

Nutrition

Anatomy

Food moves from the throat

→ esophagus

→ stomach

→ small bowel (jejunum)



Types of Esophageal Cancer

There are two common types of esophageal cancer

- Adenocarcinoma
- Squamous Cell Carcinoma

Cancer Staging

Staging refers to the tests to determine

- How large is the tumor?
- Has there been spread to lymph nodes?
- Has it spread to other parts of the body?

Treatment options depend upon the cancer stage

Esophageal Cancer Staging

- **T** = Tumor - Depth of growth into the wall of the esophagus
- **N** = Nodes - Spread to the lymph nodes
- **M** = Metastasis - Spread to liver, lungs, or bone

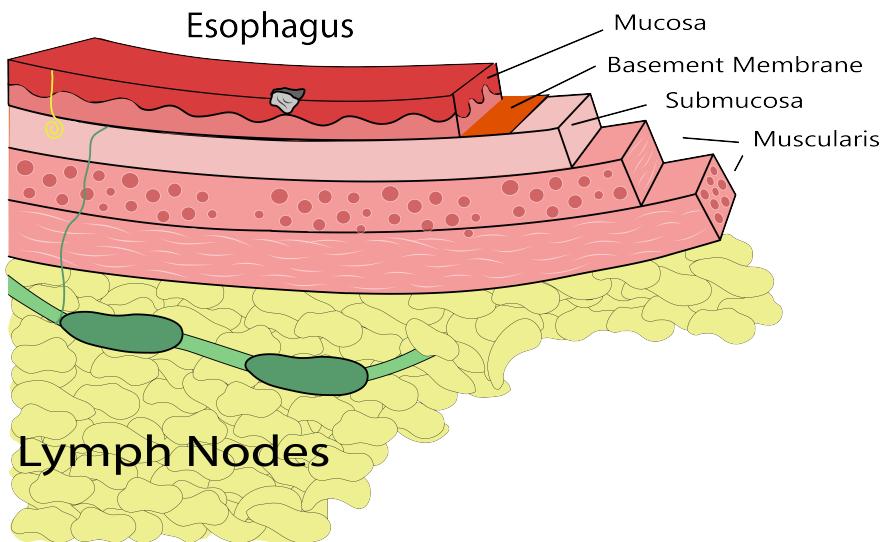
Layers of the Wall of the Esophagus

- Mucosa - Inner layer
- Muscle wall (muscularis)
- Lymph nodes located in fat outside the muscle



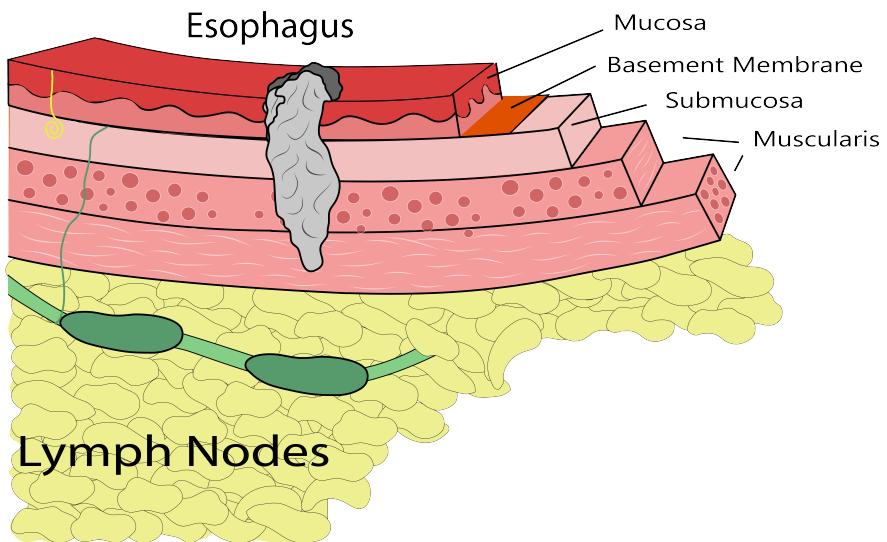
Early Stage Cancers

Cancers start on the very inside of the layer called the mucosa



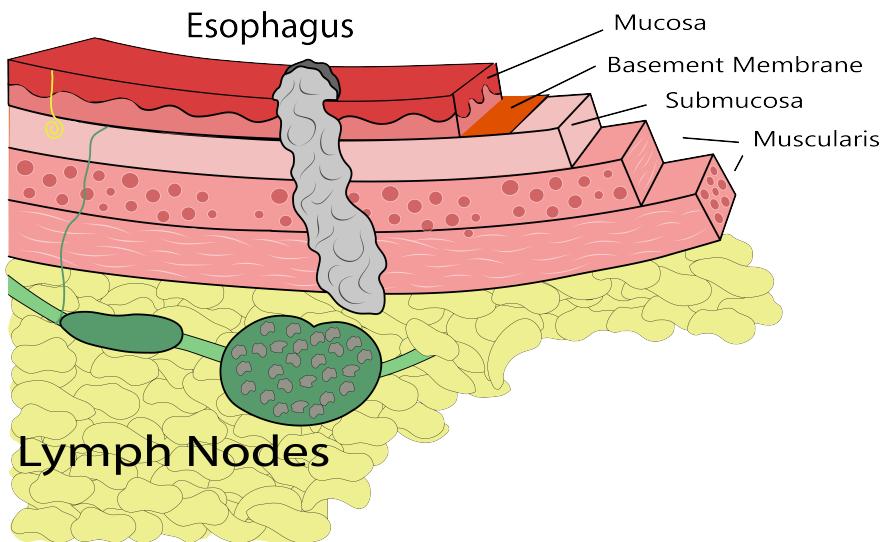
Locally-advanced Cancers

Over time, cancers can grow into the muscular wall



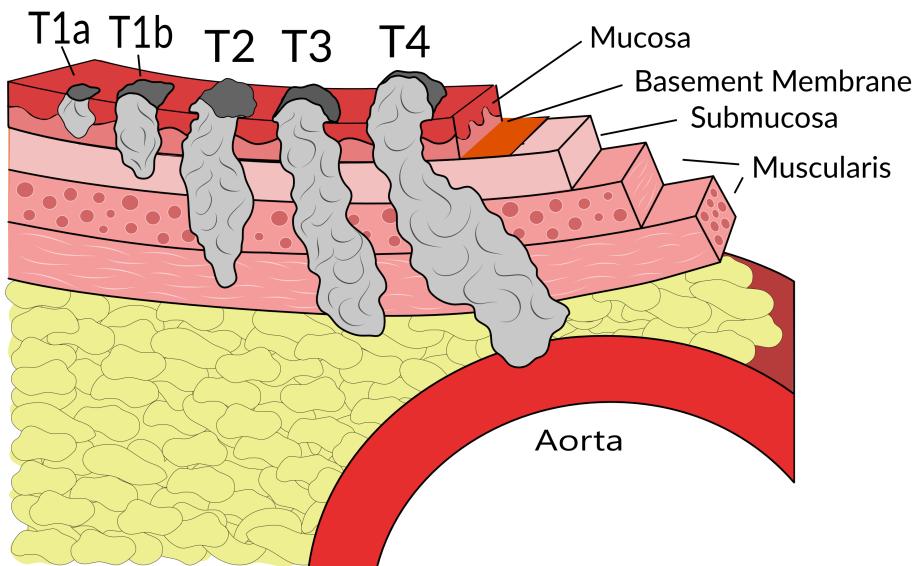
Lymph Nodes

In some cases, cancer cells can break off from the main tumor and spread to lymph nodes



T Stage

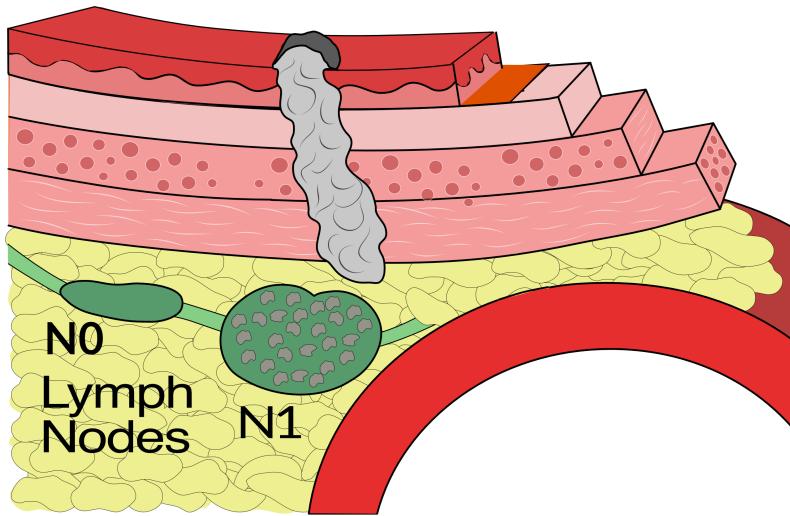
Cancers are categorized based upon the thickness of the tumor, known as the T stage



N Stage

Cancers are categorized by whether there is spread to the lymph nodes.

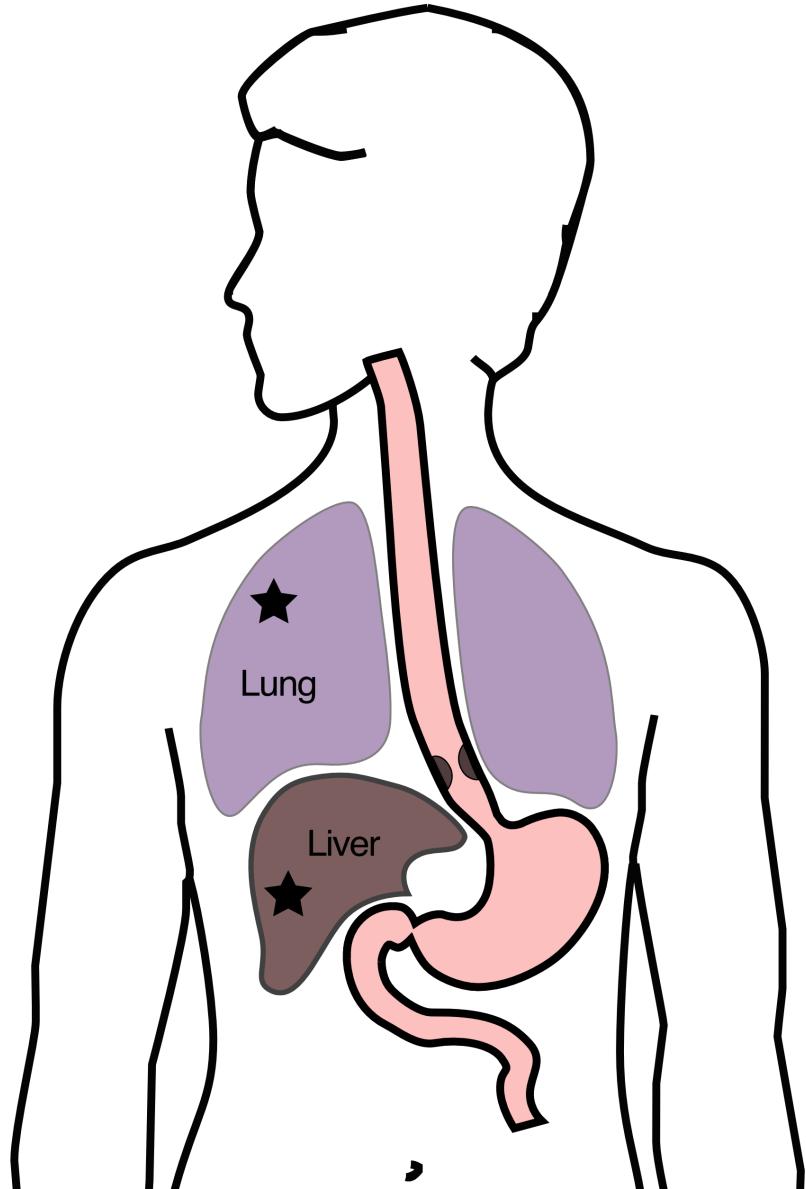
- **N0** cancers have not spread to the lymph nodes
- **N1** cancers have spread to the lymph nodes.



M Stage

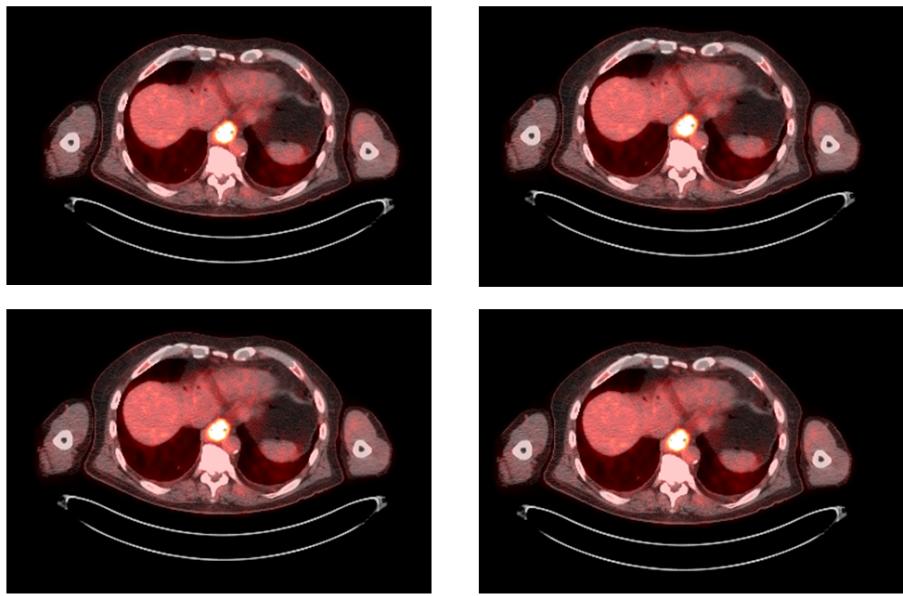
Some cancers spread from the esophagus to other parts of the body

- **M0** cancers have not spread to other parts of the body
- **N1** cancers have spread lungs, liver, or bone



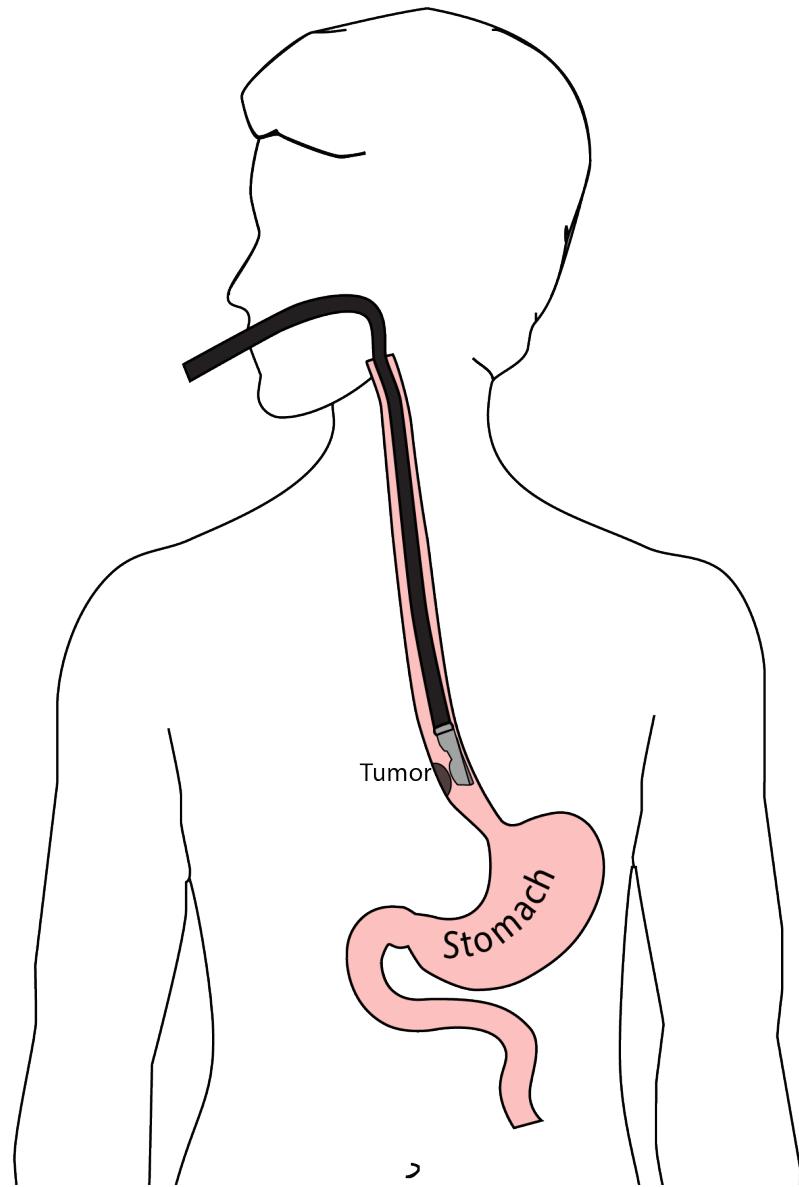
PET scan

A PET scan is similar to a CT scan, and uses a small amount of tracer to light up areas of cancer.



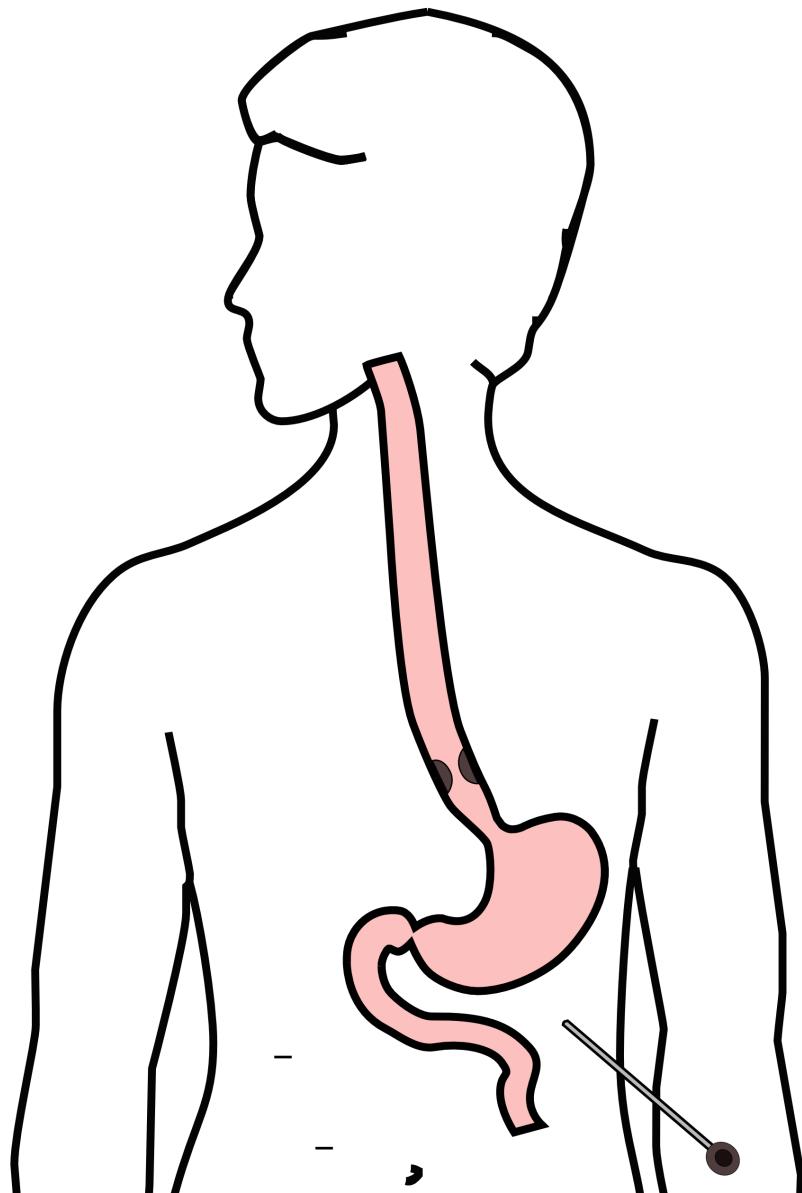
Endoscopic Ultrasound

- Similar to upper endoscopy (EGD)
- Ultrasound probe in scope
- Evaluates T stage of cancer



Laparoscopy

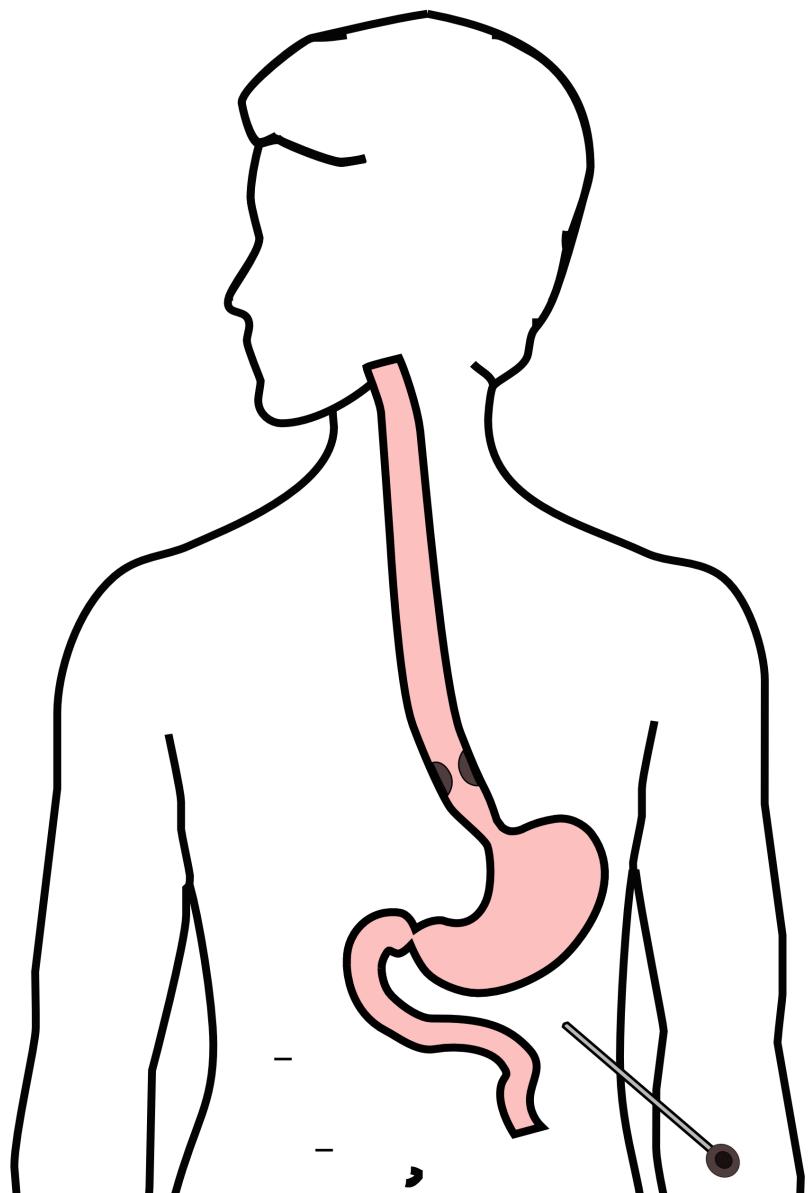
- Some esophageal cancers can spread inside the abdomen
- Areas of spread can be very small (grain of rice)
- Laparoscopy can detect spread inside the abdomen



Laparoscopy

A laparoscopy is performed under a general anesthetic.

- Several incisions $1/4"$ long
- A telescope is inserted to look inside the abdominal cavity.
- Biopsies can be performed.



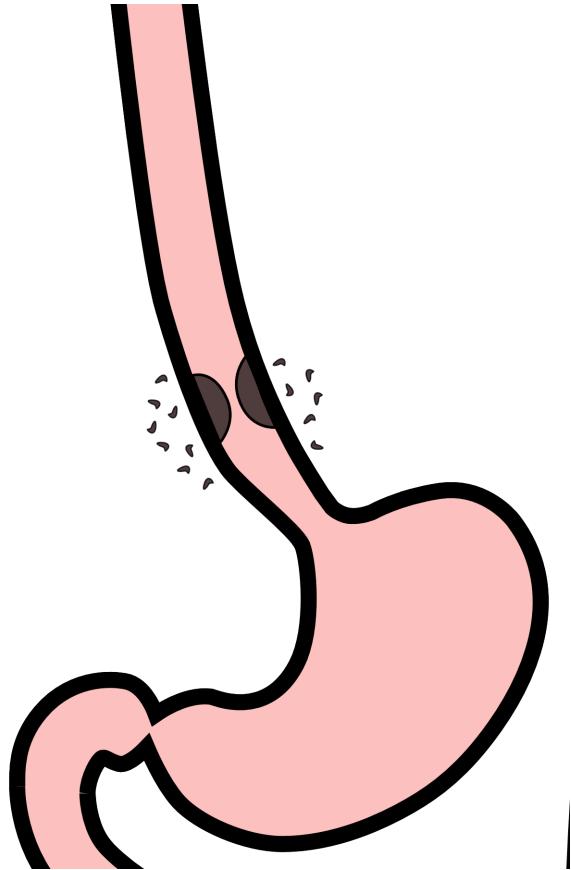
Treatment Plan

- Superficial (T1) ⇒ Endoscopic Therapy
- Localized (T1b/T2) ⇒ Surgery

- Locally-advanced (T3/N1) \Rightarrow Chemo \pm Radiation \rightarrow Surgery
- Metastatic (M1) \Rightarrow Chemotherapy

Locally-advanced cancers

Patients with locally-advanced esophageal cancer often have localized spread of cancer cells in the surrounding area



Locally-advanced cancers

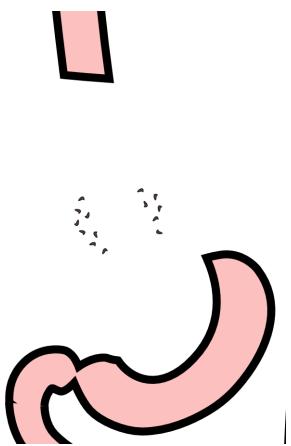
If locally-advanced cancers are treated with surgery alone...



Locally-advanced cancers

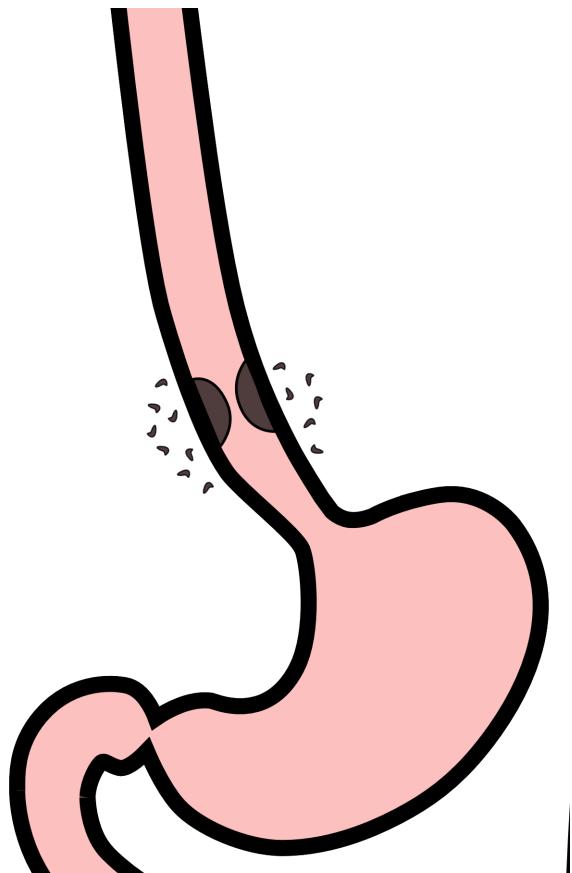
If locally-advanced cancers are treated with surgery alone...

There is a risk that cancer cells can be left behind



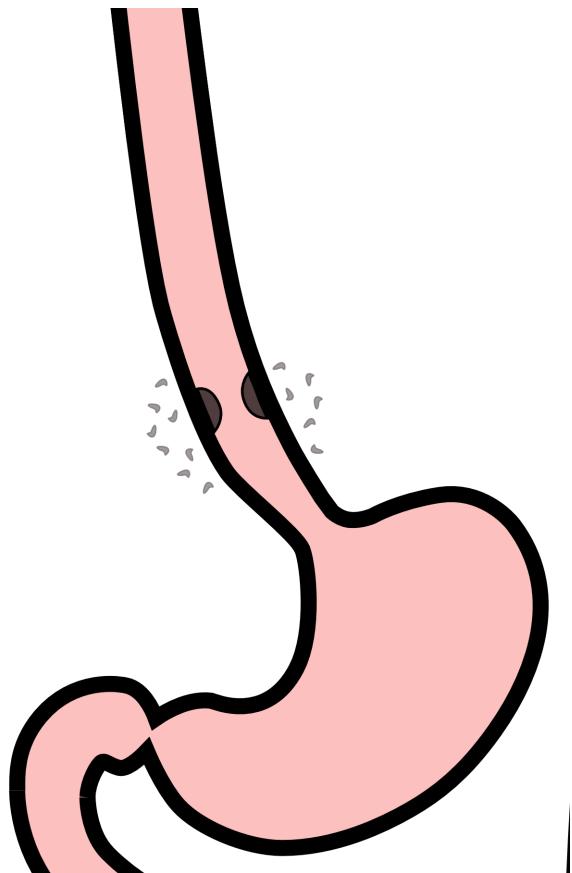
Preoperative Therapy

It is helpful to start with therapy *before* surgery that will shrink the cancer.



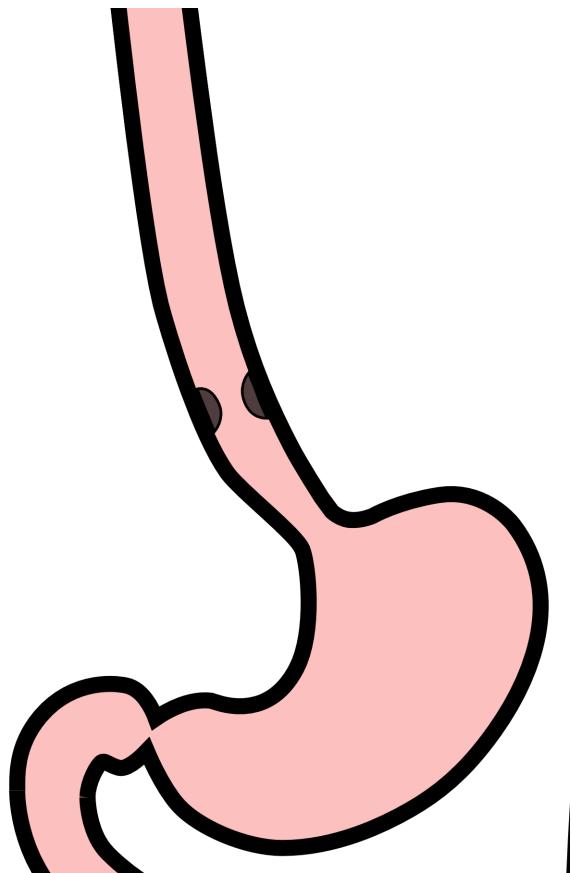
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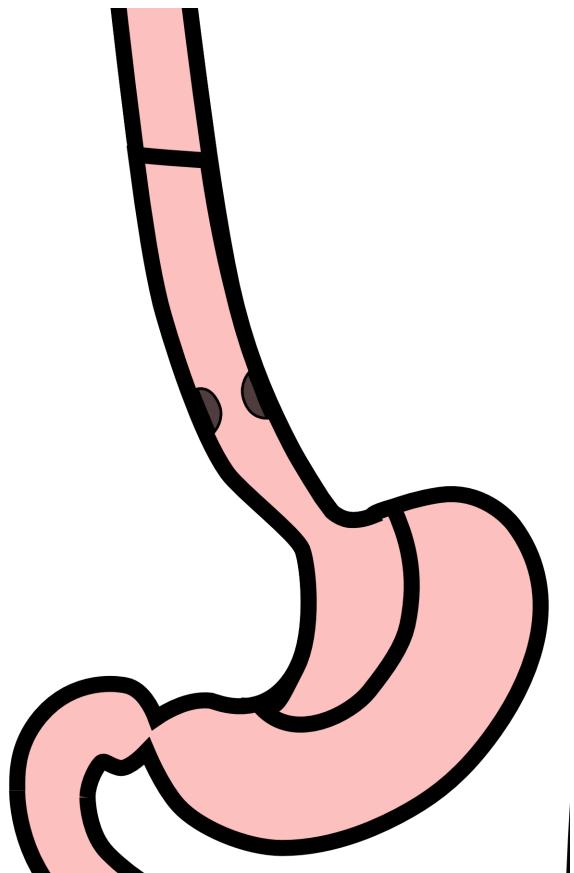
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Surgery after Preoperative Therapy

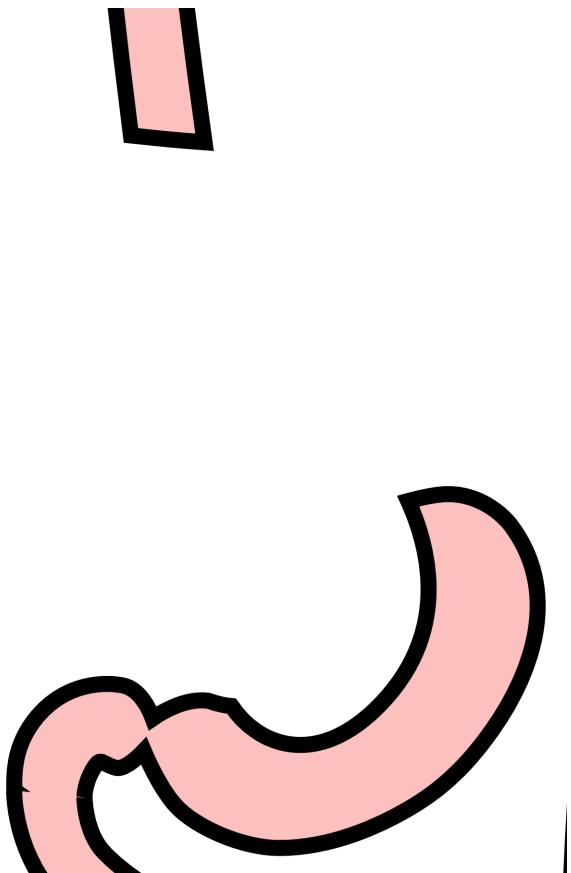
When surgery is then performed...



Preoperative Therapy

When surgery is then performed...

The risk of cancer recurrence is minimized



Chemotherapy + Radiation CROSS Trial

Researchers studied 363 patients with esophageal cancer

Patients were treated in two groups:

Surgery Alone

vs

Chemotherapy + Radiation → Surgery

Chemotherapy + Radiation CROSS Trial

Chemotherapy and radiation were given together over six weeks

Surgery Alone

vs

Chemotherapy + Radiation → Surgery ⇒ Longer Survival

Chemotherapy + Radiation CROSS Trial

Typical schedule for chemotherapy + radiation:

- Chemotherapy once per week for six weeks
- Radiation five days per week for six weeks (28 treatments)
- PET scan (or CT) 4 weeks after the end of radiation
- Surgery 8 weeks after the end of radiation

Chemotherapy + Radiation - Side Effects

Kills cancer cells in the esophagus and lymph nodes

Can also cause irritation of the lining of the esophagus.

Swallowing can be difficult the last two weeks of therapy.

Feeding tube may be needed for hydration and nutrition.

Locally-advanced Adenocarcinoma

“Sandwich” chemotherapy given before and after surgery:

Chemotherapy (8 weeks) → Surgery → Chemotherapy (8 weeks)

Two different drug combinations:

- FLOT (more effective)
- FOLFOX (better tolerated)

“Sandwich” Chemotherapy Drugs

FLOT

- 5-FU
- Leucovorin
- Oxaliplatin
- Taxotere

FOLFOX

- 5-FU
- Leucovorin
- Oxaliplatin

Adenocarcinoma Treatment Options

Chemo + Radiation

- Chemo + Radiation (6 weeks)
- Surgery

Chemotherapy

- Chemotherapy (8 weeks)
- Surgery
- Chemotherapy (8 weeks)

Adenocarcinoma Treatment Options

CROSS Chemo + Radiation

- Longer track record (14 years)
- Better tolerated
- Port usually placed
- Eating gets worse → better
- May need feeding tube

FLOT Chemotherapy

- More effective than CROSS
- More side effects
- Port always required
- Eating gets slowly better

- Less likely to need feeding tube

Chemotherapy

Chemotherapy drugs are administered intravenously.

There are several options for intravenous access:

- Peripheral IVs in the hand
- PICC line (Peripheral Inserted Central Catheter)
- Central Venous Port

Chemotherapy Administration

Most chemotherapy is administered by vein.

Several options exist to administer chemotherapy through veins:

- Intravenous catheter in peripheral veins
- Peripheral Intravenous Central Catheter (PICC)
- Central Venous port

Peripheral IV catheter

A peripheral IV catheter involves placing a small tube into the veins, which is then used to give fluids or chemotherapy

A new catheter is placed for each dose of chemotherapy

Intravenous Catheter in Peripheral Vein (“IV”)

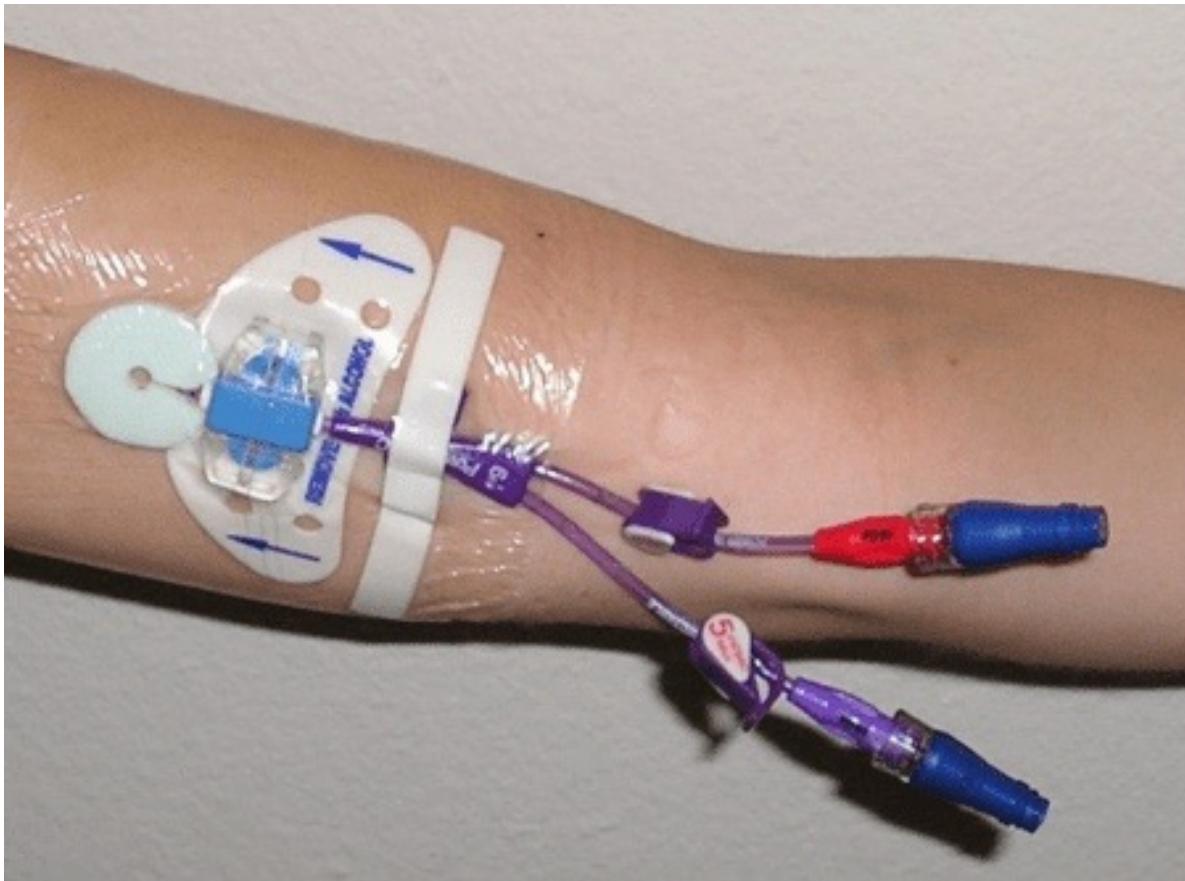
- IV catheter placed into a vein in the hand or arm
- Allows administration of chemotherapy and fluids
- Placed at the beginning of each dose
- Removed that day at the end of treatment
- Not suitable for FLOT chemotherapy



PICC Lines

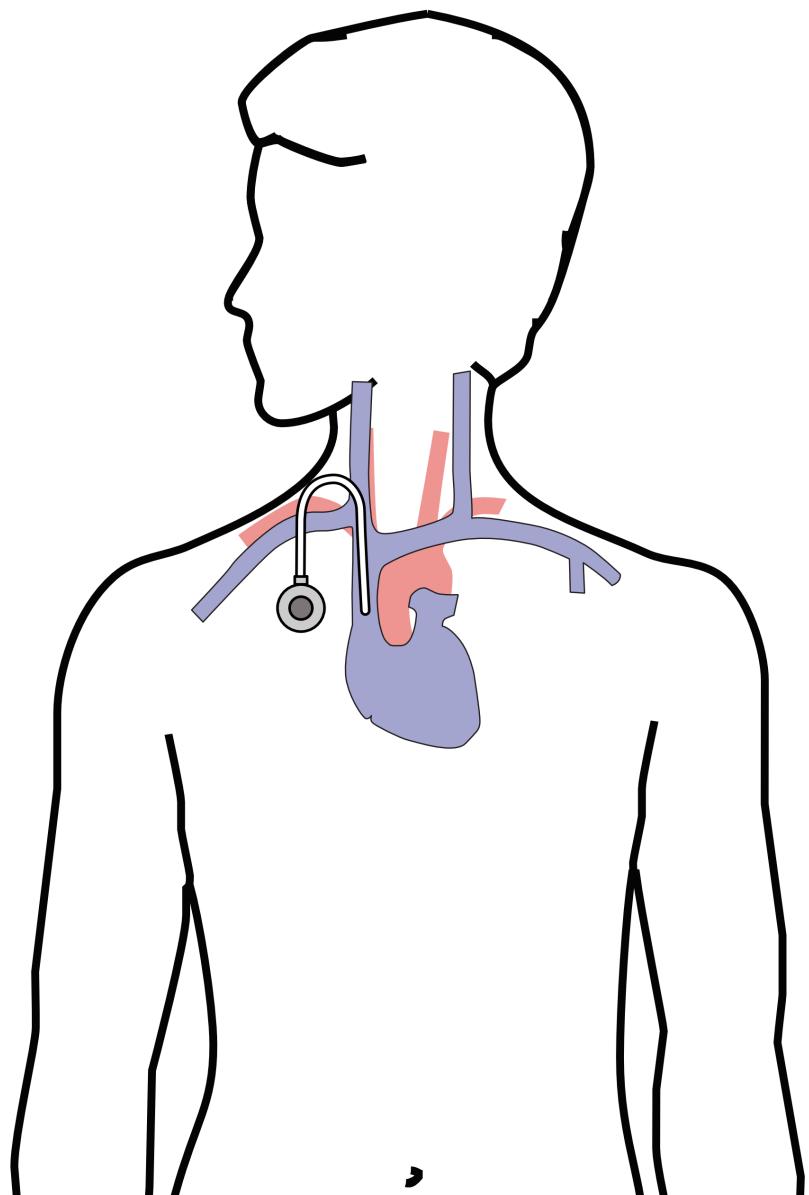
- Placed in Radiology
- Stay in place during all of treatment
- Can stay in place for weeks
- Special care is needed at home to keep it clean and dry
- Suitable for FLOT chemotherapy

Special care needed at home to keep catheter and dressing clean and dry



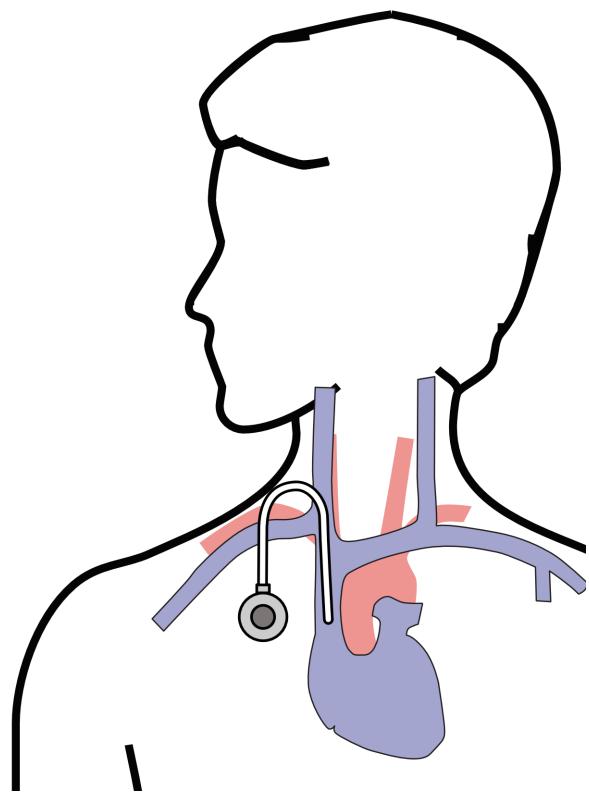
Central Venous Port

- Implantable device that makes the administration of chemotherapy easier
- May shower within 24 hours
- No special care at home
- Suitable for FLOT chemotherapy
- Allows for blood draws



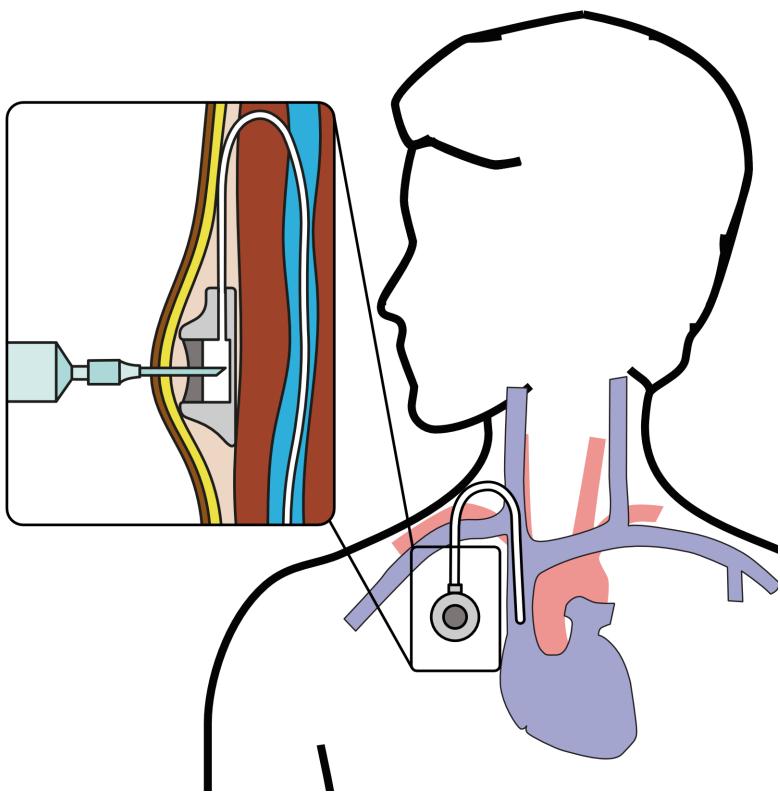
Central Venous Port

- Placed underneath the skin below the right collarbone
- Incision in the neck (1/4")
- Incision below the collarbone
- Sutures dissolve on their own
- "Super glue" on incisions



Central Venous Port

When it is time for chemotherapy, a needle is inserted through the skin into the port



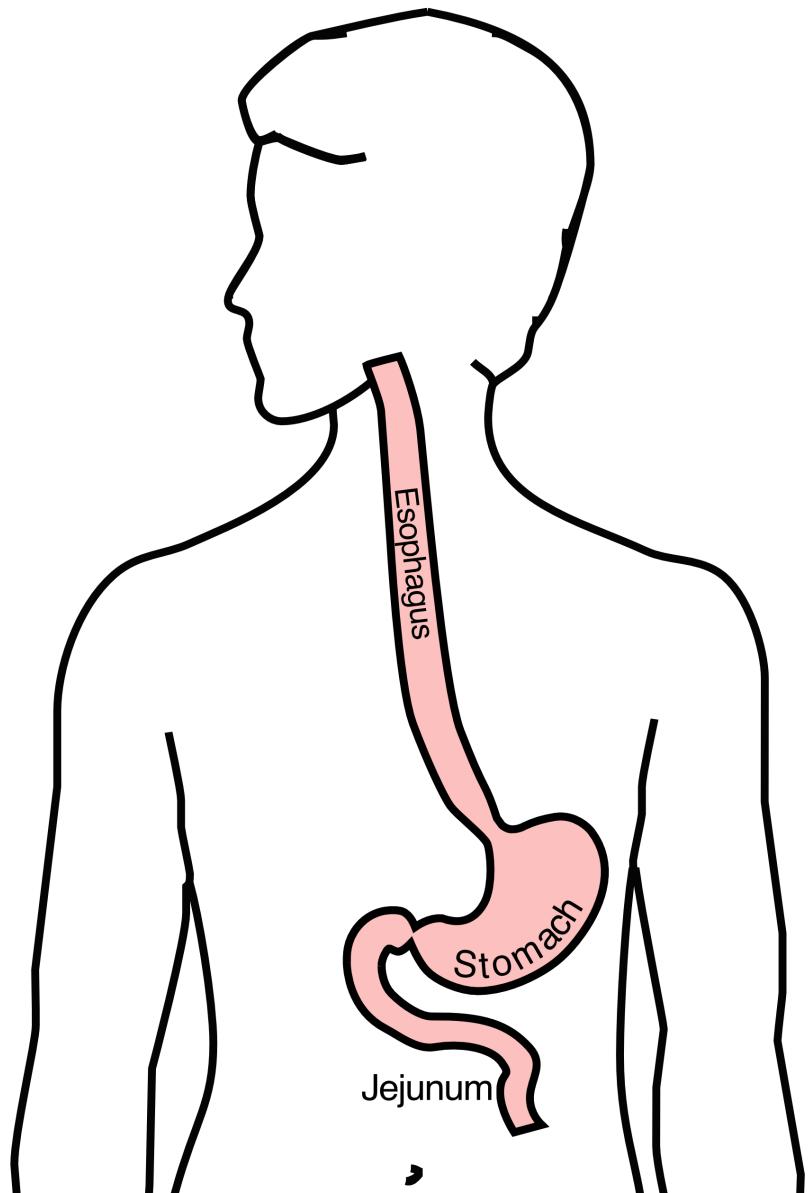
Restaging

CT or PET scan will be performed after preoperative therapy

- Surgery performed after restaging
- Timing depends upon recovery from therapy

GI Tract Anatomy

- Esophagus delivers food to the stomach
- Stomach stores food and delivers it in small quantities to the jejunum
- Jejunum begins digestion in the small intestines



Protein Needs

- Men: Average 75 grams/day
- Women: Average 60 grams/day

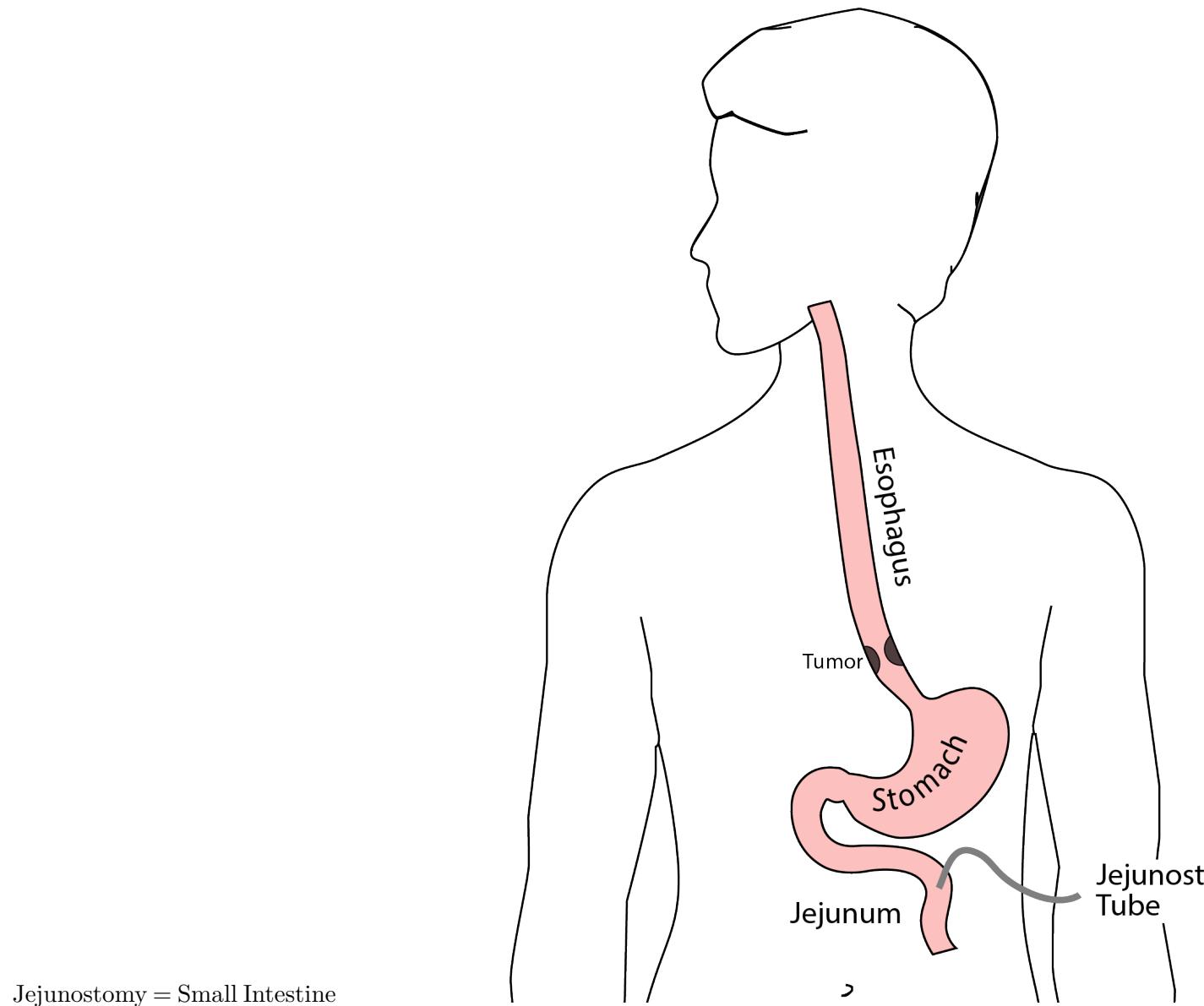
Protein Shakes

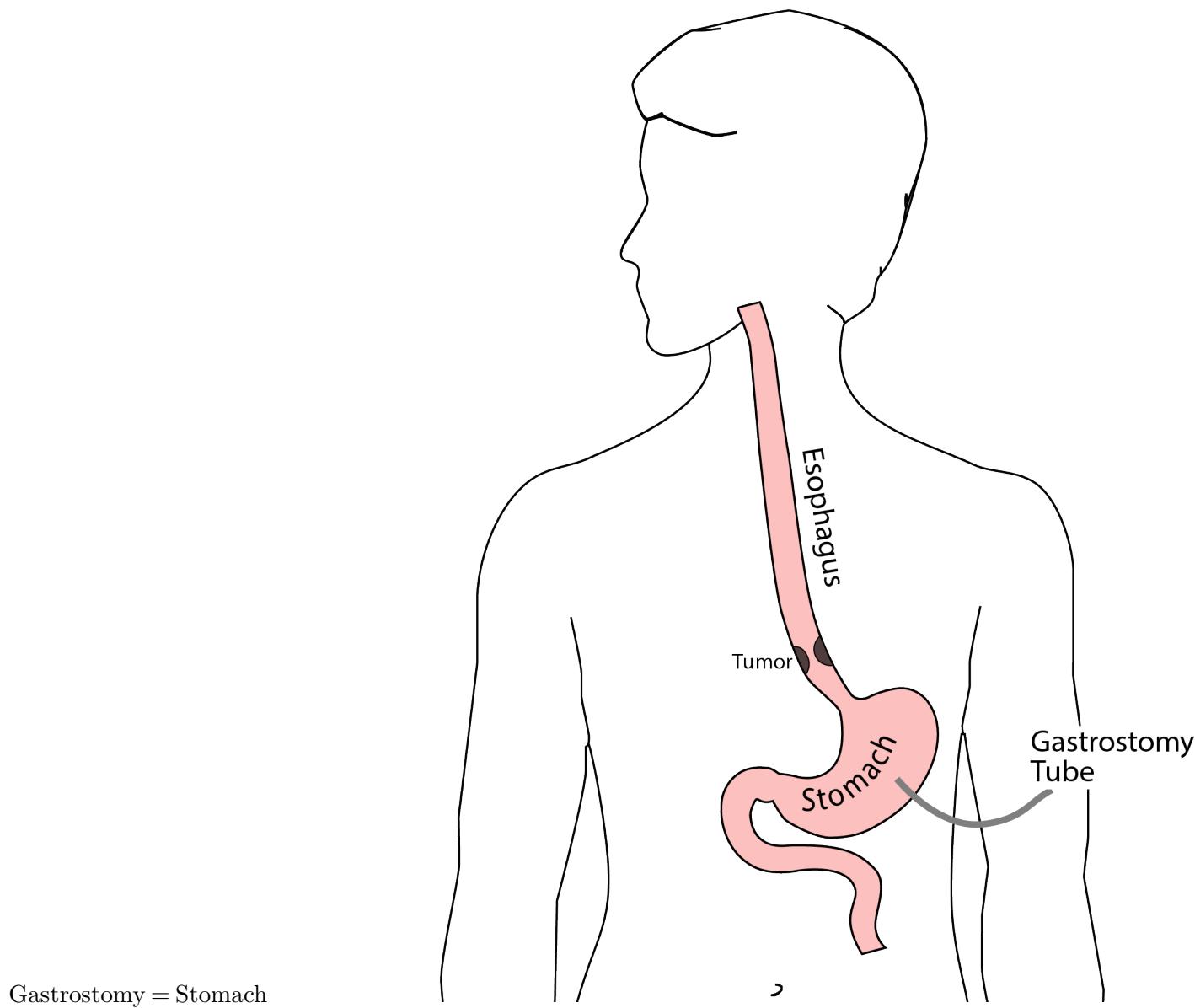
Protein Shakes can provide protein with minimal sugar



Protein Shakes

Feeding Tubes





Gastrostomy Tube

Feeding Gastrostomy

A gastrostomy tube allows feeding with a syringe, which can be done several times per day.

When it's not being used, the gastrostomy tube can be hidden underneath clothing.

For patient who later need surgery on the esophagus, it will be necessary to remove the

gastrostomy tube and place a jejunostomy tube, as the stomach frequently used to create a new esophagus

Gastrostomy Tube Methods

A gastrostomy tube can be placed either by endoscopy, which is called a PEG tube

A gastrostomy tube can also be placed by laparoscopy, which is usually preferred if surgery on the esophagus is planned in the future.

Your surgeon will help you decide which kind of tube is best for you. This is especially important if you will need esophageal surgery in the future, as the stomach is frequently used to make a new esophagus

Gastrostomy Tube

- Outpatient Placement (go home the same day)
- Central venous port can be placed at the same time (if needed)

Jejunostomy tube

The other type of feeding tube is a jejunostomy.

A jejunostomy tube is placed into the small intestines. Because the small intestine is used to receiving food in small quantities, a jejunostomy tube requires the use of a pump to deliver feedings gradually over a matter of hours.

In general, feedings are done at night in order to allow you to be active during the day

Jejunostomy

A jejunostomy tube is used in cases where it's not possible to place a gastrostomy tube, such as when there is a tumor in the stomach. A jejunostomy tube is routinely used after esophageal surgery, so in patients who need help with nutrition prior to surgery, it makes sense to put in a jejunostomy tube before surgery. The same tube can then be used for nutrition both before and after surgery.

Surgery

[Surgery Slideshow](#)