The David B. Falkenstein Lecture: Colitis in the Elderly

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## Causes of Diarrhea in the Elderly

<table>
<thead>
<tr>
<th>Small Bowel</th>
<th>Colon</th>
<th>Other</th>
<th>Systemic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diverticulosis</td>
<td>Infection</td>
<td>Chr pancreatitis</td>
<td>Diabetes</td>
</tr>
<tr>
<td>SIBO</td>
<td>S,S,C, CDI</td>
<td>Gastrocolic fistula</td>
<td>B12 defic</td>
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<tr>
<td>Ischemia</td>
<td>Microscopic colitis</td>
<td></td>
<td>Addison’s dis</td>
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<tr>
<td>FSI</td>
<td>IBD</td>
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<td>CMI</td>
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<td>Celiac disease</td>
<td>Incontinence</td>
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</table>
Diarrhea: Site of Origin

**Small Bowel**
- large volume
- generalized abd cramps
- absence of rectal sxs
- absence of blood, mucus, RBCs, WBCs in stool

**Large Bowel**
- small volume
- lower abd or pelvic pain
- rectal sxs (urgency, tenesmus)
- BRBPR, mucus, RBCs, WBCs in stool
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**Notes:**
- SCAD: Sudden Cardiac Death
- CMI: Cytomegalovirus Infection
- B12 defic: Vitamin B12 deficiency
- Amyloid: Amyloidosis
- IBD: Inflammatory Bowel Disease
- CDI: Clostridium difficile infection
- FSD: Fast Sclerosing Cholangitis
- IBS: Irritable Bowel Syndrome
- Infiltrative colitis: Infiltrative colitis
- Pancreatitis: Pancreatitis
Case 1

- A 63 yo woman with PMH of DM, Hashimoto’s thyroiditis and osteoarthritis Rxd with metformin, thyroxine, NSAIDs
- 6 mos ago pt gradually became aware of mild epigastric pain and her PMD prescribed omeprazole. Pain resolved but PPI was continued. Some time later she developed LLQ discomfort and loose non-bloody stools passed 4-5x each day and 1x at night when she got up to urinate. She also had urgency and 2 bouts of incontinence. Wt loss of 6 lbs.
Case 1: DDx

- Diabetic diarrhea
- Medications for diabetes
- Hyperthyroidism (exogenous)
- Microscopic colitis
- NSAID colopathy
CASE 1: Microscopic Colitis

- Middle-aged pts; \( \varnothing > \varnothing \); chronic, watery diarrhea
- Normal colonoscopy but abnormal histology
  - lymphocytic colitis
  - collagenous colitis
- Inflammatory diarrhea with secretory, osmotic components;↓ barrier function and bile salt malabsorption
- Link to medications: NSAIDs, PPIs, others
- Associations: celiac disease, autoimmune thyroiditis, type 1 DM, and non-erosive, oligoarticular arthritis
- Possible role of \( C. \) difficile
Case 1: Microscopic Colitis

- Colonoscopy usually normal
  multiple biopsies: yield varies with site; may be patchy
  transverse (83%) > right (70%) > rectosigmoid (63%)

- Treatment
  D/C presumed causative meds
  budesonide
  loperamide, cholestyramine
  bismuth subsalicylate
  ? mesalamine
  anti-TNF agents, immunomodulators ?? prednisone
Segmental Colitis

- Infectious
- Ischemic
- Crohn’s
Case 2

A 76 yo man presented with the acute onset of cramping lower abd pain, diarrhea with some BRB mixed in and fever to 100.5°F. He is generally healthy although he recently completed a course of antibiotics for a URI and he is on a daily PPI for GERD. He enjoys a general diet without restriction.
Case 2: Infectious Colitis

Salmonella  
C. difficile  
E. Coli O157:H7
Infectious Colitis in the Elderly: Predispositions

- **Salmonella:** age; achlorhydria; immune dysfunction (DM, malignancy, Immunosuppressive agents) reduced ability to increase IFN-γ and TNF-α and maintain number of Mφ and neutrophils (C57BL/6 mice) vascular disease, cholelithiasis
- **C. difficile:** age > 65 yrs, co-morbid disease, achlorhydria; PPI use, antibiotics, exposure (hospital and SNCF)
- **E. coli O157:H7:** age
Infectious Colitis in the Elderly: Important Points

Salmonella
1. may mimic ulcerative colitis
2. prognosis is worse than in the young
3. should be treated

C. difficile
1. takes longer to resolve
2. tends to recur
3. has a worse prognosis

E. Coli O157:H7
1. may mimic Ischemic colitis (STs: fibrin → thrombi)
2. severity and mortality is higher
3. diarrhea should not be Rxed with anti-motility agents or antibiotics (?)
Pseudomembranous Colitis: Non-Clostridial Infectious Causes
(15 cases from 1978-2010)

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
<th>Percentage</th>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteria (n=9; 60%)</td>
<td></td>
<td></td>
<td>✓ <em>E. Coli</em> O157:H7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓ salmonella</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓ shigella</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓ <em>S. aureus</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓ <em>K. oxytoica</em></td>
</tr>
<tr>
<td>Viruses (n=5; 33%)</td>
<td></td>
<td></td>
<td>✓ CMV</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>✓ adenovirus</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓ rotavirus</td>
</tr>
<tr>
<td>Parasites (n=1; 7%)</td>
<td></td>
<td></td>
<td>✓ strongyloides</td>
</tr>
</tbody>
</table>

- PMC can also be seen with colitis from ischemia, radiation, uremia and chemoRx
Case 3A: Ischemic Colitis

A 73 yo man s/p CABG (12 yrs) with AF and CKD develops mod severe abd pain at the end of his hemodialysis session and pain worsens over the next 4 hours; his weight was 4 pounds less than it was before the session. No rectal bleeding or diarrhea. He is afebrile, cardiac rhythm is irregularly irregular and he has mod RLQ tenderness. Lab data shows WBC=15,500/cmm. Non-contrast abd CT shows thickening of the ascending colon.

Case 3B: Ischemic Colitis

A 73 yo man s/p CABG (12 yrs) develops mild LLQ pain followed within an hour by diarrhea and then BRBPR He is afebrile and has mild LLQ tenderness. Lab data shows WBC=15,500/cmm. Abd CT shows thickening of the sigmoid and descending colon.
Ischemic Colitis

- Site of involvement determines presentation and prognosis
  - **Non-IRCI**: BRBPR, bloody diarrhea > abd pain
    Good outcome
  - **IRCI**: Abd pain > BRBPR or bloody diarrhea
    Poorer outcome:
    - more frequent need for surgery
    - higher 30-day mortality rate
What is the Role of Colonoscopy in CI?

**Diagnosis**
- **non-specific findings:** segmental subepithelial hemorrhage and edema, ulceration, ps.membr, ps.polyps, stenosis
- **more specific findings:** CSSS, gangrene

**Prognosis**
- segment of colon involved (IRCI worse)
- gangrene (worst), ulcers (worse), CSSS (better)
Gangrene
Colon Single Stripe Sign (CSSS)
Colonoscopic Findings in CI (297 cases)

- Erythema (83.7%)
- Edema (69.9%)
- Superficial ulcerations (57.4%)
- Friability (42.6%)
- Deep ulcerations (21.7%)
- Luminal narrowing (8.4%)
- Intraluminal blood (8.4%)
- Blue-black nodules (5.5%)

All the above findings are time-related
Arterio-venous oxygen difference (vol %)

Blood flow (% of control)

Intraluminal pressure (mm Hg)
Constant Intracolonic Press: 65 mmHg

Brandt et al. GIE, 1986
Colonoscopy and CI

- Colonoscopy with biopsy is the best test to dx CI
- In suspected CI, the colon should be insufflated minimally & with CO₂, rather than RA, if possible

**Expert Opinion**
- In severe CI, CT should be used to evaluate dis distrib with a ltd colonoscopy to confirm the nature of the CT abnl
- No need to reach the cecum; stop at the distal most extent of disease
- Bxs should be taken in most cases- except gangrene
CT and MRI in CI

- CT with IV and oral contrast is the *imaging modality of choice* to assess the distribution and phase of colitis.

- CT (MRI) findings of bowel wall thickening, edema, thumbprinting, pericolonic fat-stranding are *suggestive* of CI, but *not specific*.

- CT (MRI) findings of colonic pneumatisos and portomesenteric venous gas are *highly suggestive* of transmural colonic infarction, but *not diagnostic*.

**Common findings (good prognosis) are non-specific; the more specific findings (bad prognosis) are uncommon**

**Expert Opinion**

- *Multi-phasic CTA should be performed for any pt with suspected IRCI or when AMI cannot be excluded***
Non-specific CT
More Specific but Ominous CT Findings

**Pneumatosis linearis**

**Portal venous gas**
Is There a Role for Angiography in The Management of CI?

- By the time of presentation, colon blood flow has already returned to normal.
- Angiography will show age-related vascular changes, but not reveal a causative lesion.
- Angiography plays no role in CI except:
  - patients with *IRCI*
  - combined colon and AMI
  - recurrent disease?
At presentation: 1) blood flow has returned to normal
2) angiography is usually normal
Outcomes of Anatomic Patterns of CI

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Pan Colon</th>
<th>Right Colon</th>
<th>Trans Colon</th>
<th>Left Colon</th>
<th>Distal Colon</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOS</td>
<td>7 (1-115)</td>
<td>9 (1-54)</td>
<td>10 (1-89)</td>
<td>6 (1-113)</td>
<td>5 (1-75)</td>
<td>6 (1-55)</td>
</tr>
<tr>
<td>Surgery</td>
<td>19.8%</td>
<td>30.4%</td>
<td>44.3%</td>
<td>18.8%</td>
<td>5.9%</td>
<td>10.4%</td>
</tr>
<tr>
<td>Mortality</td>
<td>11.8%</td>
<td>21.7%</td>
<td>20.3%</td>
<td>12.5%</td>
<td>6.9%</td>
<td>6.5%</td>
</tr>
</tbody>
</table>

Brandt, Feuerstadt, Blaszka. Am J Gastro, 2010
**Risk Factors For Poor Outcome**

<table>
<thead>
<tr>
<th>Clinical Presentation</th>
<th>Vital Signs</th>
<th>Serologic Values</th>
<th>Disease Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal pain without BRBPR</td>
<td>HR &gt; 100 bpm</td>
<td>Hgb &lt; 12 mg/dL</td>
<td>IRCI</td>
</tr>
<tr>
<td>Non-bloody diarrhea</td>
<td>SBP &lt; 90 mmHg</td>
<td>Na &lt; 136 meq/L</td>
<td>Pancolonic</td>
</tr>
<tr>
<td>Peritoneal signs</td>
<td></td>
<td>LDH &gt; 450 U/L</td>
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<tr>
<td>Sx onset after hospital admission</td>
<td></td>
<td>BUN &gt; 28 mg/dL</td>
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<tr>
<td></td>
<td></td>
<td>HCO₃ &lt; 24 mmol/L</td>
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<td></td>
<td></td>
<td>Albumin &lt; 2.8 g/L</td>
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<td></td>
<td></td>
<td>WBC &gt; 15x10³/L</td>
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*Poor outcome: 30-day mortality and/or colectomy*

% Mosele et al. Scan J Gastro 2010, * Montoro et al. Scan J Gastro. 2011
# Severity of CI and Prognostic Risk Factors

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<thead>
<tr>
<th>Severity</th>
<th>Criteria</th>
<th>Treatment</th>
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</thead>
<tbody>
<tr>
<td><strong>Mild</strong></td>
<td>Typical sx of CI with a segmental colitis (not IRCI) but none of the risk factors for poorer outcome seen in mod-severe CI</td>
<td>Observation Supportive care</td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
<td>Any pt with CI and ≤3 of the following:</td>
<td>Correction CV abnl BS antibiotics Surg consult</td>
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<tr>
<td></td>
<td>- male gender</td>
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<tr>
<td></td>
<td>- abd pain w/o BRBPR</td>
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<td>- hypotension (SBP &lt; 90 mmHg)</td>
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<td>- serum Na &lt; 136 mEq/L</td>
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<td>- LDH &gt; 350 U/L</td>
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<td>- colonic mucosal ulceration (on colonoscopy)</td>
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<td><strong>Severe</strong></td>
<td>Any pt with CI and &gt;3 criteria for mod CI or any of the following:</td>
<td>Emerg surg consult Transfer to ICU Correction of CV abnl BS antibiotics</td>
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<tr>
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<td>- peritoneal findings</td>
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<td>- pneumatosis or portal venous gas</td>
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<td></td>
<td>- gangrene</td>
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<td>- pan-colonoscopic distribution or IRCI</td>
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**Risk factors for poor outcome:** male gender, hypotension (SBP < 90 mm Hg), tachycardia (HR >100 bpm), abd pain w/o rectal bleeding; WBC >15 x 10^3/L, BUN >20 mg/dL, Hgb <12 g/dL, LDH >350 U/L, Na <136 mmol/L

---

**Mild Disease**

Typical sx's of CI with none of the common risk factors for poor outcome

CT: abdomen and pelvis

Normal

No ultrasound

Abnormal

Consider colonoscopy and biopsy

Consistent with CI

Ulceration

Observation and supportive care

---

**Moderate Disease**

Any pt suspected of CI with ≤ 3 of the common risk factors for poor outcome

CT: abdomen and pelvis

Non-IRCI

Consider colonoscopy and biopsy

Supportive care, vol replacement, correction of CV abnl, BS antibiotics

Consistent with CI

Ulceration

---

IRCI (CT or colonoscopy)

Consider CTA or MRA

Mesenteric angiography

Supportive care, vol replacement, correction of CV abnl, BS antibiotics

Occlusion relieved

Surgical intervention

Occlusion not relieved

---

**Severe Disease**

Any pt suspected of CI with >3 of the risk factors for moderate disease* or any of the following: peritoneal signs, pneumatosis or portal venous gas (radiology), gangrene (colonoscopy), pancolonic or IRCI (colonoscopy or CT)

Consider CTA, MRA or mesenteric angiography

Transfer to ICU

Emerg surg consult

---

Supportive care, vol replacement, correction of CV abnl, BS antibiotics

Surgical intervention
Case 4: IBD

- A 71 yo man previously well except for psoriasis presented with 9 d of increasing constipation, urgency, straining and some BRBPR. He also had 2 episodes of nocturnal incontinence. He felt fatigued, had no fever, and had lost 3 pounds; he felt as if he was eating normally.
Case 4: IBD in the Elderly

- May be long-standing or new-onset
- UC > Crohn’s disease (6-8 vs 4/100K)
- Misdiagnosis is common (60% vs 15%)
  - infection, ischemia, medication, systemic, SCAD, >> IBD
- Diagnosis is often delayed (up to 6y vs 2y)
  - Presentation: less abd pain, wt loss, anemia
    - UC: distal dis (paradox constipation)
    - Crohn’s: colon > SB; distal > proximal; less fistulae, strict
  - Be aware of *C. difficile* infection superimposed on IBD
    (UC > Crohn’s)
- Course:
  - UC: 1st attack more severe, subseq course less severe
    fewer relapses, less surgery, less proximal extension
  - Crohn’s: remission less common in single elderly pts
Case 4: IBD in the Elderly

- Treatment
  - Essentially the same as in younger patients, but need to consider the effect of aging (e.g., GFR, forgetfulness), assoc dis, and polypharmacy
  - Risk vs benefit
    - Aminosalicylates: ↓INR when given with warfarin
    - Topical Rx: consider phys limits, anal incompetence
    - Corticosteroids: ↑DM, osteoporotic fxs, ↑BP
    - Mtx: ↑levels with ↓GFR; ↑levels with NSAIDs, ASA
    - Immunomodulators, biologics: ↑risk of infection, ↑malignancy
    - Antibiotics: ↑risk of C. difficile
Case 5: NSAID Colopathy

- 75 yo man with mild IDA and +FOBT being Rxd with diclofenac for arthritis devel BRBPR. No hx IBD or diverticulitis.
NSAID Colopathy

- Age: mean of 63 yrs (22-85 yrs)
- Duration of Rx: mos > yrs
- Sxs: rectal bleeding, diarrhea, abdominal pain (R>L)
- Colonoscopy:
  - ulcers: asc colon (ICV) and haustral crests, TI; decreasing gradient towards HF; sharply demarcated; adj mucosa nl
  - diaphragmatic strictures w/ ulcers at rim
- Histology: non-specific>granulomata
- Lesions heal upon D/C of NSAID w/ scarring but w/o ps.polyp formation
Ileocecal Ulcers (128 Patients)

- **Infection 80%**
  - Amebiasis: exudates, multiple round ulcers; “fried egg” appearance
  - TB: linear, transverse, ≥10 mm, scars
  - CMV: round-shaped
  - Campylobacter: on ICV, ≥10 mm

- **Inflammation 21%** (Crohn’s; Behcet’s, etc)

- **Best Dx technique**
  - Bx and histol
  - Bx and culture
  - Bx with PCR
  - Aspiration and culture

Nagata et al. Clin Gastroenterology and Hepatology 2013
The End