جـامعـة المعـرفـة
ALMAAREFA UNIVERSITY

Diseases of Large bowel

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Objectives

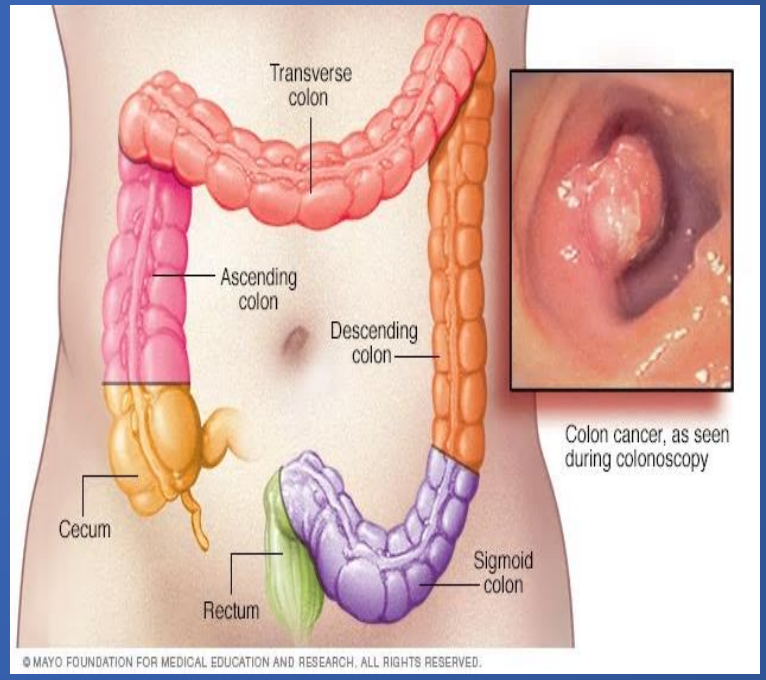
- Introduction
- Diverticular disease
- Ischemic colitis
- Colonic polyps
- Colonic volvulus
- Large bowel obstruction
- Inflammatory bowel disease
- Colon cancer

Introduction

- The colon is a 5-6–ft long, inverted, U-shaped.
- Cecum (and appendix) and ano-rectum,

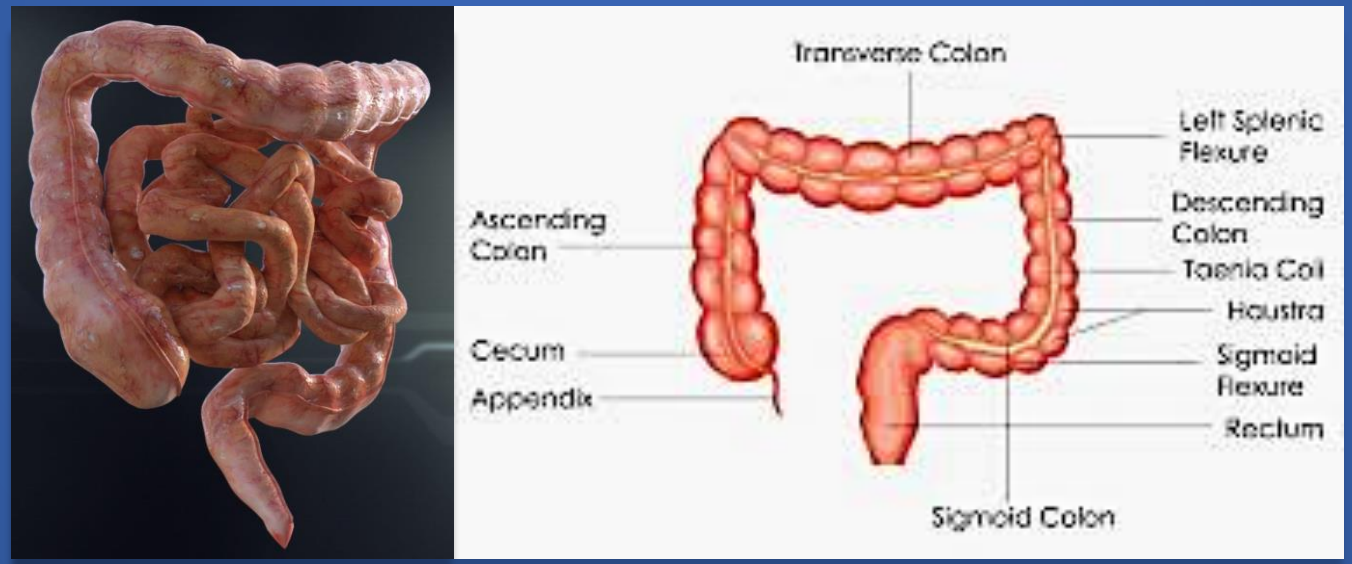
which are parts of the large intestine,

are not included in the colon.



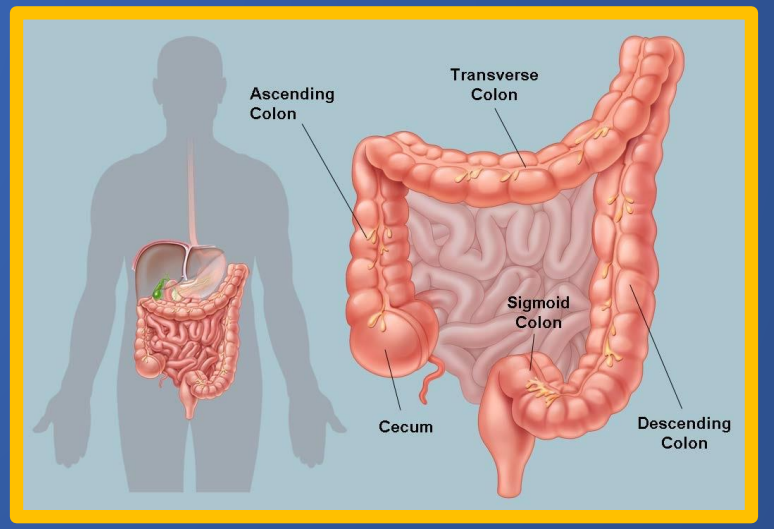
Introduction

- Ascending colon
  - Starts from a proximal blind end (pouch) called the cecum.
  - The ascending colon takes a right-angled turn just below the liver (hepatic flexure) and becomes the transverse colon



Introduction

- Transverse colon
  - Has a horizontal course from right to left, occupying the right hypochondrium, epigastrium, and left hypochondrium.
  - At splenic flexure, it is attached to the diaphragm by the phrenocolic ligament) and becomes the descending colon,
  - Splenic flexure is higher (cranial) to hepatic flexure.
- Descending colon:
  - leads to the inverted V-shaped sigmoid colon, which then becomes the rectum at the S3 level

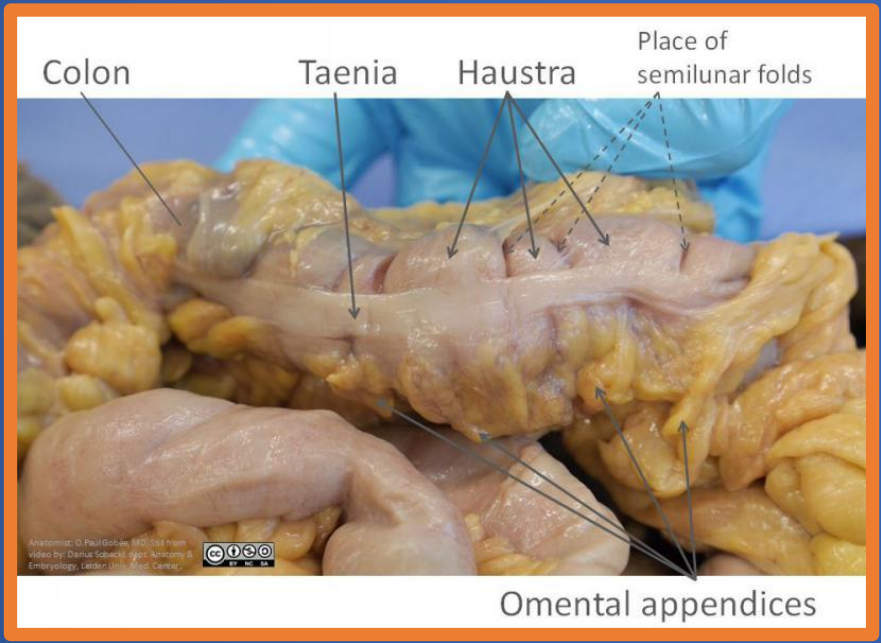


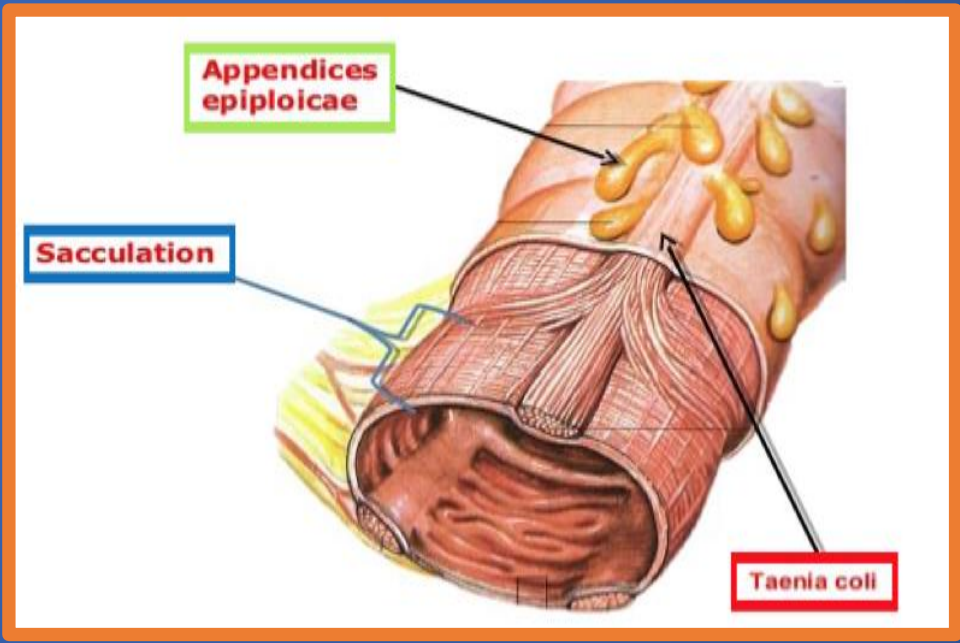
Introduction

- Ascending,& descending parts of the colon are retroperitoneal
- The transverse colon and the sigmoid colon have a mesentery
- Cecum is intraperitoneal but uses the mesentery of the ileum.

Introduction

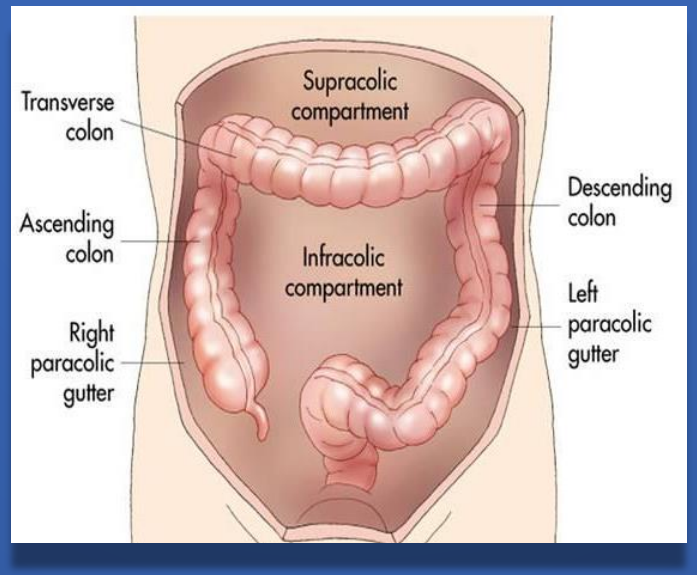
- Teniae coli are present in large bowel, but not present in the rectum.
- Appendages of fat, containing small blood vessels, called omental appendages (appendices epiploicae) are attached to colon.





Introduction

- Paracolic gutters
  - Lateral to ascending and descending colon are the right and left gutters of the peritoneal cavity,
  - Fluid/pus in the upper abdomen can trickle down into the pelvic cavity.

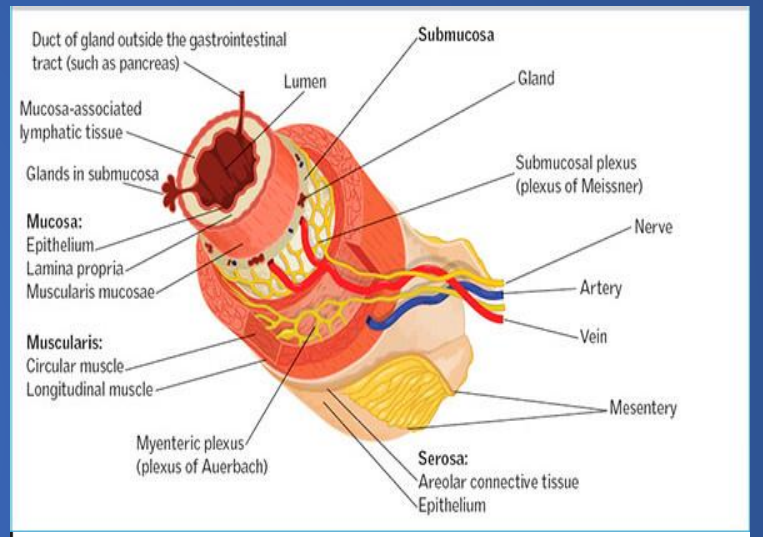


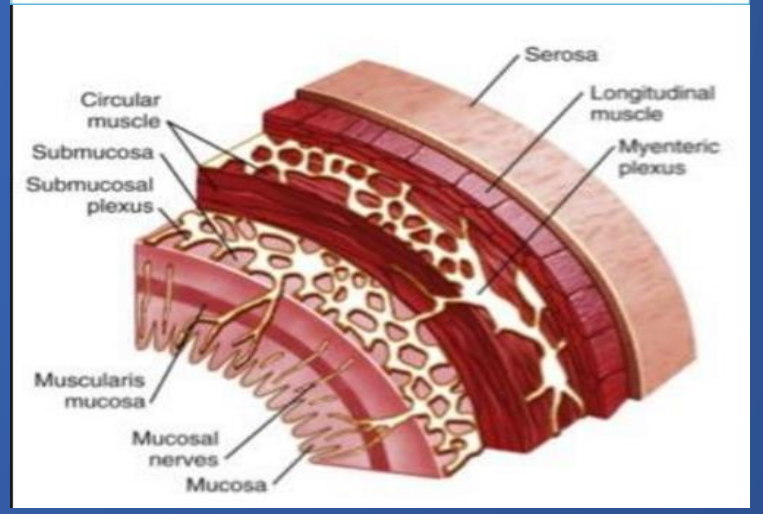
Introduction

- Blood supply
  - Superior mesenteric artery through its right colic and middle colic branches
  - Inferior mesenteric artery through its left colic and multiple sigmoid branches.
  - Vasa recta are terminal branches of these arteries entering the colonic wall

Introduction

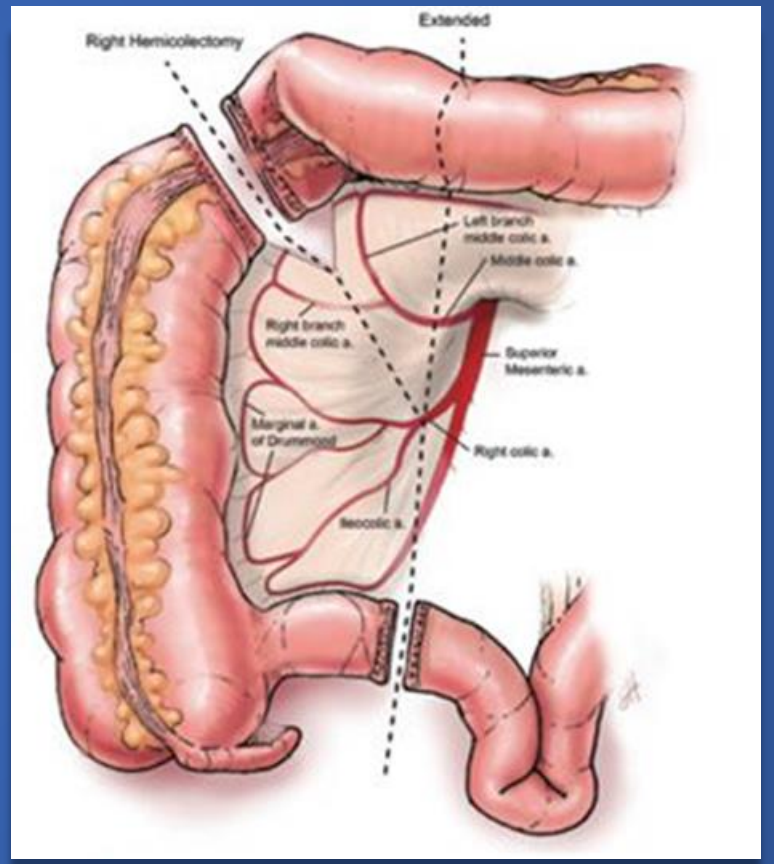
- The colon has 4 layers:
  1. **Mucosa**:
     - Columnar epithelium with a large number of mucus secreting goblet cells
     - No villi,
  2. **Submucosa**
     - Contains the blood vessels and Meissner nerve plexus.
  3. **Muscularis propria**
     - Contains the inner circular and outer longitudinal
     - Muscles and myenteric (Auerbach) nerve plexus
  4. **Serosa**
     - visceral peritoneum.





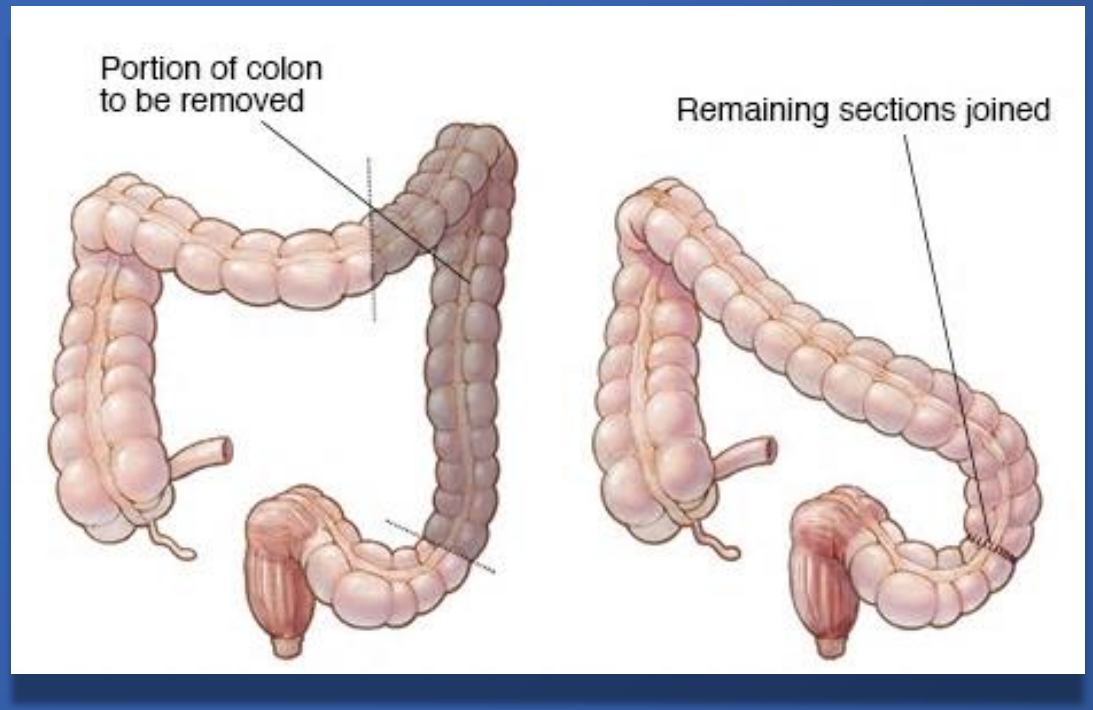
Introduction

- Right hemicolectomy:
  - Includes the removal of a few centimeters of terminal ileum, cecum (with appendix), ascending colon, & proximal transverse colon
  - Ileotransverse anastomosis



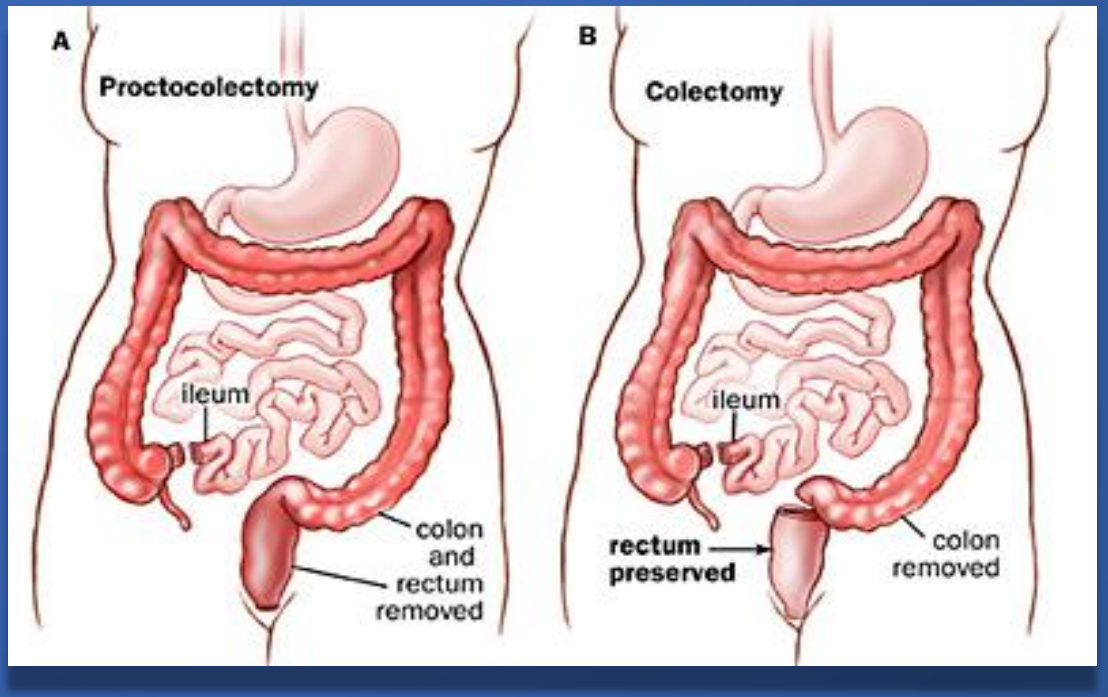
Introduction

- Left hemicolectomy
  - Includes the removal of the distal transverse colon, descending colon, and sigmoid colon
  - Colorectal anastomosis



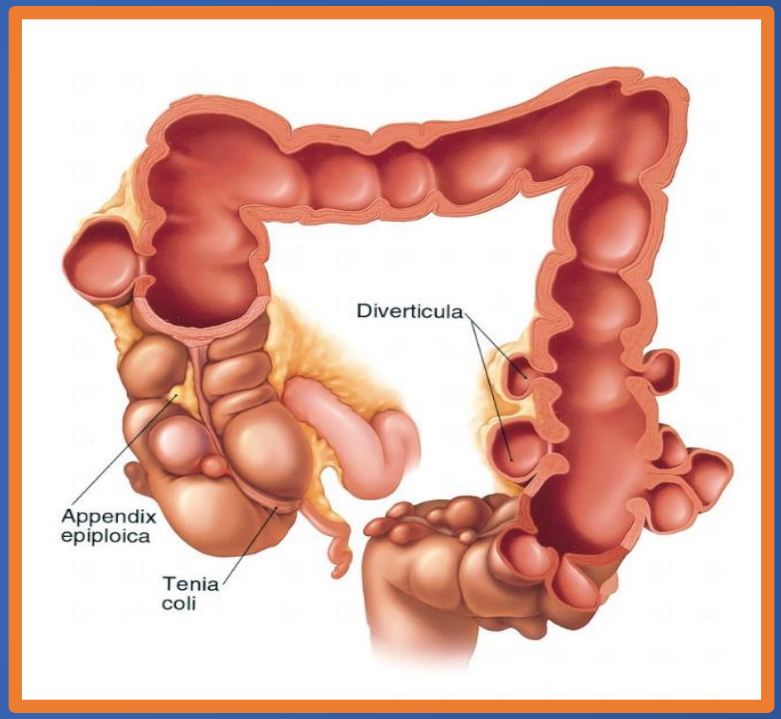
Introduction

- Total colectomy
  - Includes removal of the cecum (with appendix), ascending colon, transverse colon, descending colon, and sigmoid colon
  - Ileorectal anastomosis



Diverticular diseases

- Includes a spectrum of conditions
- Asymptomatic vs symptomatic
- Acute vs chronic
- Complicated vs non complicated
- Diverticulosis:
  - Small pouches due to herniation of the mucosa into colonic wall
  - Commonest pathology responsible for lower GI bleeding
  - <u>False</u> diverticula



Diverticular diseases

- Diverticulitis:
  - Inflammation of diverticula, due to obstruction by fecalith
  - Usually affects elderly
  - 20% of patients with diverticulitis are younger than 50 years.
  - In chronic form, patients may have recurrent low-grade diverticulitis.

Diverticular diseases

- Signs and symptoms
  - Depends on the location, the severity of the inflammatory process, and the presence of complications.
    - Abdominal pain:
      - Left lower quadrant: (70% of patients), as most diverticula occur in the sigmoid colon
      - Right lower quadrant tenderness, mimicking acute appendicitis, can occur in right-sided diverticulitis
    - Change in bowel habits
    - Nausea and vomiting
    - Constipation
    - Diarrhea
    - Flatulence
    - Bloating

Table 16.4 Complications of colonic diverticulae

Inflammation
- Peri-diverticulitis
- Pericolic abscess
- Purulent peritonitis
- Faecal peritonitis
- Inflammatory mass
- Portal pyaemia

Obstruction
- Fibrotic stricture
- Adherent small bowel loops

Bleeding
- Massive lower GI haemorrhage
- Chronic intermittent blood loss
- Anaemia

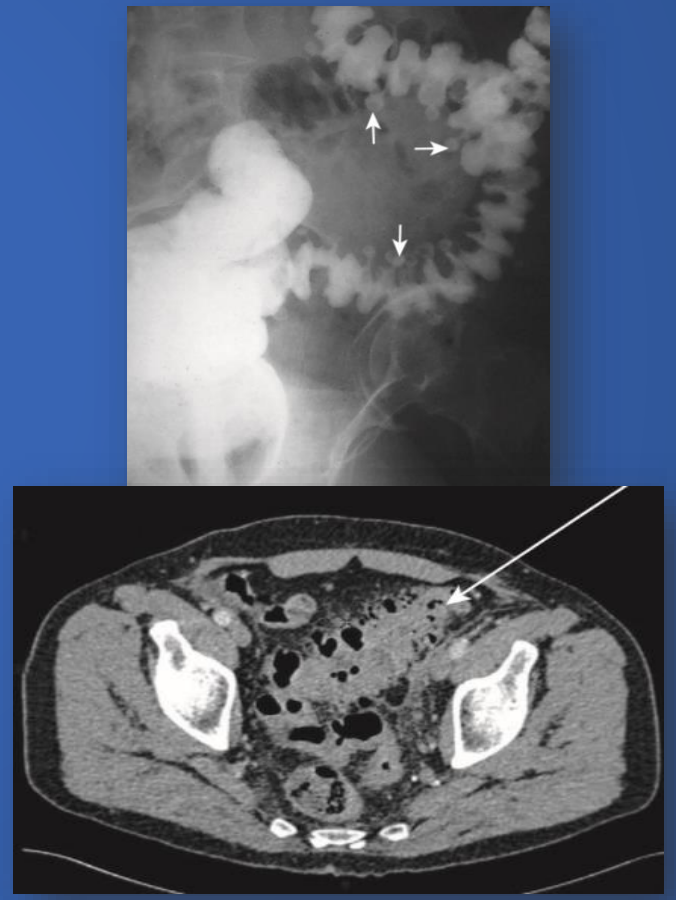
Fistula formation
- Colovesical fistula
- Colovaginal fistula
- Enterocolic fistula

Diverticular diseases

- Diagnosis
  - Usually made on the basis of history and physical examination,
  - Laboratory tests :
    - CBC: high WBC, Hb,
    - Electrolytes,
    - Renal function,
    - LFT
    - Urinalysis / culture
    - Blood cultures
    - Pregnancy test

Diverticular diseases

- Radiology images:
  - Plain abdominal radiograph series
  - Contrast enema,
    - Water-soluble medium,
    - Mild-to-moderate uncomplicated cases
  - CT abdomen with contrast
    - Best imaging method to confirm the diagnosis.
    - Sensitivity and specificity 97%
      - Bowel wall thickening
      - Soft-tissue inflammatory masses
      - Complications, exclude other pathology



Diverticular diseases

- Hinchey's classification for complicated cases:
  - Clinical staging
  - To chose the proper management option

Table 16.5 Hinchey classification of septic complications of diverticular disease

Hinchey grade I	Localised para-colonic abscess
Hinchey grade II	Distant abscess (e.g. pelvic, sub-phrenic)
Hinchey grade III	Purulent peritonitis
Hinchey grade IV	Faecal peritonitis

Diverticular diseases

- Management:
  - Conservative: (mild cases)
    - Initiate bowel rest and intravenous fluid hydration
    - Broad-spectrum intravenous antibiotic Within 2-3 days of hospitalization, fever, pain, and leukocytosis should begin to resolve
    - Start on a clear liquid diet and advanced as tolerated
    - CT–guided percutaneous drainage
  - Surgical intervention:
    - Hinchey's stage III or IV
    - Complications
    - Inability to rule out carcinoma
    - Failure of medical therapy

Ischemic colitis

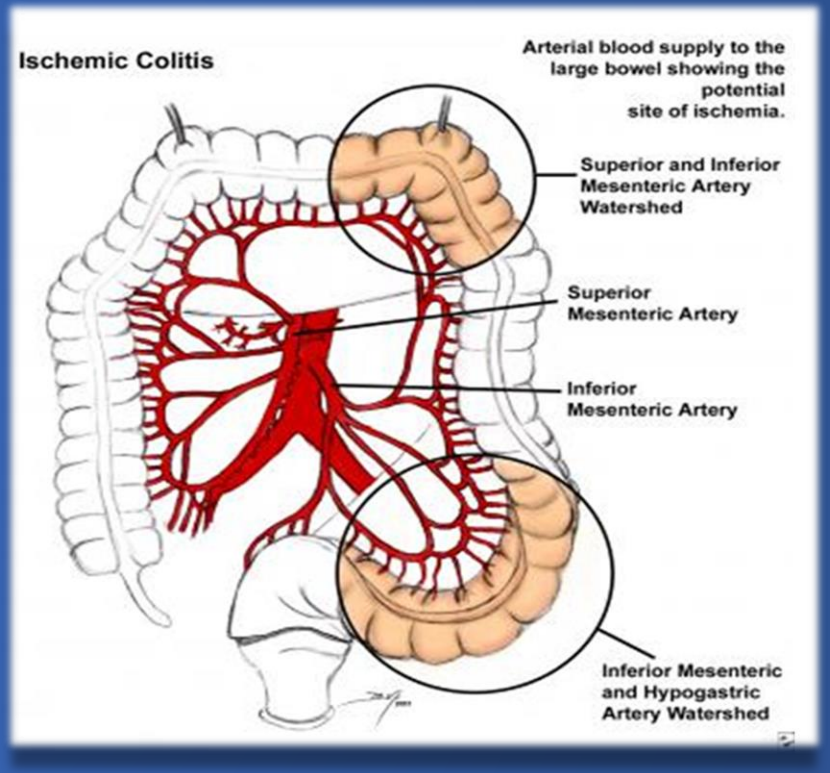
- Insufficient blood supply to a segment or the entire colon.
- Different severities up to full-thickness transmural necrosis.
- Mainly a disease of elderly
- Causes:
  - Atheroma of mesenteric vessels.
  - Other causes: include embolic disease, vasculitis, fibromuscular hyperplasia, aortic aneurysm, blunt abdominal trauma, disseminated intravascular coagulation, irradiation, and hypovolemic or endotoxic shock.

Ischemic colitis

- Watershed area of the colon:
  - Areas vulnerable to ischemia
  - Two locations
- Occlusive (90% mortality)
- Venous infarction occurs in young patients

usually after abdominal surgery.

- Presentation:
  - Colicky abdominal pain, which becomes continuous.
  - Vomiting, diarrhea, or rectal bleeding.



Colonic polyps

- Slow-growing overgrowths of the colonic mucosa.
- There are two main categories of polyps:
  - Non-neoplastic:
    - Hyperplastic polyps,
    - Inflammatory polyps
    - Hamartomatous polyps.
  - Neoplastic
    - **Adenomatous**
- Adenomatous type is important:
  - Most common type of polyps
  - Associated with malignant risk

Colonic polyps

- Malignant risk is associated with
  - Degree of dysplasia
  - Type of polyp:
    - Tubular Adenoma: 5% risk of cancer (Commonest)
    - Tubulovillous adenoma: 20% risk of cancer
    - Villous adenoma: 40% risk of cancer
  - Size of polyp:
    - <1 cm =<1% risk of cancer
    - 1-2 cm=10% risk of cancer
    - >2 cm=50% risk of cancer

Colonic polyps

Histologic type	Tubular adenomas	Villous adenomas	Tubulovillous adenomas
Characteristics	characterized by a complex network of branching adenomatous glands	contain fronds or folds of mucosa that have overgrown their underlying stroma and project toward the colonic lumen	both histologic types coexist
% of total adenomatous polyps	65% - 85% (most common)	5%- 10% (least common)	10%- 25%
Malignant potential	5% (have less atypia)	40% (have severe atypia)	22%
Location	Found anywhere in colon	Found mostly in rectum	Mostly in rectum
Attachment	Most often pedunculated	Most often sessile	

Colonic polyps

Sessile polyp

Pedunculated polyp

Colonic polyps

- Signs and symptoms
  - Most patients are asymptomatic.
  - Rectal bleeding (Commonest)
  - Iron deficiency anemia (Chronic bleeding)
  - Diarrhea or constipation, often with decreased stool caliber.
  - Massive fluid and electrolyte loss (Villous adenomas of the rectum and distal colon)
  - Distal rectal polyps can be detected by digital rectal examination. Otherwise, physical examination findings are typically normal.

Colonic polyps

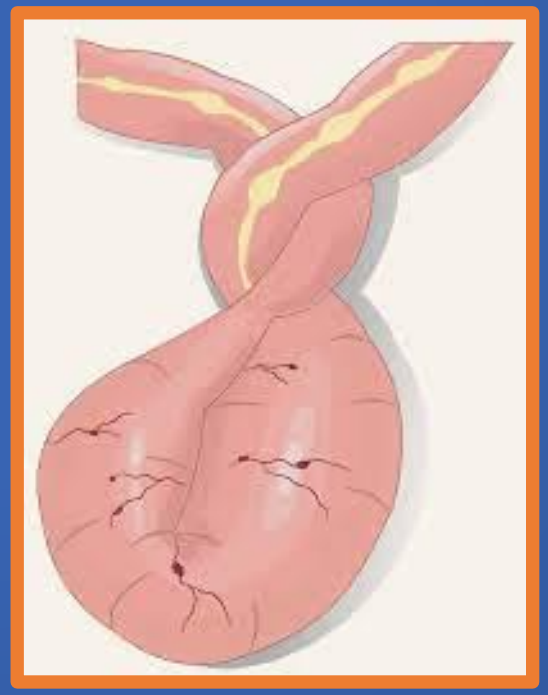
- Diagnosis
  - Labs: CBC, coagulation, LFT, Renal profile
  - Stool occult blood test
    - Detect a proportion (20%-40%) of colonic polyps that are larger than 10 mm in diameter,
  - Flexible sigmoidoscopy
  - Colonoscopy+Bx
  - Capsule endoscopy

Colonic polyps

- Management
  - Polypectomy :
    - Resected once detected
    - During colonoscopy
  - Surgical resection:
    - Difficult to remove endoscopically (large, sessile polyps)
    - Advanced recurrent colonic polyps
    - In the case of (FAP), colon resection remains the only feasible option.
    - Long-standing ulcerative colitis who have developed high-grade dysplasia or a dysplasia
  - Several surgical options should be discussed with the patient, including total colectomy, subtotal colectomy with rectal sparing, and segmental resection.

Colonic volvulus

- Derived from the Latin word volvere (“to twist”).
- Part of the colon twists on its mesentery, resulting in colonic obstruction.
- The main types:
  - Sigmoid volvulus (counterclockwise)
  - Cecal volvulus (clockwise direction)



Colonic volvulus

Sigmoid vs Cecal Volvulus	
Sigmoid volvulus is the twisting of the sigmoid colon of the large intestine.	Cecal volvulus takes place due to the torsion caused in the cecum area
Extension of the Volvulus	
Sigmoid volvulus can only move upwards and goes to the right upper quadrant.	Cecal volvulus can move in any direction and can be observed in the pelvic area as well.
Affected Population	
The elderly population is mostly affected by sigmoid volvulus.	The young population is mostly affected by cecal volvulus.

Colonic volvulus

- Causes:
  - High residue diet
  - Bulky stool
  - Tortious elongated colon
  - Chronic constipation
  - Laxatives abuse
- Diagnosis:
  - X-ray, contrast radiograph
  - CT abdomen

Colonic volvulus

- Management:
  - In patients with no evidence of peritonitis or ischemic bowel
    - Resuscitation
    - Detorsion:
      - Sigmoid volvulus (success rate 90%)
        - Sigmoidoscopy or Colonoscopy
        - Rectal tube placement
      - Cecal volvulus (success rate 15-20)
        - Cecostomy
    - Surgery:
      - Open vs Lap
      - Sigmoid resection/ Hartman's (Sigmoid)
      - Right hemicolectomy with ileocolic anastomosis (Cecal)
      - Cecopexy is associated with volvulus recurrence in 20-30% of patients
  - Unstable patient: surgery

Large bowel obstruction

- It is an emergency condition that requires early identification and intervention.
- Acute Vs chronic
- Complete vs Partial
- Mechanical vs pseudo-obstruction

Large bowel obstruction

- Symptoms:
  - Crampy abdominal pain
  - Abdominal distention
  - Nausea and vomiting
  - Other symptoms that may be diagnostically significant include the following:
    - Abrupt onset of symptoms (acute obstruction)
    - Recurrent left lower quadrant abdominal pain over several years (suggestive of diverticulitis, a diverticular stricture)
    - Chronic constipation, long-term cathartic use, and straining at stools (diverticulitis or carcinoma)
    - Changes in stool caliber (suggestive of carcinoma)

Large bowel obstruction

- Signs:
  - Abdomen (inspection, auscultation, percussion, and palpation)
  - Evaluate bowel sounds, tenderness, rigidity, guarding, and any mass or fullness
  - Inguinal and femoral regions, look for a possible incarcerated hernia
  - Rectum, contents of anal vault, and stool consistency; perform fecal occult blood testing as appropriate

Large bowel obstruction

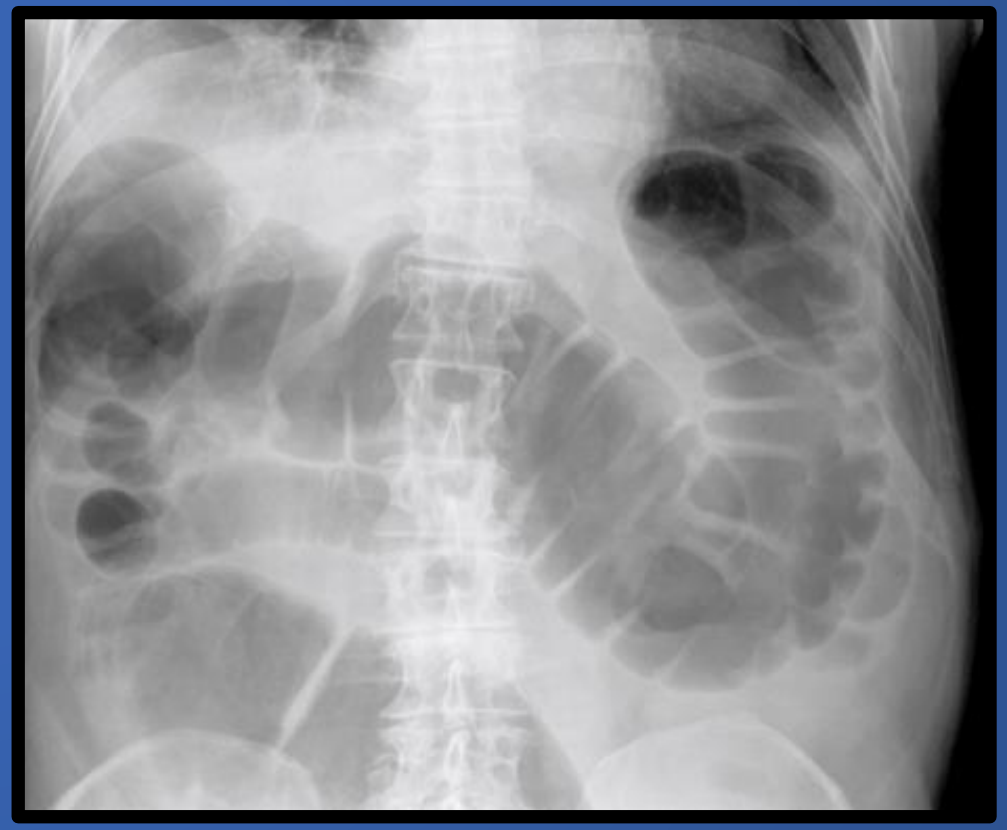
- Etiology:
  - Neoplasm (benign or malignant) 60%
  - Stricture (diverticular or ischemic)
  - Volvulus (colonic, sigmoid, cecal) 5%
  - Fecal Impaction

Large bowel obstruction

- Diagnosis
  - Labs:
    - Complete blood count (CBC) : WBC, HB, Hematocrit
    - Coagulation
    - Electrolytes
    - LFT
    - Serum lactate (if bowel ischemia is a consideration)
    - Urinalysis
    - Stool guaiac test

Large bowel obstruction

- Diagnosis
  - Radiology Imaging
    - Plain radiography (flat and upright)
    - Contrast radiography with enema
    - Computed tomography (CT) –
      - This is the imaging modality of choice
  - Colonoscopy/ Bx



Large bowel obstruction

- Management
  - Initial therapy
    - Volume resuscitation
    - Appropriate preoperative broad-spectrum antibiotics
    - Timely surgical consultation
    - Consideration of a nasogastric tube for severe colonic distention and vomiting
  - The following are emergencies that call for surgical intervention:
    - Closed loop obstructions
    - Sepsis due to complicated diverticular disease
    - Bowel ischemia
    - Volvulus

Large bowel obstruction

- Management
  - Supportive measures:
    - Nil By Mouth
    - Intake- output charts
    - IV lines, and rehydration (IV crystalloid with K^+)
    - Foley's catheter
    - NG Tube to aspirate content for 'decompression'
    - TED stockings, DVT prophylaxis
    - Antibiotics
    - Antiemetics
    - Analgesia
  - Surgery: Closed loop obstructions, Sepsis, Bowel ischemia , Volvulus

Inflammatory bowel disease

- Idiopathic disease caused by a dysregulated immune response to host intestinal microflora.
- Major types:
  - Ulcerative colitis (UC), which is limited to the colonic mucosa
  - Crohn disease (CD), which can affect any segment of the gastrointestinal tract from the mouth to the anus

Inflammatory bowel disease

- Manifestations depend on the area of the intestinal tract involved
- Not specific
- World Gastroenterology Organization WGO
  - Diarrhea: Possible presence of mucus/blood in stool; occurs at night; incontinence
  - Constipation: May be the primary symptom in UC limited to the rectum
  - Bowel movement abnormalities: Possible presence of pain or rectal bleeding, severe urgency, tenesmus
  - Abdominal cramping : Commonly present in the RIF in CD; occur in the periumbilical or in the left lower quadrant in UC
  - Nausea and vomiting: More in CD than in UC

Inflammatory bowel disease

- Diagnosis:
  - Labs: CBC, Serology (Perinuclear antineutrophil cytoplasmic antibodies (ANCA), anti-Saccharomyces cerevisiae antibodies (ASCA), Nutritional
  - Radiology:
    - Barium double-contrast enema radiographic studies
    - Abdominal ultrasonography
    - CT/ MRI
  - OGD/Colonoscopy, with biopsies
  - Capsule enteroscopy

Inflammatory bowel disease

Ulcerative Colitis	Crohn Disease
Only colon involved	Panintestinal
Continuous inflammation extending proximally from rectum	Skip-lesions with intervening normal mucosa
Inflammation in mucosa and submucosa	Transmural inflammation
	Perianal lesions
No granulomas	Noncaseating granulomas
Bleeding (common)	Bleeding (uncommon)
Fistulae (rare)	Fistulae (common)

Table 16.1 Clinical features of Crohn's disease and ulcerative colitis.

	Crohn's disease	Ulcerative colitis
Incidence	5–7 per 100 000 and rising	10 per 100 000 and static
Extent	May involve entire gastrointestinal tract	Limited to large bowel
Rectal involvement	Variable	Almost invariable
Disease continuity	Discontinuous (skip lesions)	Continuous
Depth of inflammation	Transmural	Mucosal
Macroscopic appearance of mucosa	Cobblestone, discrete deep ulcers and fissures	Multiple small ulcers, pseudopolyps
Histological features	Transmural inflammation, granulomas (50%)	Crypt abscesses, submocosal chronic inflammatory cell infiltrate, crypt architectural distortion, goblet cell depletion, no granulomas
Presence of perianal disease	75% of cases with large bowel disease; 25% of cases with small bowel disease	25% of cases
Frequency of fistula	10–20% of cases	Uncommon
Colorectal cancer risk	Elevated risk (relative risk = 2.5) in colonic disease	25% risk over 30 years for pancolitis
Relationship with smoking	Increased risk, greater disease severity, increased risk of relapse and need for surgery	Protective, first attack may be preceded by smoking cessation within 6 months

Inflammatory bowel disease

Characteristic Features of Crohn's disease and ulcerative colitis		
Feature	Crohn's Disease	Ulcerative Colitis
Macroscopic		
Thickened bowel wall	Typical	Uncommon
Luminal narrowing	Typical	Uncommon
"Skip" lesions	Common	Absent
Right colon predominance	Typical	Absent
Fissures and fistulas	Common	Absent
Circumscribed ulcers	Common	Absent
Confluent linear ulcers	Common	Absent
Pseudopolyps	Absent	Common
Microscopic		
Transmural inflammation	Typical	Uncommon
Submucosal fibrosis	Typical	Absent
Fissures	Typical	Rare
Granulomas	Common	Absent
Crypt abscesses	Uncommon	Typical

Inflammatory bowel disease

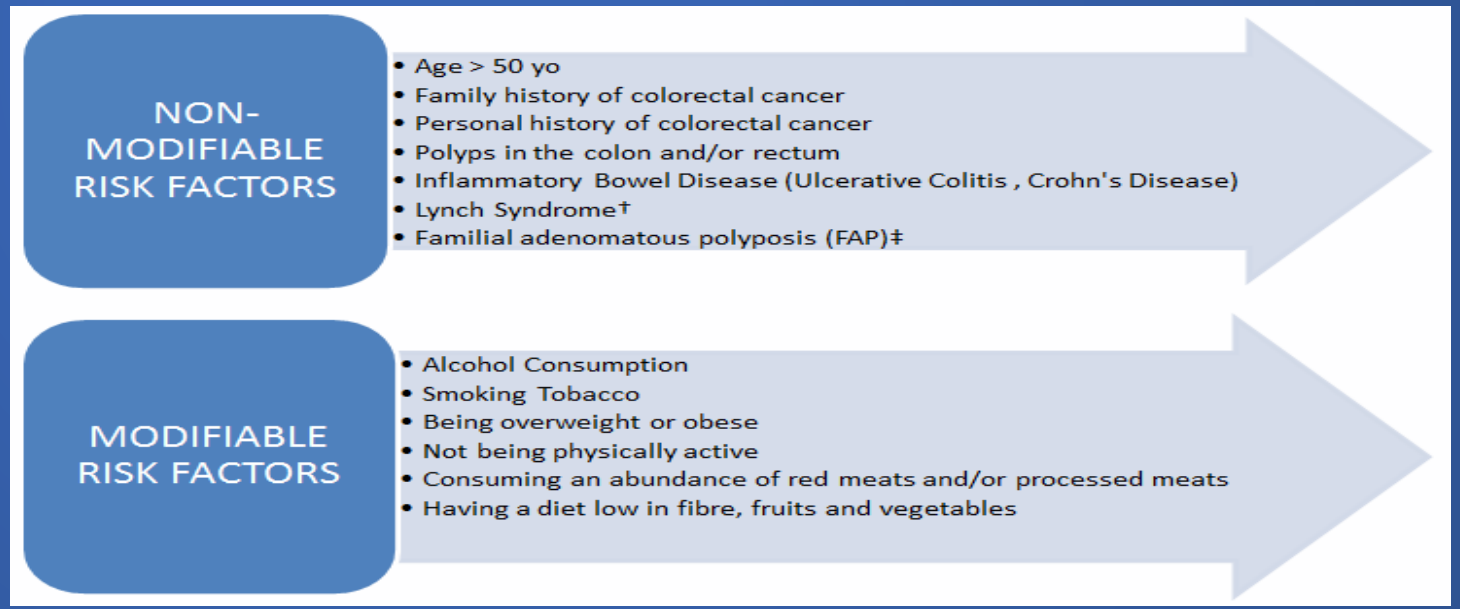
- Management:
  - Medical approach for symptomatic care, & mucosal healing
  - Surgical:
    - Resection is not curative in CD
    - if complications:
      - Perforation
      - Stricture
      - Fistula
      - Malignancy
      - Abscess/ collection

Colon cancer

- Most common type of GI cancer.
- Second highest cause of cancer occurrence and death in US
- In 2012,
  - Second most common cause of cancer in women
  - Third most common in men
  - Fourth most common cause of cancer death
- In 2015 (KSA),
  - The most common cancer among men
  - Third commonest among women

Colon cancer

- Etiology:
  - Most cases of colon cancer are sporadic.
  - It is a multifactorial disease process
    - Genetic factors
    - Environmental
    - Inflammation

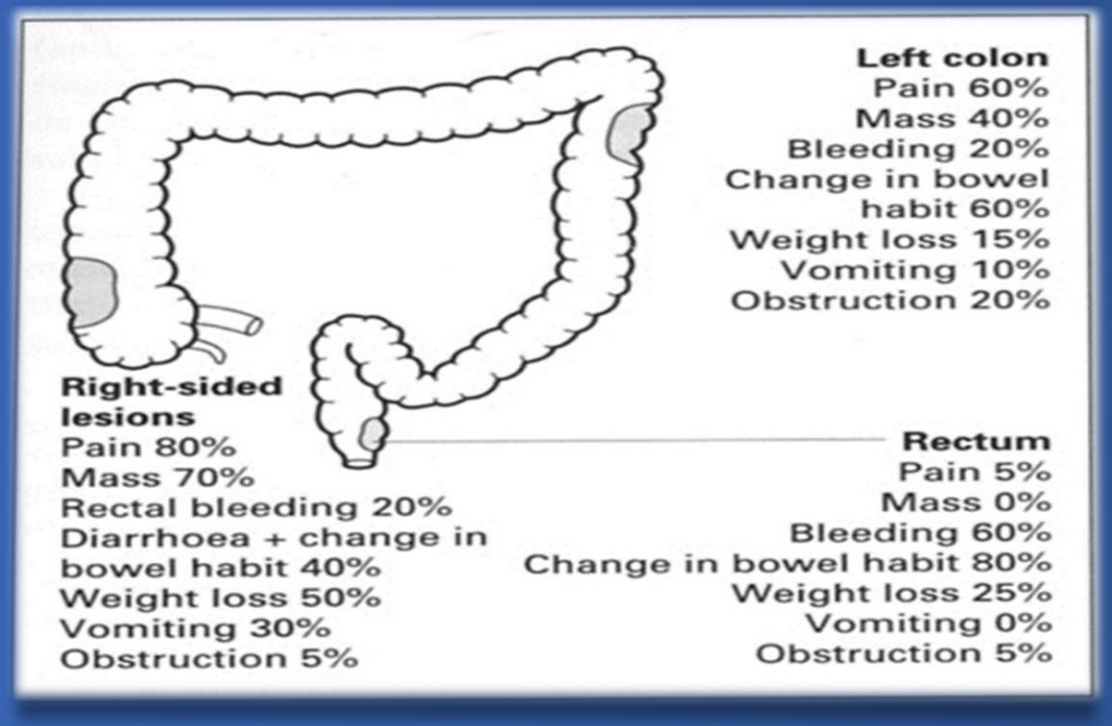


Colon cancer

- Genetic factor
  - Familial adenomatous polyposis (FAP):
    - Autosomal dominant disorder
    - Mutations in the adenomatous polyposis coli (*APC*) gene.
  - Hereditary nonpolyposis colorectal cancer (HNPCC)
    - Called (Lynch syndrome)
    - Autosomal dominant disorder
    - Mutations in the DNA mismatch repair proteins.

Colon cancer

- Signs and symptoms:
  - Screening procedures
  - Depends on the location
  - Common symptoms:
    - Rectal bleeding
    - Iron-deficiency anemia
    - Abdominal pain
    - Change in bowel habits
    - Intestinal obstruction or perforation



Colon cancer

- Physical findings may include the following:
  - Early disease: Nonspecific findings (fatigue, weight loss) or none at all
  - Advanced disease: Abdominal tenderness, palpable abdominal mass, hepatomegaly, ascites

Colon cancer

- Diagnosis
  - Laboratory studies CBC- LFT- CEA
  - Imaging studies:
    - Abdominal X-ray
    - Contrast study (Barium study with double contrast)
    - Abdomen CT/MRI
    - Positron emission tomography, including fusion PET-CT scan
  - Colonoscopy+Bx
  - Metastatic workup

Colon cancer

- The Amsterdam criteria:
  - Diagnostic criteria to identify families likely to have Lynch syndrome,
  - known as hereditary nonpolyposis colorectal cancer (HNPCC).
- Bethesda guidelines
  - Created by National Cancer Institute (NCI)
  - Recommendations for individuals with Lynch syndrome

Colon cancer

AJCC stage	TNM stage	TNM stage criteria for colorectal cancer
Stage 0	Tis N0 M0	Tis: Tumor confined to mucosa; cancer-in-situ
Stage I	T1 N0 M0	T1: Tumor invades submucosa
Stage I	T2 N0 M0	T2: Tumor invades muscularis propria
Stage II-A	T3 N0 M0	T3: Tumor invades subserosa or beyond (without other organs involved)
Stage II-B	T4 N0 M0	T4: Tumor invades adjacent organs or perforates the visceral peritoneum
Stage III-A	T1-2 N1 M0	N1: Metastasis to 1 to 3 regional lymph nodes. T1 or T2.
Stage III-B	T3-4 N1 M0	N1: Metastasis to 1 to 3 regional lymph nodes. T3 or T4.
Stage III-C	any T, N2 M0	N2: Metastasis to 4 or more regional lymph nodes. Any T.
Stage IV	any T, any N, M1	M1: Distant metastases present. Any T, any N.

Colon cancer

- Management
  - Early disease better outcome
  - Surgery is the only curative modality for localized colon cancer (stage I-III).
  - Neoadjuvant chemotherapy
  - Surgical options include the following:
    - Right hemicolectomy: For lesions in the cecum and right colon
    - Extended right hemicolectomy: For lesions in the proximal or middle transverse colon
    - Left hemicolectomy: For lesions in the splenic flexure and left colon
    - Sigmoid colectomy: For sigmoid colon lesions
    - Total abdominal colectomy with ileorectal anastomosis

References

- Principles and Practice of Surgery
  - Pg 234-262

Thanks