Atlas of Signs and Findings in Crohn’s Disease

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Outline

1. Our Patient’s Clinical Features: History and Physical Exam
2. Differential Diagnosis
3. Investigations of our patient
4. Crohn’s Disease
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   ii. Extraintestinal Manifestations
   iii. Diagnostic Tests
   iv. Radiological Findings
   v. Crohn’s vs Ulcerative colitis
5. Conclusion
6. Summary
History

A 55 yo F with

- 2-3 loose-formed nonbloody bowel movements a day
- Fleeting cramps prior to bowel movements
- Came for follow up
- No fever, chills, nausea, vomiting
- No loss of appetite or weight change
Past History

• **PMH:**
  – Crohn’s Disease
  – GERD

• **PSH and Family History** - Not significant for GI problems

• **Social History:** Smoked 2 PPD for 30 years, stopped 10 years ago
Physical Exam

- **General:** Well-developed, well-nourished female in no apparent distress
- **Vital Signs** WNL
- **HEENT:** Unremarkable
- **Neck:** Supple, no lymphadenopathy
- **Abdomen:** Soft, mild tender below umbilicus without guarding or rebound
Differential Diagnosis

- Crohn’s Disease
- Ulcerative Colitis
- Irritable Bowel Syndrome
- Yersinia Ileitis
- Ileocaecal Tuberculosis
- Mesenteric Adenitis
Investigations of Our Patient

• CT scan done outside, 5 years ago, showed *inflammation* in the *proximal transverse colon*, with *focal microperforations* and some *abnormal thickening* of the *terminal ileum*.

• A repeat CT scan showed an *ileocecal fistula*.

• Colonoscopy, 5 years back, showed a single *aphthous erosion* in the *terminal ileum* and an area in the *transverse colon* that looked like a *probable fistula* site.
Our Patient Past Coronal C+ T2 Weighted MR Enterography Image

Terminal ileum showing mural thickening and mucosal enhancement
Let us view another image of the same study.
Abnormal inflammatory process between the terminal ileum and proximal transverse colon
Let us move on to the report of the same study.
Our Patient Past C+ MR Enterography

- Abnormal wall thickening, mucosal enhancement and surrounding mesenteric inflammatory changes of the terminal ileum, consistent with terminal ileitis

- Abnormal inflammatory process between the terminal ileum and proximal transverse colon without fluid collection or discrete tract, suggest early changes of fistulization or may represent changes related to recent perforation

- No lymphadenopathy, no evidence of abscess or ascites
Labs on Present Admission

- Hb - 13.8
- ESR - 14
- CRP - 1.2

Hb, ESR and CRP are normal suggesting that there is *no active disease*. 
Coronal C+ CT Enterography in Our Patient

Focal tethering of terminal ileum against proximal transverse colon
Mild active inflammation and ulcerations in terminal ileum
Let us view another image of the same study.
Coronal C+ CT Enterography in Our Patient

Skip lesion proximal to the previous segment
Let us move on to the report of the same study.
C+ CT Enterography in Our Patient

- **Terminal ileum** demonstrating **mild active inflammation and ulcerations**, with **focal tethering** against the adjacent **proximal transverse colon** without patent fistula, similar in configuration to the past MR enterography. **Tiny skip lesion** just **proximal** to this segment appears new

- No new fistula or fluid collection
- No obstruction
- No lymphadenopathy or ascites
Crohn’s Disease

• Type of *inflammatory bowel disease (IBD)*
• **Etiology:** Unknown, Possible environmental, genetic and autoimmune factors
• **Involvement:** any segment from mouth to perianal region
• **Distal ileum** - most common
<table>
<thead>
<tr>
<th>LOCATION</th>
<th>SYMPTOMS</th>
<th>COMMON DIAGNOSTIC TESTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ileum and colon</td>
<td>Diarrhea, cramping, abdominal pain, weight loss</td>
<td>Colonoscopy with ileoscopy, CT enterography, biopsy</td>
</tr>
<tr>
<td>Colon only</td>
<td>Diarrhea, rectal bleeding, perirectal abscess, fistula, perirectal ulcer</td>
<td>Colonoscopy with ileoscopy, CT enterography, biopsy</td>
</tr>
<tr>
<td>Small bowel only</td>
<td>Diarrhea, cramping, abdominal pain, weight loss</td>
<td>Colonoscopy with ileoscopy, CT enterography, capsule endoscopy, small bowel follow-through, enteroscopy, biopsy, MR enterography</td>
</tr>
<tr>
<td>Gastroduodenal region</td>
<td>Anorexia, weight loss, nausea, vomiting</td>
<td>Esophagogastroduodenoscopy, small bowel follow-through, enteroscopy</td>
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Extraintestinal Manifestations

- Dermatological
- Rheumatological - Migratory polyarthritis, Ankylosing spondylitis
- Ocular - Conjunctivitis, Anterior uveitis, Episcleritis
- Urological - Nephrolithiasis
- Hepatobiliary - Cholelithiasis, Hepatic steatosis, Primary sclerosing cholangitis
- Metabolic bone disorder - Osteoporosis, osteonecrosis, pathological fracture
- Venous and arterial thrombosis
Let us view some images of the same.
Extraintestinal Manifestations

Erythema nodosum

Pyoderma gangrenosum

Superficial erosion of tongue

Anterior uveitis


<table>
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<th>TEST</th>
<th>COMMENT</th>
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</table>
| Small bowel follow-through/ enteroclysis/enema | Visualization of lumen using contrast medium (barium)  
radiation exposure, no wall and extraluminal visualization |
| Computed tomography enterography   | Permits visualization of the bowel wall and lumen; extraluminal sequelae  
exposes patient to ionizing radiation. |
| Magnetic resonance enterography    | Similar to CT, no ionizing radiation  
expensive |
| Endoscopy                          | Direct visualization of mucosa - inflammation, fistula, or stricture of terminal ileum and colon; ability to obtain biopsies.  
extraluminal not seen. |
| Ultrasonography                    | Detects increase in vascular flow, abscess, sinus tracts, and lymphadenopathy  
operator dependant, obesity |

Long narrow ileum with mucosal irregularity

String sign - severe narrowing of terminal ileum with dilated proximal bowel

Axial C+ CT Abdomen of Companion Patient #3

*Target sign*

Periintestinal fat showing marked inflammatory change

Target Sign

Seen on *contrast enhanced CT* and *MRI*. It consists of 3 concentric circles of bowel wall:

- **Outer Layer**: Inflamed muscularis propria (high attenuation)
- **Middle Layer**: Intermediate edema/fat (low attenuation)
- **Inner Layer**: Inflamed mucosa (high attenuation)

Best seen during *late arterial, early venous* phase.
Luminal narrowing and mural thickening of distal ileum
Dilatation of fluid-filled small bowel proximally due to obstruction.
Collapsed ascending colon (A) and descending colon (D)

Axial C+ CT Abdomen of Companion Patient #5

**Creeping fat of mesentery**

Homogeneously thickened walls of ileum and ascending colon

Separation of normal small-bowel loop from these diseased segments caused by abnormal mesenteric fat

Creeping Fat of Mesentery

Fibrofatty proliferation with hypertrophied mesenteric fat between inflamed intestinal segments.
Perirectal abscesses with sinus tract extending into right buttock.

Presacral abscess attributable to fistula from rectum (R).

Mucosal enhancement with narrowing of lumen of terminal ileum

Dilation of proximal bowel

Terminal ileum shows Two aphthous ulcers with Wall thickening and cobblestoning.

Coronal T1 Fat Suppressed C+ MRI of Companion Patient #10

Comb sign

Comb Sign

Shaft of comb - Mural hyper enhancement and thickening in the distal ileum

Bristles of comb - Prominent engorged vasa recta in the mesentery
Axial 3D FLASH C+ MRI of Companion Patient #11

Mesenteric lymphadenopathy

Mesenteric Lymphadenopathy

Mesenteric lymphadenopathy <1 cm may be seen in Crohn’s disease.

If >1 cm, then rule out other causes, especially lymphoma.
## Crohn’s vs Ulcerative

<table>
<thead>
<tr>
<th>Features</th>
<th>CD</th>
<th>UC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mucosal Granularity</strong></td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td><strong>Aphthoid ulcers</strong></td>
<td>++</td>
<td>-</td>
</tr>
<tr>
<td><strong>Deep ulceration</strong></td>
<td>++</td>
<td>-</td>
</tr>
<tr>
<td><strong>Discontinuous ulceration/ Skip lesion</strong></td>
<td>++</td>
<td>-</td>
</tr>
<tr>
<td><strong>Rectal sparing</strong></td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td><strong>Colonic shortening</strong></td>
<td>+</td>
<td>++</td>
</tr>
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</table>

Let us see some more features that differentiate the two diseases.
# Crohn’s vs Ulcerative

<table>
<thead>
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<th>Condition</th>
<th>CD</th>
<th>UC</th>
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<tbody>
<tr>
<td>Haustral obliteration</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Pseudodiverticula</td>
<td>++</td>
<td>-</td>
</tr>
<tr>
<td>Enteric fistulae</td>
<td>++</td>
<td>-</td>
</tr>
<tr>
<td>Abscess</td>
<td>++</td>
<td>-</td>
</tr>
<tr>
<td>Small bowel disease/ Anal disease</td>
<td>++</td>
<td>-</td>
</tr>
<tr>
<td>Toxic megacolon</td>
<td>+</td>
<td>++</td>
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Conclusion

Based on the clinical features and radiological findings of our patient, a diagnosis of *Crohn’s disease* was arrived upon.

Patient counselled and does not want to take medications, but is willing for follow up.

Plan of follow up:
- *ESR, CRP*
- *Repeat CT Enterography*
Summary

- **Crohn’s disease** is a type of IBD which can affect any part of GIT, most commonly **ileum**

- **Clinical features** include abdominal pain, diarrhea, weight loss, abscess, fistula, etc

- **Extraintestinal manifestations** may also be present as already mentioned

- Various **investigations** for evaluation include small bowel follow through, enteroclysis, enema with barium contrast, **CT enterography, MR enterography**, endoscopy and ultrasonography
Summary

Radiological findings include:

- Aphthous ulcers, eccentric bowel wall thickening
- Skip lesions
- String sign, creeping fat of mesentery
- Target sign
- Comb sign
- Abscesses and Fistulae
Summary

Treatment:

- Symptomatic OR to induce remission

- Medical
  - Steroids
  - 5-ASA derivatives
  - Immunomodulators

- Surgical
References


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Thank You