Endoscopy in the Diagnosis of Diarrhea: EGD, Enteroscopy or Colonoscopy?

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Diarrhea: an initial approach

- Acute vs chronic
- Small bowel vs colonic
- Cause: infectious, inflammatory, osmotic, malabsorptive, motility
- Evaluation: stool tests, x-ray studies, endoscopy (EGD/J, enteroscopy, VCE, FS colonoscopy)
- Observation vs treatment
Diarrhea: Acute vs Chronic

- **Acute diarrhea**: <3 weeks
  ~90% resolve spontaneously
- **Chronic diarrhea**: >4 weeks
  may resolve spontaneously
Diarrhea: Site of Origin

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

**Large Bowel**
- small volume
- lower abd or pelvic pain
- rectal symptoms (urgency, tenesmus)
- BRBPR, RBCs, WBCs in stool
Diarrhea: Management Considerations

Acute
- observation, stool culture and O & P, ? endoscopy

Chronic
- infectious (rare, usually parasitic): stool O & P, ? endoscopy (lower > upper)
- inflammatory: fecal WBCs, calprotectin, lower endoscopy
- malabsorptive: fecal fat (quantitative, qualitative), upper endoscopy
- osmotic: fecal osmolarity & electrolytes
- motility: radiologic & nuclear medicine studies & physiologic testing

Small bowel vs colonic origin
Diagnostic Testing of *Presumed* Infectious Colitis

**Stool Tests**

- Culture
- Wet mount, ova & parasites
- WBCs, RBCs
- *C. difficile* toxin assay
- Stains: trichrome & acid fast

Stool testing is the most important study to evaluate presumed infectious diarrhea. Colonoscopy is rarely helpful.
# Diagnostic Testing of Presumed Infectious Proctocolitis

## Stool Culture
- Salmonella
- Shigella
- Campylobacter
- *Klebsiella oxytoca*
- *E. coli* O157:H7
- Others

<table>
<thead>
<tr>
<th>Culture</th>
<th>Organism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmonella</td>
<td>N. gonorrhoeae</td>
</tr>
<tr>
<td>Shigella</td>
<td>Aeromonas</td>
</tr>
<tr>
<td>Campylobacter</td>
<td>Chlamydia</td>
</tr>
<tr>
<td>Klebsiella oxytoca</td>
<td>Mycobacteria</td>
</tr>
<tr>
<td>E. coli O157:H7</td>
<td>Others</td>
</tr>
</tbody>
</table>

*C. difficile toxin assay*

Stool testing is the most important study to evaluate presumed infectious diarrhea. Colonoscopy is rarely helpful.
The Role of Colonoscopy in *Presumed* Infectious Colitis

- Observe
- Biopsy: nl & abnl
- Culture (?)

Pattern recognition
- pseudomembranes
- colitis (ulcers, erythema)
- pseudopolyps

Colonoscopy is *rarely helpful* in finding the cause of infectious diarrheas, *but can distinguish acute from chronic disease*
The Role of Endoscopy in Presumed Infectious Enteritis

- Observe
- Biopsy: nl & abnl
- Culture (?)

Pattern recognition:
- normal or nonspecific
- ulcers, erythema, white or yellowish dots

Endoscopy is rarely helpful in finding the cause of most infectious diarrheas.
Pseudomembranes
Shigella
Strongyloidoides
E. Coli O157:H7

Hettiarachchi, et al. GIE 2012
Tuberculosis
## ASLC vs Chronic Colitis (IBD)

<table>
<thead>
<tr>
<th>Aspect</th>
<th>ASLC</th>
<th>Chronic Colitis (IBD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crypt architecture</td>
<td>normal straight glands</td>
<td>abnormal distorted glands</td>
</tr>
<tr>
<td>Lamina propria inflammation</td>
<td>acute upper ⅓</td>
<td>acute and chronic lymphoplasmacytosis (lower ⅓)</td>
</tr>
</tbody>
</table>
ASLC  Chronic Colitis
Diagnostic Yield of Colonoscopy for Non-bloody Diarrhea
(205 pts; 77 FS, 128 colonoscopy)

- Normal colonoscopy & biopsy 74%
- Specific diagnosis 18%
  - colitis (pseudomembranous, IBD, microscopic, ischemic), villous adenoma, melanosis
- Colonoscopy inconsistent with clinical diagnosis 3%
  - usually acute self-limited diarrhea > IBS
- Biopsy inconsistent with clinical diagnosis 4%
  - usually IBS > acute self-limited diarrhea

Patel et al. GIE, 1997
Causes of (Colonic) Diarrhea

(809 patients)

- 15% had colonic histopathology
  - microscopic colitis (10%)
  - Crohn’s disease (3%)
  - melanosis coli (1%)
  - ulcerative colitis (0.6%)
  - other colitides (0.6%)

- Correct assessment of colonic histology (nl or abnl) could have been made from biopsies of the distal colon in 99.7% of cases

- FS is preferable to colonoscopy

- Always biopsy nl and abnl areas

Fine et al. GIE, 2000
Causes of (Colonic) Diarrhea

Observation: most often non-specific ulcers, erosions, erythema, pseudomembranes

Biopsy: some diagnosed causes

- Actinomycosis
- Amebiasis
- Amyloid
- ASLC
- CMV
- Crohn’s
- Cryptosporidiosis
- Histoplasmosis
- Ischemia
- LGV
- Malakoplakia
- Microscopic colitis
- Mycobacteriosis
- Schistosomiasis
- Spirochaetosis
- Strongyloides
- Syphilis
- Vasculitis

Colonoscopy rarely enables a specific diagnosis to be made, even when biopsy is performed
Large Bowel Diarrheal Diseases Diagnosed by Colonoscopy

**Infectious**
- pseudomembranous colitis may not be not *C. difficile*
- some causes, not many
- no common bacteria

**Secretory**
- villous adenoma

**Motility**
- none

**Inflammatory**
- IBD, ischemic, radiation, and microscopic colitis (collagenous, lymphocytic)
### Non-Clostridial Infectious Causes of Pseudomembranous Colitis

(15 cases from 1978-2010)

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

PMC can also be seen with colitis from ischemia, radiation, uremia and chemotherapy.
128 Patients with Ileocelecal Ulcers

- Infection 80%
  - Amebiasis: exudates, multiple round ulcers
  - TB: linear, transverse, ≥10 mm, scars
  - CMV: round-shaped
  - Campylobacter: on ICV, ≥10 mm

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

- Best technique for Dx
  - Biopsy and histology
  - Biopsy and culture
  - Biopsy with PCR
  - Aspiration with culture

Nagata et al. Clin Gastroenterology and Hepatology 2013;
Axioms on AIDS and Diarrhea

- Before HAART, diarrhea occurred in ~90% of AIDS patients.
- In the HAART era, diarrhea is much less frequent and most often is caused by antiretroviral agents or unrelated diseases.
- DDx for diarrhea includes infection (protozoa, bacteria, viruses, fungi), neoplasms (lymphoma, Kaposi), AIDS-enteropathy, and pancreatic disease.
- Protozoa are the most prevalent diarrheal pathogens in AIDS (esp cryptosporidium and microsporidium) and may be dxed by EGD.
- CMV is the most frequent cause of chronic diarrhea with multiple negative stool tests in AIDS and may be dxed by FS or colonoscopy.
- Infections with enteric bacteria (sal, shig, campy) are more frequent and severe c/w in healthy hosts.
- MAC is best dxed by EGD and duodenal biopsy.
Mycobacterium Avium Intracellulare
Recommendations for Diagnosing the Cause of Diarrhea in AIDS

- **CD4 >150/mm³**
  - Stool studies*
  - Therapy: specific or empiric

- **CD4 <150/mm³**
  - Stool studies*
  - Flexible sigmoidoscopy and biopsy
  - LC+RC+TI

*O & P, culture, modified trichrome stain, acid-fast stain, *C. difficile* toxin assay
Patient with Celiac disease

A 62-year-old man with a past history of celiac disease well-controlled on a GFD comes to your office complaining of watery diarrhea 6 times daily….

- Causes for the diarrhea include
  A. Inadvertent exposure to gluten
  B. Infection
  C. Refractory celiac disease
  D. Ulcerative jejunoileitis
  E. Collagenous sprue
  F. Microscopic colitis

- Evaluation is by
  A. History and lab testing
  B. Stool studies
  C. EGD, enteroscopy
  D. Enteroscopy
  E. EGD, enteroscopy
  F. Colonoscopy
Endoscopic Dx of Sm Bowel Diarrhea

- **Disease**
  - amyloid
  - celiac disease
    - collagenous sprue
    - EATL, ulc jejunoileitis
  - drug-assoc enteropathy
  - environmental enteropathy
  - ischemic enteropathy
  - Infectious enteritis
    - giardia
    - crypto
    - isospora
    - TB
  - Lymphangiectasia
  - SIBO
  - tropical sprue
  - Whipple disease

- **Diagnostic Tool**
  - EGD
  - EGD
  - DBE
  - DBE
  - Rarely needed
    - EGD
    - colonoscopy, DBE
  - EGDJ
  - EGD?
  - DBE
  - EGDJ
VCE is used mainly to localize the disease. EGDJ or DBE follows.
Role of EGDJ and DBE in Small Bowel Diarrhea

- History, physical exam, serology and stool testing are most important.
- Endoscopy plays an adjunctive role and rarely is diagnostic.
Role of Colonoscopy in Large Bowel Diarrhea

- History, physical examination, serology and stool testing are most important.
- Colonoscopy plays an adjunctive role.
- Rarely is a diagnosis made by colonoscopy that could not be made by less invasive and cheaper means.
VCE Small Bowel Ulcers

VCE is used mainly to localize the disease. EGDJ or DBE follows.
Role of Imaging Tests in Small Bowel Diarrhea

- **Small Bowel Series**
  location and pattern of disease

- **VCE**
  pattern of disease > location

- **CTE/MRE**
  location > pattern of disease + extra-intestinal pathology, e.g. adenopathy

Only endoscopy provides for tissue sampling
The End