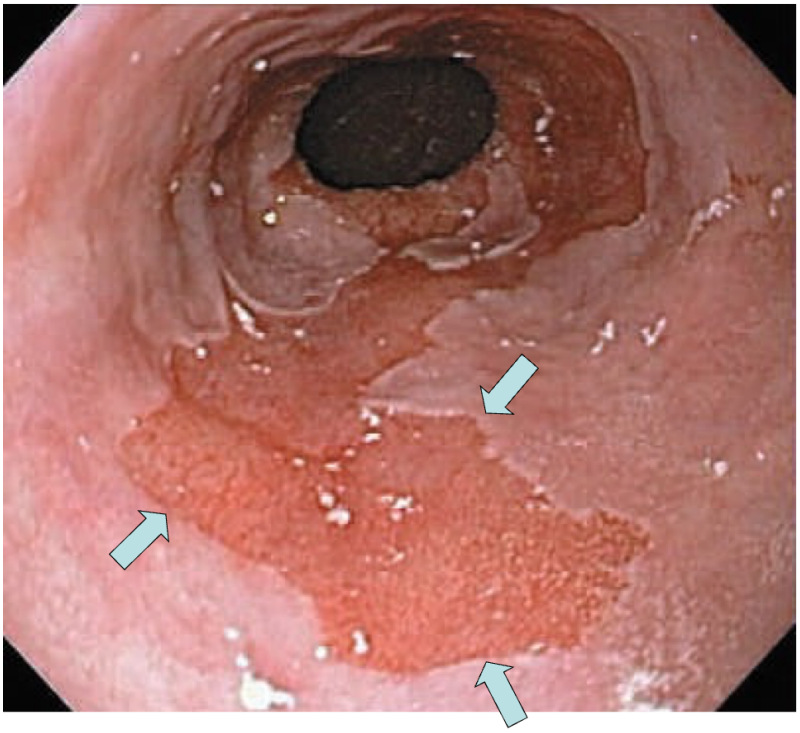
Esophageal Cancer Cases

Case 1

62M with longstanding reflux has first EGD.

Reflux got worse during training for a triathalon



Case 1

Pathology shows Barrett's metaplasia without dysplasia

What is appropriate follow up?

Biopsy strategy?

Case 1 Barrett's metaplasia without dysplasia

What is appropriate follow up?

AGA Guidelines

- No dysplasia: 3-5 years
- Low grade dysplasia: 6-12 months
- High grade dysplasia 3 months
  - (in the absence of ablation)

Case 1 Barrett's metaplasia without dysplasia

Biopsy strategy?

AGA Guidelines

- White light endoscopy
- 4-quadrant biopsy every 2cm
- Mucosal irregularity biopsied separately
- 4-quadrant biopsy every 1cm if dysplasia)

Case 2

Pathology shows high-grade dysplasia

Treatment Options:

- Observation
- Esophagectomy
- Cryotherapy
- Irreversible Electroporation
- Radio-frequency Ablation

Observation

You receive a hand-written note from the family

inviting you to the funeral of the patient

who passed after a heroic battle with esophageal cancer

Case 2

Esophagectomy

Correct answer, wrong century (not the 20th)

Case 2

Cryotherapy

Correct answer, wrong century (not the 22nd)

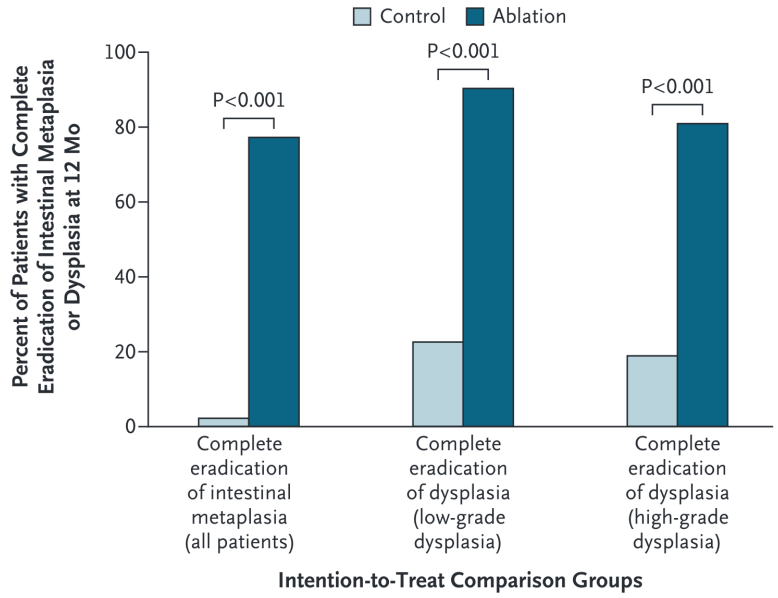
Case 2

Irreversible Electroporation

Case 2

Radio-frequency Ablation

Radiofrequency Ablation results in eradication of Barrett's in 75% at 1 year



Case 3

(Shaheen et al. 2009)

Case 3

EGD shows a nodule in the Barrett's esophagus

Treatment Options:

- Surveillance
- Minimally Invasive Esophagectomy
- Endoscopic Mucosal Resection
- Radio-frequency Ablation Barxx

Surveillance

You receive a hand-written note from the family

inviting you the patient's 70th birthday

after being treated at a competing medical center

for esophageal cancer

Case 3

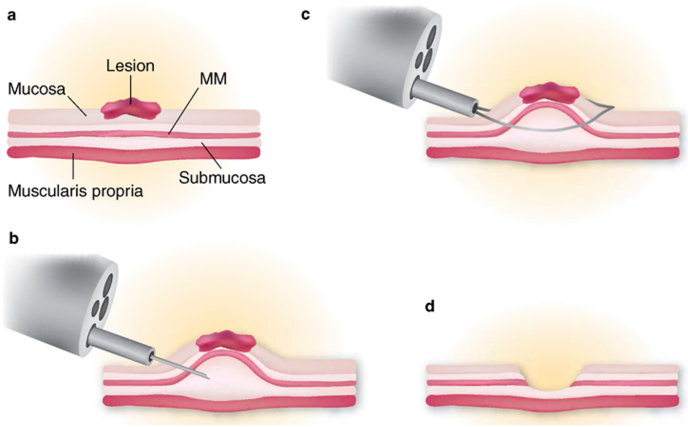
Minimally Invasive Esophagectomy

Correct answer, wrong patient

Case 3

Endoscopic Mucosal Resection

Endoscopic procedure resects mucosal tumor



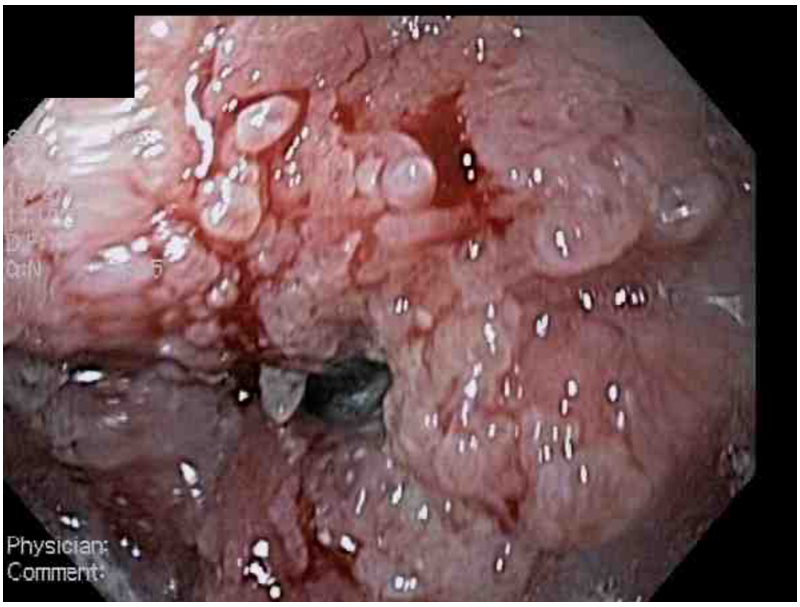
Case 4

Radio-frequency Ablation Barxx

Correct answer, wrong question

Case 4

Your patient from Case 2 returns with dysphagia and weight loss



Case 4 Adenocarcinoma

Pathology shows adenocarcinoma

Workup?

Case 4 Adenocarcinoma

Workup?

- Barium Swallow
- Endoscopic Ultrasound
- CT Chest/Abdomen/Pelvis

Barium Swallow

Correct answer, wrong century

Case 4

Endoscopic Ultrasound

You receive a hand-written note from the family

inviting you the patient's funeral

after they died from an esophageal perforation

which occured during EUS

Autopsy showed T3 adenocarcinoma

EUS in Patients with Dysphagia

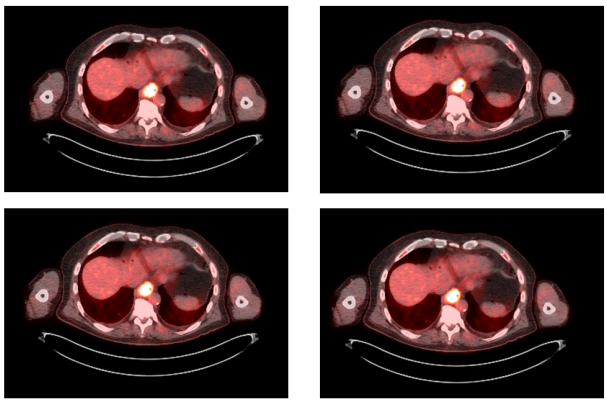
Case 4

CT Chest/Abdomen/Pelvis

What test do you order next?

PET scan

A PET scan is most accurate method of staging esophageal cancer



T3 N0 M0 adenocarcinoma

Treatment Options - First Treatment Course

- MI Esophagectomy
- Chemo + Radiation
- Chemotherapy

MI Esophagectomy

Correct answer, wrong timing

Why?

T3 N0 M0 adenocarcinoma

Chemo + Radiation

Concurrent chemotherapy and radiation followed by surgery = Trimodality therapy

CROSS Trial

- 368 esophageal cancer patients randomized:
  - Surgery alone
  - Chemo+RT → Surgery
- 75% adenocarcinoma
- T3: 80%. T2: 17%
- age $\tilde{x}$=60
- longer survival with Chemo+RT → Surgery

CROSS Trial Details

Chemotherapy: Weekly carboplatin and paclitaxel Radiation: 4140 cGy in 23 fractions (180cGy/fraction)

(Shapiro et al. 2015)

CROSS - Overall Survival

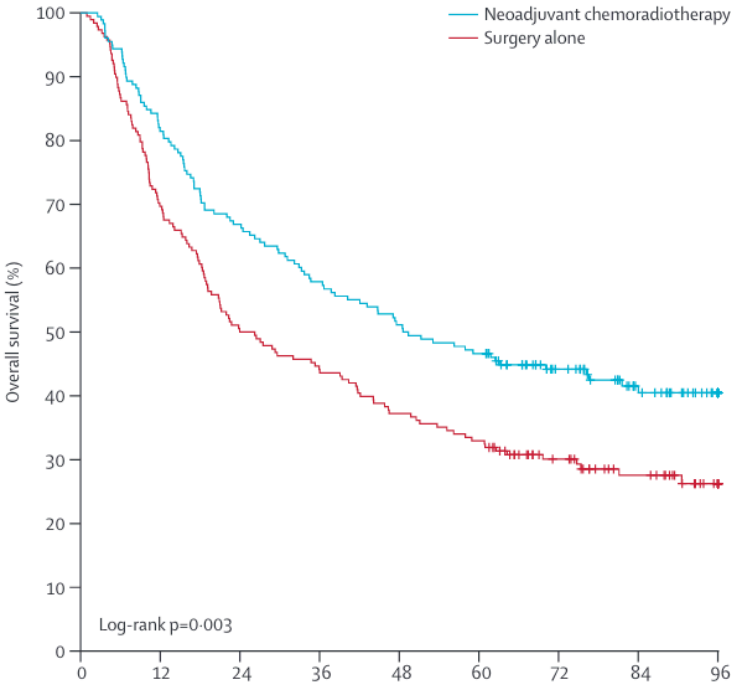


Figure 1: Surgery vs ChemoRT → Surgery

CROSS - Survival by Histology

(Shapiro et al. 2015)

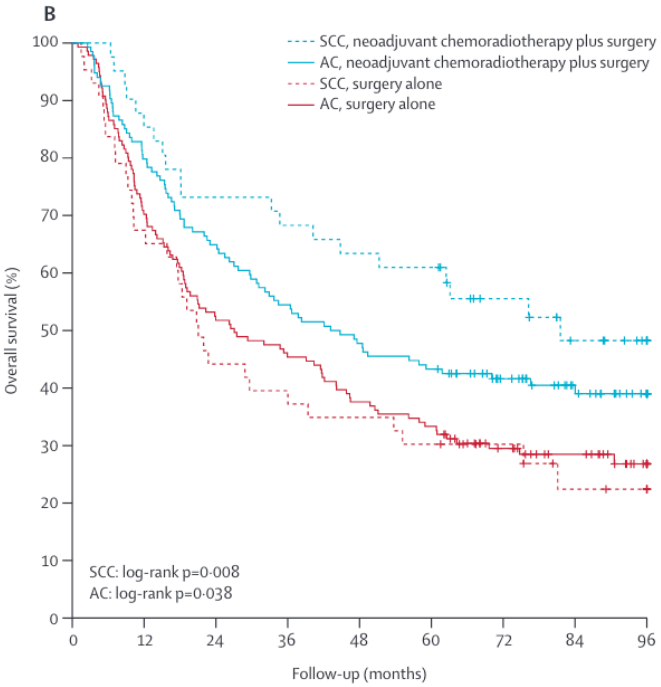


Figure 2: Surgery vs ChemoRT → Surgery

CROSS - Adenocarcinooma

(Shapiro et al. 2015)

Median survival 43mo vs 27mo

Pathologic complete response in 23%

CROSS - Squamous cell carcinoma

Median survival 82mo vs 21mo

Pathologic complete response in 40%

(Shapiro et al. 2015)

T3 N0 M0 Adenocarcinoma

Family asks if there is a better treatment option than CROSS

Chemotherapy

"Sandwich" Chemotherapy may be superior to Trimodality therapy

EsoPEC Trial

- Adenocarcinoma esophagus - T1 N+ or T2-4a M0. Median age =63. 89% men
- Randomized to CROSS (n=217) vs FLOT chemotherapy (n=221) = 438
- CROSS: carboplatin/paclitaxel + 4140cGy → Surgery
- FLOT: FLOT → Surgery → FLOT
- Excluded: Squamous cell, gastric cancer, T1N0, T4b, M1

EsoPEC Trial Results

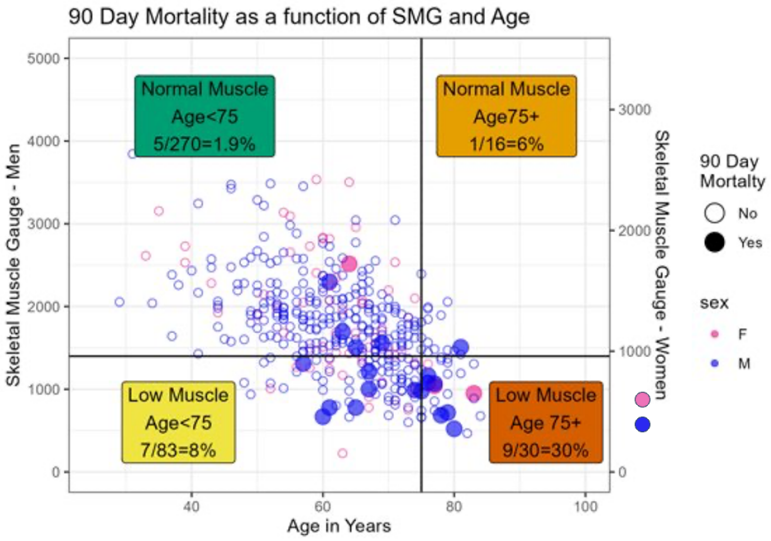
- Surgery performed in 371/438 patients
- 90-day mortality 4.3% (3.2% in FLOT and 5.6% CROSS)
- Median survival 66mo in FLOT arm and 37mo in Cross arm
- 3-year overall survival 57% FLOT vs 51% CROSS
- 5-year overall survival 51% FLOT vs 29% CROSS
- pCR 17% for FLOT and 10% CROSS

Case 7

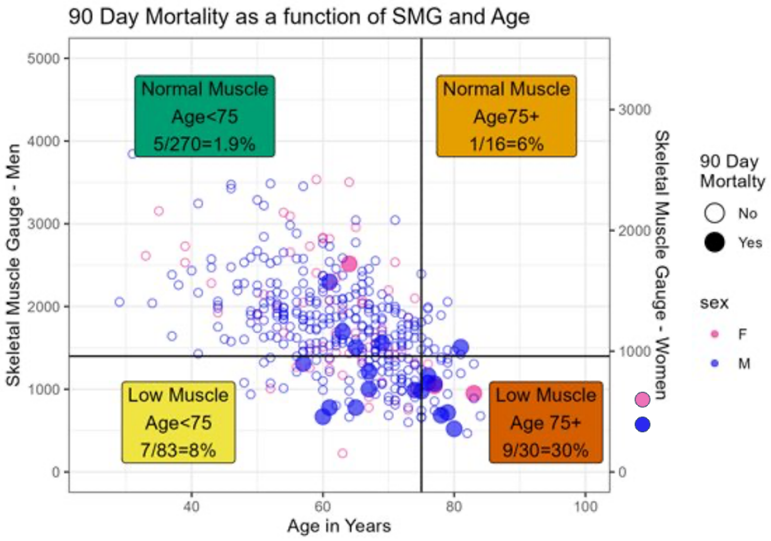
Patient returns after FLOT chemotherapy

What are risks of surgery?

Preoperative Evaluation



Preoperative Evaluation



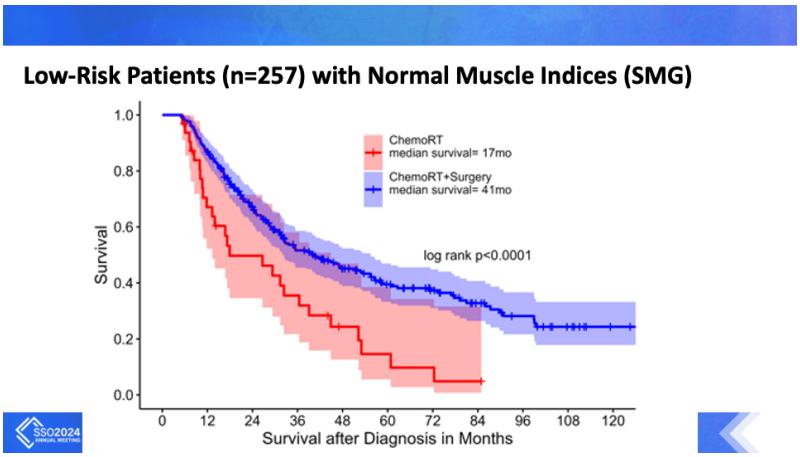
25th percentile: Grip Strength 26kg (men) / 16kg (women)

Case 7

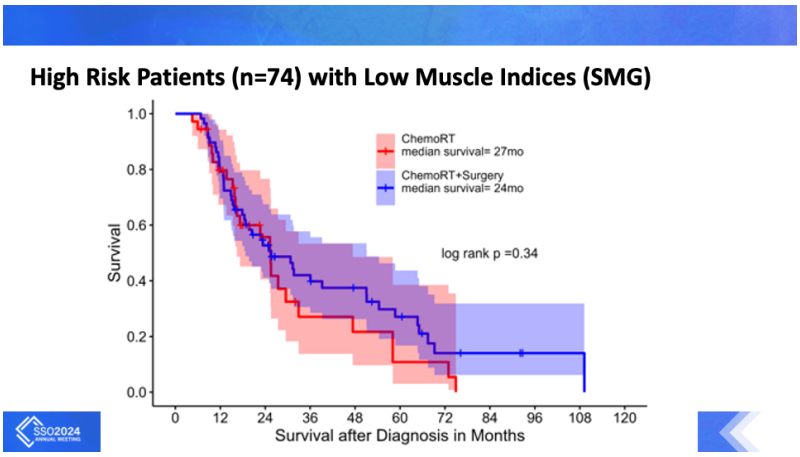
Patient returns after FLOT chemotherapy

What are surgical options?

Low Risk Adenocarcinoma



High Risk Adenocarcinoma



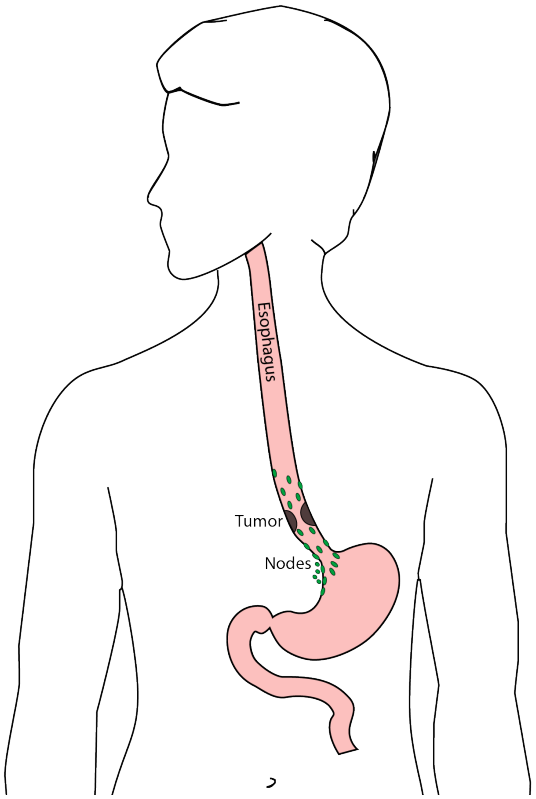
Surgery for Esophageal Cancer

Surgery for esophageal cancer is performed for:

- Superficial Tumors (T1) not completely removed by endoscopy
- Localized Tumors (T2N0)
- Locally Advanced (T3) after preoperative therapy.

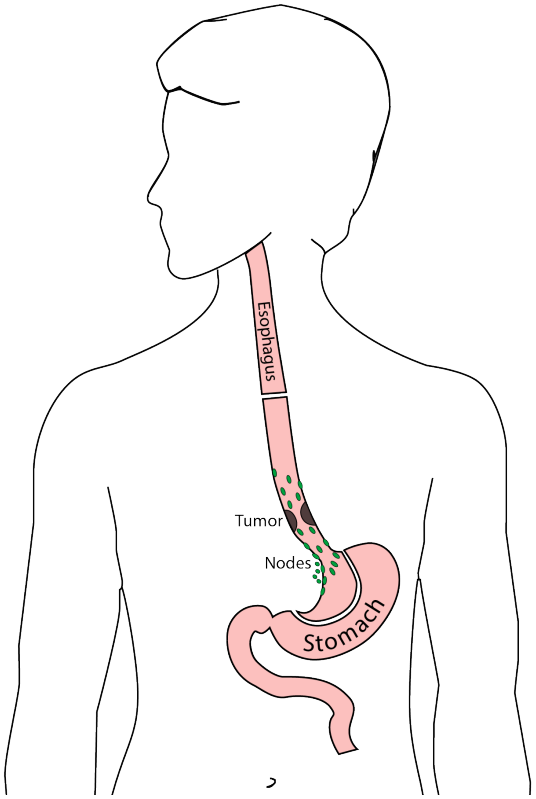
Goals of Surgery

- Remove tumor from esophagus
- Remove surrounding lymph nodes
- Create a new esophagus



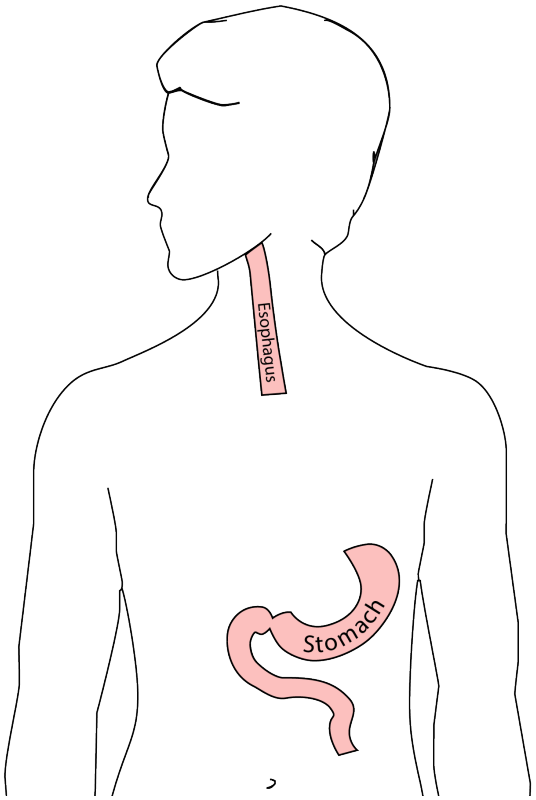
Ivor Lewis (Transthoracic) Esophagectomy

- Removes tumor
- Removes lower 1/3 of esophagus
- Removes surrounding lymph nodes
- Reconstruction of GI tract



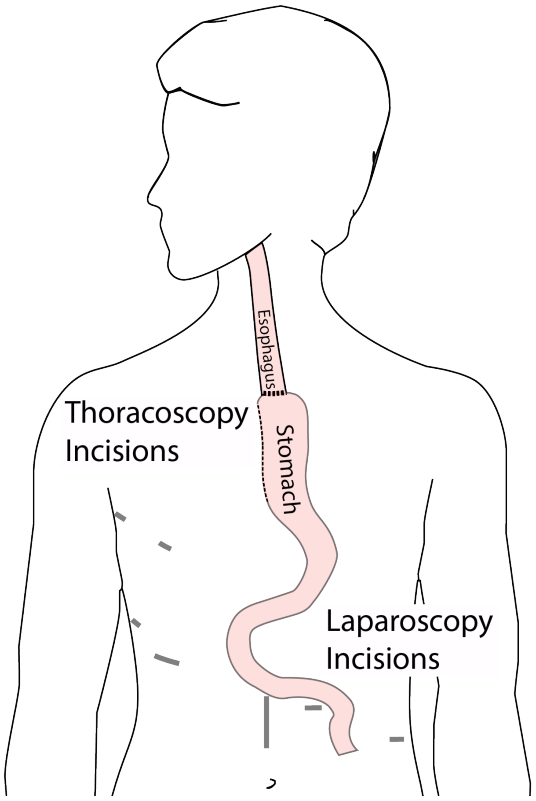
Reconstruction

A new esophagus is created from the stomach in the abdomen by fashioning it into a tube.

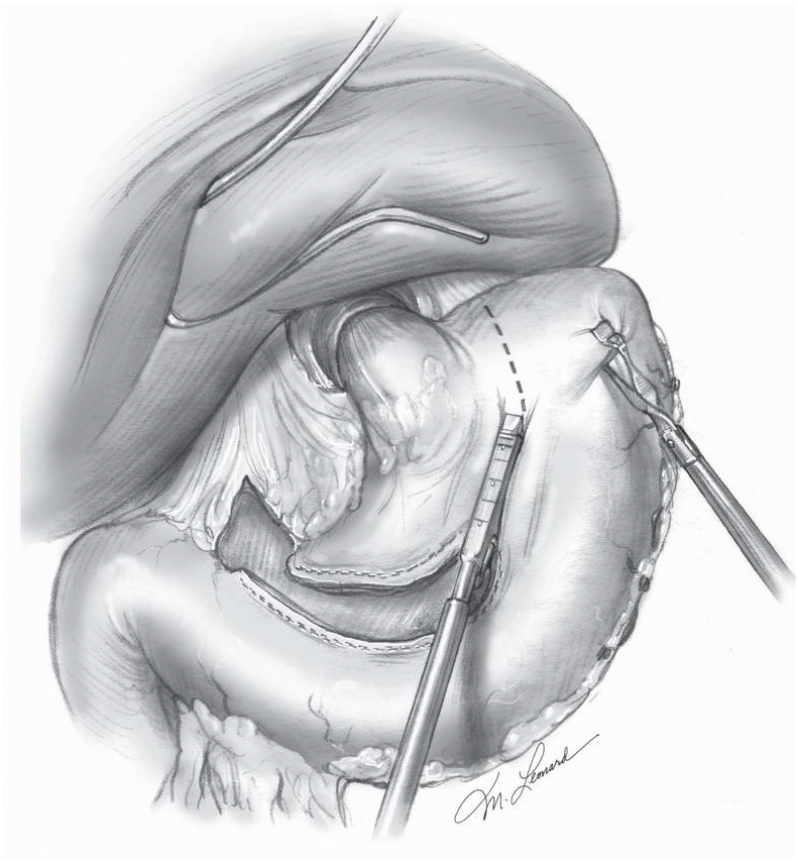


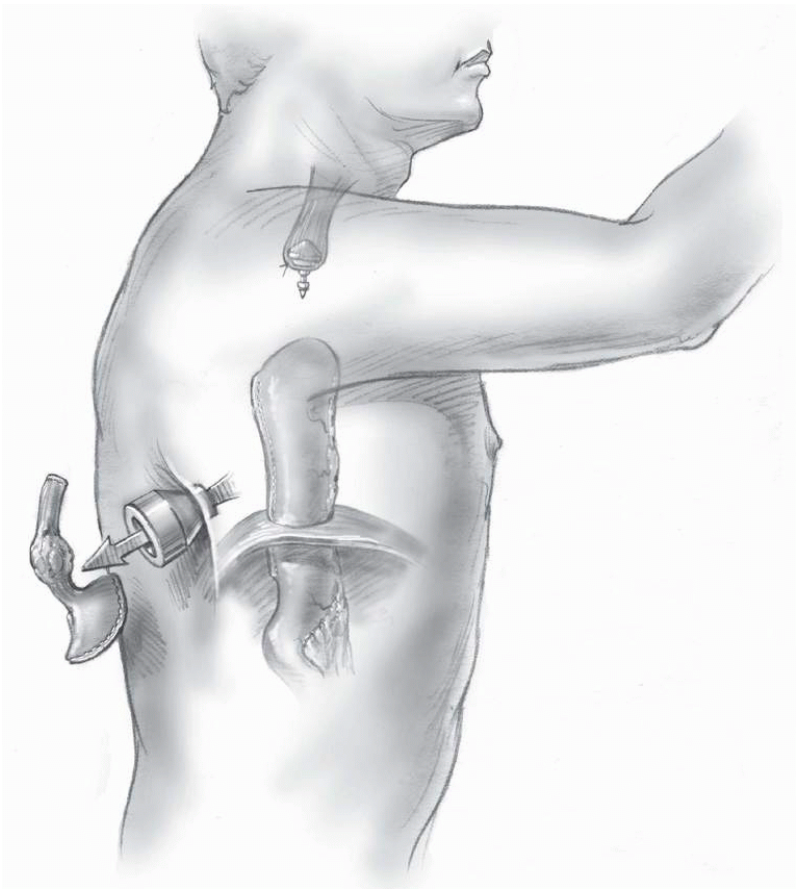
Minimally-invasive Ivor Lewis

- Laparoscopic mobilization of stomach
- Construction of gastric conduit
- Thoracic anastomosis

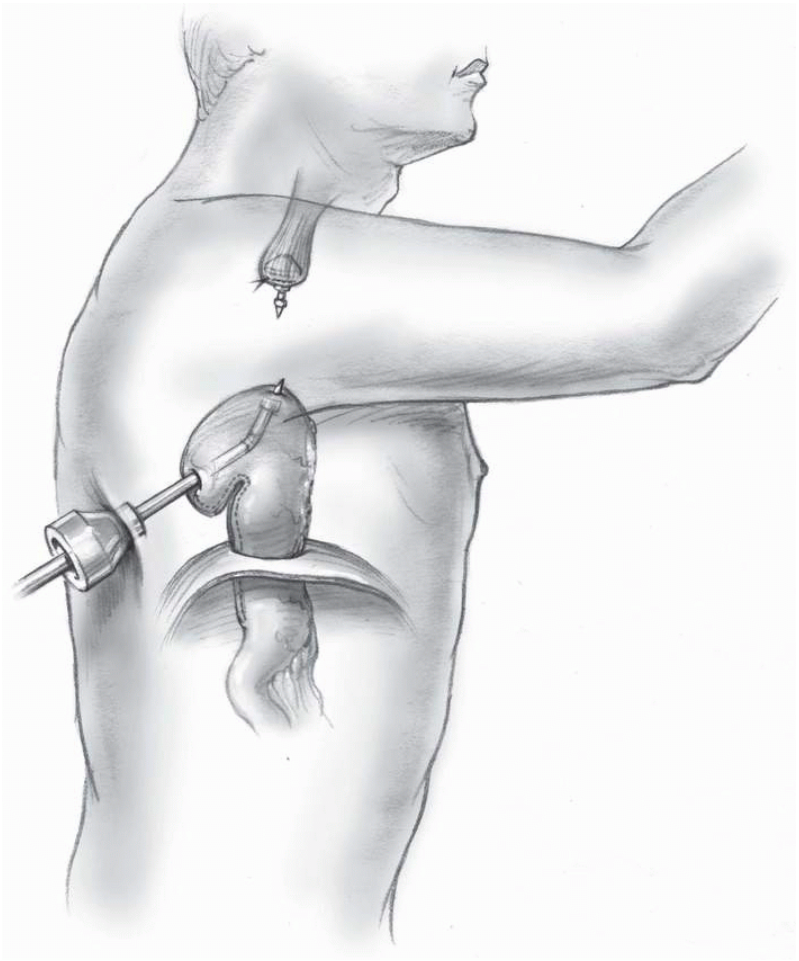

Esophagus
Thoracoscopy
Incisions
Stomach
Laparoscopy
Incisions

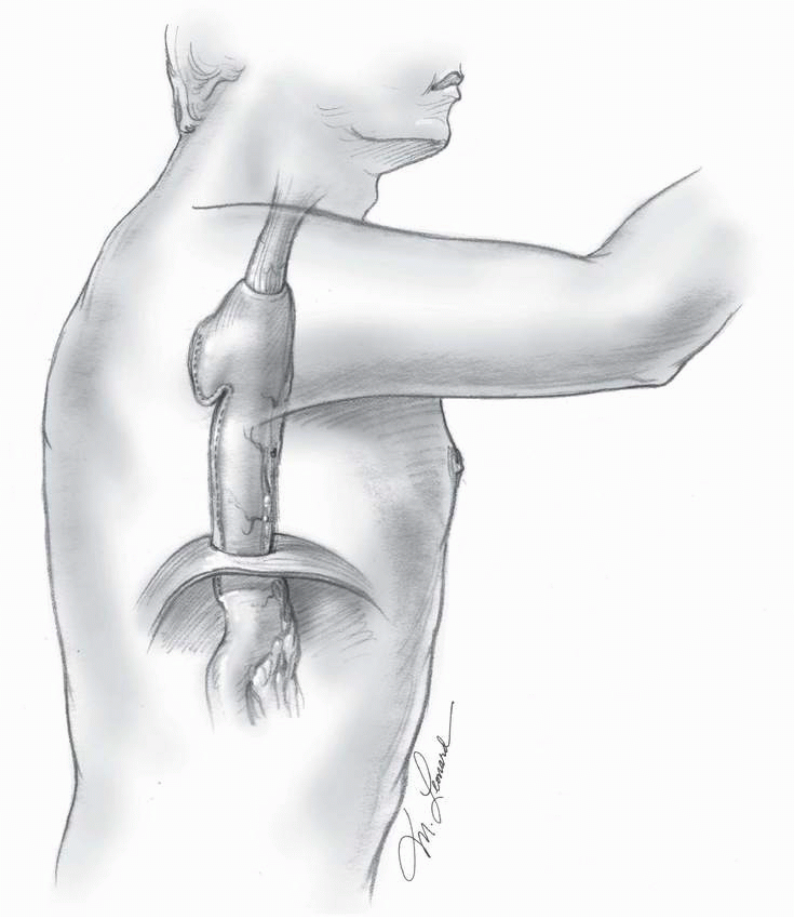
Ivor Lewis esophagectomy





Ivor Lewis esophagectomy



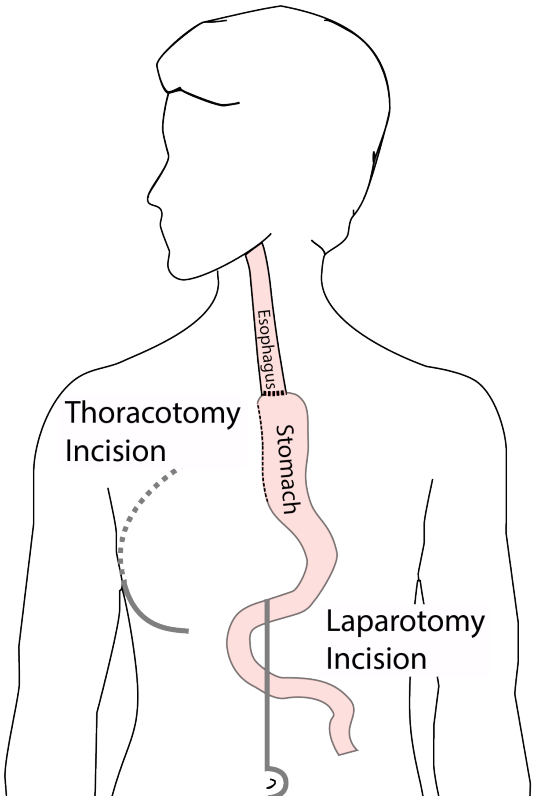


Thoracic Circular Stapled Anastomosis

Open Ivor Lewis

We use the mininally-invasive approach in 95% of cases

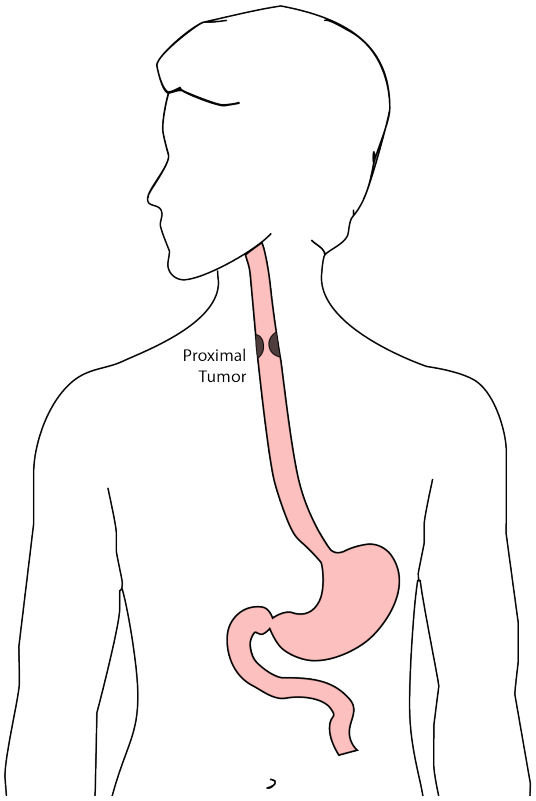
In some cases, an open approach is still necessary.



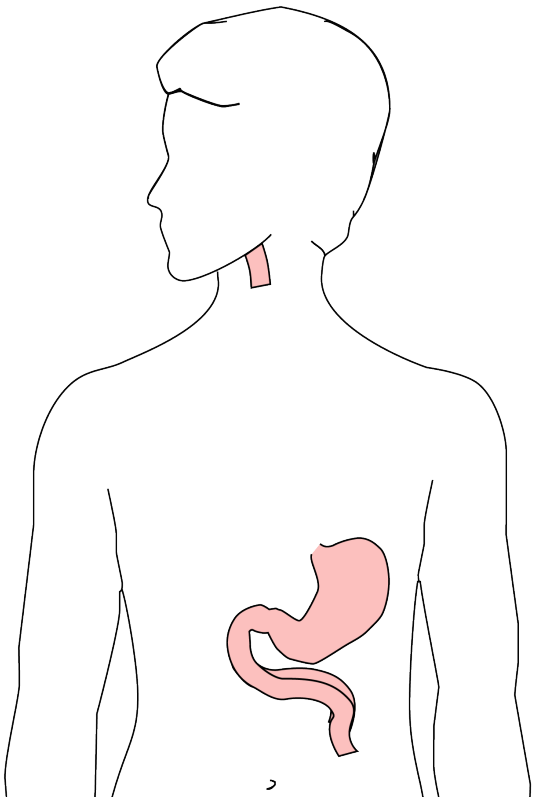
Total Esophagectomy

For patients with tumors in the upper esophagus, we need to remove more of the esophagus

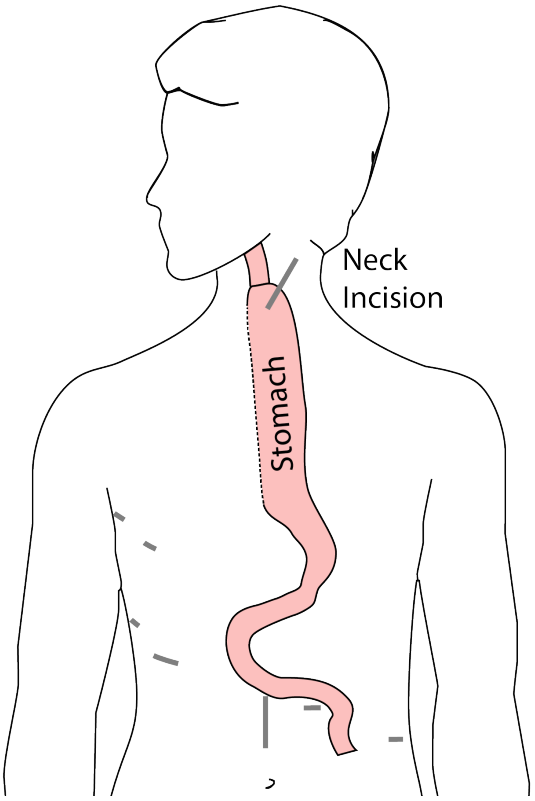
We need to remove the whole esophagus, including the portion in the neck


Proximal
Tumor

McKeown Esophagectomy

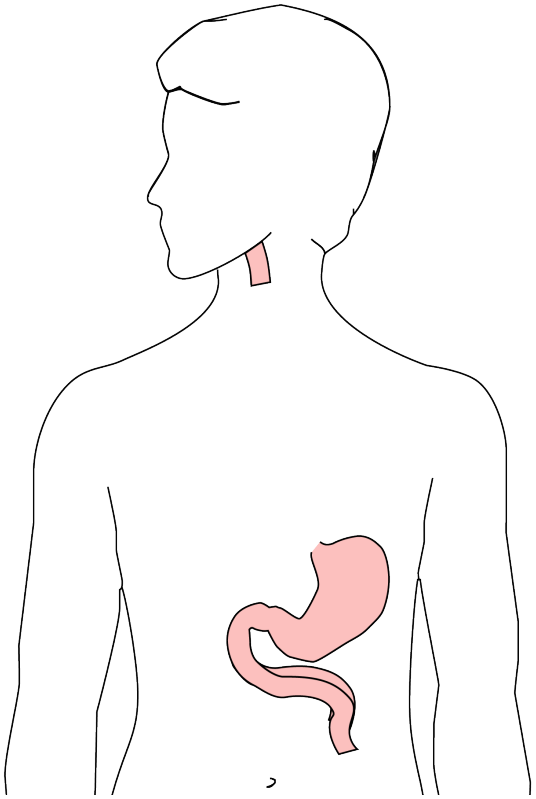


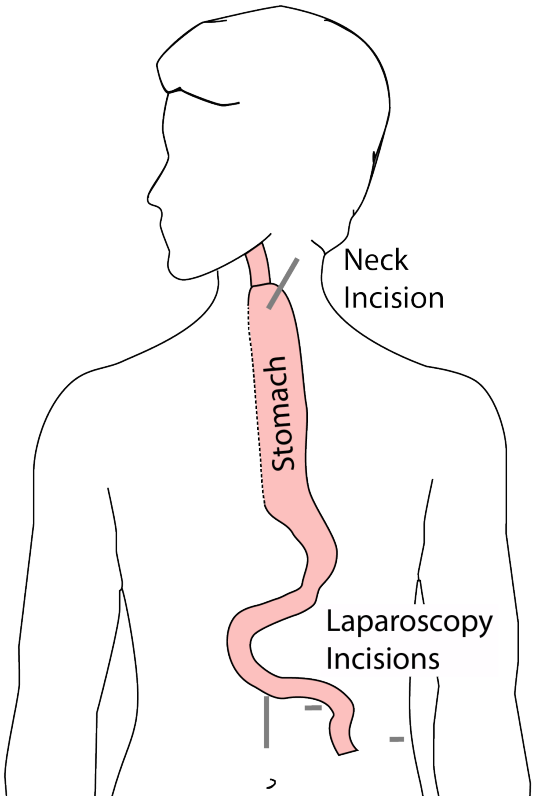
All of esophagus removed



Connection made in the neck

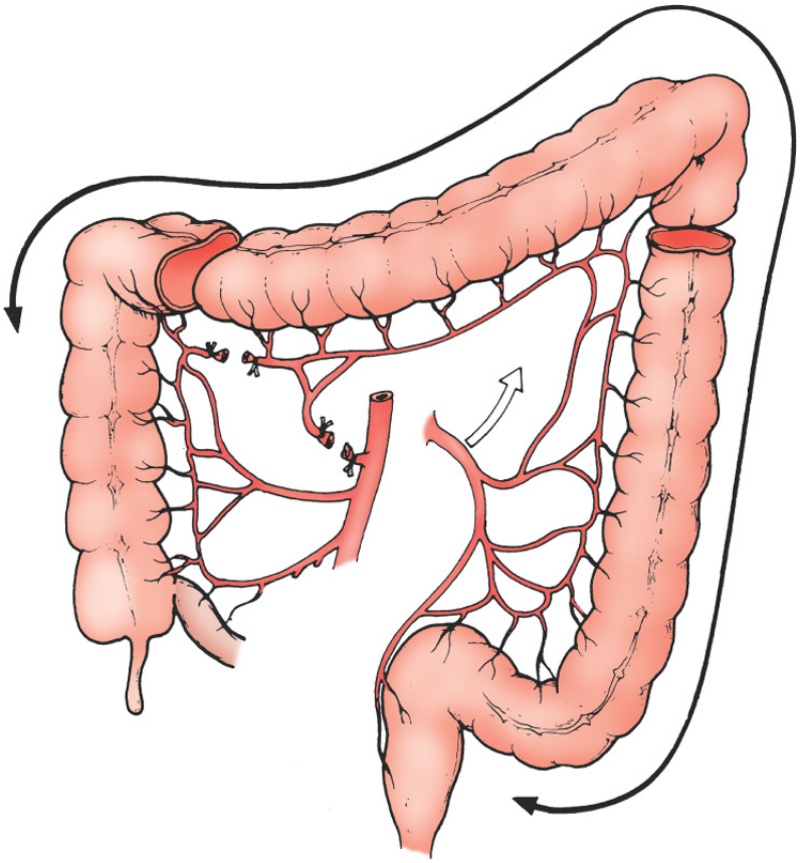
Transhiatal Esophagectomy



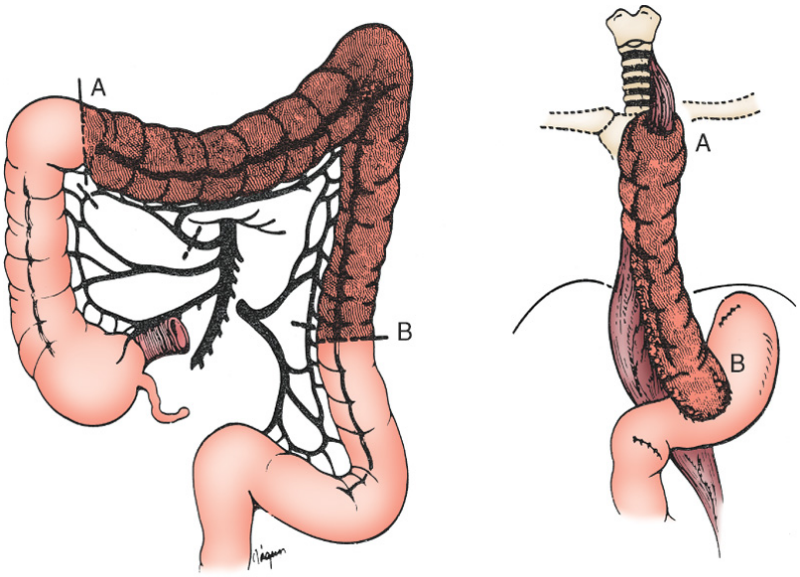


Colon Interposition

If the stomach is not suitable to make a new esophagus, the colon can be used to replace the esophagus



Colon Interposition



Esophageal Cancer Treatment Categories

Category	Stage	Treatment
Dyplasia	Tis	Radiofrequency Ablation
Superficial Tumors	T1a	Endoscopic Therapy
Localized Tumors	T1b T2	Surgery
Locally-advanced	T3 or N^+	Chemo or ChemoRT $\rightarrow$ Surgery
Metastatic	M1	Chemotherapy +/- Radiation

Dyplasia

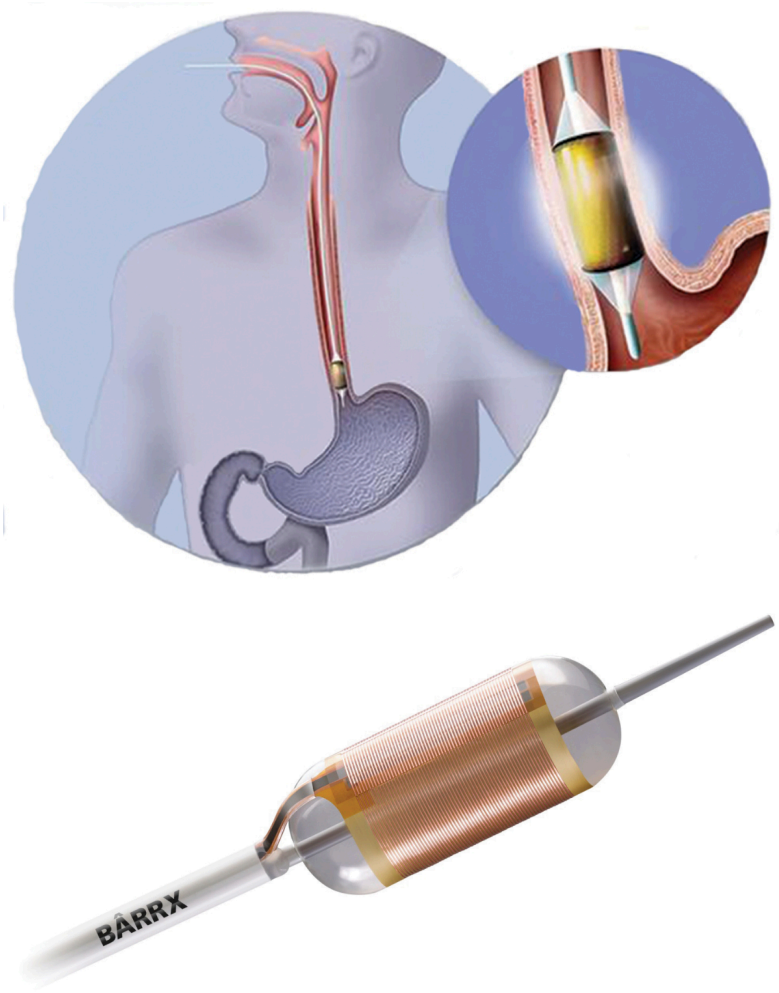
Radiofrequency Ablation for Dysplasia

127 patients with dysplasia randomized:

- Radio-frequency ablation
- Sham ablation

Low-grade dysplasia in 64

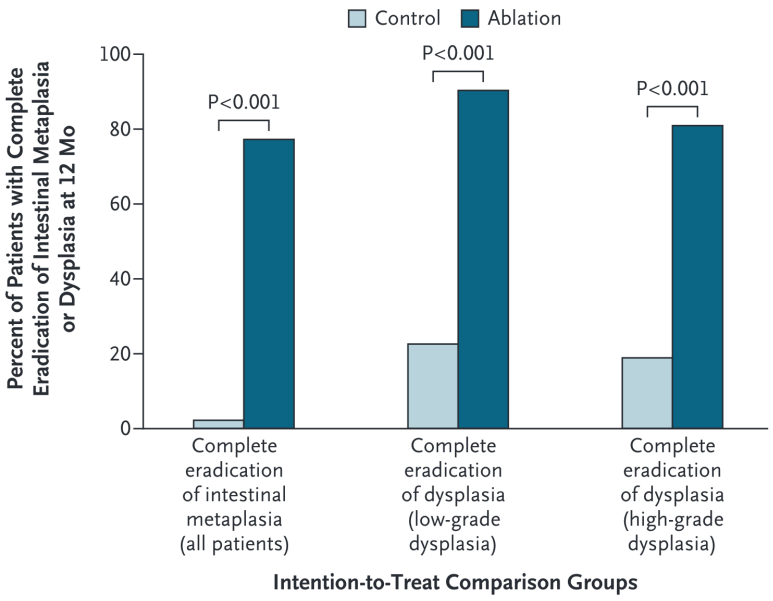
High-grade dysplasia in 63



(Shaheen et al. 2009)

Radiofrequency Ablation for Dysplasia

Radiofrequency Ablation results in eradication of Barrett's in 75% at 1 year



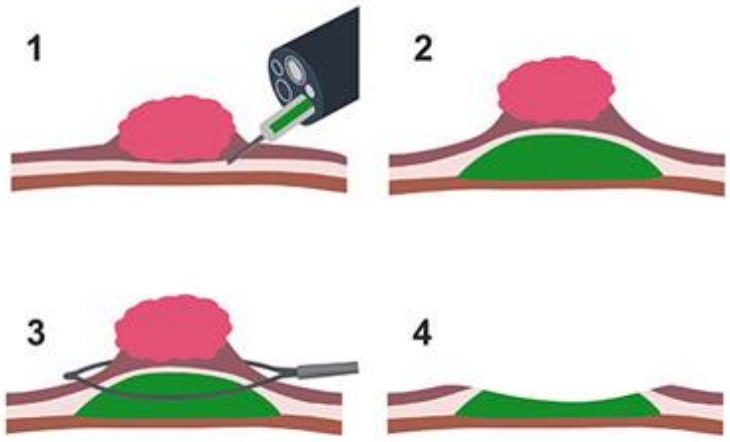
(Shaheen et al. 2009)

Superficial Tumors

Workup of nodular Barretts:

- Endoscopic Ultrasound
- Endoscopic Mucosal Resection
  - Diagnostic (T staging)
  - May be therapeutic for T1a tumors

Endoscopic Musocal Resection



Localized Tumors

Patients staged as uT2 N0 are candidates for primary surgery. *However:*

- EUS has a 25% rate of understaging uT2 N0 tumors
- Understaged patients who undergo primary surgery would need chemo or chemoRT postop

Small Tumors (minimal dysphagia)

- EUS to distinguish T2 from T3 tumors
- If uT2 N0 $\rightarrow$ CT chest/abdomen/pelvis $\rightarrow$ Esophagectomy
- If uT3 or N1 $\rightarrow$ PET $\rightarrow$ neoadjuvant therapy

Patients with dysphagia almost always are T3 tumors (and don't need EUS)

Symptomatic Tumors (Dysphagia)

Patients with dysphagia to solids or weight loss or tumor length >3cm are unlikely to have T1-2 tumors and can be initially evaluated with PET Scan

- Disease confined to the esophagus and regional nodes → Locally-advanced
- Metastatic disease → Metastatic
- N3 → induction chemotherapy followed by chemoradiation and surgical evaluation.

EUS in Patients with Dysphagia

Memorial Sloan Kettering[1] patients with esophageal cancer:

- 61 with dysphagia, 54 (89%) were found on EUS to have uT3-4 tumors.
- 53 without dysphagia, 25 (47%) were uT1-2 → candidates for primary surgery.

EUS can be omitted for patients with dysphagia, but is useful in patients *without* dysphagia.

PET Scan

PET has more specificity and sensitivity than CT in detecting regional lymph node and distal metastasis [2]

Locally-advanced

For patients with locally-advanced esophageal cancer, improved survival with adjunctive therapy. There are two options:

- ChemoRT → Surgery (CROSS Trial)
- Chemo → Surgery → Chemo (EsoPEC Trial)

[1] Ripley et al. (2016)
[2] Block et al. (1997)

Surgery for Squamous Cell Carcinoma

Squamous Cell Carcinoma of the esophagus

- responds well to chemo+RT
- more difficul to get a surgical margin on the airway
- additional benefit of surgery on top of chemoRT is uncertain

FFCD 9102 2007 (Bedenne)

All patients received 4500cGy RT + 2 cycles of cisplatin + 5FU

Patients with a clinical response were randomized:

- Surgery -> 2 year survival 34% Median 17.7mo
- 3 cycles of chemo + 2000 cGy RT -> 2 year survival 40% Median 19.3mo

No difference in overall survival

German Trial (Stahl)

4000 cGY RT + Chemo → Surgery. 64% 2-year PFS. Mortality 12.8%

6500cGy RT + Chemo: 41% 2-year PFS. Mortality 3.5%

No difference in overall survival

Metastatic

FOLFOX is first-line systemic therapy for metastatic GI cancers

- Dose-limiting toxicity is frequently peripheral neuropathy

Orientation Handbook

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