Inflammatory Diseases of Intestines

- Inflammatory Bowel Disease (IBD)
  - Crohn's Disease
  - Ulcerative Colitis
- Acute Appendicitis
- Peritonitis
  - Bacterial Peritonitis
  - Non-infected Peritonitis
- Pseudomembranous Colitis
# Inflammatory Bowel Diseases

- Both primarily affect the Intestine but may have systemic manifestations
  - Polyarthritis
  - Uveitis

## Crohn’s Disease

**Aetiology**
- Genetic factors
  - UC – DR2
  - CD – DR5
- Immunoological factors
  - Defective regulation of immune suppression
  - Multiple immunologic disorders
  - CD4+ presence
- Microbial factors
  - Mycobacterium paratuberculosis
  - Measles virus
  - Helicobacter hepticus

**Pathogenesis**
- Inflammation results in impaired integrity of mucosal barrier
- Loss of absorptive function
- Activation of secretion by Crypt of Lieberkuhn
- Intermittent bloody and non-bloody diarrhea

**Clinical Manifestations**
- Chronic inflammation
  - Low grade fever
  - On and off bloody diarrhea
  - Abdominal pain
    - Partially relieved after defecation
  - Weight loss
  - Generalized fatigue
- Obstruction
  - Early stage – edema and spasm
    - Bloating after meal
    - Cramping pain
    - Loud borborygmi
  - Chronic narrowing
    - Constipation
    - Obstruction
  - Complete obstruction leads to Impaction

**Morphology**

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<thead>
<tr>
<th>Gross</th>
<th>Microscopic</th>
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</table>
  - Terminal ileum – commonest
  - Caecum
  - Ascending Colon
| Transmural Chronic inflammatory cells infiltrate
  - Non-caseating, Sarcoidosis-like granulomas in all layers of affected bowel
  - Patchy ulcerations
  - Widening of Submucosa due to
    - Lymphoid aggregations
    - Edema
| In chronic cases, fibrosis in all layers |

**Complications**

- 2nd and 3rd decade of life
- Mostly females
- Commonly in Western countries

## Ulcerative Colitis

**Definition**
- Idiopathic form of Acute and Chronic Colitis
- Affecting the Mucosa and Submucosa of
  - Descending Colon
  - Rectum
  - But may affect the entire length of Colon

**Aetiology**
- Genetic factors
  - UC – DR2
  - CD – DR5

**Pathogenesis**
- Inflammation results in
  - Impaired integrity of mucosal barrier
  - Loss of absorptive function
  - Activation of secretion by Crypt of Lieberkuhn
  - Intermittent bloody and non-bloody diarrhea

**Clinical Manifestations**
- Bloody stools in each passing motion
- With/out mucus
- Urgency
- Tenesmus
- Abdominal cramp
- Weight loss in severe case

**Morphology**

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</table>
  - Rectum → Sigmoid → Descending → Transverse → Ascending → Caecum
  - Diffuse involvement of Colon without Skip Areas
  - Early
    - Mucosa appear
      - Raw
      - Red
      - Granular
  - Later
    - Small superficial ulcers
    - Ulers coalesce forming irregular, shallow ulcer
    - The ulcers surround islands of intact mucosa – Pseudopolyps
    - Thickening of Muscularis layer with loss of Plicae Semilunaris
    - Serosa covered by Fibrinopurulent exudate
  - In Toxic Megacolon, the wall is markedly dilated and thin |
  - Mucosal congestion
  - Edema
  - Haemorrhage
  - Diffuse inflammatory infiltrate in the Lamina Propria
  - Loss of surface Epithelium
  - Crypt abscess
| Early
  - Mucosal congestion
  - Edema
  - Haemorrhage
  - Diffuse inflammatory infiltrate in the Lamina Propria
  - Loss of surface Epithelium
  - Crypt abscess
| Later
  - Mucosal congestion
  - Edema
  - Haemorrhage
  - Diffuse inflammatory infiltrate in the Lamina Propria
  - Loss of surface Epithelium
  - Crypt abscess

**Complications**

- Toxic megacolon
- Perforation
- Pseudopolyps
- Haemorrhage
- Colonic Carcinoma

**Systemic effects**
- Uveitis
- Aknylosing Spondylitis
- Sclerosing Cholangitis
- Erythema Nodosum
- Malnutrition
- Arthritis
- Pyoderma
- Gangrenosum

**Local effects**
- Malabsorption
- Fistula
- Stricture
- Massive intestinal bleeding
- Toxic Megacolon
- Carcinoma of colon – less compared to UC

**Systemic effects**
- Uveitis
- Migratory polyarthritis
- Erythema Nodosum
- Hepatic Pericholangitis
- Sclerosing Cholangitis
- Obstructive Uropathy
- Nephrolithiasis
- Uti
- Amyloidosis
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<th>Epidemiology/ Aetiology</th>
<th>Clinical Manifestations</th>
<th>Morphology</th>
<th>Complications</th>
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</thead>
<tbody>
<tr>
<td><strong>Acute Appendicitis</strong></td>
<td>• 6-7% of population</td>
<td>• Colicky pain starting from around the Umbilicus to the Right Iliac Fossa</td>
<td>• <strong>Neutrophilic infiltration of the Muscularis layer</strong></td>
<td>• Peritonitis</td>
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<tr>
<td><strong>Pathogenesis</strong></td>
<td>• Associated with obstruction (50-80% of cases)</td>
<td>• Nausea and vomiting</td>
<td>Early</td>
<td>• Appendix abscess</td>
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<tr>
<td></td>
<td>o Fecalith</td>
<td>• Mild grade fever</td>
<td>Swollen</td>
<td>• Adhesion</td>
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<td></td>
<td>o Gallstone</td>
<td>• Abdominal tenderness</td>
<td>Serosa appeared</td>
<td>• Portal Pyolphlebitis</td>
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<td></td>
<td>o Foreign bodies</td>
<td>• Increased pulse rate</td>
<td>Acute suppurative appendicitis</td>
<td>• Mucosele</td>
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<tr>
<td></td>
<td>o Tumor</td>
<td>• Neutrophilic Leukocytosis</td>
<td>o Serosa with Fibrinopurulent exudate</td>
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<td></td>
<td>o <em>Worm</em></td>
<td>• Clinical manifestations only in 50% of patients</td>
<td>o Engorged vessels on the surface</td>
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<td></td>
<td>• Enterobius vermicularis</td>
<td><strong>Differential diagnosis</strong></td>
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<td></td>
<td>o Lymphoid Hyperplasia in children</td>
<td>• Mesenteric Lympadenitis after systemic viral infection</td>
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<td>• The mucosal secretion continue to increase the intraluminal pressure</td>
<td>• Gastroenteritis with Mesenteric Lymphadenitis</td>
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<td>• Collapse of vein</td>
<td>• Pelvic Inflammatory disease</td>
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<td>• Ischeamic injury favors bacterial growth</td>
<td>• Rupture of an Ovarian follicle during Ovulation</td>
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<td>• Inflammation further worsen the ischemia leading to necrosis</td>
<td>• Ectopic pregnancy</td>
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<td></td>
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<td>• Meckel diverticulum</td>
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<td><strong>Gross</strong></td>
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<td><strong>Microscopic</strong></td>
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<td>Edema</td>
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<td>Congestion on the Appendiceal wall</td>
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<td><strong>Later</strong></td>
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<td>Acute Gangrenous Appendicitis</td>
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<td></td>
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<td></td>
<td>o Necrosis</td>
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<td>o Ulceration across the wall of Appendix</td>
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<td><strong>Neutrophilic abscess in the wall</strong></td>
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<td>Peritonitis</td>
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| Bacterial Peritonitis| • Primary (children)  
  o Streptococcal infection  
  • Secondary  
  o Rupture of peritoneal organs as in  
  ▪ Appendicitis  
  ▪ Cholecystitis  
  ▪ Salpingitis  
  ▪ Rupture of Peptic Ulcer  
  ▪ Gangrenous bowel  
  ▪ Tuberculosis | • Perforation of abdominal viscera  
  • Isolation of common microflora of the gut  
  o Escherichia coli  
  o Bacteroides fragilis | • Electrolytes imbalances  
  • Hypovolemic shock  
  • Acute renal failure  
  • Peritoneal abscess  
  • Sepsis  
  • Breathing difficulties |
| Non-infected Peritonitis | • Due to leakage of sterile body fluids  
  o Blood  
  ▪ Endometriosis  
  ▪ Blunt abdominal trauma  
  o Gastric juice  
  ▪ Perforated Peptic Ulcer  
  ▪ Gastric Carcinoma  
  o Bile  
  ▪ Trauma and disease of the Gallbladder  
  o Urine  
  ▪ Pelvic trauma  
  o Pancreatic juice  
  ▪ Acute Pancreatitis  
  o Ruptured Dermoid cysts  
  Even at first it is sterile, but within 24-48 hours it becomes infected | • Sterile abdominal surgery normally cause localised/ minimal generalised Peritonitis  
  o May leave  
  ▪ Foreign body reaction  
  ▪ Fibrosis  
  • Rarer causes of Non-infected Peritonitis  
  o Mediterranean fever  
  o Porphyria  
  o Systemic Lupus Erythematosus |
### Pseudomembranous Colitis

**Definition**
- Acute inflammation of the Small/ Large Intestines
- Characterized by formation of Pseudomembrane over the mucosal membrane
- Caused by *Clostridium difficile*
  - Normal flora of the gut
  - Cytotoxic strain may overgrow after prolong antibiotic usage

**Pathogenesis**
- Disruption of protective colonic flora (by Antibiotic)
- Colonization of toxigenic *Clostridium difficile*
- Production of Enterotoxins
  - **Toxin A**
    - Loosens the junction between intestinal cells
    - Allowing the Toxin B to enter Epithelial cells
  - **Toxin B**
    - Activation of inflammatory cascade
    - Cell disruption
    - Fluid secretion
    - Mucosal injury
    - Edema
- *Clostridium difficile* may cause
  - Asymptomatic career
  - Mild self limited diarrhea
  - Pseudomembranous colitis
  - Fulminant colitis
- Mostly associated with the use of
  - Clindamycin
  - Ampicillin
  - Cephalosporins
- Symptoms appear 5-10 days after Antibiotic therapy

**Clinical Features**
- Watery diarrhea
  - Self limited
  - Debitating
  - With/out bloody stool
- Abdominal cramps
- Fever in severe cases
- Rigors

**Complications**
- Dehydration
- Hypovolemic shock
- Toxic Megacolon
- Perforation
- Septicaemia