

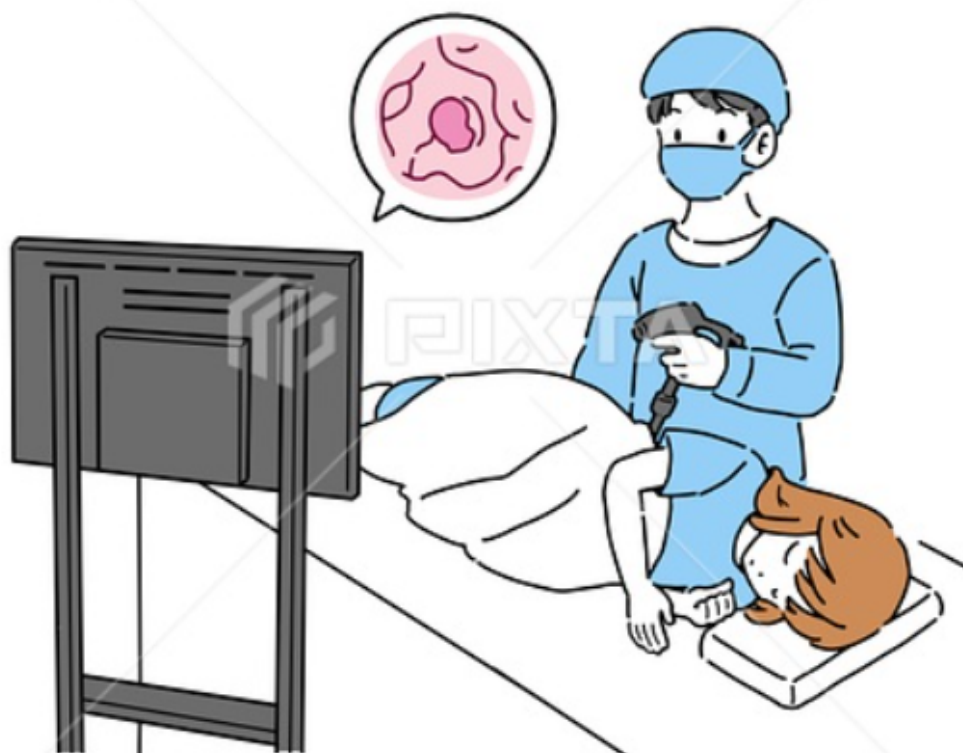


Colonoscopy Indications

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Preprocedure testing

- It is generally recommended that patients **not** undergo routine preprocedure laboratory testing, CXR, ECG
- Guidelines from the ASGE recommend preprocedure testing in the following settings:
- Pregnancy testing for women of childbearing potential who provide an uncertain pregnancy history
- Coagulation studies for patients with active bleeding, a known or suspected bleeding disorder (including a history of abnormal bleeding), an increased risk of bleeding due to medication use (eg, ongoing anticoagulant use, prolonged antibiotic use), prolonged biliary obstruction, malnutrition)

Preprocedure testing

- CXR for patients with new respiratory symptoms or decompensated heart failure.
- Hemoglobin/hematocrit for patients with preexisting significant anemia or active bleeding, or if there is a high risk of significant blood loss during the procedure.
- Blood typing for patients with active bleeding or anemia who are likely to need a blood transfusion.
- Serum chemistry testing for patients with significant endocrine, renal, or hepatic dysfunction if medications are to be used that may further impair function.

Absolute contraindications

- A competent patient who is unwilling to give consent
- An uncooperative patient in whom consent has been given but in whom adequate sedation cannot be achieved
- Toxic megacolon
- Fulminant colitis

Relative contraindications

- Acute diverticulitis
- Very large abdominal aortic aneurysms (particularly if they are symptomatic)
- patients who are immediately postoperative
- patients who have suffered recent MI, pulmonary embolism, or are currently hemodynamically unstable
- Severe coagulopathies
- Colonoscopy can generally be performed safely during pregnancy but should be deferred in most instances if the indication does not require immediate resolution.

Important considerations

Before the procedure, patients should be evaluated for factors that may affect the ability to perform a colonoscopy safely and successfully, including:

- *● Anatomic issues, such as recent colonic surgery, history of abdominal*
- *and/or pelvic surgeries, abdominal hernias, and presence of colostomy*
- Comorbidities that may increase the risks associated with sedation
- Comorbidities that may impact the ability of an assistant to apply abdominal pressure and/or position the

Important considerations

- Presence of an implanted cardiac defibrillator and some pacemakers that may require special management during application of electrocautery.
- Chronic use of medications such as benzodiazepines or narcotics that may increase a patient's tolerance to the effects of sedation
- A history of difficult intubation by anesthesia
- Finally, a suspected poor preparation is a relative contraindication to colonoscopy

COMPLICATIONS

- **Complications related to sedation** — Cardiopulmonary complications are the most frequent complication related to procedural sedation
- **Complications related to preparation** — All bowel preparations can cause adverse effects, which include fluid and electrolyte disturbances, nausea, vomiting, abdominal bloating, abdominal discomfort, aspiration, and esophageal tears from vomiting
- **Bleeding** — Bleeding is usually associated with polypectomy and rarely accompanies diagnostic colonoscopy
- **Postpolypectomy electrocoagulation syndrome**
- **Infection**
- **Gas explosion**
- **Perforation**

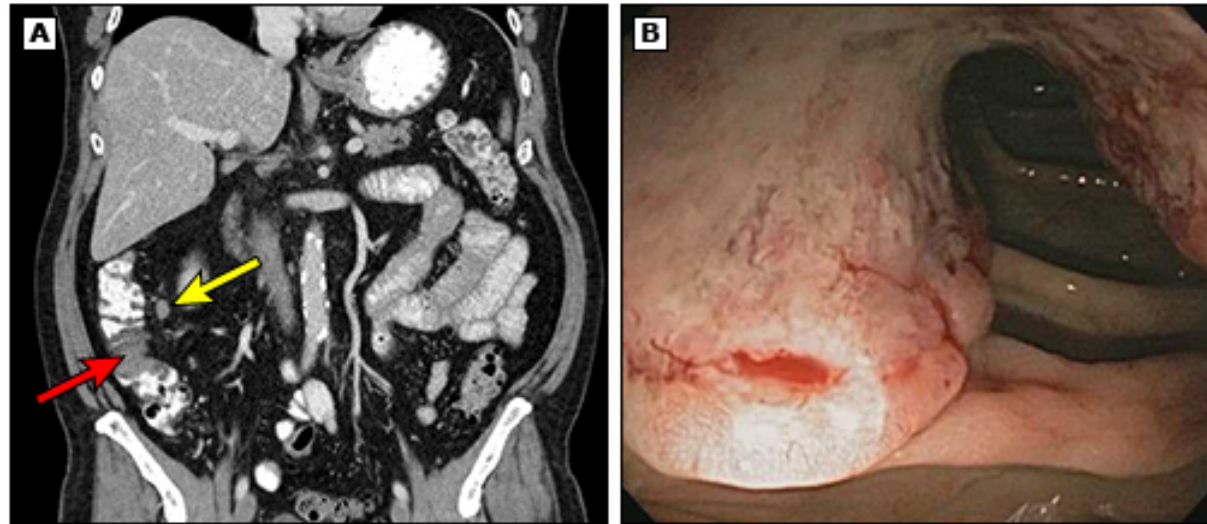
Indications for colonoscopy

- Abnormal BE
- Iron deficiency anemia
- Melana (negative EGD)
- Hematochezia (neg F/S)
- Heme Positive stool
- Chronic diarrhea (neg F/S)
- Screening / Surveillance
 - Asymptomatic, avg risk pts
 - After polypectomy
 - After CRC resection
 - In UC
 - Positive family history
- Therapeutic colonoscopy
 - Polyp removal
 - Palliation of neoplasm
 - Dilation of stricture or stoma
 - Reduction of volvulus
 - Decompression
 - Foreign body removal

Abnormal radiographs or sigmoidoscopy

- Filling defects identified on barium enema or virtual colonoscopy
- Strictures found by radiographic imaging should be examined by colonoscopy.
- Thickening of the wall of the colon or terminal ileum
- In patients with adenomas at sigmoidoscopy

Colon cancer seen on CT scan and colonoscopy



(A) Computed tomographic (CT) scan showing a filling defect in the ascending colon (red arrow) along with an involved lymph node (yellow arrow).

(B) Colon cancer identified in the ascending colon on subsequent colonoscopy.

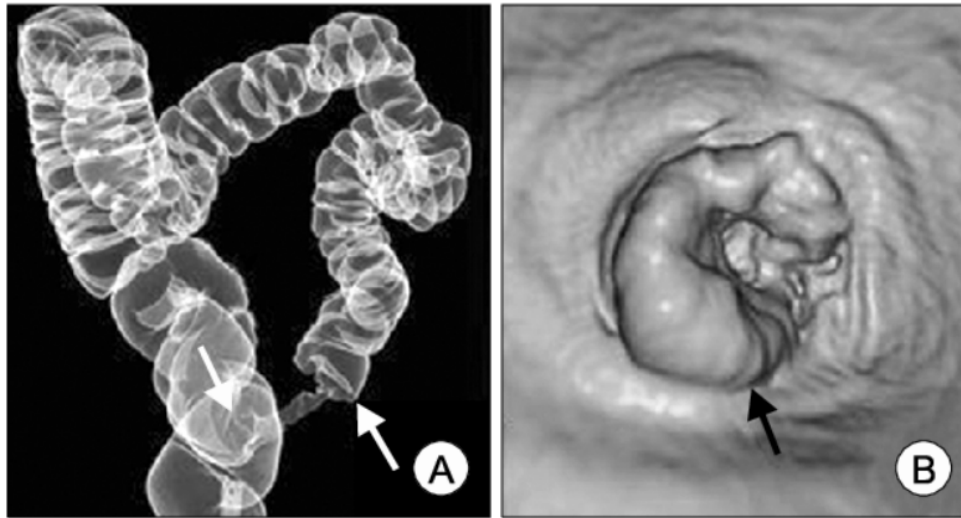


Figure 6. Colon cancer. On 3D transparent image (A), an irregular apple-core mass (arrows) is seen in the sigmoid colon. This lesion (arrow) appears as an annulo-constricting mass on 3D endoluminal image (B).

Published in 2009

CT Colonography (Virtual Colonoscopy)

- **Iron deficiency anemia**
 - **Melana (negative EGD)**
 - **Hematochezia (neg F/S)**
 - **Heme Positive stool**
- 

Occult fecal blood

➤ Patients with chronic LGIB that presents with occult fecal blood should undergo colonoscopy.

If colonoscopy cannot be completed to the cecum, air-contrast barium enema should be obtained. Virtual colonoscopy or CT colonography also can be used to rule out a proximal colonic lesion

Upper endoscopy should be considered if a source is not identified on colonoscopy, particularly if there are upper- GI symptoms or anemia.

Approximately 25% to 41% of patients with fecal occult blood can have significant findings (primarily peptic ulcer disease and esophagitis) on upper endoscopy, even in the setting of no symptoms.

Melena

- The diagnostic evaluation of a patient with melena should begin with upper endoscopy, because an upper-tract source is most likely in this setting.
- If an upper-GI source is not identified, then colonoscopy should be pursued.

Intermittent scant hematochezia

The most common pattern of LGIB

- Because most patients with scant hematochezia have an anorectal or a distal colonic source of bleeding, the initial evaluation in young, healthy patients (*<40 years of age*) should be a DRE and F/S
- Young, patients with a benign source of bleeding on F/S ,such as hemorrhoids or anal fissures, do not need colonoscopy
- Patients over 45 years of age; those with anemia,with significant RF for CRC; and/or with weight loss or change in bowel habits, should undergo colonoscopy.

Severe acute bleeding

➤ Hematochezia usually indicates a lower GI source. However, 11% of patients with rapid bleeding from an upper GI source pass bright-red blood rectally

Placement of a NGT and an endoscopic examination should be considered if there is any question about the location of bleeding in a patient with hematochezia.

➤ Colonoscopy is recommended in the early evaluation of LGIB.

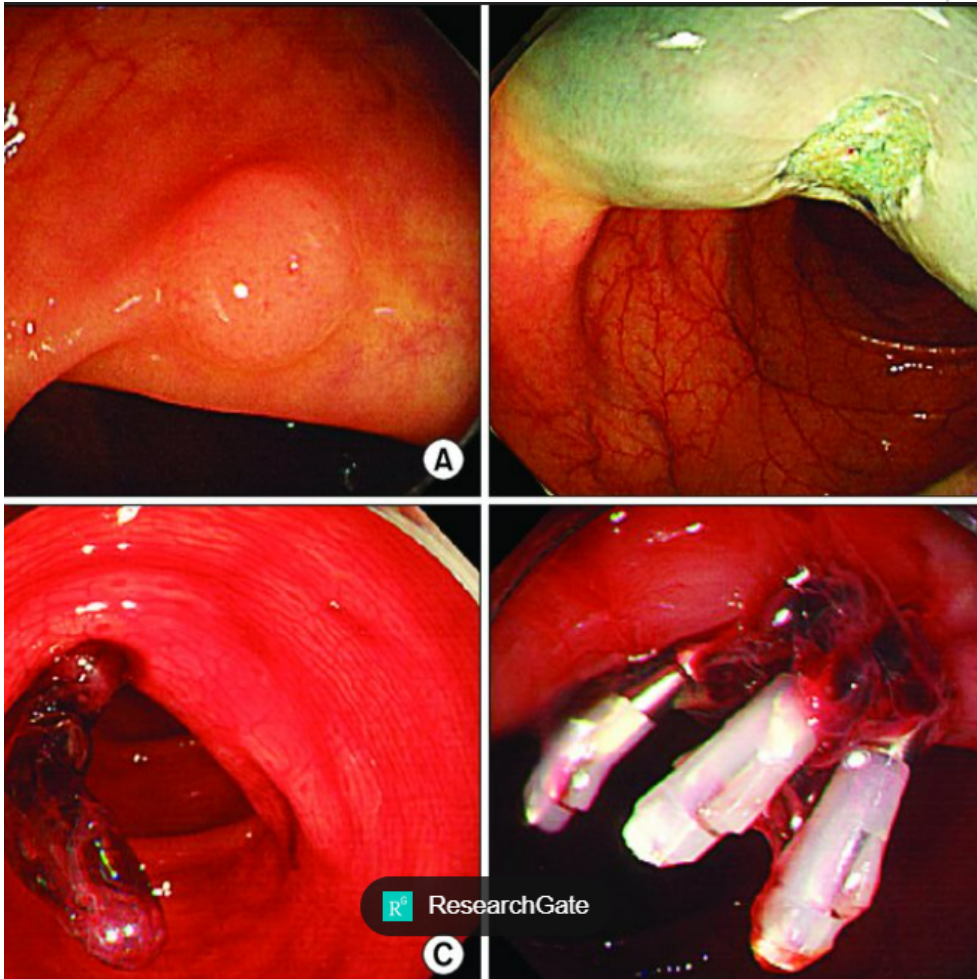
Endoscopic treatment modalities can be used to achieve hemostasis when a source of LGIB is identified at the time of colonoscopy.

Colonoscopic treatment of bleeding

- Control of active bleeding is an important therapeutic indication for colonoscopy.

Hemostasis can be applied in postpolypectomy bleeding, vascular ectasias, radiation injury of the rectosigmoid, diverticular hemorrhage, and colonic varices.

- Control of bleeding by monopolar or bipolar coagulation, heater probe, injection of various agents, and clipping.



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Figure 3 – Endoscopic image of angiodysplasia being treated with argon plasma coagulation

The role of Colonoscopy in the management of patients with diarrhea

- In patients with chronic diarrhea, colonoscopy with biopsy for the diagnosis of IBD, microscopic inflammatory disorders, and colorectal neoplasia.
- Many etiologies are not macroscopically evident (eg, quiescent IBD, microscopic colitis, eosinophilic colitis, and amyloidosis). The diagnostic yield of colonoscopy in patients with chronic diarrhea ranges from 7% to 32%, with IBD and microscopic colitis being most common.
- In patients with chronic diarrhea and normal colonoscopy, it is recommended multiple biopsy samples from both the right and left sides of the colon.

- If chronic diarrhea is accompanied by abdominal pain, it is preferable to begin with colonoscopy and include intubation of the terminal ileum to assist in the exclusion of Crohn's disease.

The role of Flexible sigmoidoscopy in diarrhea

- F/S may be a suitable initial investigation for the evaluation of:
- Acute diarrhea in patients with suspected diffuse colitis (eg, suspected *Clostridium difficile* colitis)
- Chronic diarrhea in patients who are pregnant have significant comorbidities, or when symptoms characteristic of left-sided colonic disease predominate (eg, tenesmus and urgency).

Irritable Bowel Syndrome

Rome IV Criteria for the diagnosis of IBS are:

- Recurrent abdominal pain, on average ≥ 1 day/week in the past 3 months, related to ≥ 2 of the following:
 - Defecation
 - Change in stool frequency
 - Change in stool appearance

Irritable Bowel Syndrome

- If any one of the following alarm features are present, colonoscopy can be performed:
- Positive family history of colorectal cancer (first-degree relative)
- Rectal bleeding in the absence of documented bleeding hemorrhoids or anal fissures (e.g. positive stool occult blood, hematochezia).
- Unintentional weight loss $\geq 5\%$ of body weight
- Abdominal pain awakening individual at night-time

Irritable Bowel Syndrome

- A change of pattern including frequent passage of stool during nighttime
- AND one of the following:
 - Low serum iron
 - Low serum ferritin (≤ 45 ng/mL or $<$ lab lower limit if higher than 45 ng/mL)
 - Elevated serum iron-binding capacity
 - Low serum transferrin saturation
 - Positive inflammatory markers (see typical lab studies as noted below)

Irritable Bowel Syndrome

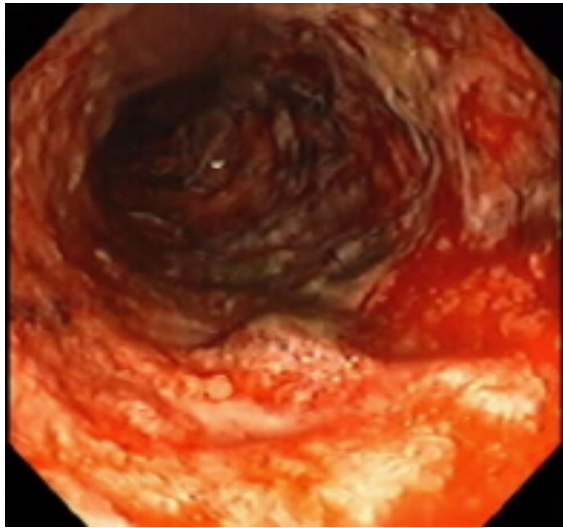
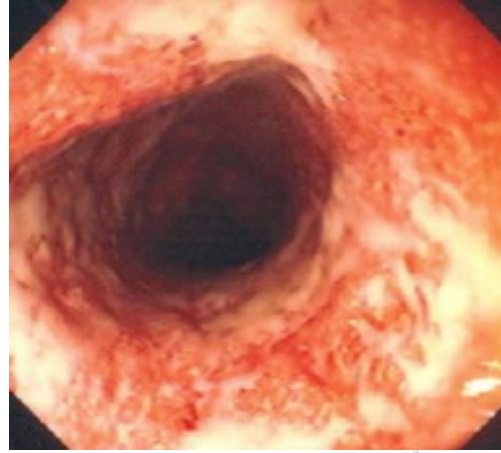
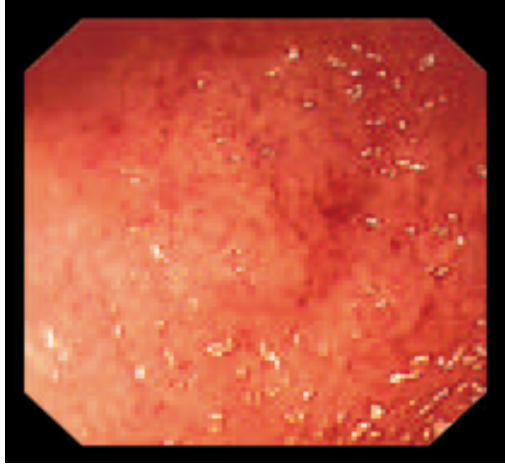
- In the absence of alarm features, the following laboratory studies should be
 - performed:
 - CBC
 - For non-constipated IBS:
 - CRP (C-reactive protein), fecal calprotectin, or fecal lactoferrin
- Serologic tests for celiac disease (Note: HLA test does not preclude the need for celiac serology)
- Stool analysis for giardia
- If the diagnosis is inconclusive or suggestive of IBD after the above studies, a colonoscopy can be approved

ASGE guideline: guideline on the use of endoscopy in the management of constipation

- Colonoscopy is indicated in selected patients to exclude obstruction from cancer, stricture, and extrinsic compression.
- *Colonoscopy if: Rectal bleeding, heme-positive stool, IDA, weight loss, obstructive symptoms, recent onset of constipation, rectal prolapse, or change in stool caliber.*
- Colonoscopy should also be done before surgery for constipation.
- Patients over the age of 45 years who have not had prior CRC screening should undergo colonoscopy.

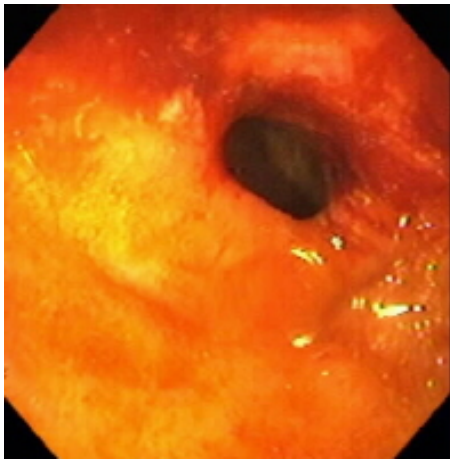
Established ulcerative colitis

- In first attack of UC F/S with biopsies is sufficient to confirm the diagnosis.
- Colonoscopy is not recommended in patients with active disease for fear of perforation. If endoscopy is necessary, care must be taken to avoid excessive distention.
- After active disease has been controlled, colonoscopy to establish the extent of the disease and to exclude Crohn's disease.
Multiple biopsies should be taken throughout the colon to map the histologic extent of disease and to confirm the diagnosis.
- If there is concern about Crohn's disease Additionally, intubation and biopsy of the terminal ileum should be attempted to exclude the presence of Crohn's disease.
- Colonoscopy is essential for CRC surveillance

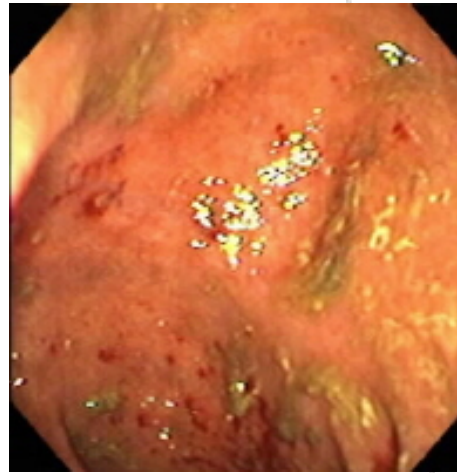


Established Crohn's disease

- Intubation and biopsy of the terminal ileum should be attempted in all patients having colonoscopy .
- The diagnostic accuracy of colonoscopy and histologic interpretation is increased by obtaining multiple biopsies from both involved and uninvolved sites. The use of jumbo forceps should be considered to improve sampling of the submucosa.
- The role of colonoscopy in [evaluating the response to infliximab](#)
- The risk of CRC in longstanding Crohn's colitis is comparable to that of UC.



Stricture in the terminal ileum



Inflammation in the terminal ileum



a large ulcer and inflammation of the descending colon

Acute diverticulitis

Recommendations following resolution :

- Two to six weeks after recovery, patients should undergo an evaluation of the colon to exclude other diagnostic considerations (such as colonic neoplasia) and to evaluate the extent of the diverticulosis .

Screening / Surveillance

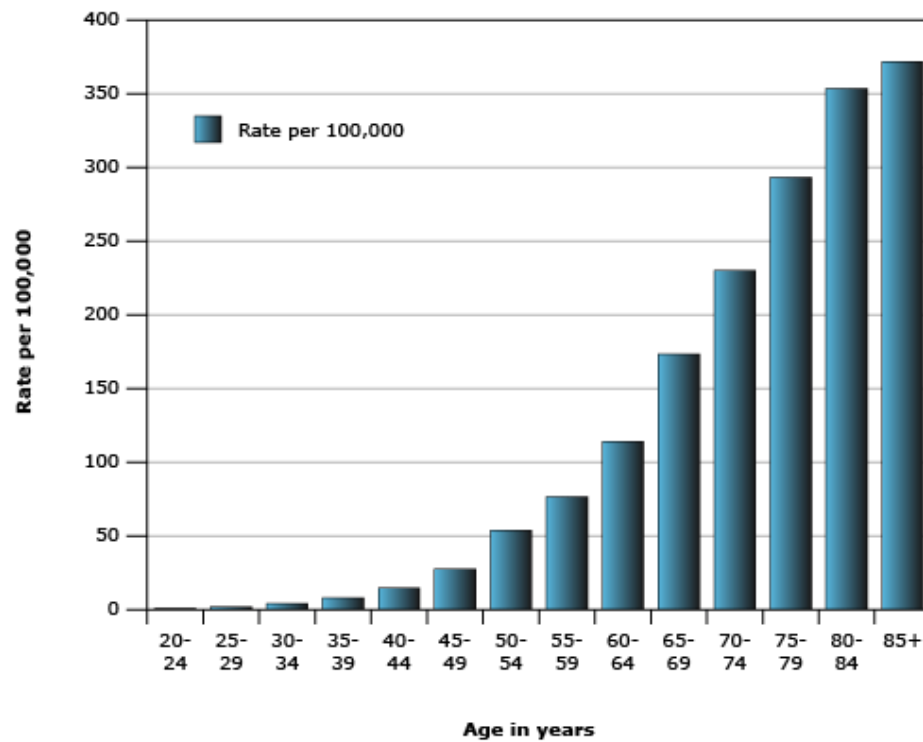
- **Asymptomatic, Average-Risk Groups**

patients older than 45 years with no personal or family history of colorectal adenoma or carcinoma and no personal history of IBD.

- **High-Risk Groups**

patients with long-standing UC, previous CRC, previous adenomas, female genital cancer, familial polyposis, HNPCC, and familial colon cancer.

Increasing incidence of colorectal cancer with age



The age-specific incidence of colorectal cancer was measured between 2002 and 2006 in men and women of all races.

Data from: *Surveillance, Epidemiology, and End Results (SEER) Program, 2002-2006.*

Available online at <http://seer.cancer.gov>.

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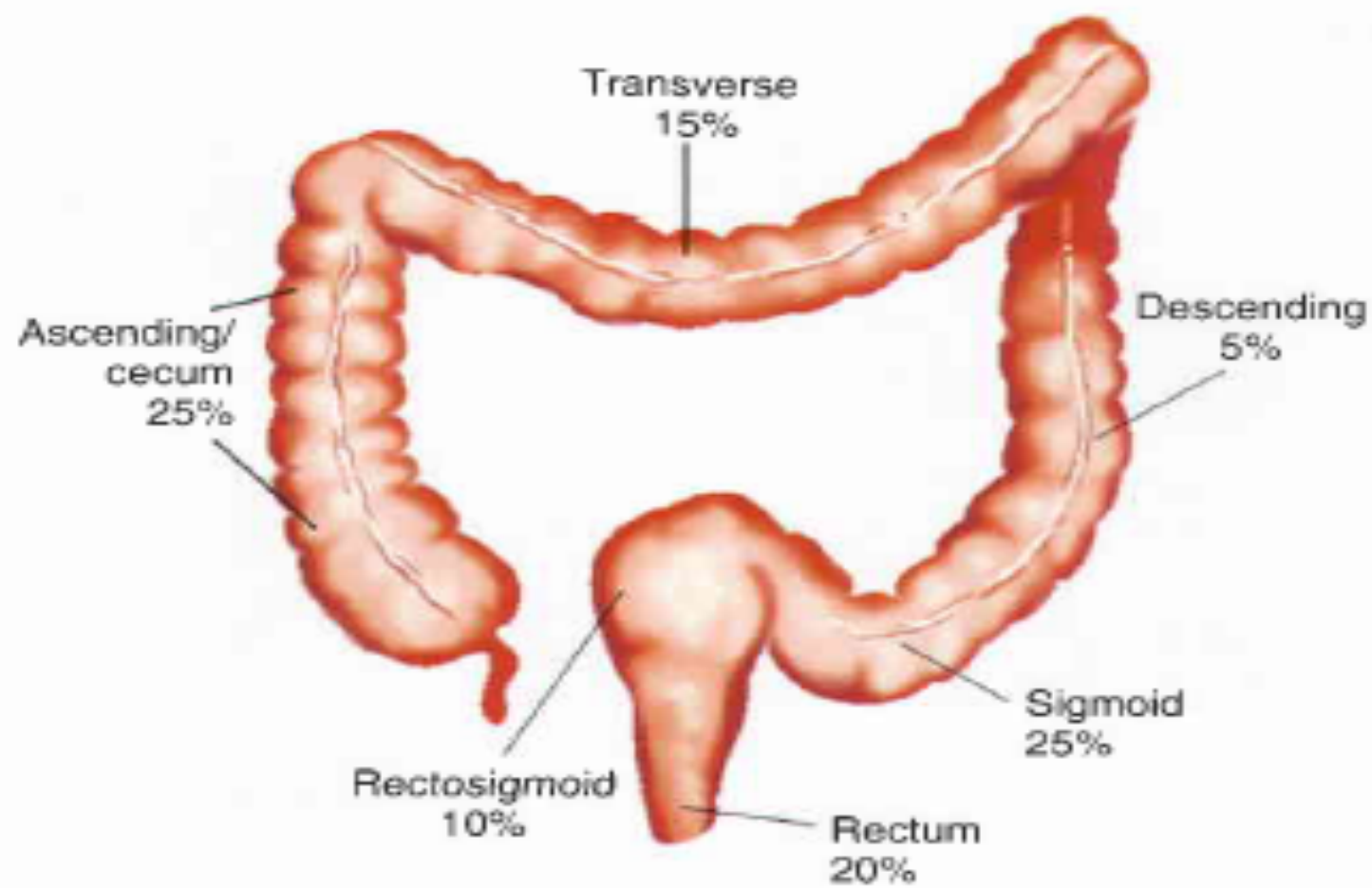
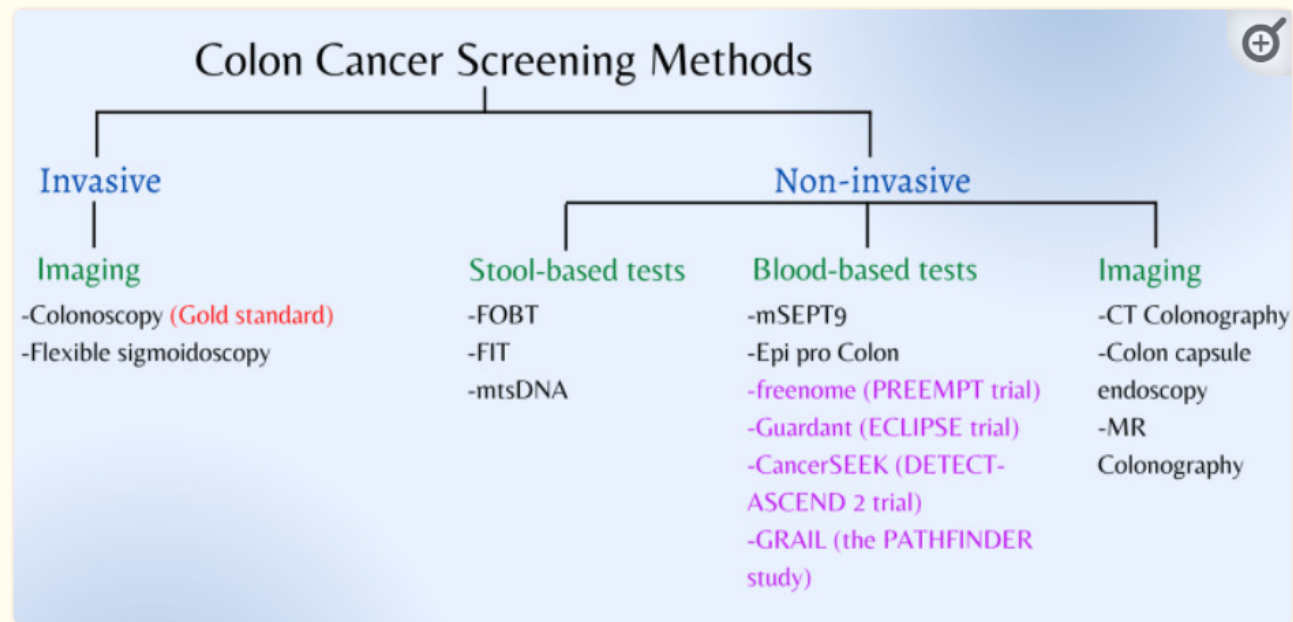


Figure 120-3 Distribution of colorectal cancers within the colon. Only approximately one half of cancers are within reach of the flexible sigmoidoscope.

Figure 3



Colon cancer screening methods

FOBT: fecal occult blood test; FIT: fecal immunochemical test; mts-DNA: multitarget stool DNA; mSEPT9: methylated Septin9.

Image Credit: Maleesha Jayasinghe

Colon Capsule Endoscopy

- The CCE-2 device provides a higher frame rate, captures images from both ends at a rate of 35 images per second in motion, and has a larger lens angle that offers nearly 360° coverage of the colon.
- A recent systematic review concluded that the accuracy of CCE is comparable to that of colonoscopy and superior to that of CT.
- While colonoscopy currently remains the gold standard tool for CRC surveillance, certain situations may prefer to use CCE as an alternative.
- Situations that contraindicate the use of colonoscopy or the use of sedation or incomplete colonoscopy highlight the alternative use of CCE as a screening modality

Colon Capsule Endoscopy

- A prospective European multicenter study showed that the detection rate of $\geq 6\text{mm}$ and $\geq 10\text{mm}$ colonic polyps using CCE-2 showed high sensitivity of 84% and 88%, respectively, almost equal to that of such polyps using colonoscopy .
- Further large-scale studies need to be conducted to confirm that CCE is a highly acceptable modality for screening for CRC.
- The main limitation of CCE is that it requires a more extensive bowel preparation than colonoscopy or CT colonography

AVERAGE RISK

RECOMMENDATIONS

Colorectal cancer screening should start at the age of 45 by either using a stool-based test or a visual exam of the colon or rectum.

Stool-based screening tests for colorectal cancer:

- Fecal Immunochemical Test (FIT)- every year
- Guaiac-based Fecal Occult Blood Test (gFOBT)- every year
- Multi-targeted stool DNA Test (mt-sDNA)- every 3 years

Visual exam for colon and rectum:

- Colonoscopy- every 10 years
- CT colonography- every 5 years
- Flexible sigmoidoscopy (FSIG)- every 5 years

Average Risk Group

- Colonoscopy every 10 years, beginning at age 45, up to age 85
- Abnormal findings on an average-risk screening examination should be followed up according to the specific guideline for that finding

● High-Risk Groups

- patients with long-standing UC
- previous CRC, previous adenomas
- Female genital cancer
- Familial polyposis
- HNPCC
- Familial colon cancer

HIGH RISK OR INCREASED RISK CATEGORY

- History of colorectal cancer or adenomatous polyps.
- Positive family history of colorectal cancer or adenomatous polyps.
- History of inflammatory bowel diseases such as ulcerative colitis or Crohn's disease.
- Positive family history of hereditary non-polyposis colon cancer (Lynch disease or HNPCC), familial adenomatous polyposis (FAP) or any other rare syndromes that can increase the risk of colorectal cancer (Peutz-Jeghers syndrome and MUTYH-associated polyposis)..
- History of undergoing radiation therapy as a previous cancer treatment for the abdominal or pelvic area.

● High-Risk Groups

Patients with Adenomas at Colonoscopy



High Risk Polyps

- Size: larger > 1 cm
- Number: 3 or more
- Location: proximal to the splenic flexure
- Histologic findings: Advanced adenomas (villous, high-grade dysplasia, presence of invasive cancer within an adenoma)

● Patients with Adenomas at Colonoscopy

- If no polyps found on screening or other colonoscopy: 10 years (average risk)
- 1-2 tubular adenomas < 10mm: 7-10 years
- 3-4 tubular adenomas < 10mm: 3-5 years
- 5-10 tubular adenomas < 10mm: 3 years
- One or more tubular adenomas ≥ 10mm: 3 years
- Adenoma with tubulovillous or villous histology: 3 years
- Adenoma with high-grade dysplasia: 3 years.
- > 10 adenomas on a single examination: 1 year (Consider familial syndrome)

- Piecemeal resection of adenoma ≥ 20mm: 6 months

Hyperplastic polyps:

- All polyps located in the rectum and/or sigmoid colon:
 - ≤ 20 polyps, size < 10mm: Repeat in 10 years
- Polyps located proximal to the sigmoid colon:
 - ▣ ≤ 20 polyps, size < 10mm: Repeat in 10 years
 - ▣ Polyps ≥ 10mm: Repeat in 5-10 years
- > 20 polyps: Follow Serrated Polyposis Syndrom

Sessile Serrated Polyps:

- 1-2 polyps < 10mm in size: Repeat in 5-10 years
- 3-4 polyps < 10mm in size: Repeat in 3-5 years
- 5-10 polyps < 10mm in size: Repeat in 3 years
- Polyp $\geq$ 10mm: Repeat in 3 years
- Isolated polyp containing dysplasia: Repeat in 3 years
- Piecemeal resection of SSP > 20mm: Repeat in 6 months

Traditional Serrated Adenoma:

- Repeat in 3 years

Patients with CRC

	3 to 6 months after cancer resection or intraoperatively	Colonoscopy	Patients with CRC should undergo high-quality perioperative clearing of the colon. For nonobstructing tumors, examination can be done preoperatively; for obstructing cancer, CTC or DCBE can be used to detect proximal neoplasms
Patients undergoing curative resection for CRC	1 year after resection (or 1 year after clearing colonoscopy)	Colonoscopy	If exam at 1 year is normal, subsequent exam at 3 yr. If that exam is normal, then subsequent exam at 5 yr

Flexible proctosigmoidoscopy, rectal cancer

- For patients who have not received pelvic radiation therapy, direct imaging of the rectum with F/S is recommended every six months for five years.

Indications for enhanced screening

Obtaining family history permits determination of the number of FDRs diagnosed with **ANY** of the following:

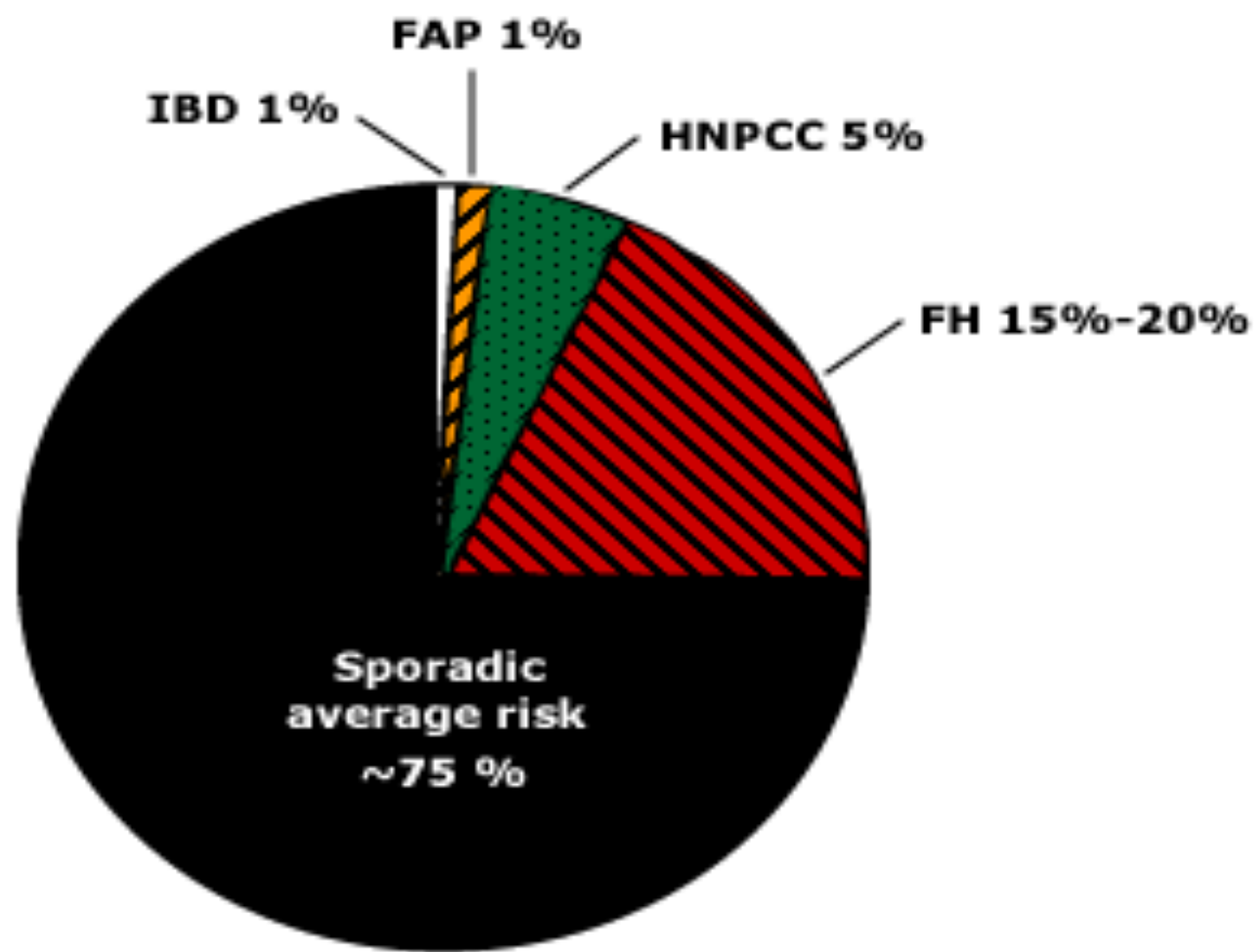
- Colorectal cancer (CRC)
- Documented advanced polyp with ANY of the following:
 - **Advanced adenoma**
 - Adenoma size ≥ 1 cm
 - Adenoma with high-grade dysplasia
 - Adenoma with villous elements
 - **Advanced serrated lesion**
 - Sessile serrated polyp (SSP) ≥ 1 cm
 - Traditional serrated adenoma ≥ 1 cm
 - SSP with cytologic dysplasia

● Patients with a Family History of CRC

Patients with a Family History of CRC			
CRC or advanced polyps in a first-degree relative before age 60 yr or in 2 or more first-degree relatives at any age	Age 40 yr, or 10 yr before the youngest case in the immediate family	Colonoscopy	Every 5 yr
Either CRC or advanced polyps in a first-degree relative $\geq$ age 60 yr or in 2 second-degree relatives with CRC	Age 40 yr	Screening options at intervals recommended for average-risk persons	Screening should begin at an earlier age, but patients may be screened with any recommended form of testing

Colorectal cancer in IBD

- Patients with IBD are at increased risk for CRC
- The risk is related to the **duration** and **extent** of the disease
- The **mortality** in patients diagnosed with CRC in IBD is **higher** than for **sporadic** CRC



Screening and surveillance for dysplasia in established ulcerative colitis

- Average-risk individuals with ulcerative colitis

Begin screening 8 years after symptom onset (includes individuals with pancolitis, and left-sided colitis).

- Continue surveillance colonoscopy every 1-3 years
- Individuals with isolated ulcerative proctitis do not appear to be at increased risk of colon cancer. Thus, surveillance is not recommended in this group.

Screening and surveillance for dysplasia in established ulcerative colitis

- Elevated risk individuals with ulcerative colitis:

Begin annual surveillance beginning immediately upon diagnosis in the following high-risk individuals:

- Active inflammation
- Anatomic abnormality such as a stricture or multiple pseudopolyps
- Prior history of dysplasia
- Family history of CRC in a first-degree relative
- History of primary sclerosing cholangitis

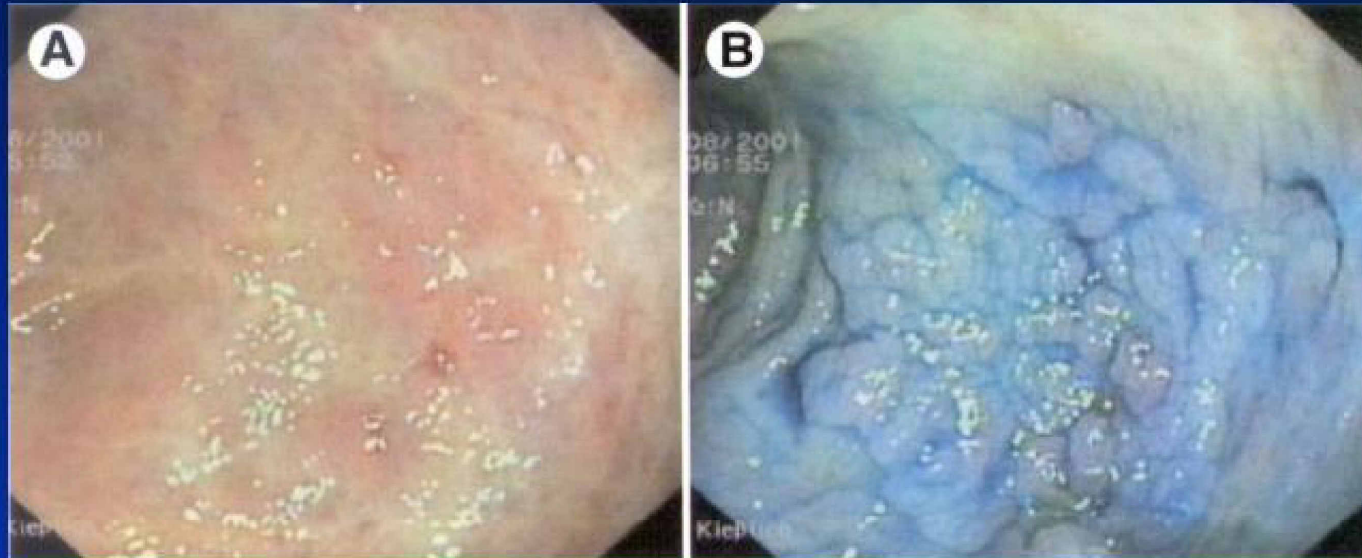
Newer endoscopic thechnic for dysplasia detection

- Current practice: >32 random biopsies throughout colon
- *Chromoendoscopy*
- *Narrow band image*
- *Auto fluorescence*
- *Confocal endomicroscopy*

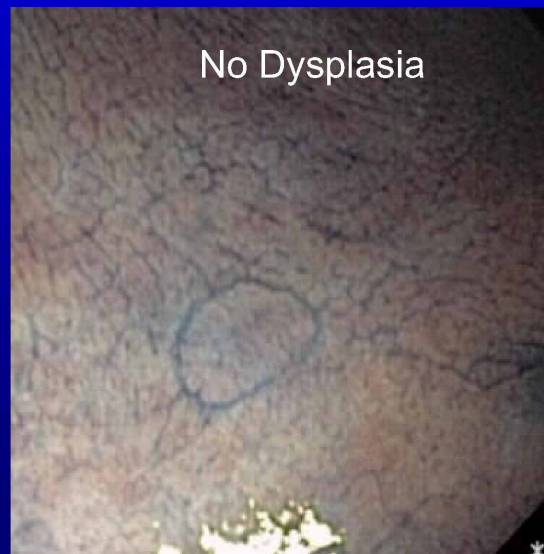
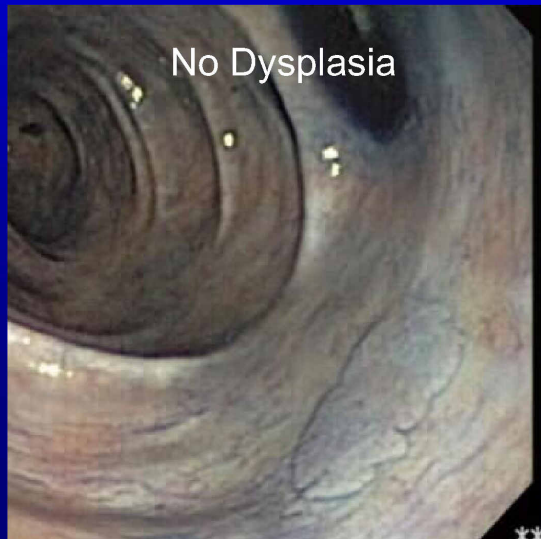
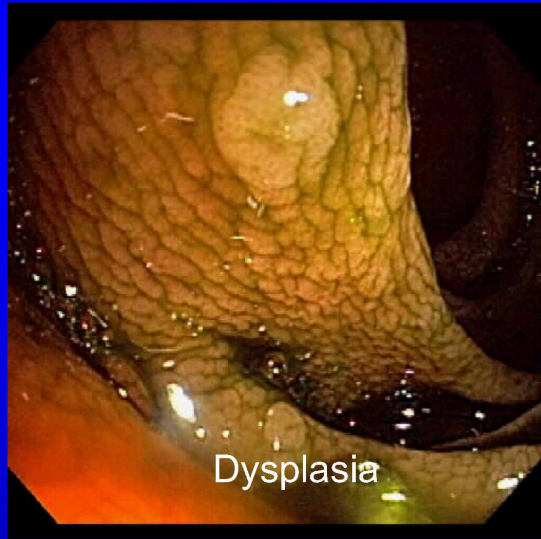
Chromoendoscopy

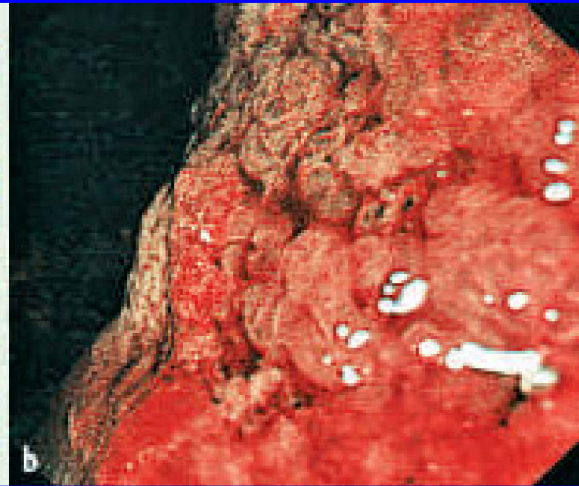
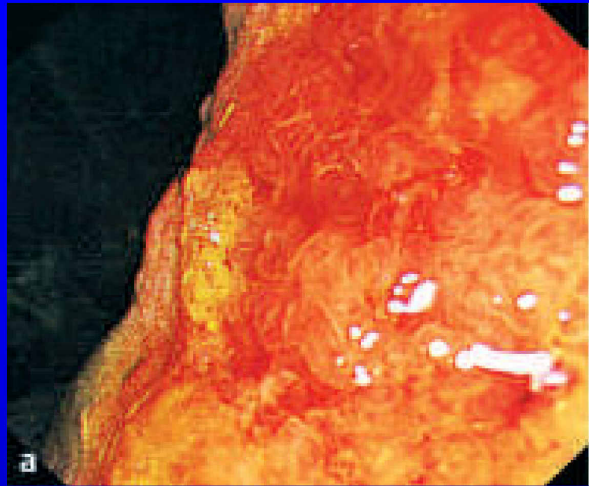
- Topical application of stains or pigments to improve tissue localization, characterization, or diagnosis during endoscopy ,several agents have been described:
- **Absorptive (vital) stained**
 - methylen blue
 - Lugol
- **Contrast (reactive) stains**
 - congo red
 - phenol red
 - Indiago carmine
- **Tattooing**

High-grade Dysplasia

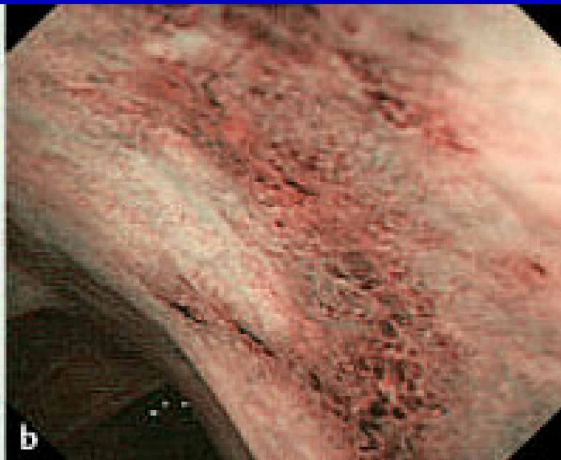


Kiesslich R, et al. Methylene blue-aided chromoendoscopy for the detection of intraepithelial neoplasia & CRC in UC. *Gastroenterology* 2003;124:880-8.





HGD



LGD

- In patients with a subtotal colectomy with an ileostomy and have rectum left in place and tied off (ie, a Hartmann's pouch), we suggest surveillance of the remaining rectum every_year
- We suggest not performing surveillance for patients with UC limited to the rectum
- In patients with a pouch, we suggest F/S every other year

Therapeutic colonoscopy

- Polyp removal
- Palliation of neoplasm
- Dilation of stricture or stoma
- Reduction of volvulus
- Decompression
- Foreign body removal

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**Thank you for your
attention**