

UPPER ENDOSCOPY 101

This is intended as a basic review of indications, techniques, and maneuvers of EGD (esophagogastroduodenoscopy).

As the name implies, EGD allows visualization of the esophagus, stomach, and the first portion of the small bowel (the duodenum).

For EGD in the adult, three main endoscopes are used. (At UNC, we use Olympus scopes. Pentax and Fujinon are the other main competitor brands.) A standard scope has up-down and left-right tip deflection dials and two buttons. The top button (red) is for suction; the bottom button (blue) serves as the lens wash (when depressed) and as the air insufflation button when the hole is covered. The mnemonic SAW may help for suction of air-water. In addition, there are buttons that capture/freeze the images on the screen for obtaining photographs. The number and size of the instrument channels vary:

- a) GIF Q140 – The standard upper scope containing 1 (one) channel/biopsy port for insertion of instruments.
 - b) 300CT, 2T, 2T-20, 310-D – These are the “therapeutic scopes” and have a larger diameter and contain 2 (two) biopsy/instrument channels.
 - c) MR100 enteroscope – This is a longer scope used to visualize a longer portion of the small bowel beyond the fourth portion of the duodenum.
- 1) Processor/video monitor – What the scope attaches to so that the image can be viewed/stored, which includes a light source for the scope.
 - 2) A nurse/assistant must be present to administer and monitor sedation and to monitor the patient’s vitals and maintain the airway. The nurse assists the endoscopist by obtaining instruments and handing specimens obtained.
 - 3) Miscellaneous items, including lubrication jelly, dry washcloths, irrigation syringe, oral suction device, heat source (we use the ERBE), and current grounding pad.

Before doing the endoscopy, you should perform a brief history and physical exam and obtain informed consent from the patient (or a power of attorney). This involves explaining to the patient what the procedure involves, its potential risks, and alternatives to the procedure. We have standardized consent forms for upper endoscopy that we give to the patient (there is a different one for PEG placement). It is a good idea to read over these forms. I usually explain the procedure to the patient in simple terms and for the most part emphasize there are three main risks: 1) reaction to the sedation, 2) bleeding, 3) perforation. (When doing a PEG, I also include infection.)

Preparation: The patient should be NPO for at least 6 (six) hours prior to the exam and should have an I.V. in place for sedation. The standard drugs used for EGD include Demerol and Versed and sometimes droperidol. Sedation dosing varies from endoscopist to endoscopist. In an otherwise healthy patient, a good starting dose is 50 mg of Demerol and 2 mg of Versed. This dosing will need to be adjusted based on a variety of situations. For example, someone who is hypotensive will not be able to be administered as much sedation (Demerol can lower BP); a frail, elderly patient may require less medication to be sedated. A good rule of thumb.... “Start low, go slow.”

Other Things to Think About:

1. ASA/NSAID use: In the absence of a preexisting bleeding disorder, endoscopy can be performed in patients taking ASA/NSAIDS.
2. Coags/platelet counts prior to the procedure: See back of the GI Procedures requisition form. If there is no known bleeding disorder and no reason to think that a person is at high risk for bleeding (young, healthy, no bleeding gums, nosebleeds, family history of bleeding, etc.), you do not need to check coags prior to the procedure. (Relative contraindications to EGD are $INR \geq 1.4$, $Plts < 50,000$. Consider FFP, Vitamin K, Plt transfusions prior to the study, if indicated.)
3. Coumadin. For elective procedures, delay the procedure until INR is normalized. For patients at high risk for thromboembolism (a-fib/prosthetic valves), hold Coumadin 3-5 days pre-procedure and give heparin while INR is subtherapeutic.
4. EGD is contraindicated in the setting of a perforated ulcer or perforated esophagus as well as if the patient is peri-MI.
5. SBE prophylaxis: There are different published guidelines for when antibiotics are indicated for endoscopic procedures – different organizations have different guidelines. (We follow the AGA guidelines, which are printed on the back of the GI Procedures requisition form.)

In terms of EGD-related procedures, when doing variceal sclerotherapy or dilatation of strictures, antibiotics should be given to patients with prosthetic valves, hx of endocarditis, synthetic vascular grafts, and systemopulmonary shunts (Abx = 2g ampicillin or 1 g vancomycin in pen-allergic patients.) When placing a PEG, antibiotics are also indicated in all patients (a cephalosporin or its equivalent). In all other EGD indications, antibiotics are either not recommended or there is “insufficient data” to make specific recommendations.

Passing the Endoscope:

- 1) Sedate the patient – The patient should be sedated, but alert enough to be able to follow commands as you coax them to swallow to facilitate passing the scope.
- 2) The patient should be recumbent in the left lateral decubitus position. A bite block is put in their mouth and held in place with a band.
- 3) The scope is held with the left hand on the controls and the right hand on the shaft. The patient’s neck should be partially flexed. The scope is then passed through the hypopharynx and slowly guided past the epiglottis to rest on the cricopharynx. (This should be in the



midline, posterior to the larynx and between the pyriform sinuses. It is usually between 15-18 cm from the incisors. Coaching the patient to take a swallow will help the scope past the UES and into the esophagus.)

- a) If you are having difficulty seeing the anatomy, DO NOT force the scope! There may be anomalies that make it more difficult to pass the scope (e.g. a Zenker’s diverticulum), and forcing the scope can cause a perforation.
- 4) Once you pass the UES, you will be in the esophageal lumen. For the most part, the esophagus is a “straight shot” and you should not need to torque or turn the dials much. Adding air (insufflation) by pressing the blue button will facilitate visualization of the pertinent structures.

- 5) There are two techniques that need to be mastered – 1) getting into the third duodenum and 2) retroflexing the scope.
 - a) Once you are in the duodenal bulb, slowly advance to the second duodenum. By simultaneously torquing the scope and the shaft to the right and “thumbing up” (counterclockwise rotation) on the “big wheel,” you will slip around this turn and pass into the third duodenum.
 - b) The retroflex is important for viewing the cardia of the stomach, the angulus, and the gastric side of the GE junction. This view is best obtained by maneuvering so that you are facing the pylorus. Slowly pull back into the antrum and the thumb up on the big wheel as you advance the scope back toward the pylorus. The scope will now be in a J-position facilitating visualization of the aforementioned structures. Rotate the left-right dial to full right (clockwise) and apply the brake to hold it there.

What are the indications for endoscopy? There are many indications for EGD, and it is beyond the scope of this handout to cover them all in detail. Simply stated, the two broad categories of indications are diagnostic and therapeutic.

Diagnostic: You will usually use the standard upper scope (GIFQ140), with the goal being to visualize the esophagus, stomach, and small bowel. This may be performed for a number of reasons:

- 1) To localize/establish the site of an upper GI bleed (i.e., bleeding from a site proximal to the ligament of Treitz such as esophageal varices, portal gastropathy, ulcers, Mallory-Weiss tears).
- 2) To provide visualization of abnormalities picked up on other studies (CT/UGISBFT/barium swallow) such as ulcers, strictures, and cancers.
- 3) To follow up healing of previously diagnosed/treated gastric ulcers.
- 4) To evaluate symptoms of dysphagia. (Note that the history is the most important part of the evaluation of dysphagia.) Nine times out of ten you should already know what you will find on the EGD based on the history that you have obtained. Remember that is important to elicit a time course of the symptoms (i.e., to differentiate between solid vs. liquid dysphagia, Is the problem initiating swallowing, or does the food “get stuck” going down? Does the food eventually go down? What does that patient have to do to get the food to go down?) There is some controversy as to what the first

test should be with dysphagia. A barium swallow is another test that is often diagnostic in this problem. E-manometry is a secondary modality.

- 5) To evaluate symptoms of GERD/dyspepsia. Do not forget H. pylori testing (the CLO test).
- 6) To evaluate abdominal pain.
- 7) To evaluate “chest pain of undetermined etiology.” After a negative cardiac evaluation, about 70% of chest pain is found to have an esophageal etiology.
- 8) To evaluate symptoms of gastric outlet obstruction (GOO).
- 9) To evaluate odynophagia (especially in immunocompromised patients, i.e., HIV+, s/p BMT, s/p solid organ Tx, on immunosuppression, etc.). Look for things like HSV or CMV in addition to Candida.
- 10) To evaluate mucosal damage after caustic ingestion.
- 11) To localize a bleeding source in iron deficiency anemia in the setting of a negative colonoscopy. Things to look for include watermelon stomach, AVM's, Osler-Weber-Rendu lesions, ulcers, cancers. Also look at the small bowel for celiac sprue and evidence of SB parasitic infections.

Therapeutic: There are therapeutic implications/indications for EGD. These include but are not limited to

1) Removal of ingested foreign bodies.

This is generally more common in pediatrics, but at UNC we see a lot of our friends from Central Prison who are apt to ingest a variety of objects in order to get a “road trip” out of “the big house.” Some of the favorite objects include pencils, forks and batteries, but we have also seen razor blades, hanger tops, dominos, and springs from beds. Foreign body removal presents a challenge to the endoscopist. Not only is it often difficult to grasp the object, but once grasped, a dilemma may exist in the best way to extract the object. It is advisable to think through your retrieval approach in vitro before doing the actual in vivo exam. This helps you to anticipate problems and to have solutions prior to the problem occurring. It is often advisable to use “overtubes” to protect the esophagus from perforations with sharp objects. In addition, there is a “foreign body retrieval kit” stocked with a plethora of helpful gadgets for foreign body removal including a “coin grasper,” “pelican forceps,” endo-scissors, snares, and a variety of other toys. Take a look

at the box and familiarize yourself with some of the other instruments – you never know which ones might come in handy some day.

2) Treatment of variceal bleeding.

Varices are graded on a scale of 1 to 4 (1 = present, but decompressed with insufflation of air; 2 = larger, not compressing with air insufflation; 3 = still larger (rather subjective here between 2 & 3), and 4 = columns touching (“kissing”) in the midline. Things to look for with varices are active site of bleeding and “red whale signs” (stigmata of recent bleeding, i.e. hyperemic red spots on the vessels).

The two main therapeutic modalities for treating varices include sclerotherapy with morrhuate (not used as much any more) and banding (there are a variety of companies that make the banders – Wilson Cook makes the “tried and true” 6-shooter; Microvasive makes the Sure-view).

Banding is best performed by starting at the distal most area (i.e. the lower esophageal sphincter) and then moving up more proximally, usually done on varices of grade 2 and higher and involves loading the banding device onto the end of the scope. There is a “suction-cup” end into which the varix is suctioned by holding down the red button on the scope head. The band is released on top of the varix. It is generally inadvisable to perform banding of gastric varices (too much collateral circulation to be of benefit), but sometimes you will see a “feeder vessel” in the retroflexed position. This will be a vessel high in the cardia just on the gastric side of the GE junction. A carefully placed band here is often successful in decompressing the variceal columns in the esophagus.

To perform **sclerotherapy**, you will need a sclero-needle injector and a sclerosing agent (5% morrhuate) or ethanoloamine. The varix is visualized. The sclero-needle is passed through the instrument channel. The needle is put out, the varix is impaled with the needle, and the morrhuate is injected in 1-2 cc increments). (You should not use more than 20 cc’s in one session.)

This leads to an important (and often forgotten) point: Always remember that you need to protect the airway. Often in situations of acute upper GI bleeding we lose site of this fact and want to jump right

in and stop the bleeding and forget that the lungs may be filling with blood as we are trying to do this. It is often advisable to perform elective endotracheal intubation of the patient prior to the EGD in order to protect the airway.

3) Non-variceal bleeding:

Sources of upper bleeding other than varices include ulcers, angiodysplasia, and Mallory-Weiss tears. We have a variety of modalities at our disposal to control these situations:

Injection Therapy: Use of a sclerotherapy needle. Can use different solutions including epinephrine (the epi is 1:1000 1 ml mixed with 9 ml of saline to make it 1:10,000) and dehydrogenated alcohol.

Heater Probe: Direct heat thermal cautery by thermal conduction. Use of a heater probe that has a central lumen for washing. Apply the probe onto site for cautery. Pressure onto the site is needed for this method to be effective. Apply heat by depressing the foot pedal for 1-2 seconds. Wash through the lumen prior to lifting the probe from the mucosa. Depth of injury is 1-3 mm.

APC (Argon Photo Coagulator): Works by igniting a flow of argon gas distributed through the probe. Causes dessication of the tissue in the path of the probe. Depth of burn is 3 mm. Need to be about 1mm away from the tissue when depressing the foot pedal to ignite the gas.

4) PEG (Percutaneous-Endoscopic-Gastrostomy) Placement:

Indication is for establishing a long/short-term route of enteral feeding. (This is one of the procedures requiring prophylactic antibiotics.)

There are a number of contraindications for placing a PEG, including 1) the presence of ascites, 2) morbid obesity, 3) extensive scarring of the anterior abdominal wall, 4) portal gastropathy, 5) esophageal obstruction (preventing passage of the scope to place the tube).

The most commonly used kits for PEG are “push-type” gastrostomy tubes.

This procedure requires an endoscopist as well as a surgeon.

An endoscopy is performed, during which a wire is deposited into the stomach through the anterior abdominal wall and retrieved as the endoscopist snares it, pulling it up through the esophagus and out of the mouth. The PEG is then guided into the stomach over this guide wire and pushed through the anterior abdominal wall.

The procedure is performed under sterile conditions. The abdomen is cleaned with betadine. The surgeon wears sterile gloves/cap/gown. The site on the anterior abdominal wall where the PEG will be placed is identified by transillumination and by indentation. The site should be at least 2 cm away from the rib margin. The site on the skin is anaesthetized with 3-5 cc's of 1% lidocaine. A small (1-cm) horizontal skin incision is made with a scalpel. A Seldinger trocar is inserted perpendicularly through this incision. Once visualized by the endoscopist, the stylet is removed, and the guide wire is passed through the needle and snared by the endoscopist. This snared wire is pulled up through the esophagus and out of the mouth. The PEG is threaded over the wire and is pushed antegrade into the stomach and through the abdominal wall. The surgeon pulls the tube until the bolster lightly touches the gastric mucosa. The bolster on the end of the tube prevents it from pulling through the abdominal wall easily.