

INFECTIOUS DIARRHEA

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GI Update
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Who to refer to GI?

NOBODY

Introduction

- ◉ Worldwide – infections are most common cause of diarrhea
- ◉ Major contributor to morbidity and mortality in developing countries but food distribution practices have resulted in rapid, efficient and wide dissemination of infectious agents in developed countries

- ◉ Two broad groups of pathogens
 - Small intestinal (non-invasive)
 - Colonic (invasive)
- ◉ Illness usually self limited but mortality can occur

Pathogenesis

- ◉ Enterotoxin
- ◉ Cytotoxin
- ◉ Preformed toxin
- ◉ Enteroadherence
- ◉ Mucosal invasion
- ◉ Penetration or the mucosa with proliferation in submucosa

Clinical presentation

- ◉ Small bowel vs colonic infection

Characteristics of Infectious Diarrhea

| Small intestinal | Colonic |
|-------------------------------|----------------------|
| Large volume stools | Small volume stools |
| Watery | Can be bloody |
| Diffuse abdominal pain/cramps | Lower abdominal pain |
| Malabsorption | Tenesmus |
| Dehydration | dehydration |

Specific Infections

Small Intestinal Pathogens

Source of Infectious Diarrhea

| Noninvasive pathogens (small intestine) | Invasive diarrhea (ileocolonic) |
|---|---|
| Viruses <ul style="list-style-type: none"> • Rotavirus • Calicivirus (norovirus, Norwalk agent) • Adenovirus (enteric) • Astrovirus | Bacteria <ul style="list-style-type: none"> • <i>Campylobacter</i> species • <i>Salmonella</i> species • <i>Shigella</i> species • <i>E. coli</i> (O157:H7/EHEC) • <i>Yersinia</i> • <i>C. diff</i> • Noncholera <i>Vibrio</i> • <i>Aeromonas hydrophila</i> • <i>Plesiomonas shigelloides</i> • ETEC • <i>Listeria monocytogenes</i> • Tuberculosis |
| Bacteria <ul style="list-style-type: none"> • <i>Vibrio cholera</i> • <i>Salmonella</i> • Toxigenic <i>E. Coli</i> (ETEC, EPEC, EAEC) • <i>Aeromonas hydrophila</i> • <i>Listeria monocytogenes</i> • Tuberculosis | Parasites <ul style="list-style-type: none"> • <i>Amoeba</i> • <i>Trichuris trichiura</i> |
| Parasites <ul style="list-style-type: none"> • <i>Giardia lamblia</i> • <i>Cryptosporidia</i> • <i>Isospora belli</i> • <i>Cyclospora cayentanensis</i> | Viruses <ul style="list-style-type: none"> • Cytomegalovirus • Herpes simplex virus type II |

Source of Infectious Diarrhea

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- Astrovirus

Bacteria

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- Listeria monocytogenes
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Parasites

- Giardia lamblia
- Cryptosporidia
- Isospora belli
- Cyclospora cayentanensis

Invasive diarrhea (ileocolonic)

Bacteria

- Campylobacter species
- Salmonella species
- Shigella species
- E. coli 0157:H7 (EHEC)
- Yersinia
- C. diff
- Noncholera Vibrio
- Aeromonas hydrophila
- Plesiomonas shigelloides
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Parasites

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- Trichuris trichiura

Viruses

- Cytomegalovirus
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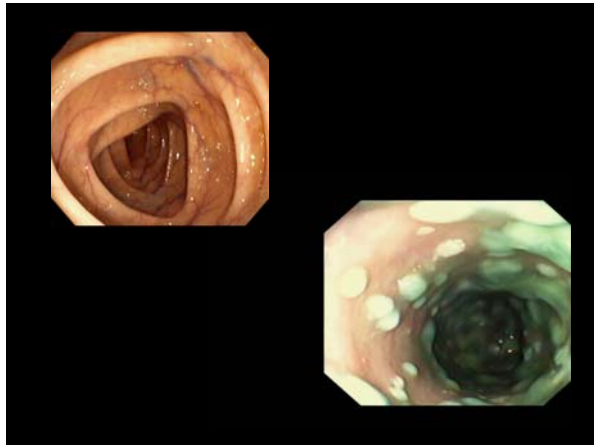
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Special Considerations

- Clostridium difficile
- IBD and infections
- Traveller's diarrhea

C. Difficile

- ◉ Most common nosocomial infection
- ◉ Usually prior antibiotic within 8 weeks
- ◉ Disturbing trend of increasing incidence of sporadic cases in community and lack of history of previous antibiotics
- ◉ Increased incidence in IBD
- ◉ 20% recurrence
- ◉ Strategies for recurrent C diff FMT



Infections and IBD

- ◉ Mimics IBD (TB, Yersinia-Crohn; Shigella, Campylobacter-UC)
- ◉ ? Precipitates IBD (Salmonella, Campylobacter)
- ◉ Aggravates IBD (C diff., CMV); amebiasis, strongyloides

Traveller's Diarrhea

- 9 million cases/year; high risk regions Africa and Middle East
- Fecal oral from contaminated food and water
- Prophylaxis pepto-Bismol 8 tabs/day 40-65% protection Rifaximin 70%
- High risk - immunosuppressed, postgastrectomy, PPI, IBD, ileostomy

Conclusions & bullet points

- Small intestinal pathogens, viruses (Norovirus) bacteria (ETEC) & parasites (Giardia) are generally noninvasive so they do not cause bloody diarrhea.
- Ileocolonic pathogens, predominately bacteria like Campylobacter, Shigella, Salmonella and STEC can be invasive and thus cause bloody diarrhea.

Conclusions & bullet points

- Antidiarrheals & antibiotics are contraindicated in Shiga toxin E. coli (STEC) (E. coli 0157:H7) and suspected STEC as they increase the risk of Hemolytic Uremic Syndrome (HUS).
- The most common causes of HUS are Shigella and STEC infections.
- Food poisoning with initial nausea and vomiting is typically due to a preformed toxin from S. aureus or B. cereus.

Conclusions & bullet points

- Shigatoxin E. coli, like 0157:H7, is an enterohemorrhagic E. coli, and produces toxin and also invades the colonic mucosa. In contrast, Enterotoxigenic E. coli (ETEC) also produces a toxin but does not invade the mucosa; it affects the small intestine and is a major cause of traveller's diarrhea. The terminology is confusing because both organisms produce a toxin but affect different parts of the GI tract.

Conclusions & bullet points

- Headache and meningismus in patient with diarrhea should arise suspicion for *Listeria monocytogenes* infection. Pregnant women and immune suppressed individuals are at increased risk.
- Eosinophilia is more common with helminth infections than protozoal infections.

Conclusions & bullet points

- A patient with severe CDI, as evidenced by increased WBC, elevated serum creatinine, a lower albumin, abdominal distention, requires maximal medical therapy and early surgical consultation.
- There is no uniform effective Rx for recurrent CDI – pulse regimens or tapered dosing of vancomycin may decrease recurrences. Fecal transplants may be the future
- Yersinia* infection causes ileocolitis and mesenteric adenitis that can mimic Crohn disease or appendicitis.

Conclusions & bullet points

- ◉ Recurrent giardiasis is common with immune deficiency, such as IgA deficiency, which should be ruled out.
- ◉ Salmonella infection has a hematogenous phase so one can get distant infections of grafts, joints, and prosthetic valves.
- ◉ 1/1000 patients with Campylobacter develop GBS (**Guillain-Barré syndrome**). 40% of GBS are due to Campylobacter infection!
- ◉ There is no long-lasting immunity to Norovirus.

Treatment

- ◉ Supportive
- ◉ ? Antimicrobials
- ◉ i) invasive → septicemia
(Salmonella, Campylobacter, Yersinia)
- ◉ ii) very ill – extremes of life
- ◉ iii) immunosuppressed

Treatment

- ◉ Supportive---
REHYDRATION, antidiarrheals
- ◉ Antibiotics YES Shigella, cholera, non cholera vibrios, Aeromonas, C diff., Parasites esp E. histolytica
- ◉ Antibiotics MAYBE Campylobacter, Salmonella
- ◉ Antibiotics NO STEC E coli (0157:H7)

Who to refer to G.I.?

- ⦿ Prolonged symptoms or alarm symptoms
- ⦿ ? C.diff
- ⦿ ? Known IBD or legitimate suspicion
- ⦿ ? Post infectious I.B.S.



Conclusions & bullet points

- ⦿ Strongyloides hyperinfection (disseminated disease) occurs with immune suppression. Eosinophilia may be absent. This has a high mortality if not recognized and treated.
- ⦿ Quinolones are not a wise choice to treat traveller's diarrhea in Southeast Asia due to increased rates of quinolone resistant Campylobacter.

Conclusions & bullet points

- ◉ Azithromycin, single dose, is effective treatment of acute traveler's diarrhea, and is a safe alternative to quinolones for children and pregnant women.
- ◉ There is no perfect diagnostic test for *C. difficile*. Even PCR for Toxin B can occasionally be negative. There is no harm in empiric therapy for patients with suspected CDI who have moderate or severe symptoms.
- ◉ Severe *C. difficile* infection (CDI) requires therapy with oral vancomycin and IV metronidazole.

Infectious Diarrhea

- ◉ Investigation & Evaluation
 - History
 - Laboratory – stool culture?, O&P
 - When to refer
 - Prolonged
 - Immunosuppressed
 - IBD?

Approach to Presumed Acute Infectious Diarrhea

Diagnosis

- ◉ History
 - Risk factors
 - Immunosuppressed
 - MSM
 - Traveller's
 - antibiotics
 - Stools for C&S – O&P ???
 - Just if bloody or prolonged
 - GI referral ?
 - Scope ?
- ◉ IBD – prolonged/recurrent

