Lower GI Endoscopy

CORE | January 06, 2025 | Terence Jackson, MD, and Jeffrey Marks, MD

Learning Objectives

1. Indications and Contraindications

Recognize diagnostic and therapeutic indications for lower gastrointestinal endoscopy.

- Indications
  - Urgent/emergent: lower gastrointestinal bleeding and endoscopic decompression
  - Elective: screening, staging, surveillance
- Contraindications
  - Relative: cardiopulmonary instability and coagulopathy
  - Absolute: acute severe colitis, enteric perforation, and patient refusal

2. Operative Anatomy

Identify endoscopic anatomic features and key landmarks of the lower gastrointestinal tract.

- Anus/rectum
  - Anal verge. This is the first landmark to be visualized. At this time, the perianal area is also evaluated for benign conditions such as abscesses, fissures, fistulae, and condyloma, as well as for malignant conditions such as anal cancer.
  - Dentate line. This is the squamocolumnar junction found just as the colonoscope enters the anal verge. It can be identified as a faint change in color and texture of the lining of the anal canal.
  - Rectal valves/folds. Rectal folds of Houston are incomplete haustral folds (upper, middle, and lower) that divide the rectum into three segments. These segments are used to describe lesions when found in the rectum. Distance from the dental line must also be used when describing the location of rectal lesions. Retroflexion is also performed in the rectum to identify internal hemorrhoids and very low rectal lesions.
- Colon
  - Rectosigmoid junction. This typically tortuous and angulated area is also commonly affected by diverticula and diverticulitis. Therefore, it is necessary to be vigilant in the identification of strictures or stenosis and to take care when progressing against resistance.
  - Diverticuli. In most cases, these appear as small lumens aside from the larger lumen. In some circumstances, they may be larger and appear as a false lumen. Again, it is necessary to take care not to advance into them, leading to perforations in rare cases.
  - Descending colon. This is usually a straight segment with a circular appearance and relatively fewer diverticuli.
  - Splenic flexure/transverse colon. This may be noted as a bluish-gray hue at the end of a fluid-filled descending colon to a typical air-filled transverse colon. The transverse colon can be identified by triangular haustra with a prominent taenia coli.

- Hepatic flexure. This may be identified as a bluish color at the end of the transverse colon. This leads to the ascending colon, which is typically a shorter segment of the colon.
- Cecum. This can be identified by a blind-ending larger lumen with thickened/hypertrophic taenia, which coalesce at the caput.
- Ileocecal valve. There is also a thickened fold noted in the vicinity corresponding to the ileocecal valve. This can sometimes be identified by noting some prolapsing small bowel mucosa or biliary discharge emanating from it. After intubating the ileocecal valve, the lack of haustra and the presence of hypertrophic mucosa or lymphoid tissue and terminal villi verify the location of the endoscope in the terminal ileum.
- Appendiceal orifice. This may be identified as a small slit in a whirl of mucosal folds.

3. Preoperative Preparation

Be aware of several points well before the planned endoscopic procedure.

- A thorough history and physical examination must be performed prior to procedural planning and also immediately before the procedure.
- Different aspects need to be kept in mind during scheduling, such as the need for:
  - Endoscopy suite or operating room
  - Sedation or general anesthesia
  - Consideration of different endoscopic equipment, including:
    - Type of endoscope (flexible sigmoidoscope; adult colonoscope [different lengths]; gastroscopes, which can be therapeutic or diagnostic; and side-viewing duodenoscope), A therapeutic gastroscope has one to two channels for instruments and is of a greater diameter to accommodate larger instruments, as opposed to the slim gastroscope or diagnostic gastroscope, which has a single narrower channel and works fairly well for most common purposes.
    - Designated energy device
    - Disposable endoscopic items (wires, snares, baskets, and stents). These need to be selected depending on the procedure planned.
- Patient preparation is essential.
  - The risks and benefits of the proposed procedure as well as alternatives must be explained to the patient in order to obtain informed consent. The risk of perforation is 0.1% for diagnostic procedures and up to 3% if therapeutic procedures such as polypectomies or endoscopic mucosal resection is performed.
  - It is important to explain the correct bowel preparation (prep) required and its benefits. The most commonly used bowel preps are polyethylene glycol and magnesium citrate. If the procedure planned is only a sigmoidoscopy, an over-the-counter Fleet enema prep may be enough. Risks of bowel prep include dehydration or worsening kidney function in patients with marginal kidney function. Bowel prep must be individualized for every patient. For example, either no prep or a low-volume prep or enema must be used for a person with stenosis or partial obstruction to minimize the risk of aggravating the obstruction or causing perforation. No periprocedural antibiotic prophylaxis is required.
- While preparing the patient for sedation/anesthesia, it is essential to keep the following points in mind:
  - Risks and benefits of sedation. This should include a discussion about the possibility of respiratory failure, cardiac complications, and aspiration. Rarer

complications of sedating and analgesic medications must also be considered (eg, malignant hyperthermia and anaphylaxis). The endoscopist must be familiar with the pharmacology and treatment of medication-related complications. A crash cart must be available in the endoscopy suite in case of cardiopulmonary arrest.
        - Importance of basic life support
        - Need for anesthesiology support
        - Formal preanesthetic evaluation for select patients with multiple comorbidities
    - It is key to identify and set up the required equipment.
        - Selected endoscope
        - Light source
        - Suction
        - Necessary forceps/snares
        - Electrocautery units

4. Key Steps of the Procedure

Understand the details of the endoscopic procedure.

- Positioning
    - Left lateral and frog-leg positions are commonly used options.
    - Supine positioning may also be used, particularly in cases of endoscopy via colostomy.
- Equipment check. Ensure that the light source, suction, irrigation, and positioning of video screens are appropriate.
- Sedation. Understand the pros and cons of different sedative and analgesic medications, and make the appropriate choice based on the patient's clinical characteristics.
- Endoscope advancement
    - Keep the lumen in view or use the "slide by" technique to safely advance the endoscope.
    - Choose between the use of (1) air or carbon dioxide insufflation or (2) water irrigation to facilitate the view of the lumen without overinsufflation.
    - Avoid advancing the endoscope blindly.
    - Recognize when the endoscope starts looping and be familiar with techniques to straighten it.
    - Be familiar with the use of stiffening the endoscope and be able to advance through a loop.
    - Properly visualize the colon during withdrawal in appropriate time.
- Special techniques. Be familiar with the following:
    - Different types of polypectomy forceps and snares
    - Use of electrosurgical energy
    - Techniques for hemostasis
    - Advanced techniques such as dilation and endoscopic stenting (some knowledge)

5. Intraoperative Decision Making

Apart from the methods mentioned in Learning Objective 4, demonstrate familiarity with how patient positioning and transabdominal pressure are very useful in challenging colonoscopies.

- Transabdominal pressure in conjunction with patient repositioning to supine or right lateral and sometimes prone may help advance the endoscope.
- Abdominal pressure also helps reduce and prevent looping of the endoscope. This can be performed by having the assistant or bedside nurse use one or two hands to push

down into the abdomen. Sometimes in leaner patients the loop may be palpable and direct pressure may be applied.

6. Complications

Be alert for procedure-related complications.

- Anesthetic-related complications include cardiac and pulmonary problems such as arrhythmias, vasovagal reactions, myocardial infarctions, and aspiration.
- Endoscopy-related problems include colonic perforations and postpolypectomy bleeding.

7. Assessment of Outcomes

Learn to communicate the results to the patient. After high-quality screening colonoscopy, surveillance guidelines in average-risk individuals are:

- No polyps: repeat colonoscopy in 10 years
- One to two tubular adenomas (<10 mm): repeat colonoscopy in 7 to 10 years
- Three to 4 tubular adenomas (<10 mm): repeat colonoscopy in 3 to 5 years
- Five to ten adenomas (<10 mm): repeat colonoscopy in 3 years
- Adenoma (>10 mm): repeat colonoscopy in 3 years
- Adenoma with tubulovillous or villous histology: repeat colonoscopy in 3 years
- Adenoma with high grade dysplasia: repeat colonoscopy in 3 years
- More than 10 tubular adenomas: screening in 1 year and consideration for genetic testing
- Piecemeal resection of adenoma (>20 mm): repeat colonoscopy in 6 months
- 1–2 sessile serrated polyps (SSPs) <10 mm: 5–10 years
- 3–4 SSPs <10 mm or hyperplastic polyp ≥10 mm: 3–5 years
- 5–10 SSPs, SSP ≥10 mm, SSP with dysplasia, or traditional serrated adenoma: 3 years

Discussion Questions

Question 1

A 65-year-old Caucasian woman with a history of diabetes and hypertension presents to her primary care physician with occasional blood-stained stools. What are the various indications for colonoscopy?

Key Discussion Points

a. Screening/diagnostic reasons
b. More specific pathologic reasons such as inflammatory bowel disease/diverticulitis
c. Surveillance for familial disorders
d. Postoperative indications

A 50-year-old morbidly obese man with a history of chronic constipation and hypothyroidism presents for his screening colonoscopy. The procedure is very demanding, and the endoscopist is unable to reach the cecum. What morphologic characteristics of the colon can make endoscope advancement challenging?

Key Discussion Points

a. Length of colon
b. Tortuosity
c. Diverticulosis

d. Postoperative status

Question 3

A 68-year-old man with a history of coronary artery disease needed coronary artery bypass grafts 4 years ago. He has heart failure, atrial fibrillation, peripheral arterial disease, chronic obstructive pulmonary disease, and diabetes. He presents to the gastroenterologist with blood per rectum. What conversational key points should be discussed with the patient as part of informed consent?

Key Discussion Points

a. Indication for the procedure
b. Anesthetic plan and possible complications, including cardiopulmonary issues
c. Operative/procedural plan

Question 4

A 48-year-old African American man presents for his screening colonoscopy. During the procedure, he is found to have a 4-cm sessile, carpeting lesion in the descending colon. It appears friable and ulcerated. It is easily traversable and no other lesions are identified in the colon. What are the considerations/steps an endoscopist must take when encountering a polyp with malignant potential?

Key Discussion Points

a. Considerations:
    - Technique for biopsy
    - Use of electrosurgical energy
    - Technique for hemostasis
    - Inking for potential resection
b. Pathology follow-up
c. Communication with the patient

SCORE Resources

Gupta S, Lieberman D, Anderson JC, et al. Recommendations for follow-up after colonoscopy and polypectomy. *Gastroenterology.* 2020;158(4):1131-1153.

Short MW, Layton MC, Teer BN, Domagalski JE. Colorectal cancer screening and surveillance. *Am Fam Physician*. 2015;91(2):93-100.

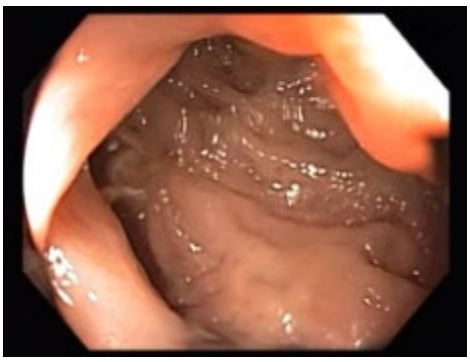
The American Board of Surgery's Entrustable Professional Activities - General Surgery. Flexible GI Endoscopy.

Additional Resources

ASGE Standards of Practice Committee, Saltzman JR, Cash BD, Pasha SF, et al. Bowel preparation before colonoscopy. *Gastrointest Endosc.* 2015 Apr;81(4):781-94.

ASGE Standards of Practice Committee, Fisher DA, Maple JT, Ben-Menachem T, et al. Complications of colonoscopy. *Gastrointest Endosc.* 2011 Oct;74(4):745-52.

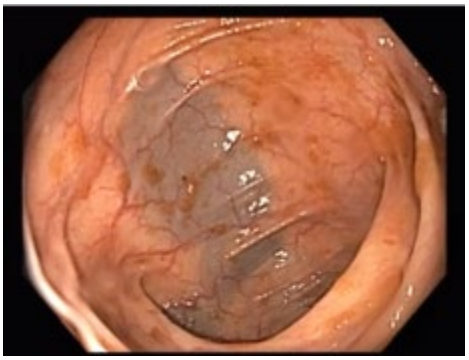
Images

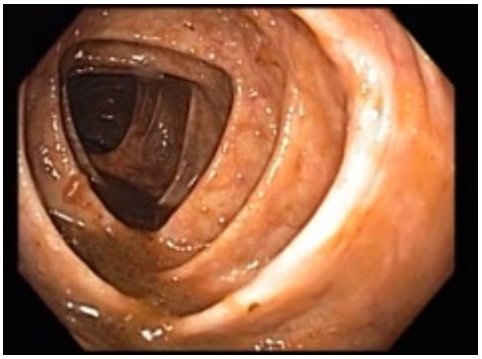

Anal verge. Courtesy of Dr. Mark Anderson and...


Dentate line. Courtesy of Dr. Mark Anderson a...


Rectal valves. Courtesy of Dr. Mark Anderson ...


Diverticulosis. Courtesy of Dr. Mark Anderson...

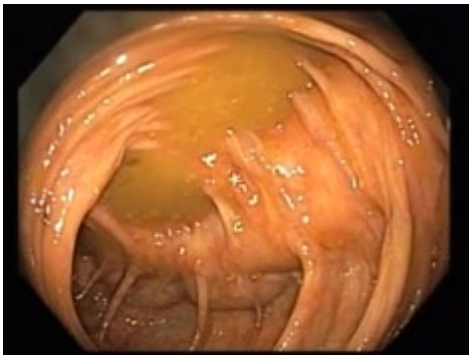

Splenic flexure. Courtesy of Dr. Mark Anderso...

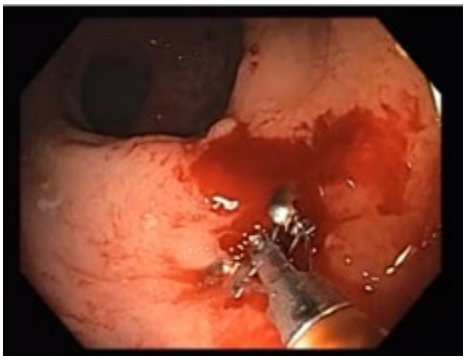

Triangular haustra. Courtesy of Dr. Mark Ande...


Hepatic hue. Courtesy of Dr. Mark Anderson an...


Cecum. Courtesy of Dr. Mark Anderson and Dr. ...


Appendiceal orifice. Courtesy of Dr. Mark And...


Ileocecal valve. Courtesy of Dr. Mark Anderso...


Postpolypectomy hemorrhage. Courtesy of Dr. M...


Terminal ileum. Courtesy of Dr. Mark Anderson...