22 – Helicobacter and Clostridium Difficile

Speaker: David Aronoff, MD

IDBR INFECTIOUS DISEASE BOARD REVIEW AUGUST 20-24 2022

Helicobacter and *Clostridioides difficile*

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6/12/2022

IDBR INFECTIOUS DISEASE BOARD REVIEW AUGUST 20-24 2022

Disclosures of Financial Relationships with Relevant Commercial Interests

- **None**

Microbiology: *Helicobacter pylori*

Gastric Mucosa
- Spiral-shaped
- Flagellated
- Non-invasive

First isolated in 1983
Nobel Prize (Marshall & Warren, 2005)
NEJM 362: 1597, 2010

Agar
- Slow-growing (3-7 days)
- Gram negative rod
- Microaerophilic (5% O_2)
  - Catalase +
  - Oxidase +
  - **Urease +** → **Survival**
    Urea → CO_2 + NH_3 → ↑**pH** **Colonization**
    Diagnostic testing

GROWS BEST AT **pH 6-8**

Question #1

A young woman undergoes upper endoscopy for unexplained nausea & vomiting. The stomach appears normal. Surveillance biopsies are taken & the gastric biopsy urease test is positive. The biopsies are most likely to show:

A. Hp organisms, but no gastric or esophageal inflammation.
B. Hp organisms plus gastric inflammation (gastritis).
C. Hp organisms plus esophagitis.
D. Neither Hp organisms, nor inflammation because the urease test is often false positive with a normal endoscopy.

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Question #2

What is the most likely source for humans to acquire *H. pylori* infection?

A. Perinatally from mother
B. Ingestion of raw vegetables
C. Ingestion of undercooked meat
D. Ingested tap water from a municipal source
E. Contact with infected secretions from another human

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Helicobacter pylori: Key Points

- Humans are the only natural Hp host
- Infects > 50% of the world's population
  - US ~20-40%*
- A leading chronic infection in humans
  - Similar to dental caries
- Majority are asymptomatic but all have chronic active gastritis
- Severity of gastritis varies depending on the Hp strain & the host

*At greater risk: indigenous Americans, Black/AA, Hispanic, & immigrants from high-cancer-risk countries like Japan, Korea, Taiwan & China

Lee Y, *et al. Annu Rev Med* (2022)
Crowe SE, *NEJM* (2019)

Helicobacter pylori: Key Points

Hp is a carcinogen that causes an inflammation-driven cancer

- 1-3% of infected individuals will develop cancer
- Hp causes 15% of the total cancer burden globally
- Up to 89% of all gastric cancer is attributable to Hp

Chronic active gastritis
↓
Atrophic gastritis
↓
Epithelial metaplasia
↓
Intraepithelial neoplasia
↓
Invasive carcinoma

Lee Y, *et al. Annu Rev Med* (2022)
Shah SC, *et al Gastroenterology* (2021)

Transmission of *H. pylori*

- Exact route of transmission is not known
- Likely **fecal-oral** or **oral-oral**
- Intrafamilial spread – (person-to-person, esp. mother-to-child but not during pregnancy)
- Low socioeconomic status, poor sanitation, crowding associated with ↑transmission

JAMA 282:2240, 1999 & Crowe SE, UpToDate (2018)

Disease Paths for *Helicobacter pylori* Infection

• Asymptomatic gastritis	85-90%
• Peptic ulcer (DU, GU)	1-17%
• Gastric cancer	0.1-3%
• MALT lymphoma	<0.01%

DU, duodenal ulcer
GU, gastric ulcer
MALT, mucosal-associated lymphoid tissue

Lee Y, *et al. Annu Rev Med* (2022)
NEJM 347: 1175, 2002
Gut 66:6, 2017

H. pylori: Disease Associations

- #1 cause of chronic gastritis
- PUD: 90% of DU, 80% of GU
- MALT lymphomas (72 – 98%)
- Gastric Cancer (60 – 90%)

Hp causal

H. pylori is a World Health Organization-designated carcinogen & the strongest known risk factor for non-cardia gastric adenocarcinoma

- Iron deficiency anemia, B12 deficiency, ITP
- Eradication Hp neither causes nor exacerbates GERD
- Hp poss. **reduces** risk for Barrett's esophagus/esophageal CA

HP is classified by WHO as a Class 1 carcinogen.
MALT = mucosal-associated lymphoid tissue

Maastricht V. Gut 66:6, 2017
Kasahun GG, Infect Drug Resist 13:1567-1573, 2020
Shah SG, et al. Gastroenterology 2021;160:1831–184

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Question #3

2022 PREVIEW QUESTION

A 25-year-old woman complains of 6 weeks of symptoms consistent with dyspepsia unrelieved by current use of antacids & an OTC PPI.

The best approach to the diagnosis of *H. pylori* infection in this patient is:

A. Immediate Hp serology
B. Immediate Hp stool antigen EIA
C. Endoscopy with rapid urease test (RUT)
D. Immediate ^{13}C Urea Breath Test
E. D/C PPI for 2 weeks then Hp stool antigen EIA

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Who Should Be Tested for Hp?

Patients with:

- Suspected Hp infection (e.g., active DU)
- Current or past GU or DU
- Uninvestigated dyspepsia
- Gastric mucosa-associated lymphoid tissue lymphoma
- Family members in same household of pt w/ proven, active Hp infection
- Family hx of PUD or gastric cancer
- 1st generation immigrants from high-prevalence areas
- High-risk groups (Latino, Black/AA, indigenous populations)
- Regular user of NSAIDs
- Long-term PPI use
- Fe deficiency anemia (unexplained)
- ITP (low evidence base)

Lee Y, *et al. Annu Rev Med* (2022)

Diagnosis of *H. pylori Infection*

NO:

Noninvasive (global)	Sensitivity	Specificity	
Urea Breath Test UBT (^{13}C)	> 90 – 95%	> 90 – 95%	Live Hp
Stool Antigen (monoclonal)	> 90 – 95%	> 90 – 95%	Live & dead Hp
Serology	85%	79%	Detects exposure

Biopsy-based (sampling error)	Sensitivity	Specificity	
Rapid urease test	90%	95%	2-5 bx recommended
Histology	90 – 95%	95 – 98%	
Culture	73%	100%	Difficult

Serology is not useful. UBT considered 'best test'. Antigen test is usually less expensive.
Use only monoclonal stool Ag tests.
Histology requires 10^4 organisms to visualize

Lee Y, *et al. Annu Rev Med* (2022)

Testing Limitations for Hp

PPI
Antibiotics
Bismuth
Bleeding

} Interfere with all Hp tests because they reduce bacterial load

False negatives due to decreased Hp burden
Recommend delay diagnostic testing until:

- PPI stopped for > 2 weeks (**OTC antacids & H2RA do not affect UBT/SA testing**)
- Antibiotics, bismuth stopped for > 4 weeks
- Bleeding stopped for 4-8 weeks

Lee Y, et al. Annu Rev Med (2022)
Crowe SE. UpToDate. (2018)
Crowe SE, NEJM 380:1158-65 (2019)

Initial Diagnosis of *H. pylori* with Dyspepsia

MOST = NONINVASIVE

- Stool antigen test (SAT)
- Urea Breath Test (UBT)

- Endoscopy mandatory if ≥60 years old or 'alarm symptoms or signs':
  - Unexplained iron-def anemia
  - GI bleeding
  - Unintentional weight Loss
  - Palpable mass
  - Severe abdominal pain
  - Persistent vomiting
  - Progressive dysphagia / odynophagia

Crowe SE, UpToDate (2018)
Crowe SE, NEJM 380:1158-65 (2019)

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Question #4

2022 PREVIEW QUESTION

- Which of the following is the most appropriate next step for evaluating a 29-year-old previously healthy but overweight male patient with typical retrosternal heartburn symptoms?
  - A. Stool antigen test for *H. pylori*
  - B. Urea breath test for *H. pylori*
  - C. No testing for *H. pylori*
  - D. Serological testing for *H. pylori*
  - E. Empiric therapy for *H. pylori* regardless of testing

Answer #4

- Which of the following is the most appropriate next step for evaluating a 29-year-old previously healthy but overweight male patient with typical retrosternal heartburn symptoms?
  - A. Stool antigen test for *H. pylori*
  - B. Urea breath test for *H. pylori*
  - C. No testing for *H. pylori*
  - D. Serological testing for *H. pylori*
  - E. Empiric therapy for *H. pylori* regardless of testing

Explanation for Q#4

- *H. pylori* is not implicated as an etiological factor in gastroesophageal reflux disease (GERD)
- Treatment for (eradication of *H. pylori*) can increase the risk for Barrett's esophagus and esophageal adenocarcinoma
- Serology is **not** a recommended test for *H. pylori*

Siddique O, *et al. AJM* 2018

Question #5

A 23 yo woman presents with persistent epigastric discomfort diagnosed as Hp+ gastritis by endoscopy. Fecal Hp antigen is also positive. Last year she was treated with azithromycin for a respiratory tract infection. As a child, she was treated repeatedly with PCN/amoxicillin for recurrent tonsillitis.

What do you recommend for therapy?

A. Clarithromycin + amoxicillin + PPI
B. Metronidazole + erythromycin + PPI
C. Bismuth subsalicylate + TCN + metronidazole + PPI
D. Metronidazole + amoxicillin + PPI
E. PPI therapy alone given her age

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E. PPI therapy alone given her age

Who should be treated for *H. pylori* infection?

Houston Consensus Conference on Testing for *Helicobacter pylori* Infection in the United States

Hashem B. El-Serag,[1,2] John Y. Kao,[3] Fasiha Kanwal,[1,2,3] Mark Gilger,[4,5] Frank LoVecchio,[6] Steven F. Moss,[7] Sheila Crowe,[8] Adam Elfant,[9] Thomas Haas,[10] Ronald J. Hapke,[6,11] and David Y. Graham[12]

- "We recommend that all patients with active *H pylori* infection be treated"
- "Infection causes chronic progressive damage to the gastric mucosa that in 20%–25% of individuals will result in life-threatening clinical outcomes such as peptic ulcer or gastric cancer"

El-Sarag HB, *et al. Clin Gastroenterol Hepatol 2018;16:992-1002*

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Takeaways about Treatment of Hp

- Cure rates of most Hp therapies are **relatively low** (e.g., 80% or lower).
- Antibiotic resistance is a HUGE challenge, even with 3-drug therapies, provoking newer quadruple therapies
- **Ask about prior antibiotic exposure** hx (especially clarithromycin & fluoroquinolones)
- Discuss the critical importance of **adherence to treatment**
- Use **high dose PPI** (BID dose; increase gastric pH>4-5)
  - Hp grows optimally at pH 6-8
  - Acidity hinders stability & activity of macrolides, amoxicillin a lot
  - Fast metabolizers of PPIs (CYP2C19 genotypes) reduce levels of omeprazole/lansoprazole
  - Vonoprazan is a new potassium-competitive acid blocker that appears very promising

Lee YC, Annu Rev Med (2022)

Takeaways about Treatment of Hp

- Combination therapy is essential
- The optimal duration of Hp therapy is **14 days**
- Consider antibiotic susceptibility testing after multiple relapses
  - Culture-based and non-culture-based (NGS) techniques can determine resistance
- Success should always be confirmed by a **test of cure** after treatment of every patient (*e.g.*, UBT performed 4 or more weeks after therapy)

Lee YC, Annu Rev Med (2022)

Eradication of *Helicobacter pylori*

- Triple therapy with a PPI, clarithromycin, & amoxicillin or metronidazole is **not favored** due to increased prevalence of macrolide resistance (but might still be an option on boards!)
  - Clarithromycin resistance in the US now ≥ 15%
- Use a bismuth-based **quadruple therapy** for 14 days as 1st-line therapy:
  - Bismuth subsalicylate or subcitrate
  - Tetracycline (**not** doxycycline: results are inferior)
  - Metronidazole
  - PPI

Shah SC, *et al. Gastroenterology* 2021;160:1831–1841
Cho J, *et al. Gastroenterol Clin N Am* 50 (2021) 261–282
Hulten KG, *et al. Gastroenterology* 2021
Lee YC, *Annu Rev Med*: 2022

RIFABUTIN-Based Combinations

- 2020: The FDA approved **fixed-dose combination** of omeprazole, amoxicillin & rifabutin (Talicia) for *Hp* treatment in adults
- Omeprazole 10 mg, amoxicillin 250 mg, & rifabutin 12.5 mg
  - The recommended dosage is 4 capsules (with food) every 8 hours for 14 days.

Summary: Omeprazole/Amoxicillin/Rifabutin *(Talicia)*

- A fixed-dose, rifabutin-based, 3-drug combination FDA-approved for treatment of *Helicobacter pylori* infection.
- First rifabutin-based product to be approved for treatment of *H. pylori* infection.
- Rifabutin-based triple therapy has been used for years as a salvage regimen for treatment-refractory *H. pylori* infection.
- Approval was based on the results of two trials in treatment-naive patients; *H. pylori* was eradicated in about 80% of those treated with the combination.
- How the efficacy of *Talicia* compares to that of other regimens used for first-line treatment of *H. pylori* infection is unknown.
- Rates of *H. pylori* resistance to rifabutin have been low; whether more widespread use as part of a first-line regimen would result in higher rates of resistance remains to be established.
- Common adverse effects include diarrhea, headache, rash, and dyspepsia.
- Has the potential to interact with many other drugs.

The Medical Letter (2020)

Eradication of *Helicobacter pylori*

- Fluoroquinolone resistance is common now (>50%)
  - They are not recommended in 1st-line treatment regimens
- Resistance to amoxicillin, tetracycline & rifabutin is **uncommon**
- Clinical significance of resistance to metronidazole not straightforward

Shah SC, *et al. Gastroenterology* 2021;160:1831–1841
Cho J, *et al. Gastroenterol Clin N Am* 50 (2021) 261–282
Hulten KG, *et al. Gastroenterology* 2021

Question #6

After treatment of this patient for Hp gastritis, the *H. pylori* stool antigen test should be repeated:

A. On the final day of *H. pylori* therapy
B. Two weeks after completion of *H. pylori* therapy
C. Four weeks after completion of *H. pylori* therapy
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Management Issue:
Test of cure for *H. pylori* Infection

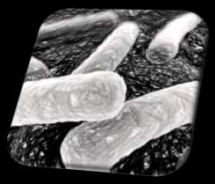
- Stool antigen test Perform ≥ 4 weeks post-Rx
- Urea Breath Test Perform ≥ 4 weeks post-Rx

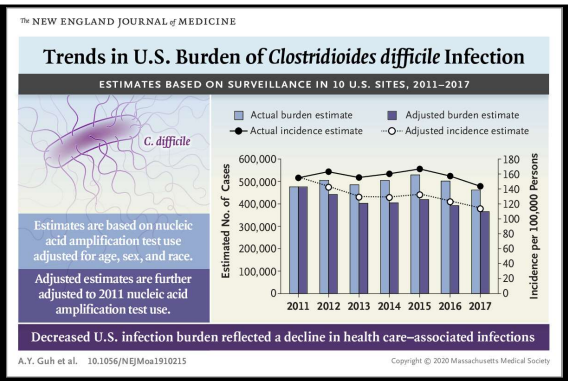
Some recommend testing 6-8 weeks post-Rx

Endoscopy required if gastric ulcer, for example

Maastricht V. Gut 66:6, 2017

CLOSTRIDIOIDES DIFFICILE





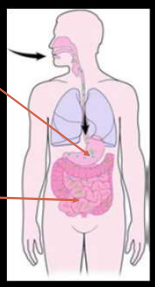
Antibiotic-Associated Diarrhea (AAD)

- Common
  - In 5-25% of antibiotic treatment courses especially with > 3 days of Abx but one dose is sufficient
- 10-40% of AAD is associated with *C. difficile* infection (CDI) but nearly all AA **colitis** is CDI
- Disruption of colon microbiome & bile acid physiology are key mechanisms

Pathogenesis of CDI

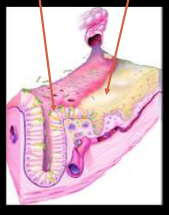
1. CDI spores survive in the environment for long periods of time. Following ingestion, they traverse the acidic environment of the stomach.

2. Spores germinate within the intestine.



3. Altered lower intestine flora (due to antimicrobial use) allows proliferation of *C. difficile* in colon.

4. Toxin A & B production leads to colon damage +/- pseudomembrane.



Slide adapted from CDC.gov. Sunenshine & McDonald Cleve Clin J Med 2006; 73(2):187-197.

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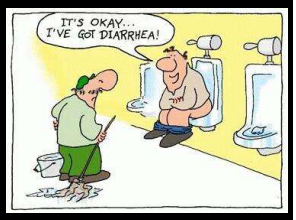
Common Clinical Manifestations

- Watery & mucusy diarrhea up to 10 - 15 times daily
- Lower abdominal pain & cramping
- Low grade fever (15%+)
- Leukocytosis (> 15,000 cells/ml = severe)
- Nausea
- Anorexia
- Malaise



http://year9diseases.wikispaces.com/

Complications of CDI

- Sepsis ± multiple organ dysfunction
- Megacolon: need for surgical intervention
  - Colectomy
  - Loop iliostomy
- Bowel Perforation
- Lack of treatment response
- Recurrent infection (20%+)
  - Relapse
  - Reinfection

Major Risk Factors for Acquisition of CDI

1. **Antibiotic use**
   - Disruption of microbiome
2. **Recent hospitalization or LTCF**
   - Increased exposure
   - Co-morbidities reduce immunity or alter microbiome
3. **Age > 65 years**
   - Reduced gastric acidity
   - Impaired immunity
   - Altered microbiome

REMEMBER:
Even healthy people in the community without antibiotic exposure can get CDI

Dubberke E, *et al. Infect Control Hosp Epidemiol* 2011;32(4):360-366
Pacheco & Johnson. *Curr Opin Gastroenterol* 2013, 29:42-48
Loo V, *et al. NEJM*. 365;18

Minor Risk Factors for Acquisition of CDI

4. Gastric acid suppression (**proton pump inhibitor**)
   - Reduced biochemical defense
   - Altered microbiome
5. Abdominal surgeries
   - Altered microbiome
6. Immunocompromised host
   - Impaired mucosal immunity
   - Altered microbiome

McFarland LV. *Curr Opin Gastroenterol*. 2009 Jan;25(1):24-35
Dubberke E, *et al. Infect Control Hosp Epidemiol* 2011;32(4):360-366
Pacheco & Johnson. *Curr Opin Gastroenterol* 2013, 29:42-48

CDI Severity

- **Leukocytosis**
- **AKI**
- **Sepsis/shock**
- **Megacolon**

Stool frequency is not part of severity assessment

Clinical Definition	Supportive Clinical Data
Nonsevere	Leukocytosis with a WBC count of ≤15,000 cells/mL and a serum creatinine level <1.5 mg/dL
Severe	Leukocytosis with a WBC count of ≥15,000 cells/mL or a serum creatinine level >1.5 mg/dL
Fulminant	Hypotension or shock, ileus, megacolon

Table from Wilcox M. *IDSE* (2018)
McDonald LC, *et al. Clin Infect Dis.* 2018 Mar 19;66(7):987-994

C. difficile Diagnostic Testing

Whom to test?

- Appropriate epidemiology/ill with diarrhea/endoscopic findings
  - No laxatives within last 48 hrs
- Test diarrheal stools (unless ileus). *One stool.*
  - >3 liquid stools over 24h
- Only test specimens if patient > 1 year old

McDonald LC, *et al. Clin Infect Dis.* 2018 Mar 19;66(7):987-994

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C. difficile Diagnostic Testing

Simplified approach:

Diarrhea* + **Toxigenic *C. difficile* &/or toxin in stool** → **TREAT**

***No laxatives or other obvious causes**

C. difficile Diagnostic Testing

Nucleic acid amplification test (NAAT; PCR):

Detects the gene for toxin B

Advantages	Disadvantages
• High sensitivity • Rapid • Relatively inexpensive	• Does not detect actual toxin • Can't differentiate colonization *vs* infection

Patient selection is critical

C. difficile Diagnostic Testing

Glutamate dehydrogenase (GDH) antigen EIA:

Detects *C. difficile* bacteria by secreted antigen

Advantages	Disadvantages
• High sensitivity • Rapid • Relatively inexpensive	• Does not detect toxin • Detects NON-toxigenic strains • Cannot differentiate colonization from infection

Must be combined to test for toxin (NAAT or EIA)

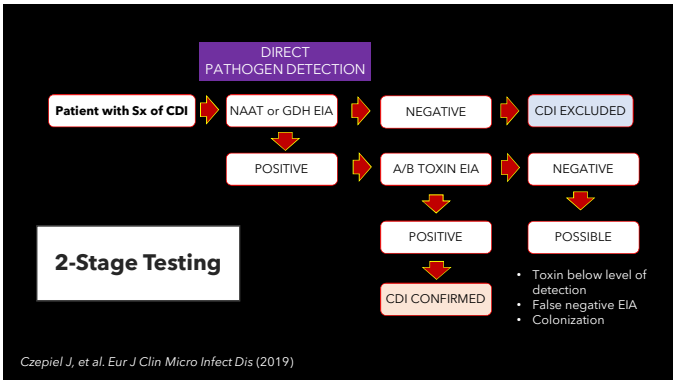
C. difficile Diagnostic Testing

Toxin A/B detection by EIA:

Detects *C. difficile* toxin(s) directly

Advantages	Disadvantages
• Good specificity • Rapid • Relatively inexpensive	• Poor sensitivity • False positives possible

Usually used in a 2-step protocol with NAAT or GDH



Czepiel J, et al. Eur J Clin Micro Infect Dis (2019)

CDI TAKE AWAYS

Careful selection of patients for testing, especially with NAATs, is extremely important

Only patients with diarrhea (≥3 stools in ≤24 hrs)

NO formed or soft stools (unless ileus)

NO 'Test of Cure'

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Question #7

- 67 year old woman develops diarrhea while hospitalized for community acquired pneumonia. She is afebrile, WBC count is 12,000/ml, creatinine is 1.2 mg/dl (baseline 1.0 mg/dl) and she is experiencing 12 small loose stools daily with abdominal cramping. Stool PCR is positive for *C. difficile* toxin B. Which of the following therapies is recommended?
  a. Metronidazole 500 mg po TID x 10 days
  b. Vancomycin 500 mg PO qid x 10 days
  c. Vancomycin 125 mg PO qid x 10 days
  d. Bezlotoxumab + vancomycin x 10 days
  e. Fidaxomicin 200 mg PO BID + metronidazole 500 mg PO TID x 10 days

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Therapy of CDI

- D/C antibiotics/change to 'lower risk abx'
- Avoid antiperistaltics
- Recurrent CDI occurs in **≥1 in 5** patients

McDonald LC, *et al. Clin Infect Dis.* 2018 Mar 19;66(7):987-994
Kelly CR, *et al. Am J Gastroenterol* 2021;00:1-24
Poylin V, *et al. Dis Colon Rectum* 2021; 64: 650-668

Therapy of CDI

TABLE 1

Recommended Treatment Options for CDI

Presentation	Treatment options	Additional information
Initial case	Preferred: Fidaxomicin (Dificid), 200 mg twice daily for 10 days Alternative: Vancomycin, 125 mg four times daily for 10 days Alternative for nonsevere CDI if above agents not available: Metronidazole (Flagyl), 500 mg three times daily for 10 to 14 days	Fidaxomicin: Caution for use in patients with congestive heart failure Diagnosis of nonsevere cases supported by: White blood cell count < 15,000 cells per μL (15 × 10^9 per L) Serum creatinine < 1.5 mg per dL (132.6 μmol per L)

No more metronidazole
(unless mild disease, in young person, +/- cost constraints)

Table from *Am Fam Physician.* 2022 Jun;105(6):678-679.
Kelly CR, *et al. Am J Gastroenterol* 2021;00:1-24
Poylin V, *et al. Dis Colon Rectum* 2021; 64: 650-668

Therapy of CDI

TABLE 1

Recommended Treatment Options for CDI

Presentation	Treatment options	Additional information
First recurrence	Preferred: Fidaxomicin, 200 mg twice daily for 10 days or twice daily for five days followed by once every other day for 20 days Alternatives: Vancomycin in a tapered and pulsed regimen Vancomycin, 125 mg four times daily for 10 days Adjunct: Bezlotoxumab (Zinplava), 10 mg per kg given intravenously once	Tapered and pulsed vancomycin regimen example: 125 mg four times daily for 10 to 14 days, two times daily for seven days, once daily for seven days, and then every two to three days for two to eight weeks

Table from *Am Fam Physician.* 2022 Jun;105(6):678-679.
Kelly CR, *et al. Am J Gastroenterol* 2021;00:1-24
Poylin V, *et al. Dis Colon Rectum* 2021; 64: 650-668

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Recommended Treatment Options for CDI

Presentation	Treatment options	Additional information
Subsequent recurrences	Preferred: Fidaxomicin, 200 mg twice daily for 10 days or twice daily for five days followed by once every other day for 20 days Alternatives: Vancomycin in a tapered and pulsed regimen Vancomycin, 125 mg four times daily for 10 days, followed by rifaximin (Xifaxan), 400 mg three times daily for 20 days Fecal microbiota transplantation Adjunct: Bezlotoxumab, 10 mg per kg given intravenously once	Infectious Diseases Society of America guideline panel recommends appropriate antibiotic treatments should be tried for at least two recurrences (i.e., three CDI episodes) before offering fecal microbiota transplantation

Table from *Am Fam Physician.* 2022 Jun;105(6):678-679.
Kelly CR, *et al. Am J Gastroenterol* 2021;00:1-24
Poylin V, *et al. Dis Colon Rectum* 2021; 64: 650-668

22 – Helicobacter and Clostridium Difficile

Speaker: David Aronoff, MD

Recurrent CDI

- **Bezlotoxumab**, a monoclonal antibody directed against toxin B produced by *C. difficile*, approved as adjunctive therapy for patients receiving antibiotic treatment for CDI & at high risk for recurrence
- ≥65 years old with >1 additional risk factor:
  - Experiencing 2nd episode of CDI within 6 mo
  - Immunocompromised, or severe CDI

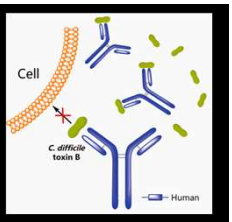

Figure from http://en.pharmacodia.com/web/drug/1_9806.html
McDonald LC, *et al. Clin Infect Dis.* 2018 Mar 19;66(7):987-994
Kelly CR, *et al. Am J Gastroenterol* 2021;00:1-24
Poylin V, *et al. Dis Colon Rectum* 2021; 64: 650-668

Therapy of CDI

TABLE 1

Recommended Treatment Options for CDI

Presentation	Treatment options	Additional information
Fulminant CDI	Vancomycin, 500 mg four times daily; if ileus is present, consider adding rectal dosing of vancomycin Metronidazole, 500 mg intravenously every eight hours, administered with oral or rectal vancomycin, particularly if ileus is present	Definition of fulminant CDI is supported by: Hypotension or shock, ileus, megacolon

Table from *Am Fam Physician*. 2022 Jun;105(6):678-679.
Kelly CR, *et al. Am J Gastroenterol* 2021;00:1-24
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Prevention of *C. difficile* Disease (HCW & visitors)

Contact precautions for patient care.

Gloves, gowns while diarrhea persists.

Single rooms

Handwashing with SOAP & WATER

Alcohol gel rubs do not kill *Cd* spores

Sporocidal solutions for hospital cleaning.

(eg. hypochlorite solutions)

Antibiotic restriction policies

(Antimicrobial stewardship programs).

Lancet ID 17:194, 2017 Scotland
Lancet ID 17:411, 2017 England

CDI **TAKE AWAYS**

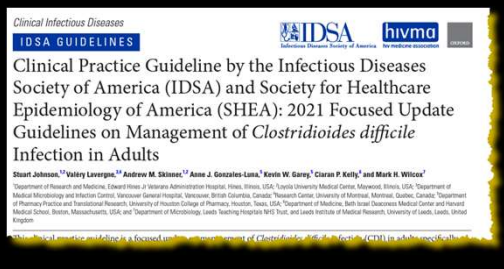
Epidemiology
- Most CDI is health-care associated

Diagnosis
- Need to demonstrate toxin B in stool with NAATs, EIA
- Send only unformed stools when diarrhea meets CDC definition

Treatment: Primary or Recurrent CDI
- Vancomycin & fidaxomicin > metronidazole
- Bezlotoxumab & fidaxomicin associated with lower risk for recurrent CDI
- Consider FMT for second or more recurrence

Prevention
- Hand wash as alcohol gels ineffective
- Bleach
- Antimicrobial Stewardship Programs

New Guidelines 2021



Clinical Infectious Diseases

IDSA GUIDELINES

IDSA Infectious Diseases Society of America | hivma hiv medicine association

Clinical Practice Guideline by the Infectious Diseases Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA): 2021 Focused Update Guidelines on Management of *Clostridioides difficile* Infection in Adults

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Clinical Infectious Diseases 2021

Thank you

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