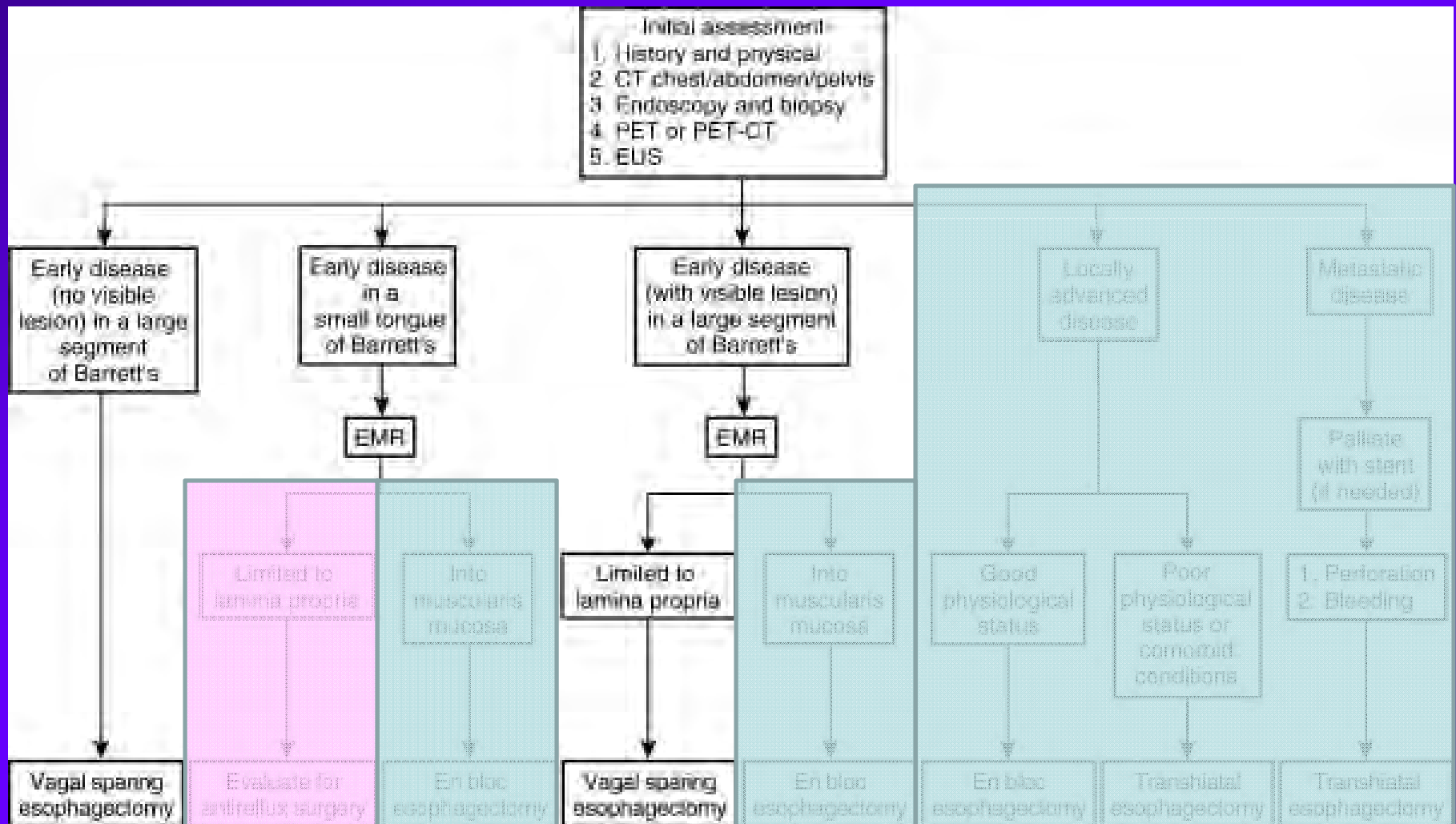
P<0.0001

al):

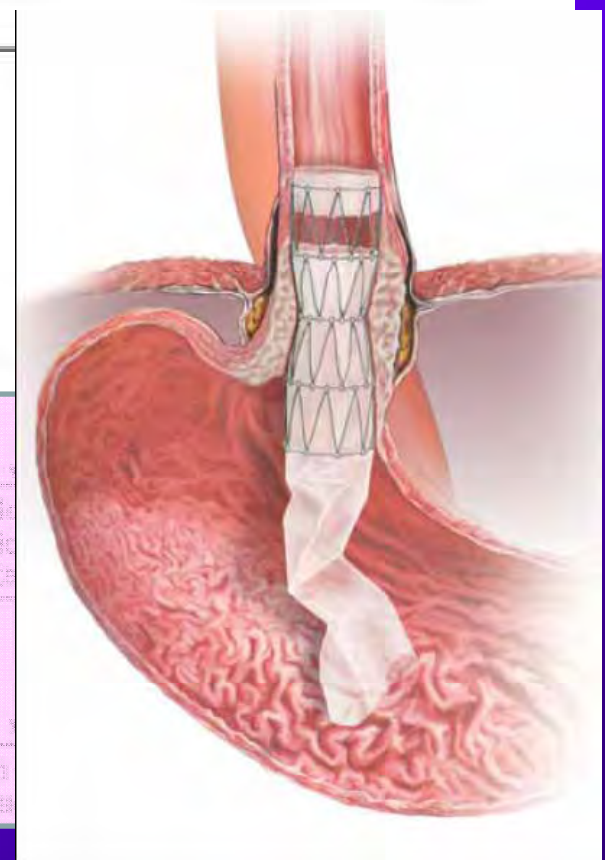
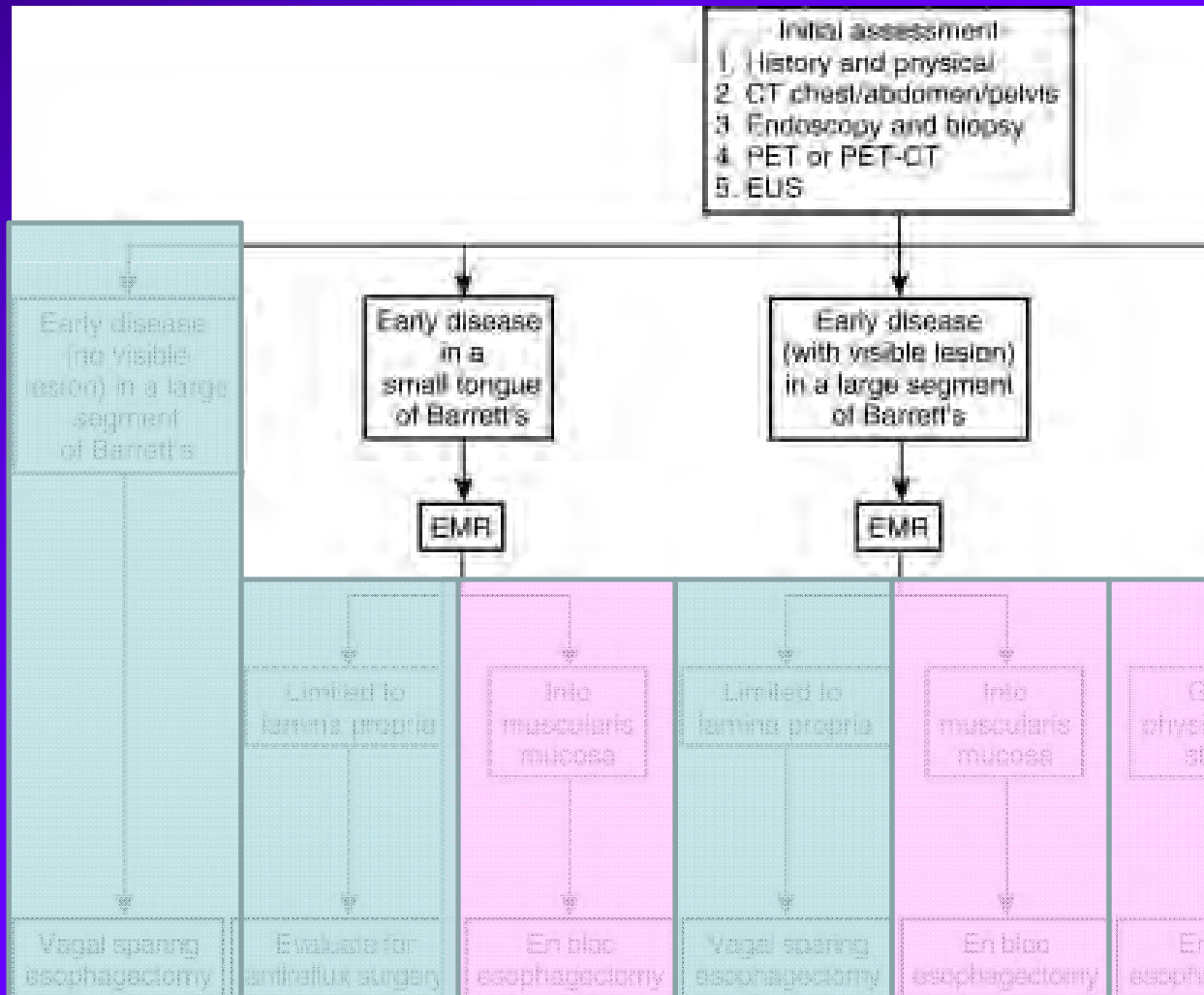
➤ Location & #LNs independent predictors survival

➤ Revised: celiac nodes are regional & includes #LN

Algorithm for Management of Esophageal CA



Algorithm for Management of Esophageal CA



➤ The T and N status of esophageal carcinoma is most accurately assessed by?

- A. Upper gastrointestinal series
- B. Computed tomographic scan of the chest with double contrast
- C. Endoscopic ultrasound (EUS)
- D. Positron emission tomography (PET scan)
- E. Magnetic resonance imaging (MRI)

- Which of the following statements about the incidence, location, and type of esophageal cancer is TRUE?
 - A. The overall rate is decreasing
 - B. Proximal squamous cell lesions are increasing
 - C. Proximal adenocarcinomas are increasing
 - D. Distal adenocarcinomas are increasing
 - E. Distal squamous cell cancers are decreasing

- In a patient without metastatic disease who completes neoadjuvant chemotherapy and radiation therapy, the 5-yr survival after complete resection would be?
 - A. 5%
 - B. 10%
 - C. 35%
 - D. 50%
 - E. 75%

- When mobilizing the stomach in an esophagectomy, which vessel is preserved?
 - A. Left gastric artery
 - B. Short gastric arteries
 - C. Left gastroepiploic artery
 - D. Right gastroepiploic artery

- Substantial mortality from anastomotic leakage
 - A. Transthoracic (Ivor Lewis) esophagectomy
 - B. Transhiatal esophagectomy
 - C. Both
 - D. Neither

Esophagus Ana

- The esophagus is a muscular tube extending from the pharynx to the stomach.
- 4 segments
 - Cervical esophagus
 - From the inferior aspect of the cricoid cartilage to the thoracic inlet (suprasternal notch, ~18 cm from incisors)
 - Thoracic esophagus
 - Upper thoracic
 - Thoracic inlet to level of tracheal bifurcation; 18-23 cm.
 - Mid thoracic
 - Tracheal bifurcation midway to gastroesophageal junction; 24-32 cm.
 - Lower thoracic
 - Midway between tracheal bifurcation and gastroesophageal junction to GE junction, including abdominal esophagus; 32-40 cm.
 - Abdominal
 - Considered part of lower thoracic esophagus; 32-40 cm.

