Intestinal Crohn’s Disease
Classic Radiologic Findings

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Our Patient

• 25 yo F presented w/persistent fever, nausea, postprandial abdominal cramping, diarrhea x6 wks
• 13 lb weight loss
• PE - T 100.7; abd soft, mild bilateral LQ tenderness; no peritoneal signs; no masses; normal bowel sounds; guaiac neg
• Labs - WBC 12.1; ESR 31; otherwise unremarkable
• Micro - Blood, urine cx negative
Our Patient: Imaging

Narrowed terminal ileum w/ thickened wall

UGI w/SBFT

CT

Ascending Colon

Cecum

Terminal ileum

Cecum

Terminal ileum

From PACS, BIDMC
Ddx of bowel wall thickening

• Hemorrhage
• Ischemia
• Infection
• IBD
• Radiation
• Neoplasm

In this patient, thickening in iliocecal region is highly suggestive of Crohn’s

- age
- classic sx: diarrhea, abd pain, fever
- common sx: weight loss, nausea
- labs: ↑ WBC, ↑ ESR
- ileocecal distribution
Inflammatory Bowel Disease (IBD): Crohn’s vs. Ulcerative Colitis (UC)

Crohn’s
- transmural
- skip areas
- rectal sparing
- may involve any region of GI tract

UC
- mucosal
- continuous
- involves rectum
- usually limited to colon
Ulcerative Colitis - CT

Rectal involvement

Descending colon

Sigmoid

R Transverse Colon Uninvolved

Splenic Flexure
Ulcerative Colitis – Barium Enema

Acute UC w/extensive mucosal ulceration, inflammation

Chronic UC w/pipestem appearance, loss of haustral markings


Images courtesy of Jonathan Kruskal, MD, PhD
Patient’s course

• Colonoscopy revealed patchy erythema, apthoid ulcers in distal ileum, bx c/w chronic active ileitis
• In light of clinical presentation and imaging findings, she was given dx of Crohn’s disease
• She was started on corticosteroids
• Fevers, nausea, abdominal cramping resolved; diarrhea improved
Crohn’s Disease - The Basics

• **Definition** - Transmural granulomatous inflammatory disease of GI tract

• **Epidemiology** - 10-70 cases/100,000; peak age 15-25, 55-65

• **Etiology** - genetic, environmental, infectious, immunologic, psychologic factors

• **Clinical presentation** - diarrhea, abdominal pain/tenderness, weight loss, fever
  – Complications: fistulae, abscesses, strictures, obstruction, malignancy, malabsorption, bleeding
  – Extraintestinal: Hepatobiliary, urinary, joint, eye, skin

• **Labs** - ↑WBC, ↑ESR, ↓HCT

• **Endoscopy** - patchy erythema, apthoid ulcerations, linear ulcers, skip lesions
Distribution

- May involve entire GI tract
- 80% small bowel involvement, most often distal ileum
- 30% exclusive ileitis
- 50% ileocolitis
- 20% limited to colon

Anatomy of colon

Hepatic flexure
Ascending colon
Ileocecal valve
Cecum
Appendix
Terminal Ileum

Splenic flexure
Descending colon
Transverse colon
Sigmoid

Small bowel distribution

- Frontal image
  - peripheral colon
  - central small bowel

Anatomy of small bowel

Roentgenogram w/barium

- Duodenum
- Ileum
- Jejunum

Standard Imaging Modalities

• Barium studies
  – along with endoscopy, choice for dx
  – visualization of mucosa, abnormal surface patterns, caliber
  – barium enema for colitis
  – UGI w/SBFT for disease proximal to colon

• CT
  – double contrast – oral barium, IV iodinated contrast
  – visualization of transmural inflammation and extraintestinal manifestations
Management

• Medical
  – steroids
  – immunosuppressants
  – sulfasalazine
  – antibiotics

• Surgical
  – reserved for treatment of severe complications
    • obstruction
    • fistulas
    • hemorrhage
    • carcinoma
    • abscesses
Early Mucosal Changes

Double contrast BE

- Not seen on CT
- Best seen on barium studies
- Apthous ulcerations
  - lymphoid follicle enlargement, ulceration of overlying mucosa
  - barium crater c/surrounded halo
Cobblestoning

- Apthae enlarge, merge
- Interspersed with edematous mucosa
- Deep ulcers lead to fistulas

From Peppercorn, MA. Clinical Manifestations and diagnosis of Crohn’s Disease. *UptoDate* 2001. Image courtesy of Norman Joffe, MD
Pseudopolyps

- Inflammatory
  - cobblestoning
  - nodular filling defects
  - edematous mucosa surrounded by ulcerations

- Postinflammatory
  - mucosal overgrowth during healing process
  - filiform
Intramural sinuses

- Transmural inflammation
- Ulceration
- Leads to sinus tracts within wall, through wall to form fistulas
Transmural disease

- Best seen on CT
- Normal wall thickness on CT is 2-3 mm
- Wall thickening, inflammation
  - Stratified attenuation
- Progresses to fibrosis
  - Homogenous attenuation of thickened wall

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Stricturing

• Active disease
  – “string sign”
  – edema, spasm

• Fibrotic disease
  – irreversible strictures
  – lead to obstruction, fistulas

From Peppercorn, MA. Clinical Manifestations and diagnosis of Crohn’s Disease. UptoDate 2001. Image courtesy of Jonathan Kruskal, MD, PhD

Courtesy of Jonathan Kruskal, MD, PhD
Fistulas

- Barium studies
  - kissing lesion of prefistulas
  - premature filling w/enteroenteric fistulas

- CT
  - useful in defining fistulas, particularly enterocutaneous, rectovaginal, enterovesical, abscesses

From Peppercorn, MA. Clinical Manifestations and diagnosis of Crohn’s Disease. *UptoDate* 2001. Image courtesy of Jonathan Kruskal, MD, PhD
Fistulas

Iliosigmoid Fistula

SBFT w/contrast filling sigmoid

Sigmoid

Enterovesicular Fistula

Ileum

Bladder

Cecum

Fistula

SBFT

Courtesy of Jonathan Kruskal, MD, PhD

Courtesy of Linda Miles, MD
Creeping Fat

- Mesentary thickened, edematous, fibrotic
- CT
  - increased attenuation of mesenteric fat due to inflammatory cells, fluid
  - separation of bowel loops

Courtesy of Linda Miles, MD
Abscesses

R Rectus Abdominus Abscess

- 2º to sinus tracts, fistulas, perforations, surgery
- Barium, endoscopy may suggest abscess by mass effect, fistula
- CT is imaging modality of choice
  - Circumscribed, round/oval water-density mass
  - Capsule may enhance
  - Air 2º to gas-forming bacteria or sinus to skin, GI tract

Fistula

Courtesy of Jonathan Kruskal, MD, PhD
Abscesses

CT-guided drainage

- CT used therapeutically
- CT guided drainage plus abx
- May obviate need for surgery

Courtesy of Jonathan Kruskal, MD, PhD
The End
References


• John’s Hopkins Medical Institutions website, *Crohn’s Disease*. John’s Hopkins University 2000.


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