



Basic Principle for Surgical Treatment of Esophageal Cancer

부산대학교병원 조정수



Contents



- ▶ Surgical indication and guideline
- ▶ Operative method and technical principle



Operative Indication

- ▶ **Complete resection(R0)** is ultimate goal of esophagectomy for cancer
- ▶ **Positive nodal disease** is **not** necessarily a **contraindication** for surgery if the metastatic LNs are **deemed resectable** and within the region of the primary tumor
- ▶ In case of **cN+ and /or cT3-4(transmural tumor extension)**, multimodality treatment plan including **induction chemo±radiotherapy** is commonly used in most centers today.



○ ○ ○ Absolute contraindication for esophagectomy ○ ○ ○

- ▶ Local tumor invasion of non-resectable neighboring structures(T4b)
- ▶ Carcinomatosis peritonei
- ▶ Hematogenous metastases involving solid organs
- ▶ Non-resectable LN metastases



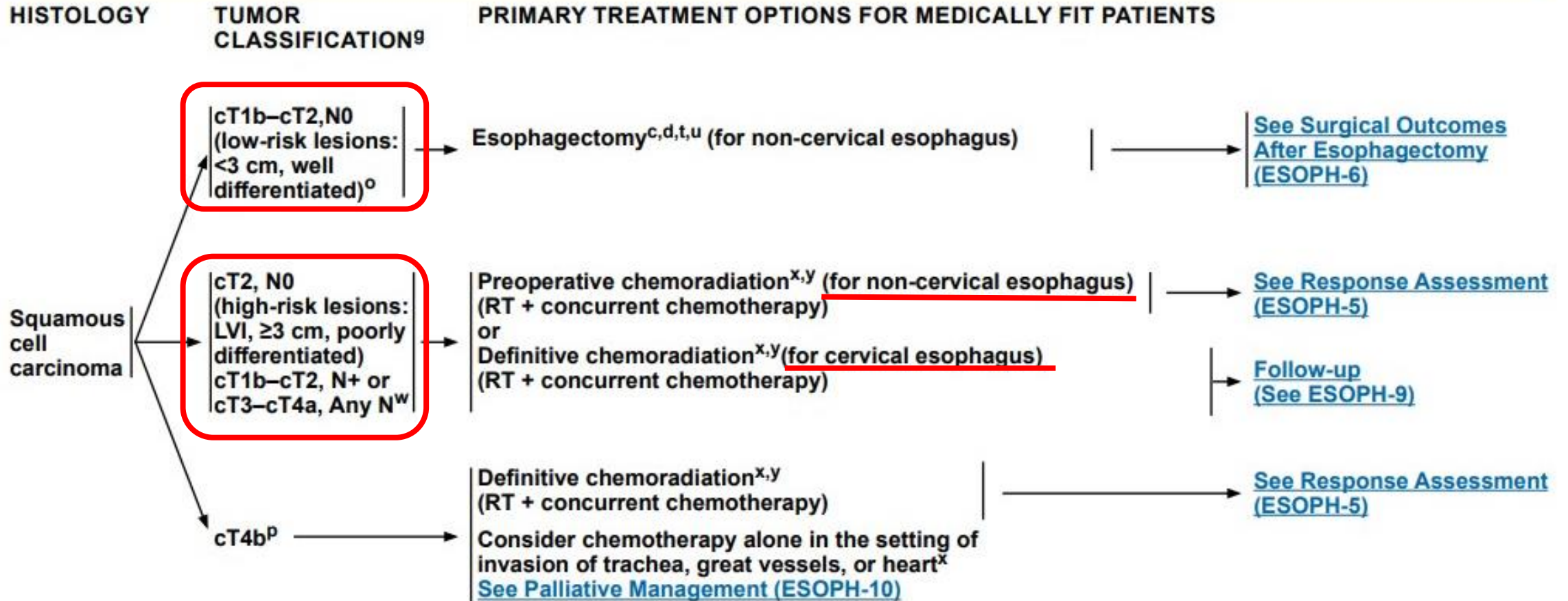
HISTOLOGY	TUMOR CLASSIFICATION ⁹	PRIMARY TREATMENT OPTIONS FOR MEDICALLY FIT PATIENTS	
Squamous cell carcinoma	pTis ^{m,n}	Endoscopic therapies (preferred): • ER ^a • Ablation ^a • ER followed by ablation ^{a,q,r} or <u>Esophagectomy^{c,d,s,t,u}</u>	Endoscopic surveillance See ESOPH-A (4 of 5) See Surgical Outcomes After Esophagectomy (ESOPH-6)
	pT1a ^{m,n}	Endoscopic therapies (preferred): • ER ^a • ER followed by ablation ^{a,q,r} or <u>Esophagectomy^{c,d,s,t,u}</u>	Endoscopic surveillance See ESOPH-A (4 of 5) See Surgical Outcomes After Esophagectomy (ESOPH-6)
	pT1b,N0 ^m	<u>Esophagectomy^{c,d,t,u,v}</u>	See Surgical Outcomes After Esophagectomy (ESOPH-6)
	cT1b–T4a,N0–N+ ^o	See (ESOPH-4)	
	cT4b ^p		

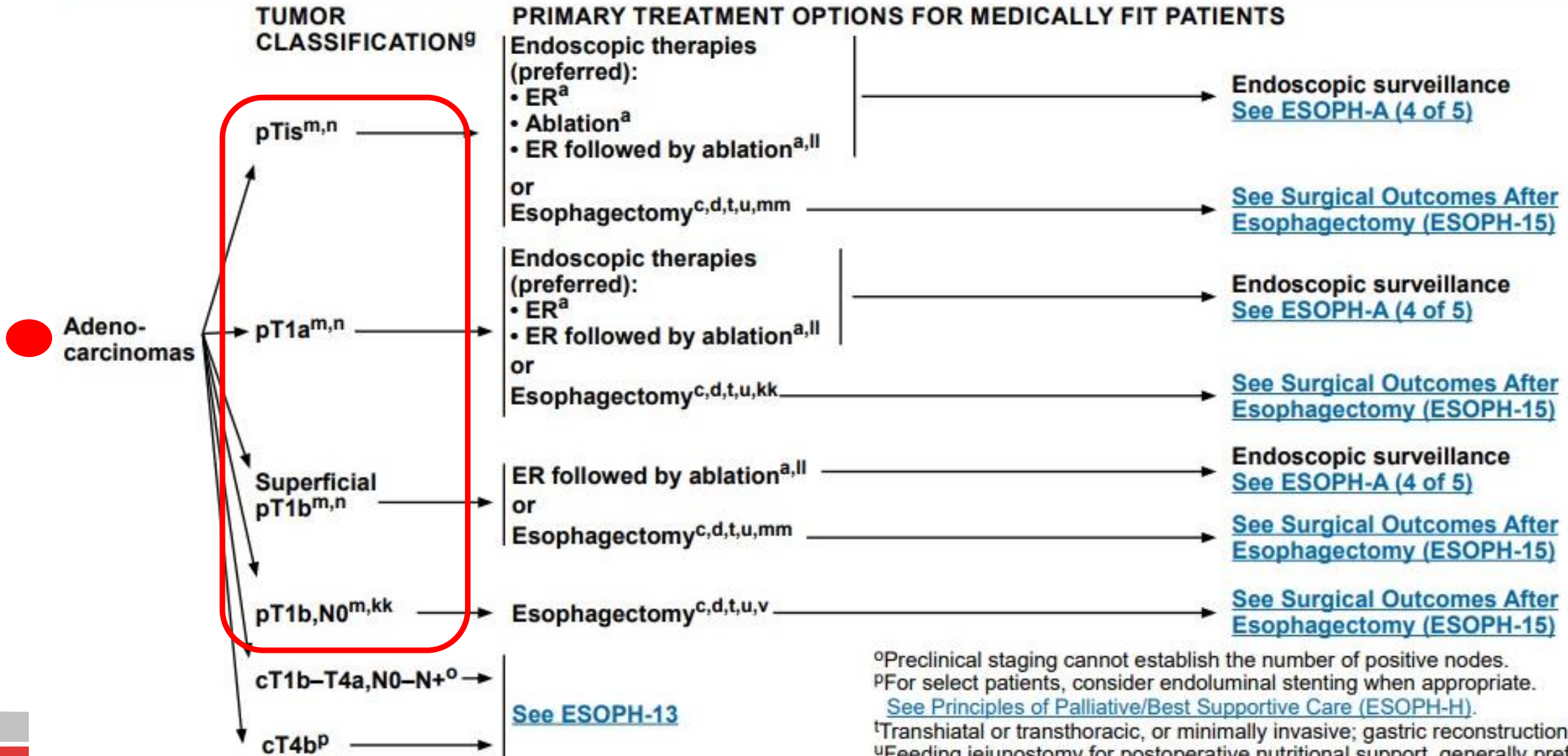
⁹For pTis and pT1a the level of evidence for ablation of SCC after ER is low. However, additional ablation may be needed if there is multifocal high-grade





NCCN Guidelines Version 2.2023 Esophageal and Esophagogastric Junction Cancers





^gPreclinical staging cannot establish the number of positive nodes.

^pFor select patients, consider endoluminal stenting when appropriate.

^h[See Principles of Palliative/Best Supportive Care \(ESOPH-H\)](#).

^tTranshiatal or transthoracic, or minimally invasive; gastric reconstruction preferred.

^uFeeding jejunostomy for postoperative nutritional support, generally preferred.



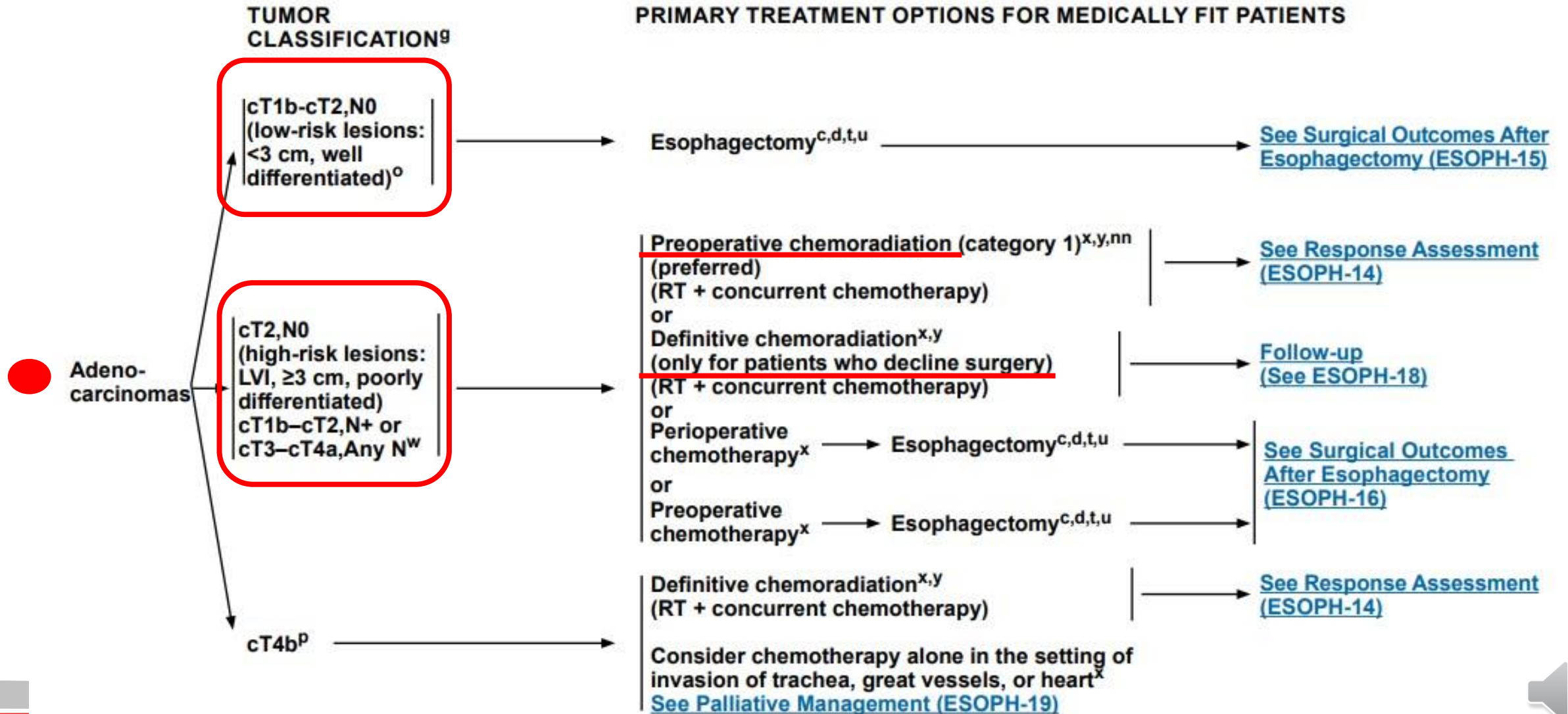
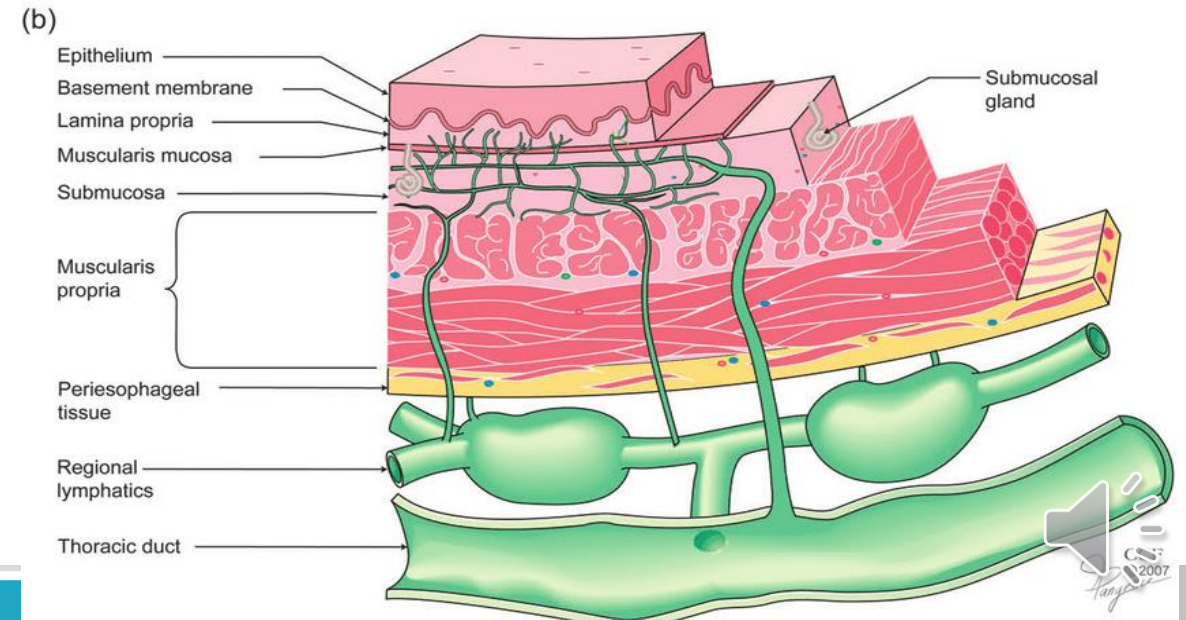
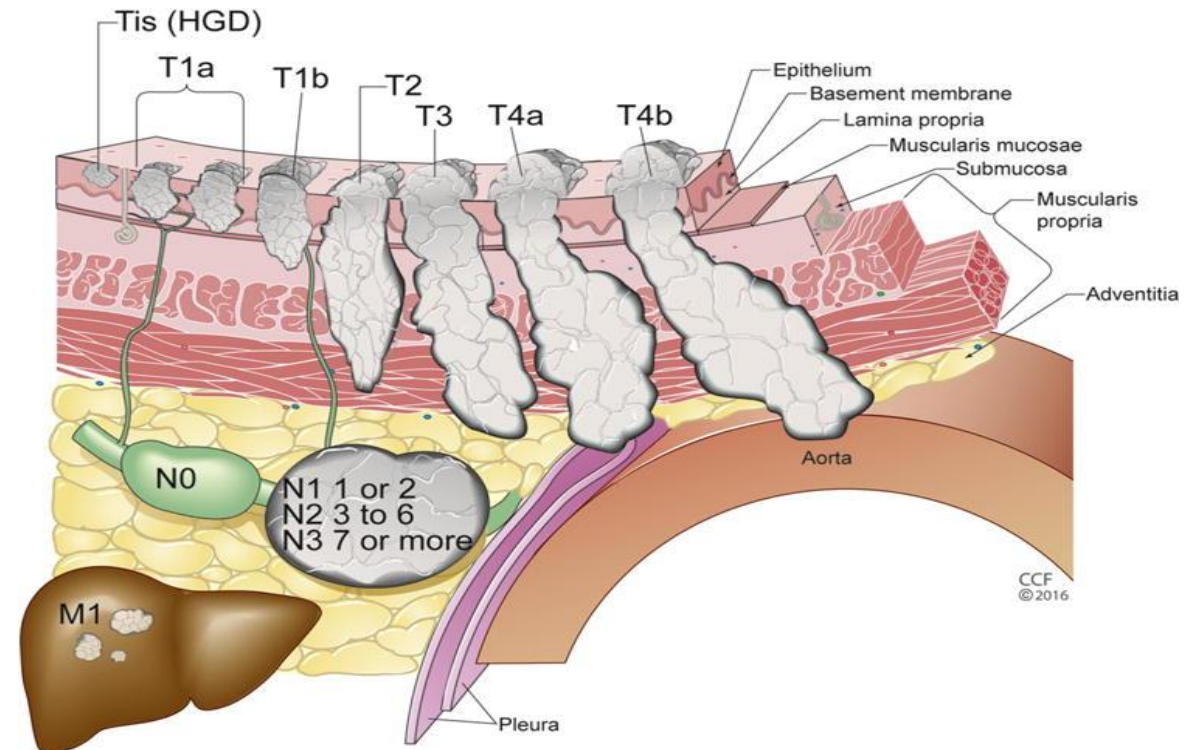


Table 1. Definitions for T, N, M

T	Primary Tumor
TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Tis	High-grade dysplasia, defined as malignant cells confined to the epithelium by the basement membrane
T1	Tumor invades the lamina propria, muscularis mucosae, or submucosa
T1a	Tumor invades the lamina propria or muscularis mucosae
T1b	Tumor invades the submucosa
T2	Tumor invades the muscularis propria
T3	Tumor invades adventitia
T4	Tumor invades adjacent structures
T4a	Tumor invades the pleura, pericardium, azygos vein, diaphragm, or peritoneum
T4b	Tumor invades other adjacent structures, such as the aorta, vertebral body, or airway
N	Regional Lymph Nodes
NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	Metastasis in one or two regional lymph nodes
N2	Metastasis in three to six regional lymph nodes
N3	Metastasis in seven or more regional lymph nodes



Operative method and technical principle

- ▶ Extent of operation
 - ▶ Standard resection
 - ▶ En bloc resection
- ▶ Acceptable LN dissection
 - ▶ Without induction chemoradiation, at least 15 LNs should be removed and assessed to achieve adequate nodal staging
 - ▶ After induction chemoradiation, optimal number of dissected LNs is unknown, although similar LN resection is recommended

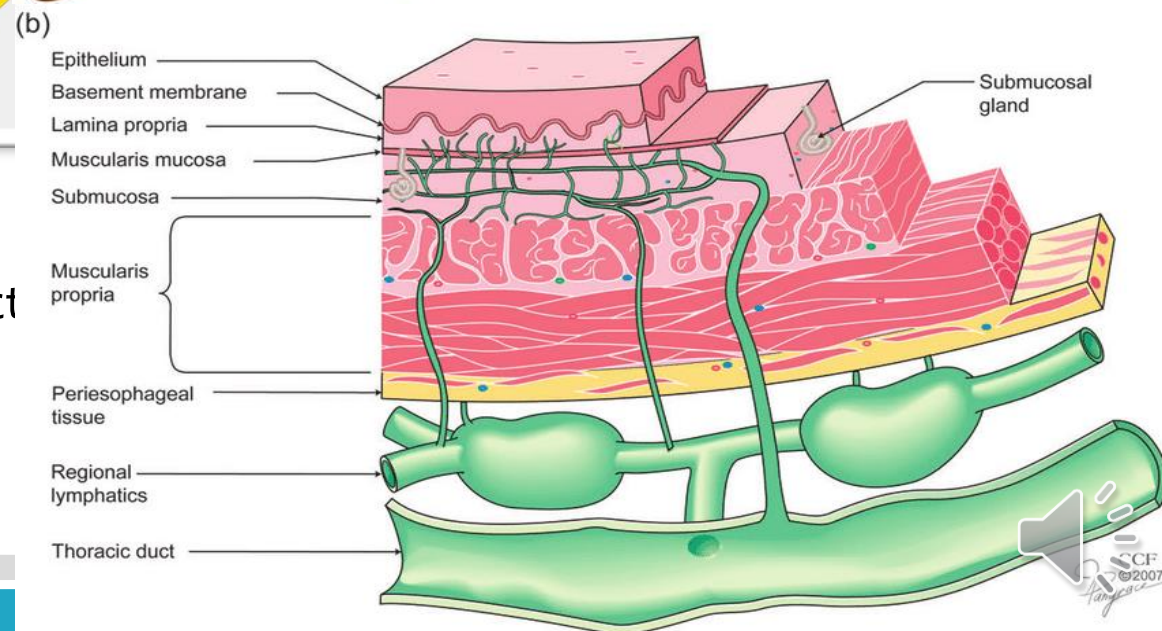
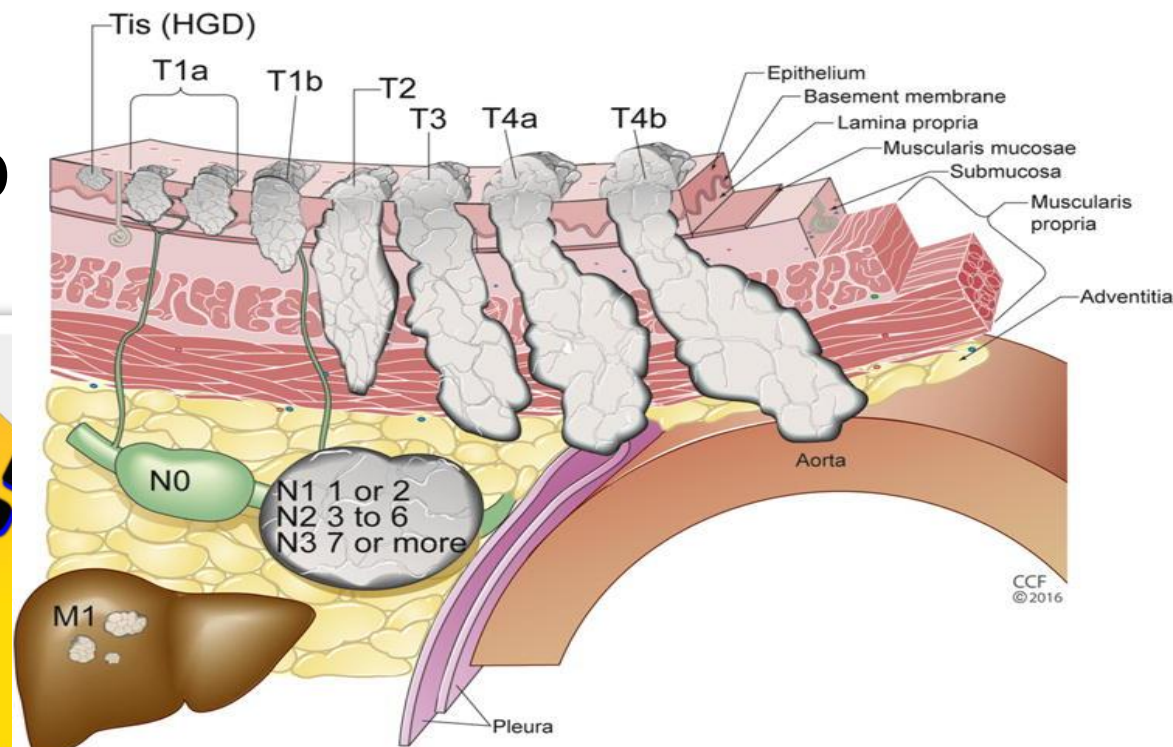
Operative method princip

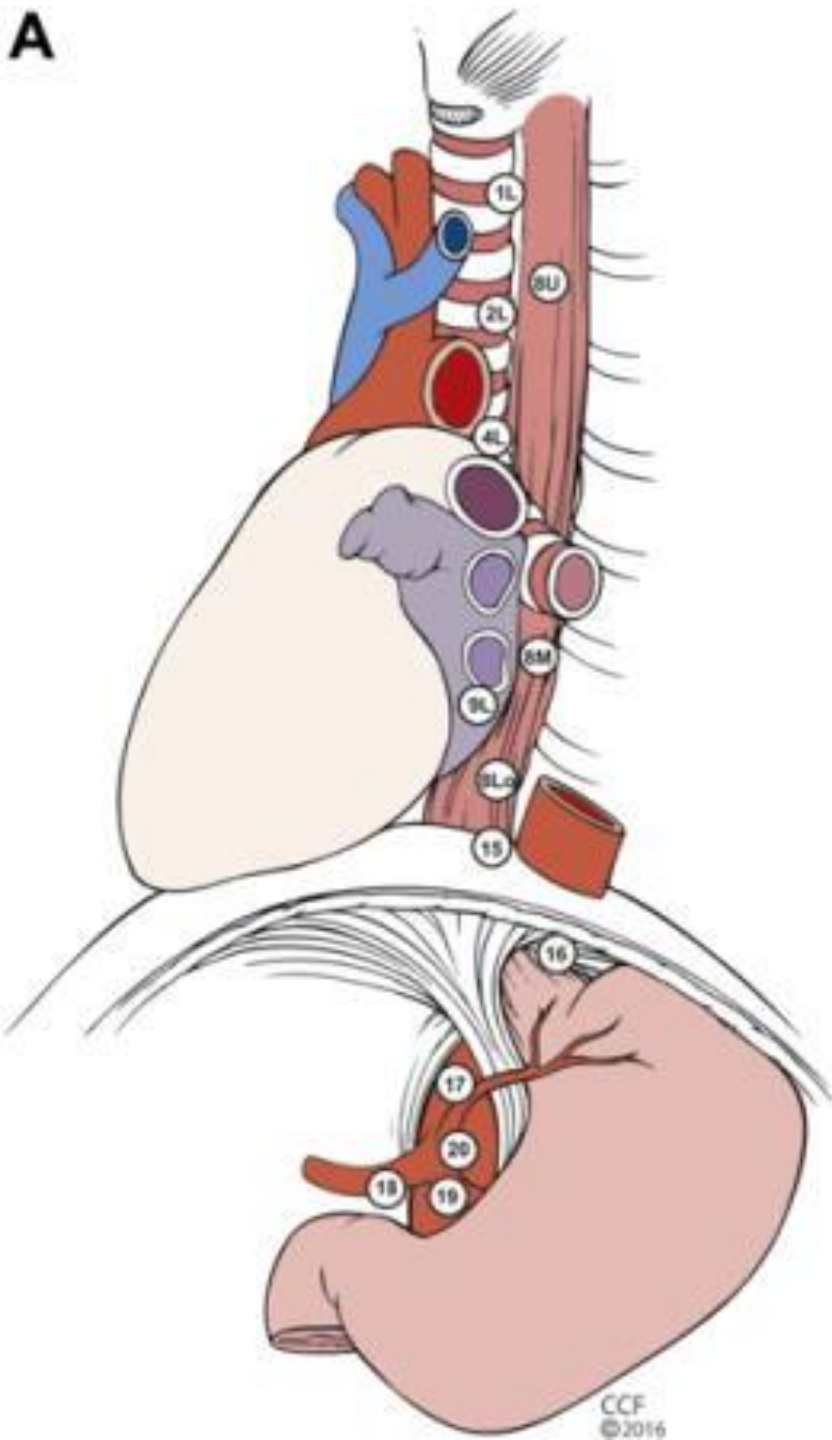
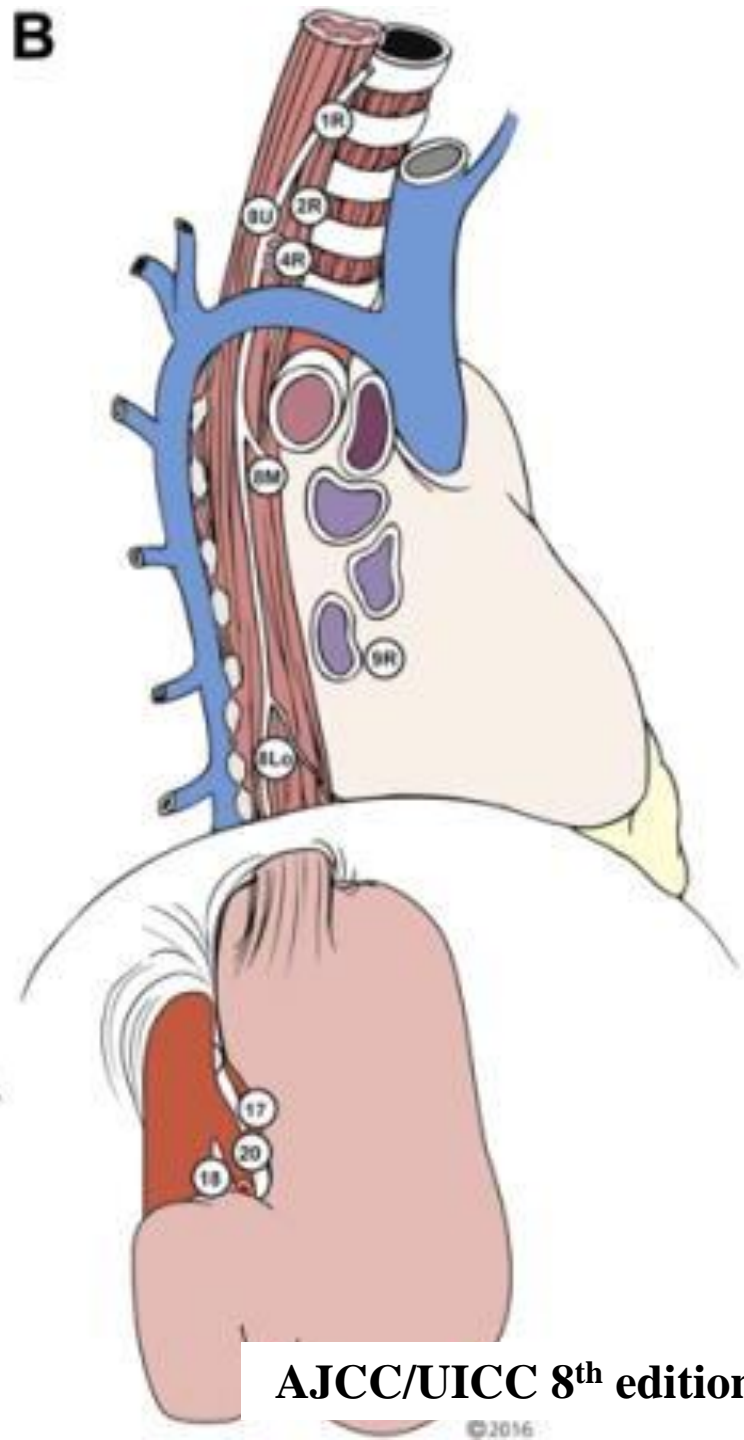
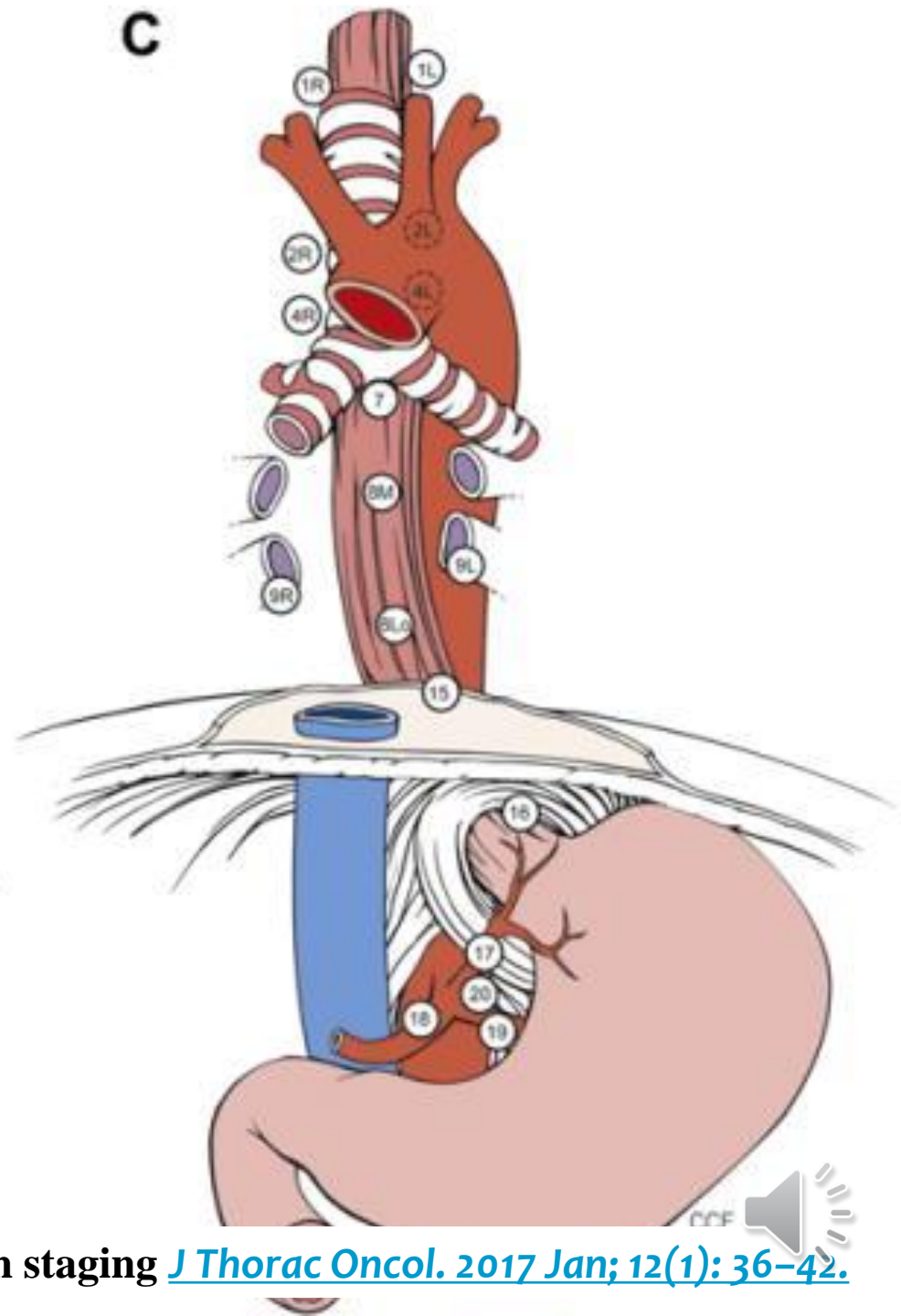
▶ Standard resection

- ▶ All periesophageal tiss
- ▶ Paratracheal LNs

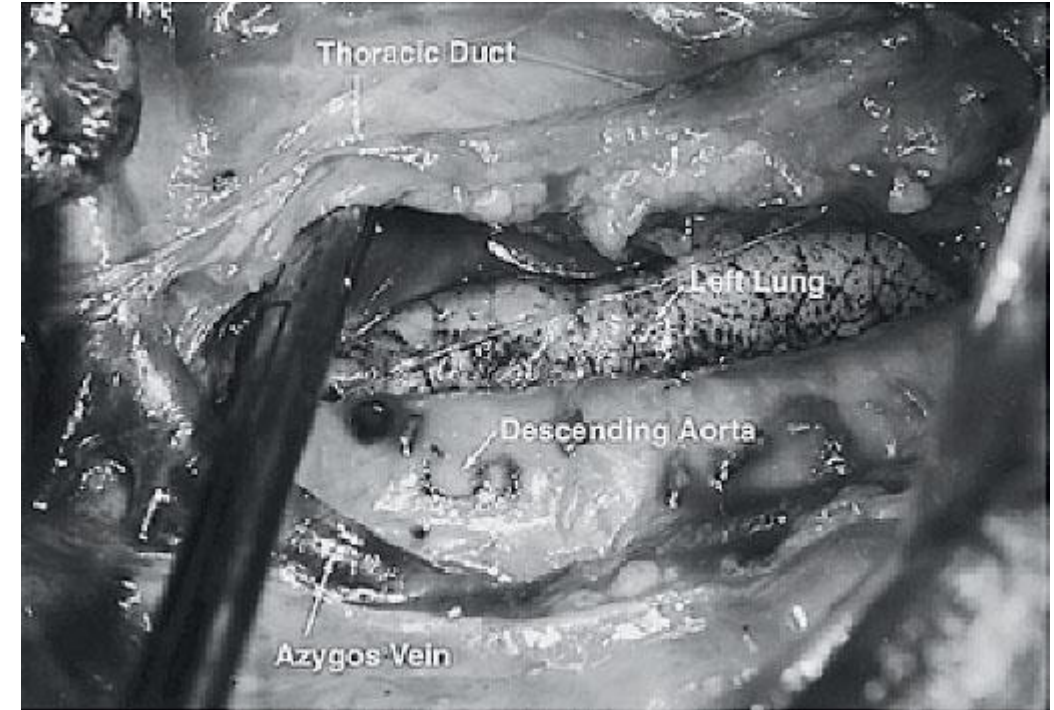
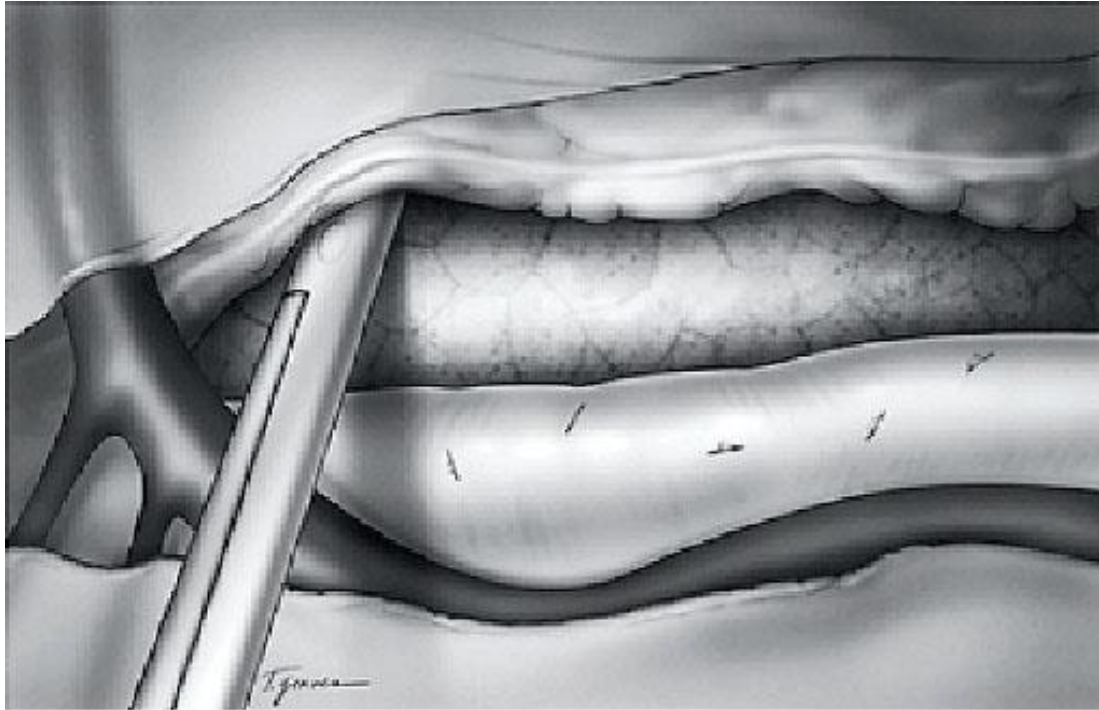
▶ En bloc resection

- ▶ Extensive en bloc resecti
- ▶ Radical en bloc resection
 - ▶ En bloc resection with extensive lymphadenect
 - ▶ Two field and three field LN dissection

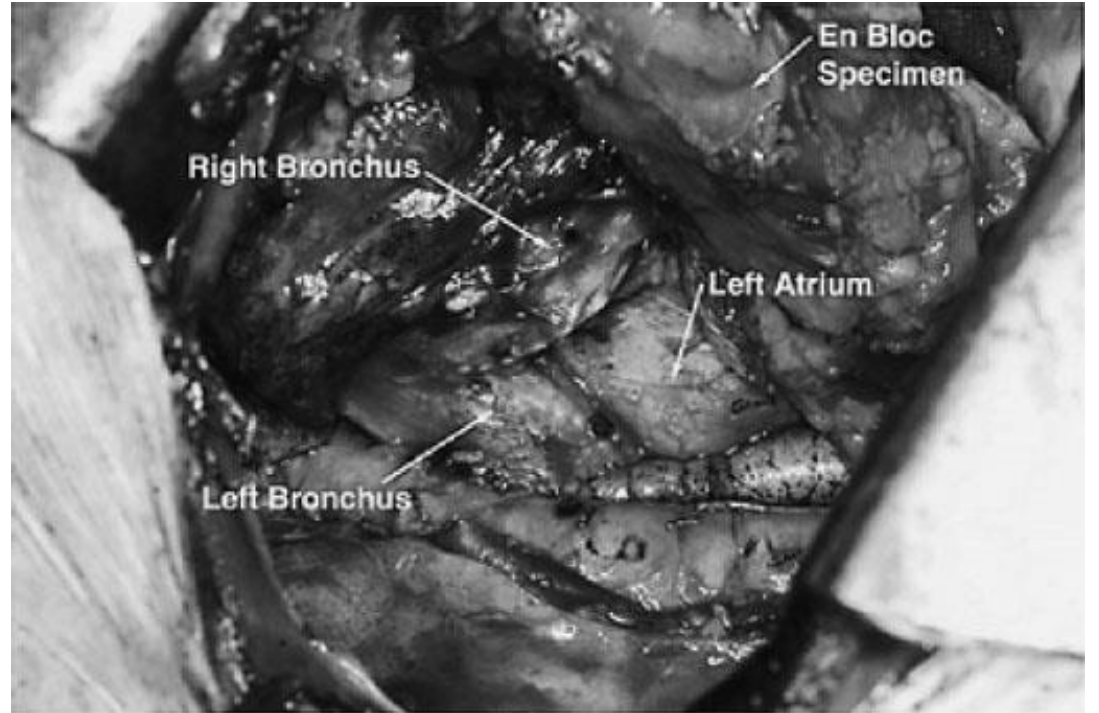
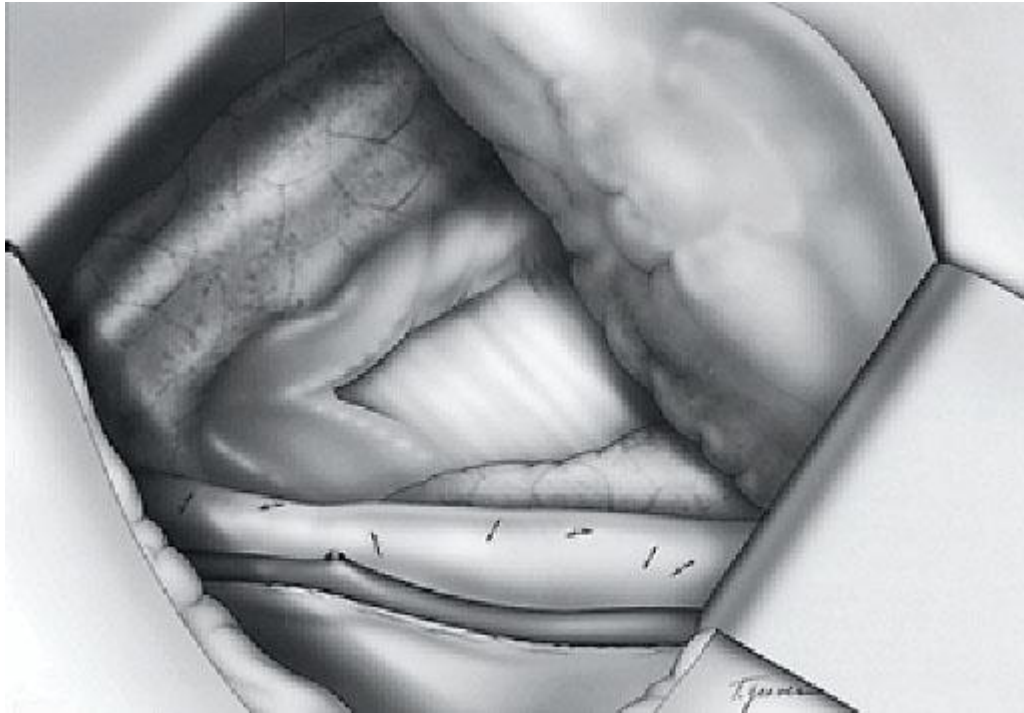


A**B****C**

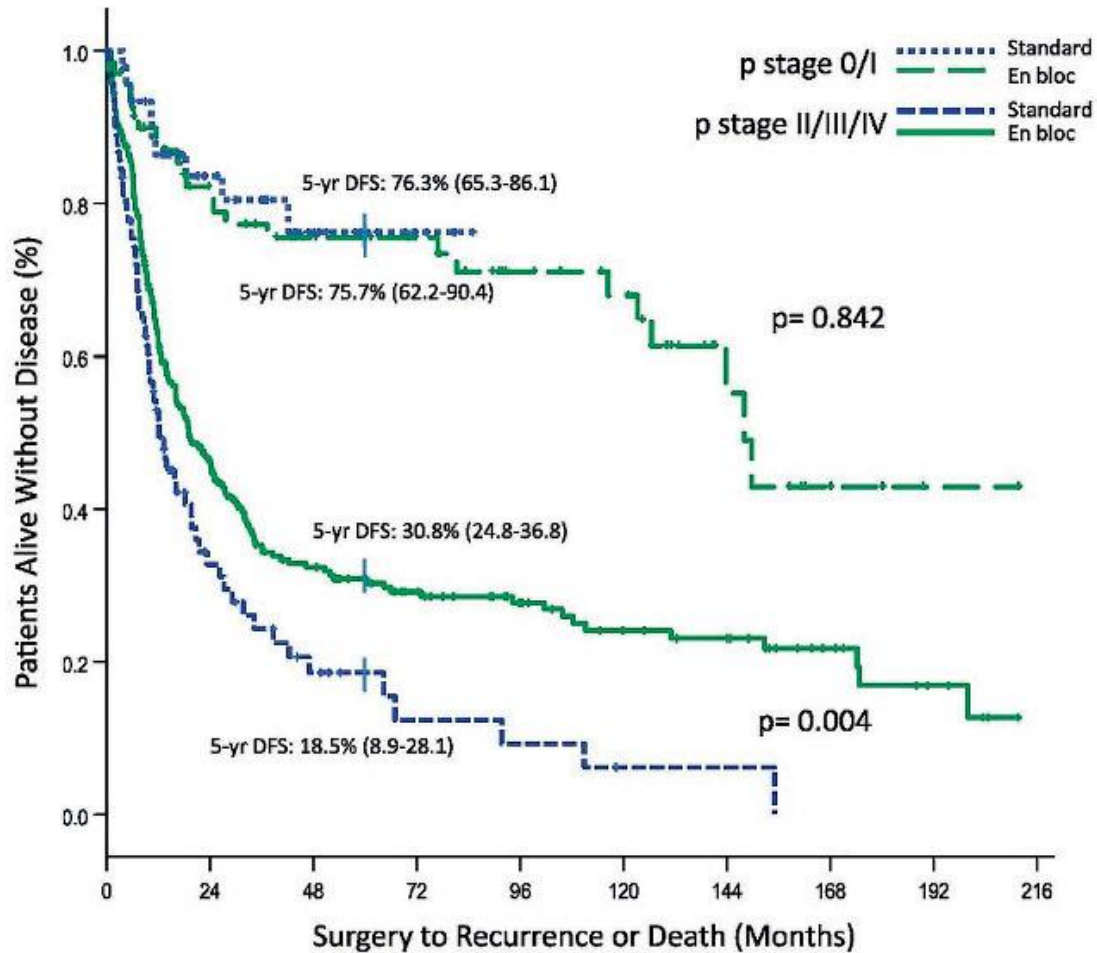
○ En bloc resection



○ En bloc resection



En bloc resection



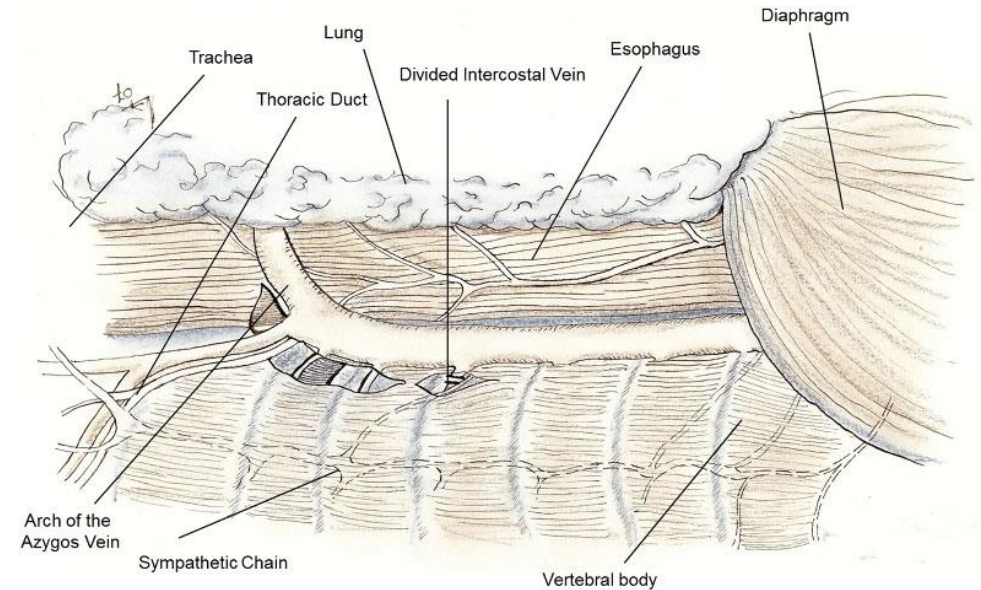
- ▶ Lee PC, Mirza FM, Port JL, et al. **Predictors of recurrence and disease-free survival in patients with completely resected esophageal carcinoma.** J Thorac Cardiovasc Surg 2011;141(5):1196–1206.
- ▶ 465 patients with completely resected esophageal cancer in the
- ▶ 328 patients (70%) underwent en bloc resection (two-field in 199 patients and three-field in 129 patients)



Operative methods and technical principles

▶ Operative approaches

- ▶ Transthoracic esophagectomy
- ▶ Minimally invasive esophagectomy
- ▶ Transhiatal esophagectomy



Transhiatal esophagectomy

▶ Indication

- ▶ When transthoracic esophagectomy is impossible
- ▶ the esophagus be externally normal in the region of blunt dissection, especially from the distal trachea into the subcarinal region (5-10cm)
- ▶ Hemodynamic stable

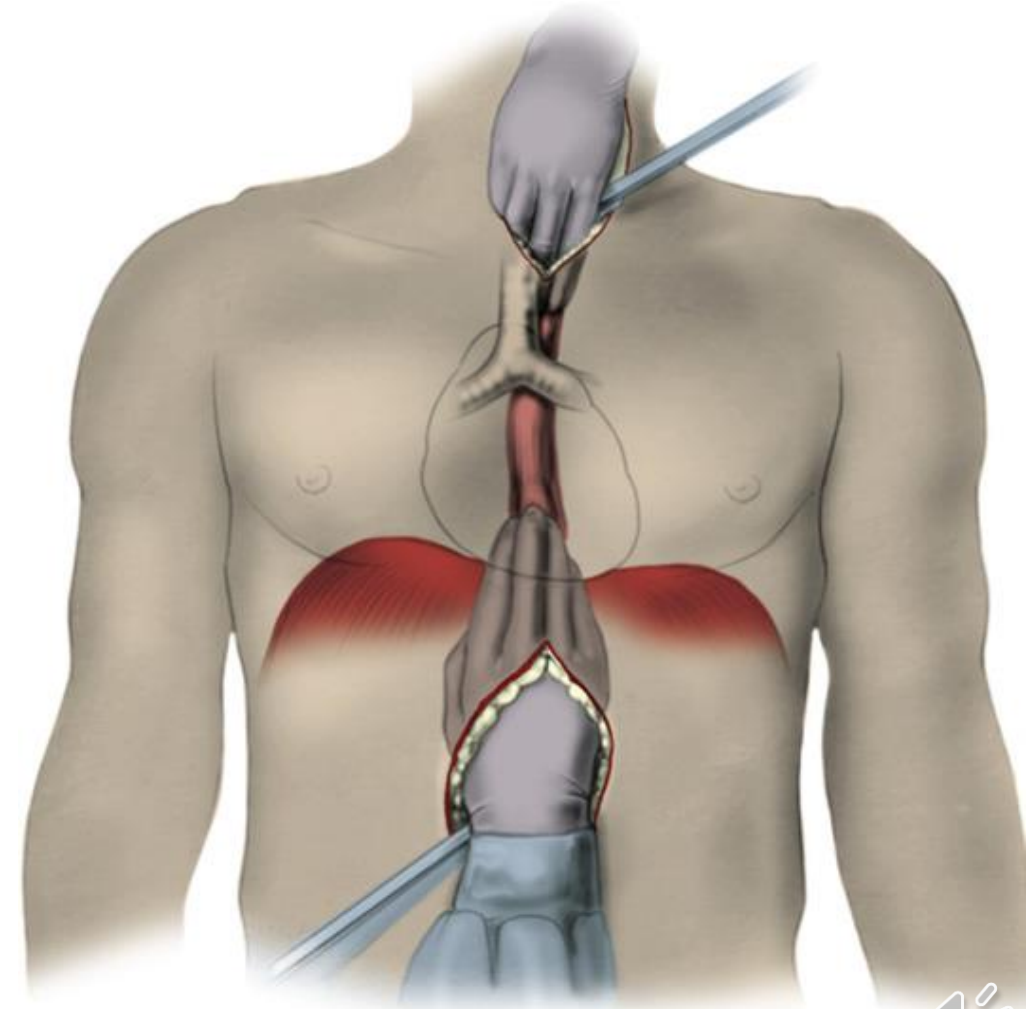
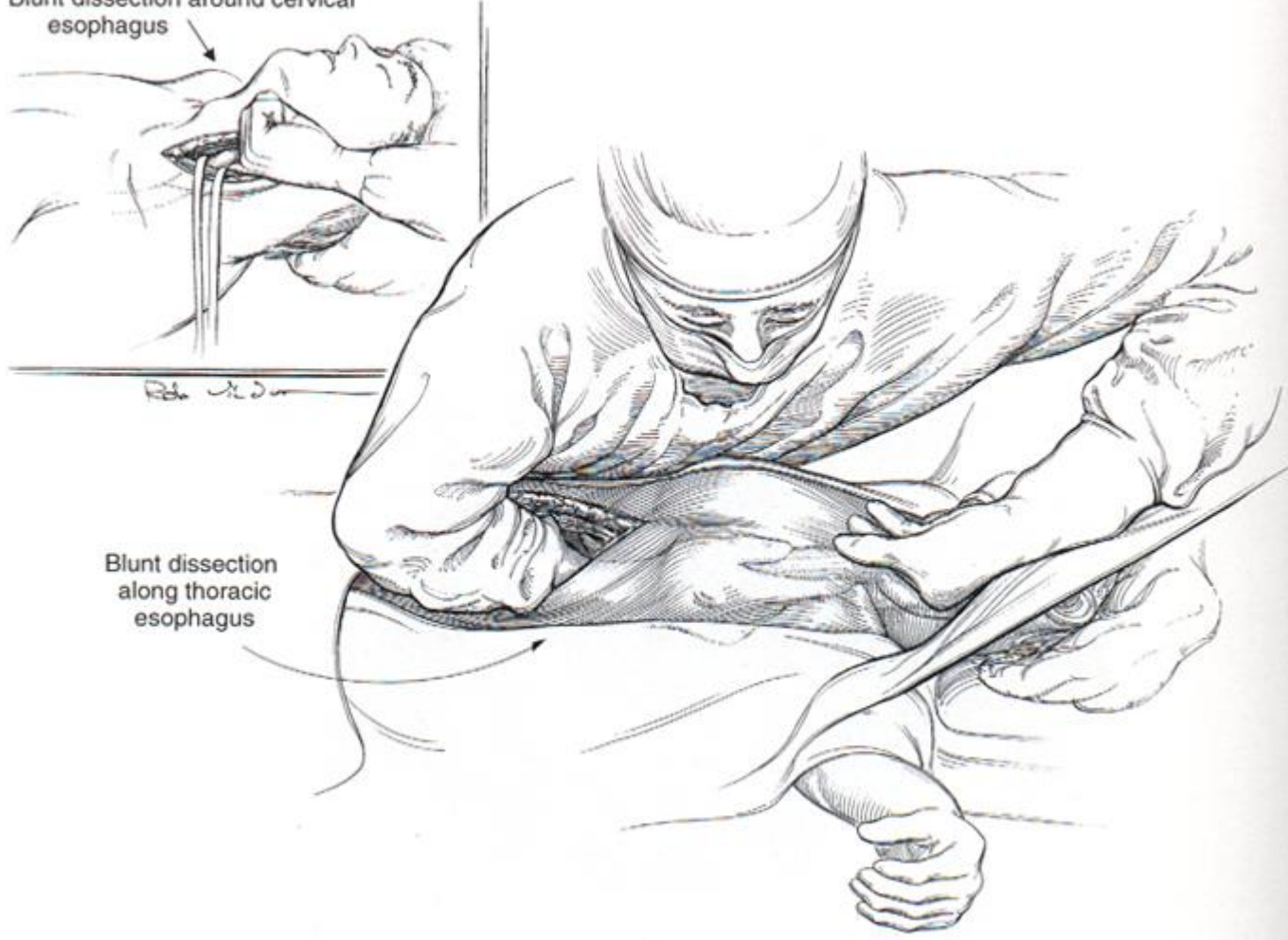
▶ Limitation

- ▶ Oncological unsafe
- ▶ Major bleeding from larger vessel injury
- ▶ Blind procedure



Transhiatal esophagectomy

Blunt dissection around cervical esophagus



Alternative Conduits for Replacement of the Esophagus

- ▶ Gastric (preferred)
- ▶ Colon
- ▶ Jejunum





Gastric conduit

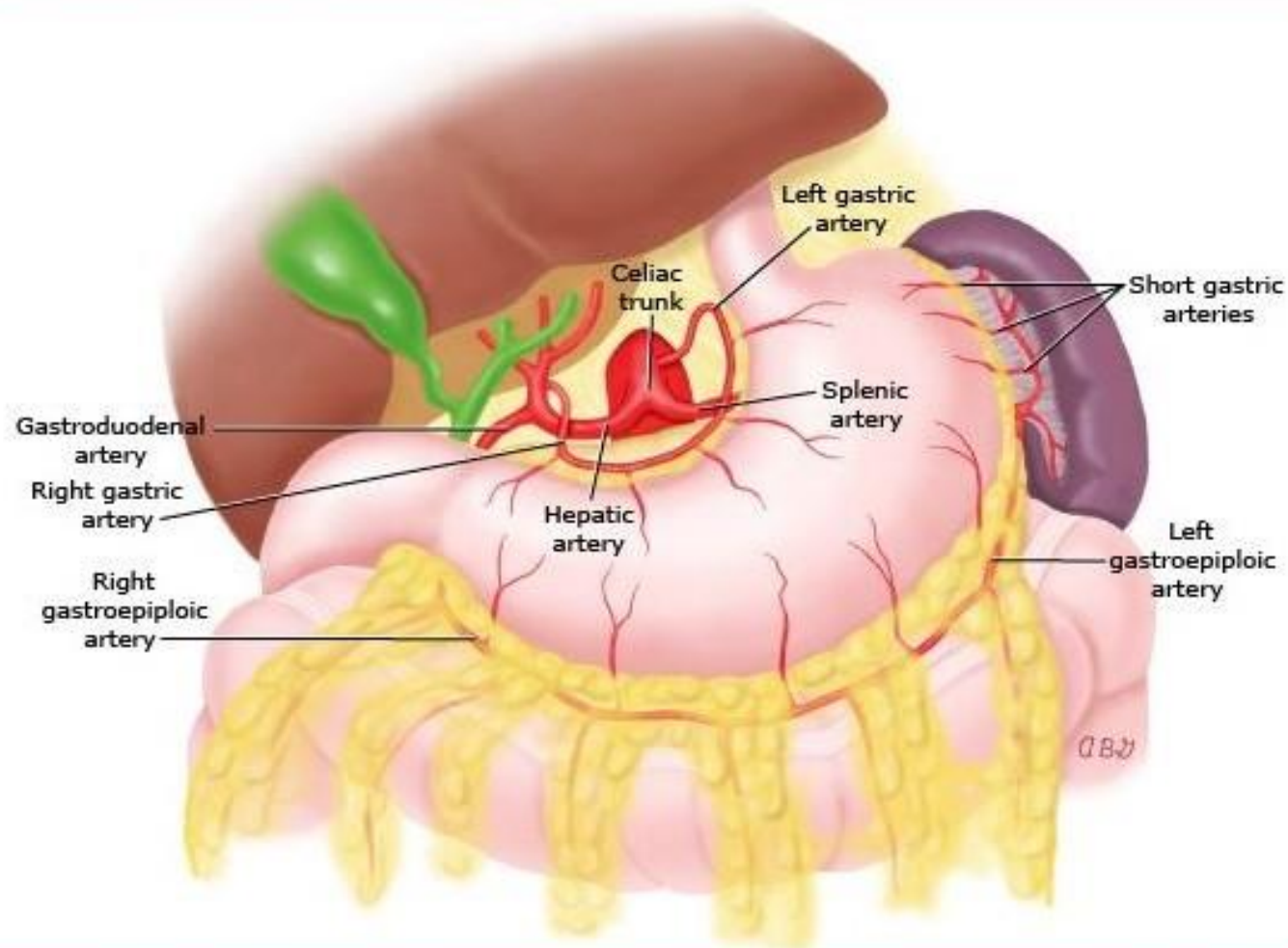


- ▶ Gastric mobilization with/without tubulization
- ▶ Esophagogastrostomy
 - ▶ Cervical anastomosis vs thoracic anastomosis
 - ▶ Hand-sewing and stapling (circular vs linear)

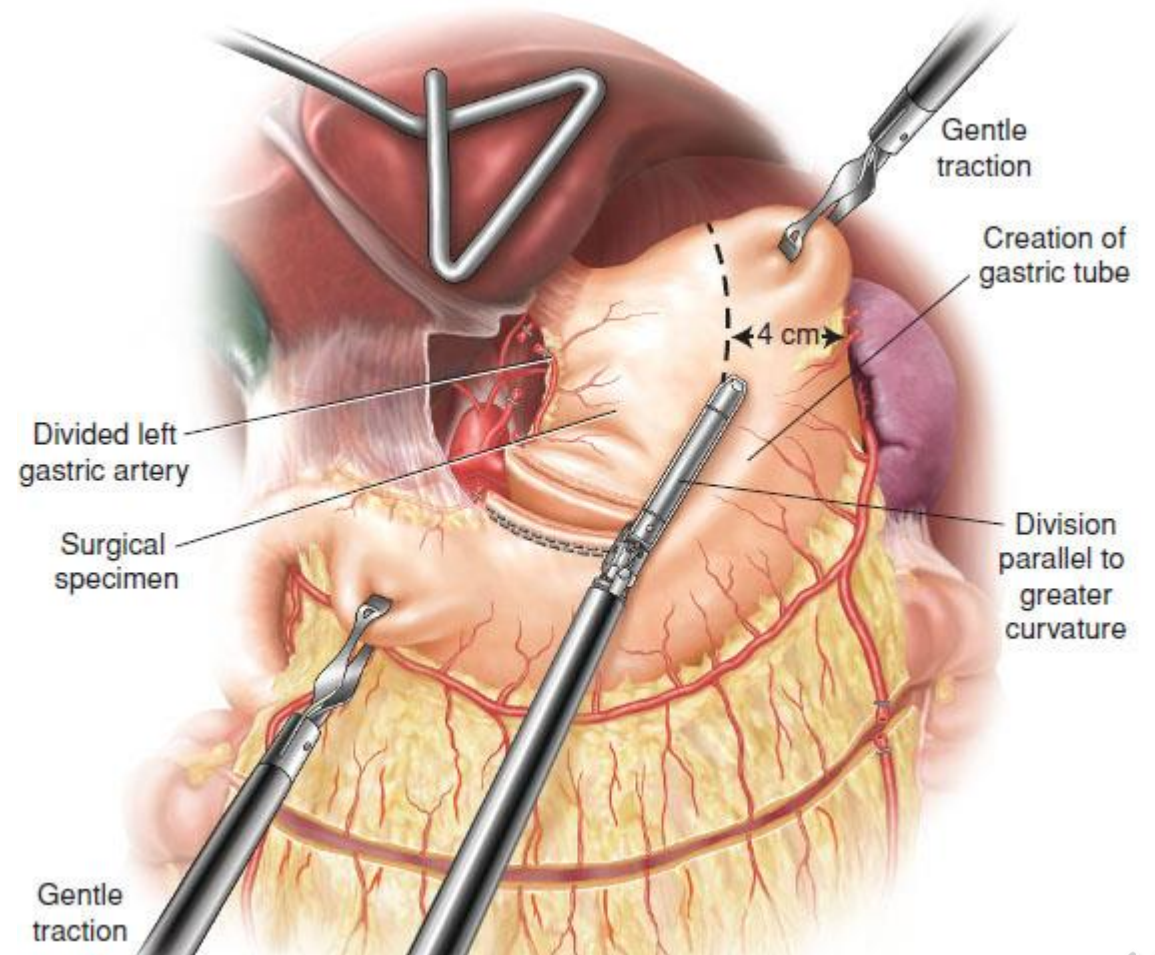
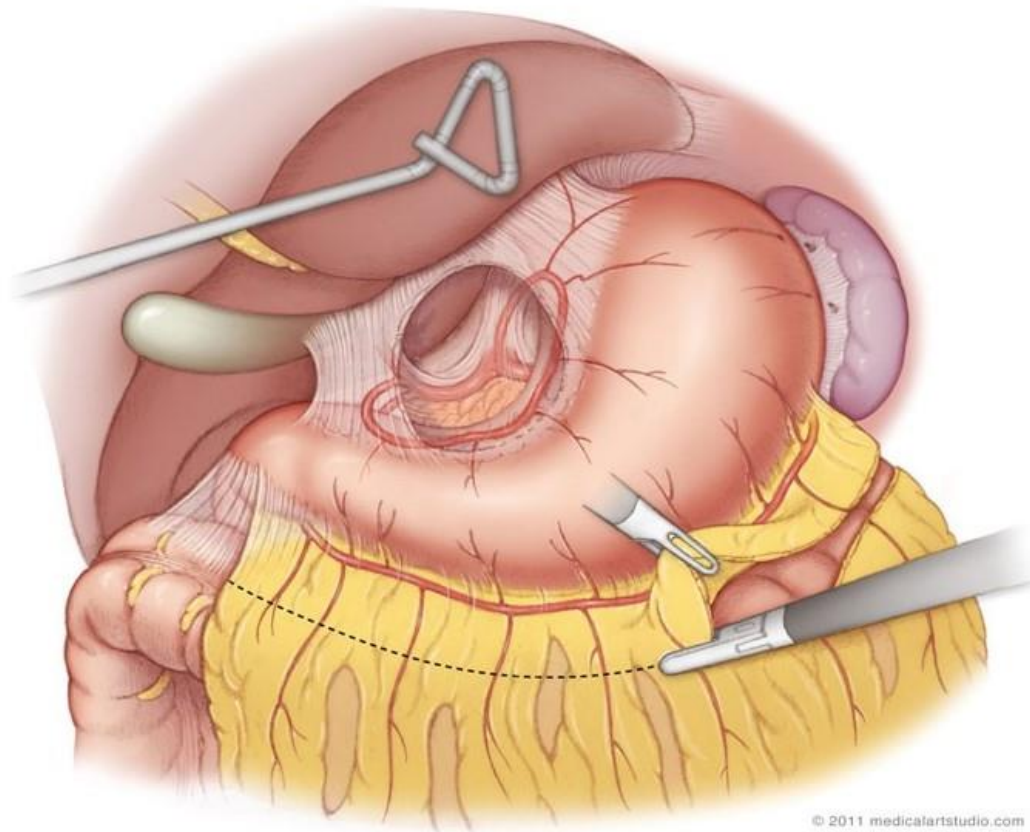


Gastric mobilization with/without tubulization

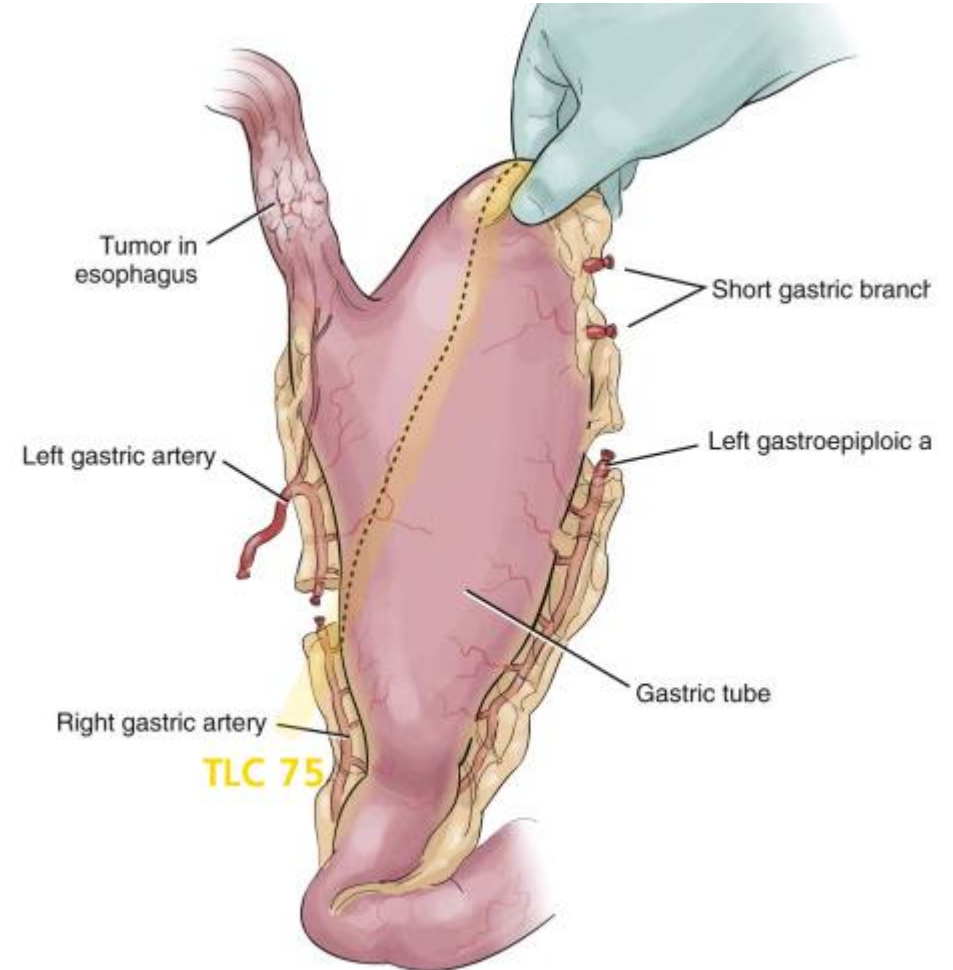
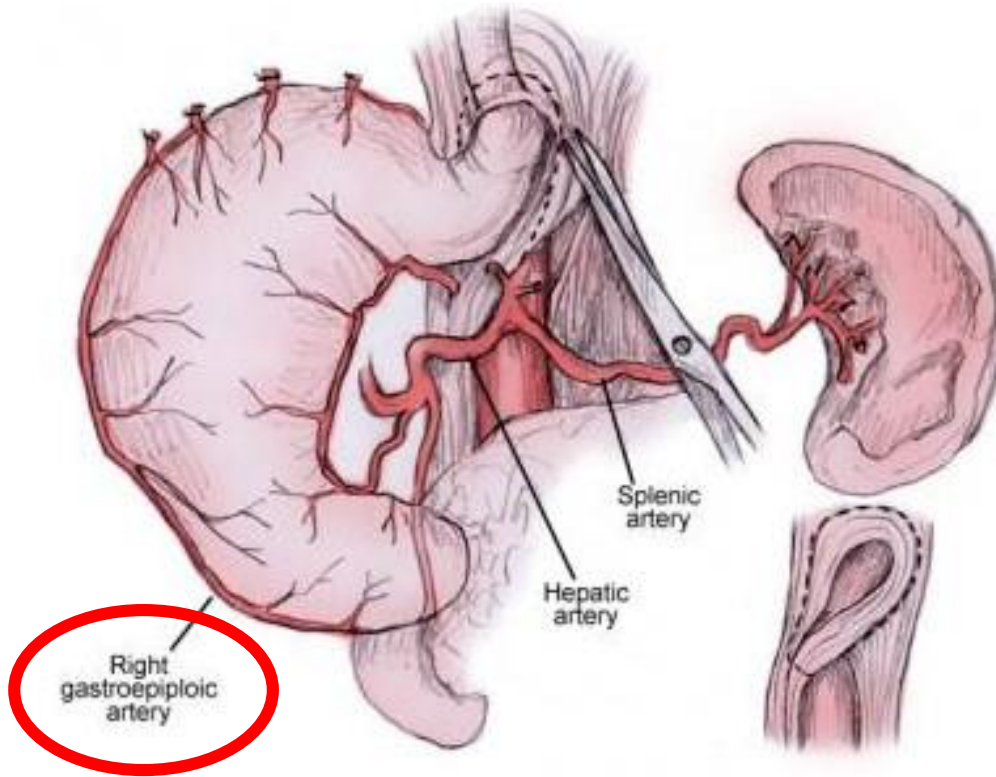
Anatomy of the stomach



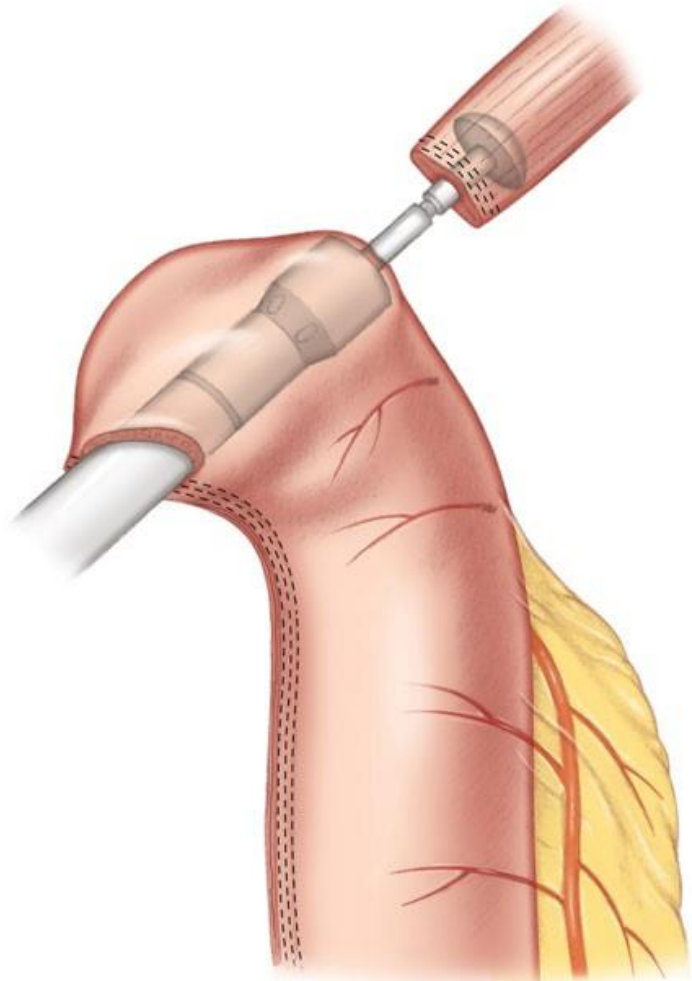
Gastric mobilization with/without tubulization



Gastric mobilization with/without tubulization



○ ○ ○ Esophagogastrostomy – circular staple ○ ○ ○



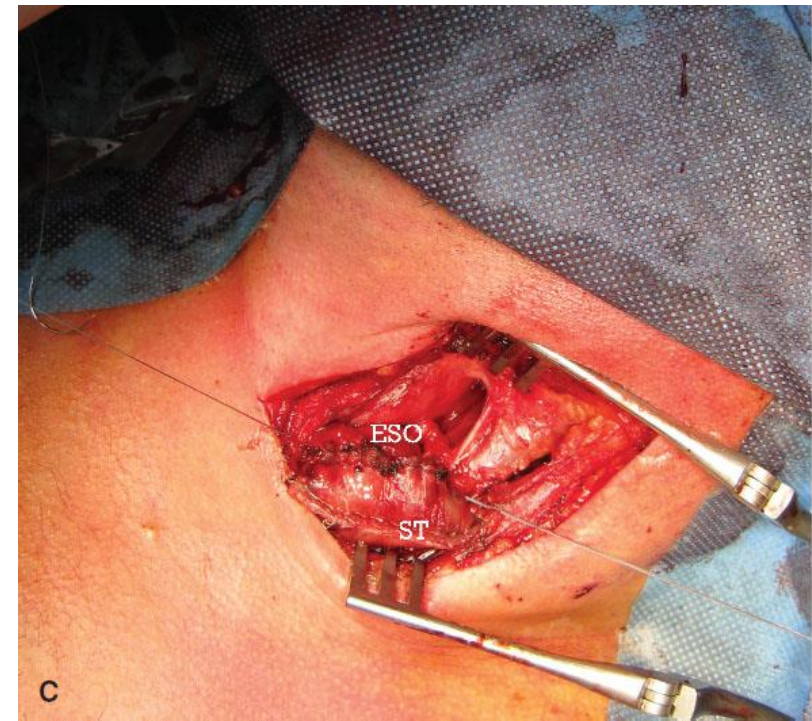
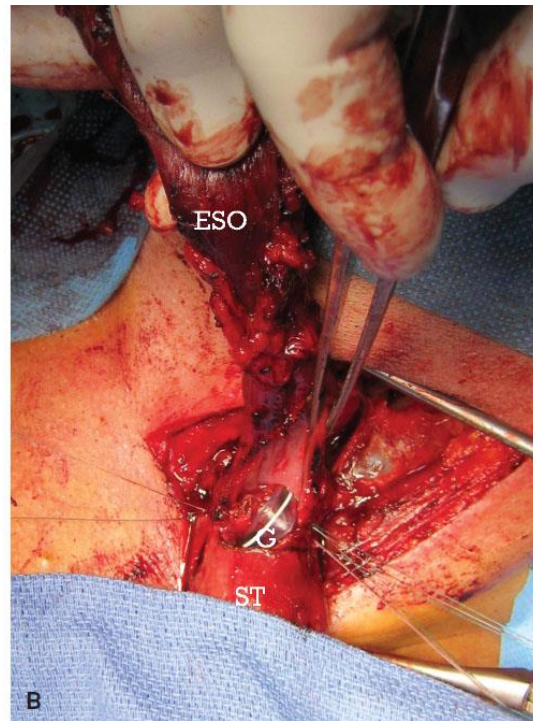
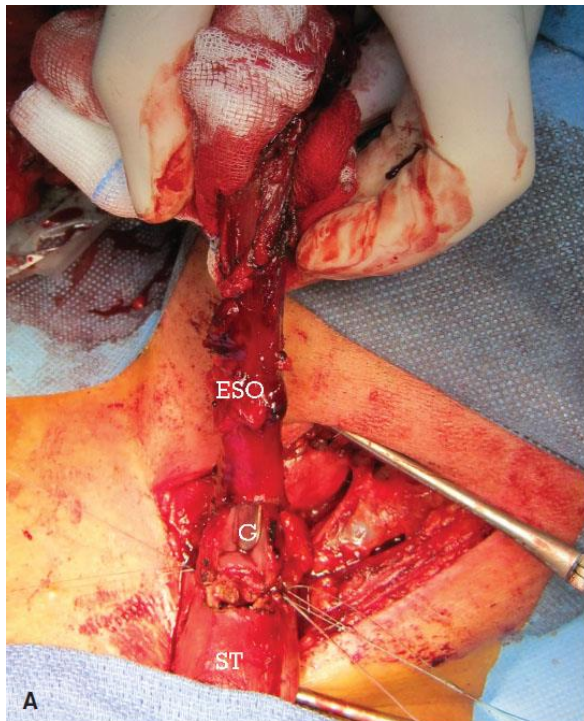
© 2011 medicalartstudio.com

- ▶ Decision of optimal diameter
- ▶ No tension
- ▶ No mucosal slip
 - : affects stricture, leakage and other anastomotic complication

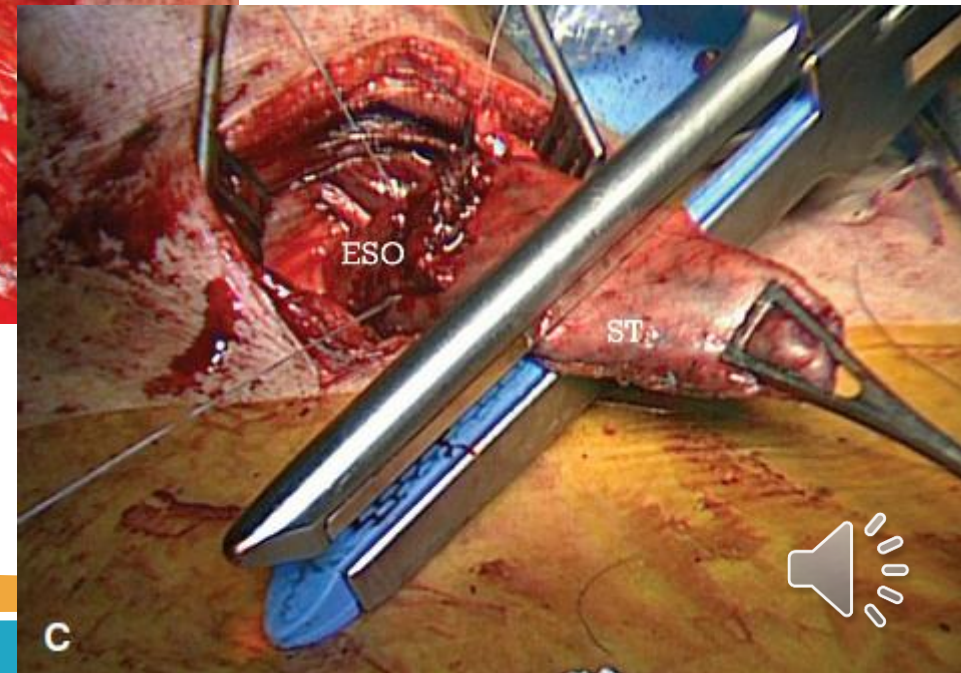
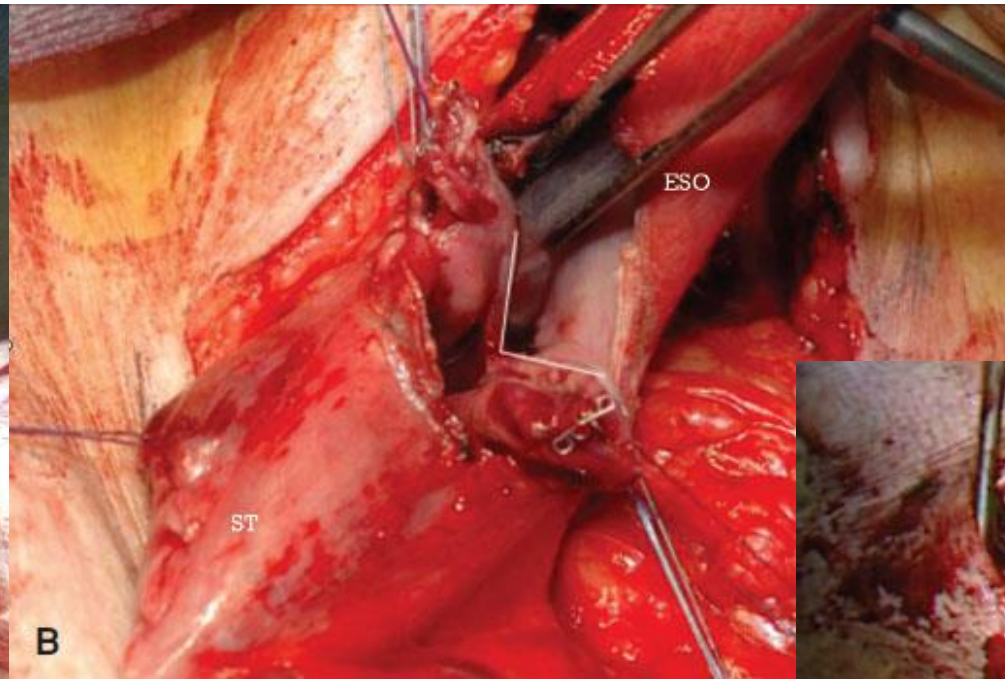
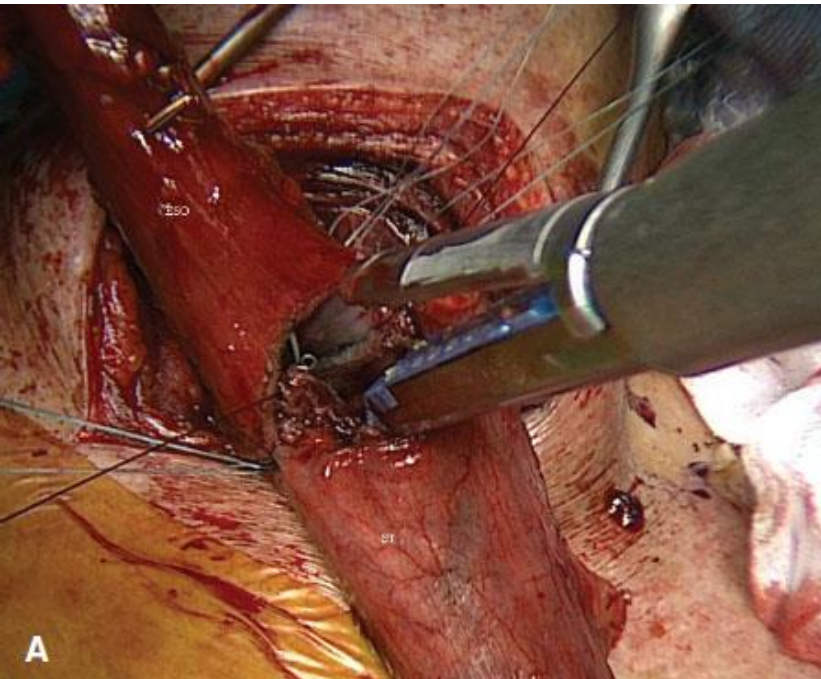




Esophagogastrostomy – hand sewn



Esophagogastrostomy – linear staple



Acceptable operative approaches for resectable esophageal or EGJ cancer

- ▶ Ivor Lewis esophagogastrectomy
(laparotomy + Rt thoracotomy)
- ▶ McKeown esophagogastrectomy
(Rt thoracotomy+ laparotomy + cervical anastomosis)
- ▶ Minimally invasive Ivor Lewis esophagogastrectomy
(laparoscopy + limited Rt thoracotomy)
- ▶ Minimally invasive McKeown esophagogastrectomy
(Rt thoracoscopy + limited laparotomy/laparoscopy + cervical anastomosis)



Acceptable operative approaches for resectable esophageal or EGJ cancer

- ▶ Transhiatal esophagogastrectomy
(laparotomy + cervical anastomosis)
- ▶ Robotic minimally esophagogastrectomy
- ▶ Left transthoracic or thoracoabdominal approaches with anastomosis in chest or neck



Colon conduit

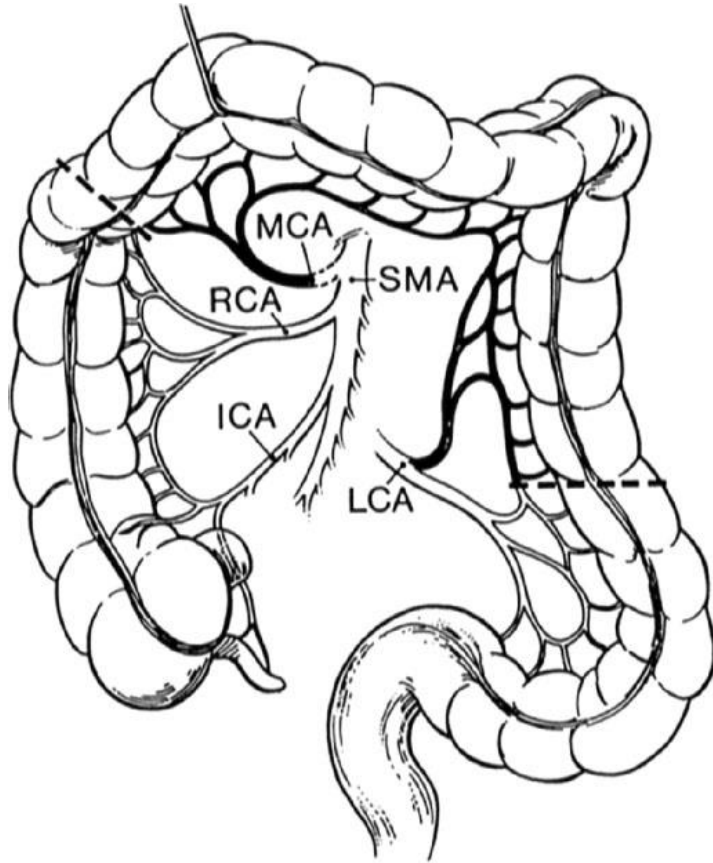


- ▶ Either the left or right colon may serve as an alternative conduit
 - Lt colon is preferred
 - The ideal colon conduit includes transverse colon and extends to a point distal to the splenic flexure.

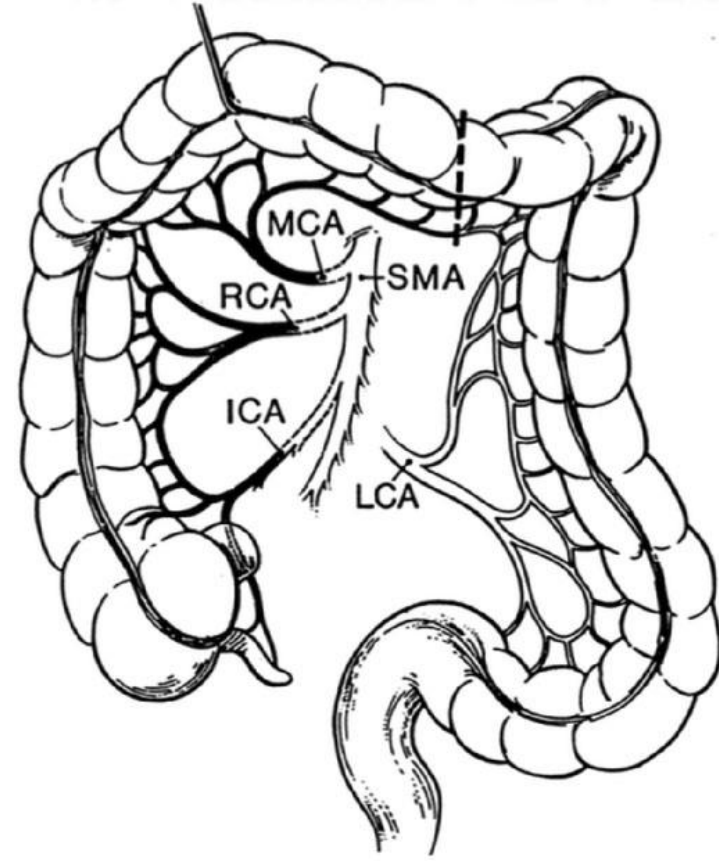


Colon conduit

Blood supply for a left colon conduit.



Blood supply for a right colon conduit.

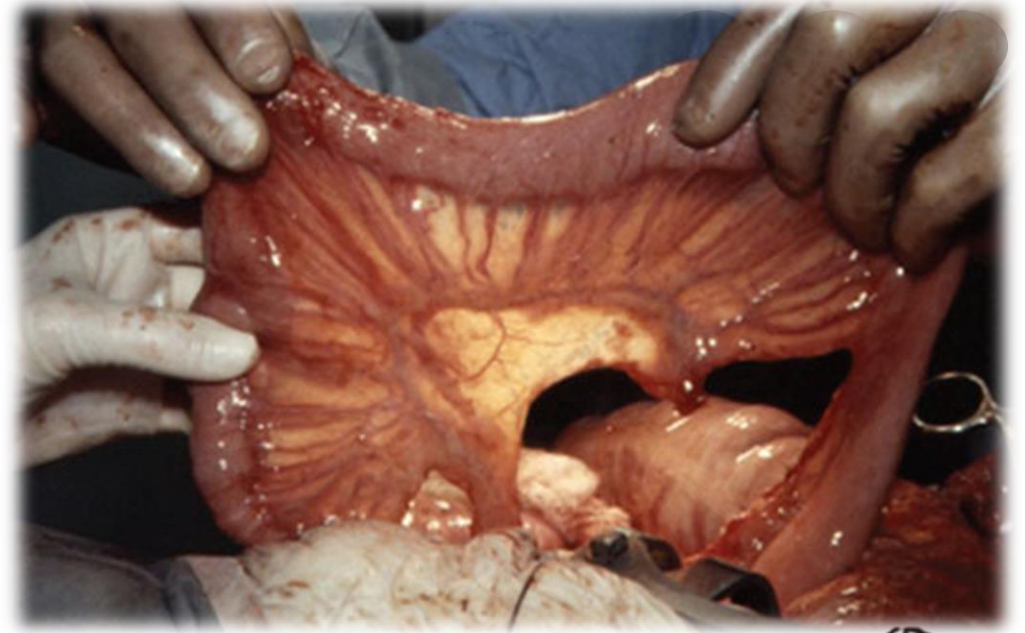




Jejunal conduit

▶ Pedicle jejunum

- ▶ Pedicled jejunum is an excellent conduit for replacement of the distal esophagus



▶ Supercharged jejunum

- ▶ a technique in which the blood supply to the proximal conduit is augmented using microvascular anastomoses between the mesenteric vessels and vessels in the neck





Position of conduit



- ▶ Posterior mediastinal
- ▶ Substernal
- ▶ Transpleural
- ▶ Subcutaneous



Other considerations

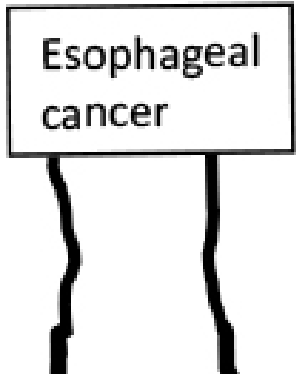
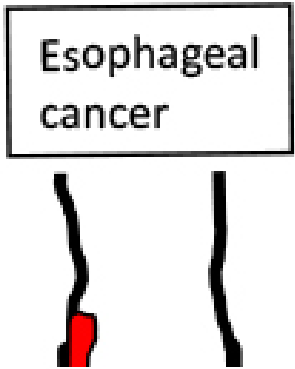
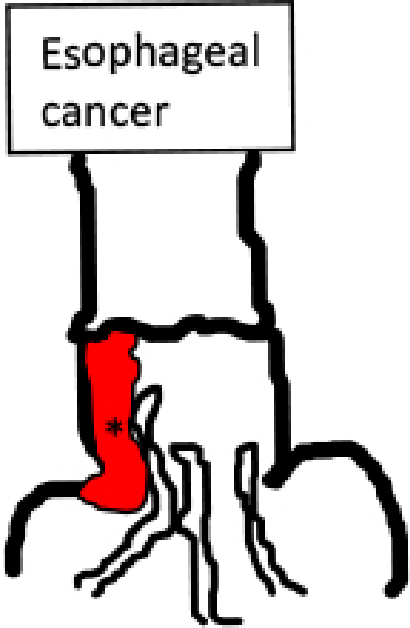
- ▶ Pyloric drainage
 - Not mandatory
 - selective postoperative pneumatic dilation of pylorus
- ▶ Feeding jejunostomy
 - allow for early enteral nutrition
 - their own set of complications, including local wound complications, intussusception, and small bowel obstruction
 - the benefits of jejunostomy tubes continue to outweigh these risks



Other considerations

- ▶ Definition of cervical esophagus
 - < 5cm from cricopharyngeus muscle
- ▶ Siewert classification
 - ▶ Siewert tumor type should be assessed in all patients with adenocarcinomas involving the EGJ
 - ▶ Siewert type I – the epicenter located within 1cm to 5cm above anatomic EGJ
 - ▶ Siewert type II – true carcinoma of the cardia with the tumor epicenter within 1cm above and 2cm below the EGJ
 - ▶ Siewert type III – subcardial carcinoma with the tumor epicenter between 2cm and 5cm below the EGJ, which infiltrates the EGJ and lower esophagus from below

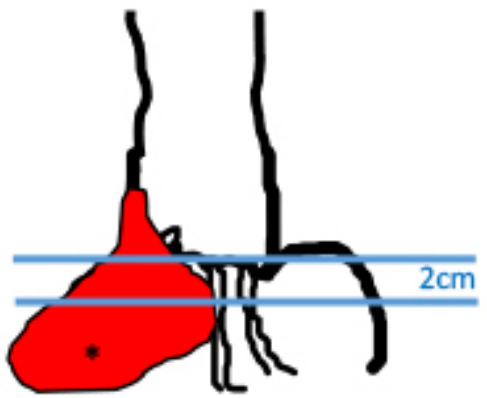




Barrett cancer with extension into cardia
*epicenter in esophagus
(Siewert type II)

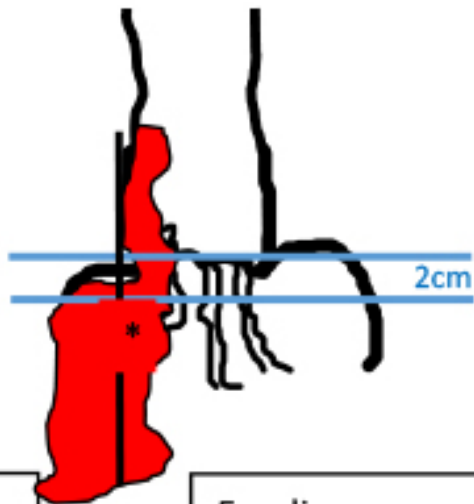
Cardi
exter
*epic
Siew

Gastric cancer



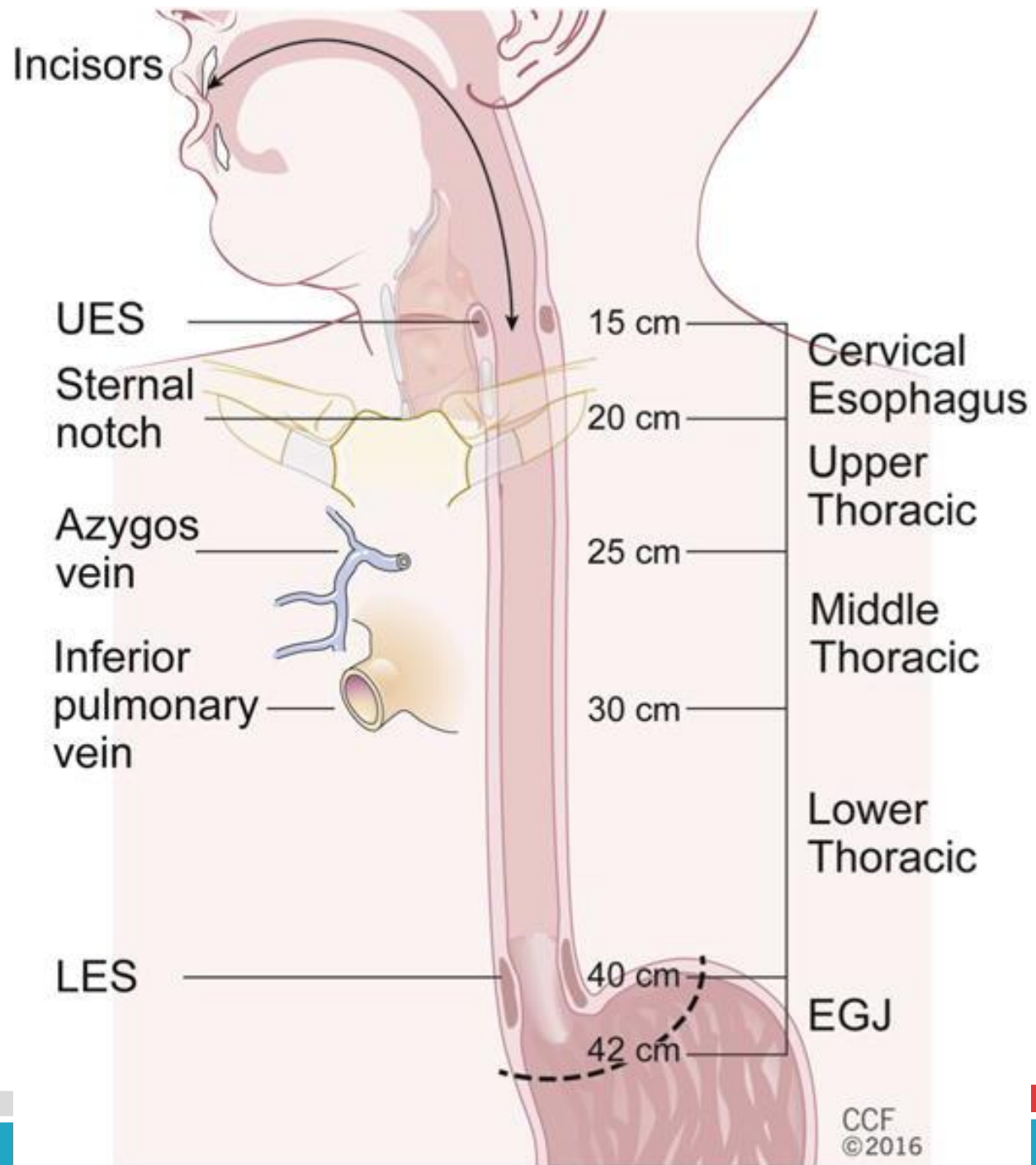
Fundic cancer with extension into distal esophagus , * epicenter more than 2 cm distally to esophagogastric junction
(Siewert type III)

Gastric cancer



Fundic cancer with long extension into distal esophagus, * epicenter more than 2 cm distally to esophagogastric junction
(Siewert type III)







경청해 주셔서 감사합니다.

