C. di ífícil

Management of

Clostridioides difficile infection (CDI)

David LeVine, M.D.

Clinical Practice Guidelines

The American College of Gastroenterology (ACG) and The Infectious Diseases Society of America (IDSA) in conjunction with the Society for Healthcare Epidemiology of America (SHEA) 2021 Up To Date 2023

Case scenario

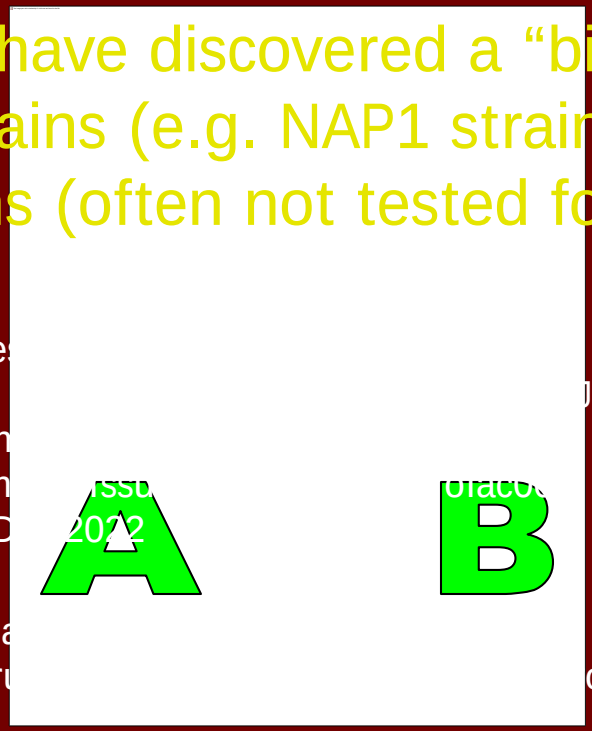
- Anita John is a pleasant 82 y.o. WF who resides at an ALF with mild dementia.
- You recently see her on Friday for routine visit, and she has no complaints or acute findings.
- The following day, Anita's family visits and notices that she is sleepy and more confused.
- The family demands a urine be checked to exclude UTI, and the on call doctor is called.
- The on call doctor orders CC UA which shows 5-10 WBC. Urine C & S is pending.

Case scenario

- The on call doctor calls in ciprofloxacin 250mg PO b.i.d. x 1 week while awaiting urine C & S.
- Several days later Anita has voluminous diarrhea and abdominal cramps.
- She tests positive for C diff and is started on metronidazole for 14 days.
- She becomes anorexia and loses 10 lbs
- On Day 15, her diarrhea returns and she becomes more debilitated and dehydrated.
- Patient is sent to hospital and admitted to ICU with severe sepsis (AMS, low BP, elevated BUN, leukocytosis).

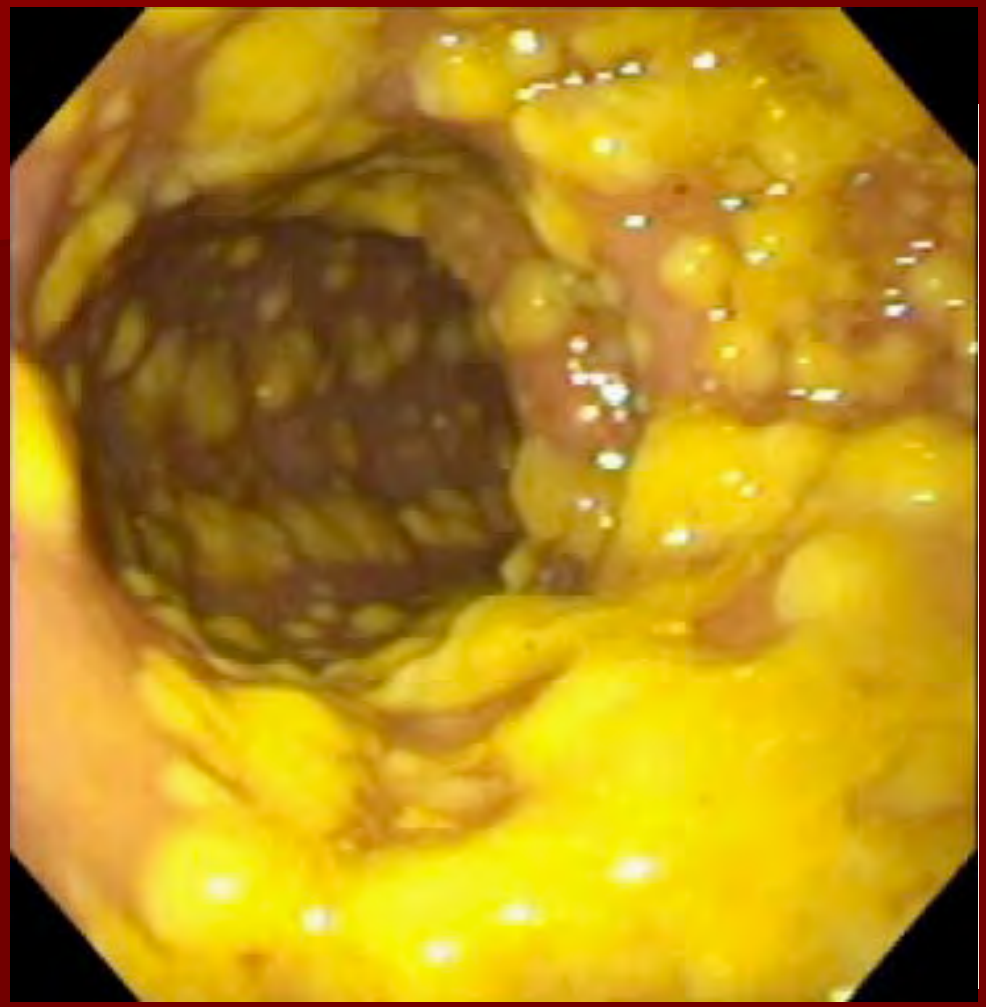
C. difficile is a Gram-positive, spore forming, and toxin-producing anaerobic rod bacterium that secretes: Toxin A – enterotoxin Toxin B- cytotoxin (10x more toxic than A)

Recently, researchers have discovered a “binary toxin” seen primarily in virulent strains (e.g. NAP1 strains) felt to contribute to severity of symptoms (often not tested for routinely by labs).



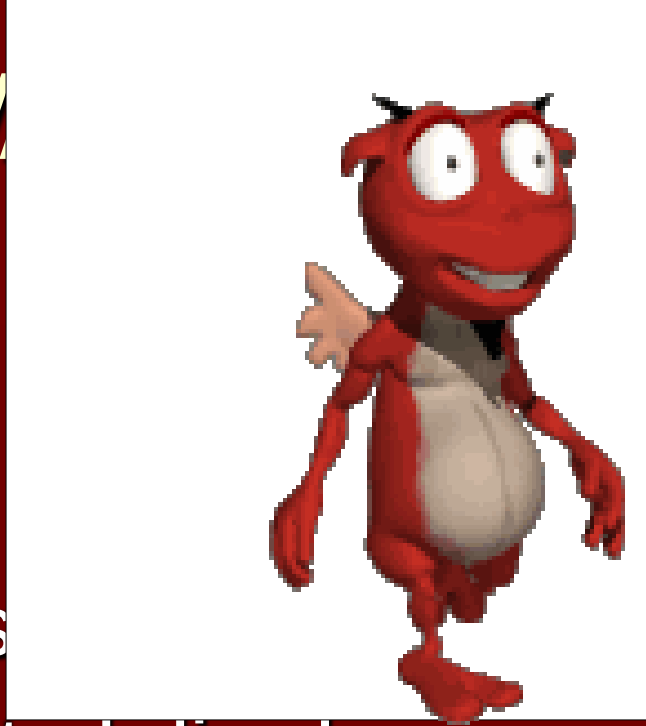
Binary Toxin Expression by Clostridioides Disease
Mary K Young, Jhansi L Leslie, Gregory J Carman, Matthew W Lyerly, David B Stewart, Mayuresh M Abhyankar, Willian
Open Forum Infectious Diseases, Volum
https://doi.org/10.1093/ofid/ofac001MD 2022

An Update on Clostridioides difficile Bina
by Adrián Martínez-Meléndez 1,Flora Cru o 2,Héctor J. Maldonado-Garza 3 andElvira Garza-González 4,*ORCID



Pseudomembranous colitis

Prevalence of *C. d*

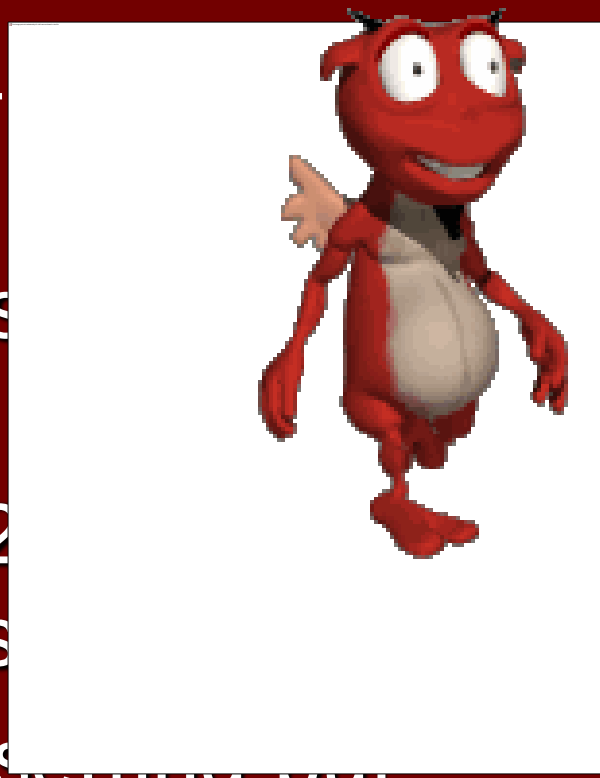


- Common in infant colonic flora
- 2-3% of healthy adults
- 5-7% in LTC facilities
- 20-50% of hospitalized patients
- 20-30% of all antibiotic associated diarrhea
- 50-70% of all antibiotic associated colitis

C. difficile infection (CDI)

CDC Data 2023

- The incidence of CDI in the United States is approximately 1% of all hospitalized patients
- Increases length of stay by 55%
- Acute inpatient costs exceeds $4 annually
- Among highest readmission rates infection including sepsis
- Overall incidence rate of CDI in 2 121.2 cases per 100,000 persons
- Incidence plateauing in hospital setting but increasing in the community



Symptoms

- Diarrhea
- Cramps
- Abdominal pain
- Fever +/-
- Leukocytosis
- Abdominal distention (less common)
- Occasionally ileus or constipation (especially in patients who are post-op)


4 out of 5 people suffer from Diarrhea
DOES THAT MEAN 1 IN 5 PEOPLE ACTUALLY ENJOY IT...?

Past Expiry by Johnny Ancich 874

"Diarrhea Hotline... your call is important to us... please hold..."

www.PastExpiry.com

POOPIE

(clues that you are dealing with CDI)

- P- Pancolitis on CT with no SB involvement
- O- Odor of loose stool is foul
- O- Old aged patient (>=65y.o.)
- P- PPI use, Protein and albumin are low
- I- Increased WBC and procalcitonin
- E- Exposure to antibiotics (1-3 months)


Love is in the Air
Nope, thats € diff

Complications

- Anorexia/Malnutrition
- Dehydration
- Ileus
- Toxic megacolon
- Hypoalbuminemia
- Shock
- Renal failure
- Leukemoid reaction
- Death

Diarrhea & WBC

WBC	15-20K	20-30K	>30K
	N=200	N=147	N=53
Infection identified	48%	54%	60%
CDI	11%	15%	34%

Clin Infec Dis. 2002;34:1585-1592

C. Difficile can be a fatal disease

CDC data 2023

- 1/2 million C difficile cases per year in US
  - 50% community acquired
  - 50% healthcare-associated (i.e. hospital)
- 30 day mortality is about 6.6-7.2% (especially >65y.o.)
- 29,000 die/year (usually within first month)
- 15,000 of these deaths could be directly attributed to C difficile infection.

Risk factors

- Elderly age (especially >= 65 y.o.)
- Hospitalization
- Chronic care facility e.g. NH or ALF
- PPIs? (as well as H2 antagonists and methotrexate)
- Presence of preexisting gastrointestinal pathology:
  - Inflammatory bowel disease
  - Colon cancer
  - Intestinal obstruction
- Abdominal surgery
- Nasogastric tubes
- End-stage renal disease
- Diabetes mellitus
- Immunosuppresion/Transplantation

Antibiotics!!!

CDAD causing antibiotics through the decades: 1970s

clindamycin (amoxicillin)

CDAD causing antibiotics through the decades: 1980s

2nd-3rdg cephalosporins(clindamycin)

CDAD causing antibiotics through the decades: 1990s

2nd-4thg cephalosporins (clindamycin)

CDAD causing antibiotics through the decades: 2000s

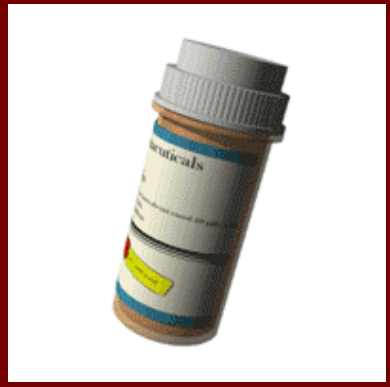
quinolones(2nd-4thg cephalosporins)

CDAD causing antibiotics through the decades: 2010 to present

Broad spectrum penicillins (quinolones)

Antibiotic risk and *C. difficile*

Highest risk antibiotics

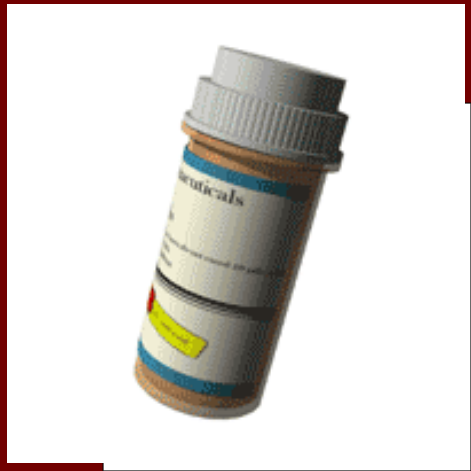


- **Broad spectrum penicillins** (e.g. piperacillin/tazobactam (Zosyn)*, ticarcillin/clavulanate, amoxicillin/clavulanate)
- **Fluoroquinolones** (e.g. ciprofloxacin, levofloxacin, moxifloxacin, gemifloxacin)
- **2nd, 3rd, 4th generation cephalosporins** (e.g. cefuroxime, ceftriaxone, cefotaxime, cefipime)
- **Clindamycin**
- **Carbipenems** (e.g. imipenem, meropenem, ertapenem, doripenem)

Medium risk antibiotics

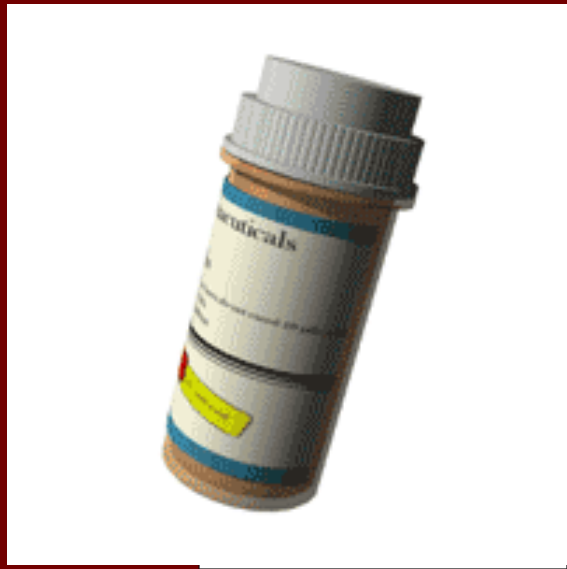
- **Penicillins** (narrow spectrum e.g. amoxicillin)
- **1st generation cephalosporins** (e.g. cefazolin, cephalexin)
- **Macrolides** (e.g. azithromycin)
- **Trimethoprim-sulfamethoxazole**
- **Sulfonamides**

Use of 1 to 2 doses of 1st generation cephalosporin for surgical prophylaxis does not confer significant risk for C difficile infection



Minimal risk antibiotics

- Linezolid
- Tetracyclines (e.g. doxycycline, IV tigecycline)
- Metronidazole
- Rifaximin
- Vancomycin (IV)
- Aminoglycosides
- Nitrofurantoin
- Chloramphenicol
- Fosfomycin
- Methenamine*



Nap 1 Strain (NAP1/B1/027)

- Recognized in Quebec 2002 – now global
- 30-60% of all cases in the mid to late 2000s
- Causes more serious disease
  - toxic megacolon
  - leukemoid reaction
  - severe hypoalbuminemia
  - septic shock and death.
- Highest associated mortality (up to 17%)
- Releases more toxin(16-23x): A,B, and binary
- More refractory to treatment
- More likely to relapse
- Most often associated with fluoroquinolones
- Fidaxomicin or Vancomycin Rx should be considered 1st line if NAP1 identified (as cure rates with metronidazole are 50%).

C. difficile NAP1/B1/027 is most common among healthcare-associated CDI cases, while the type 078 is more commonly associated with community-acquired CDI

NAP-1

Recommendations for stool testing

- Do not test asymptomatic patients
- Patients should have >=3 watery stools/day not due to laxatives
- Send only diarrheal stools (which take shape of container) unless ileus is present
- Send only one stool since duplicate samples do not increase yield (may be useful to repeat >1 week from last test)
- Tests are for diagnosis and do not measure response to treatment or resolution of disease.
- Understand what test is used by the laboratory for the right interpretation

Testing for C difficile

NAAT-nucleic acid amplification testing is used in about 50% of labs in the USA. NAAT is sensitive for detecting the presence of toxigenic strains of C. difficile usually using PCR (polymerase chain reaction) method. A negative test will r/o C. diff but positive test cannot distinguish between colonization and active production of the toxin.

GDH - glutamate dehydrogenase is rapid test (less than one hour) very sensitive assay that detects C diff antigen GDH. Negative test will r/o C diff but positive test may detect non-toxic Clostridium. Therefore, usually done with EIA.

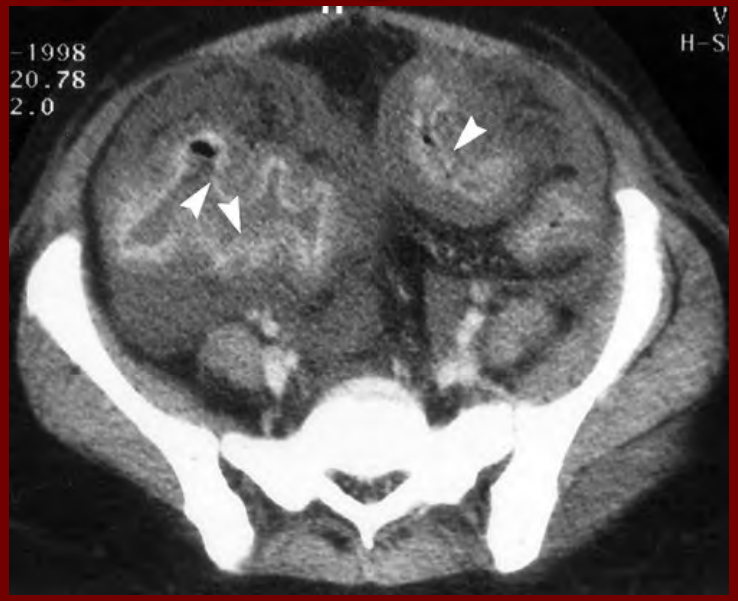
EIA - enzyme immunoassay used if NAAT or GDH are positive. EIA detects toxins faster than other tests but isn't sensitive enough to detect many infections and has a 20-30 % false (-) rate. If 2 tests are positive, then C diff diagnosed. Begin Rx if suspicion is high for C diff even if EIA negative and do further testing.

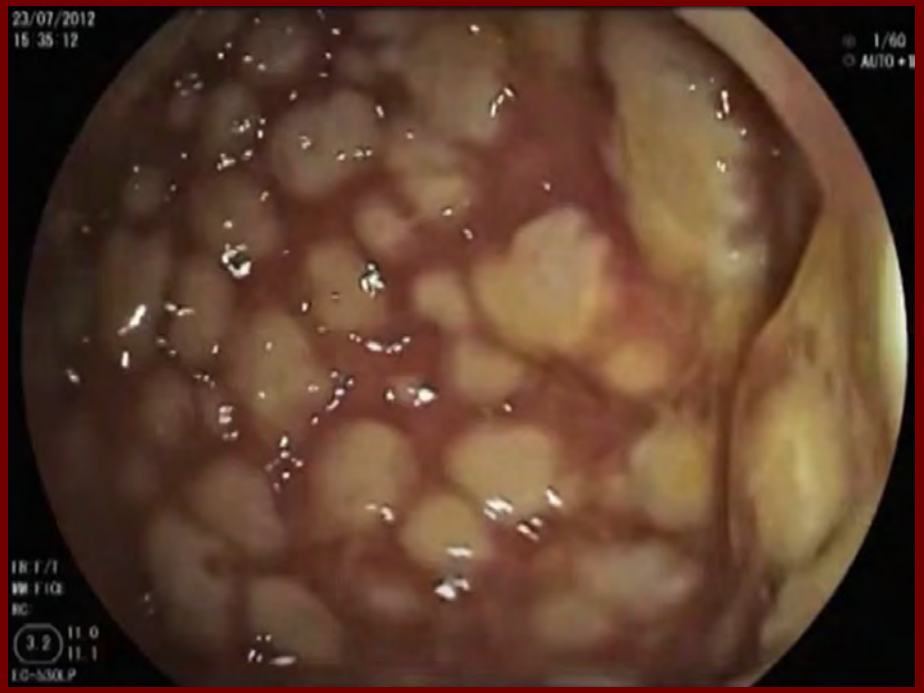
GDH/EIA - Uses a glutamate dehydrogenase (GDH) in conjunction with an EIA test. (C. DIFF QUIK CHEK COMPLETE ® test)

Cell cytotoxicity assay - looks for the effects of the C. difficile toxin on human cells grown in a culture. This type of test is sensitive, but it is less widely available, more cumbersome to do and requires 24 to 48 hours for test results. Some hospitals use both the EIA test and cell cytotoxicity assay to ensure accurate results.

Testing for C difficile

- **Imaging tests -** an abdominal X-ray or a computerized tomography (CT) scan, can detect the presence of complications such as thickening of the colon wall, expanding of the bowel, or more rarely, a hole (perforation) in the lining of your colon.
- **Colon examination -** flexible sigmoidoscopy or colonoscopy can look for areas of inflammation and pseudomembranes.






The good news is, I did a close inspection of your colon and it looks PERFECT!
What's the bad news?
I'm not a DOCTOR.

Clostridium difficile toxin is very unstable. The toxin degrades at room temperature and may be undetectable within 2 hours after collection of a stool specimen. False-negative results occur when specimens are not promptly tested or kept refrigerated until testing can be done.

LAB→

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a ptly

Treatment of suspected CDI

- Stop implicated antibiotic (if not possible, try to avoid highest risk antibiotics)
- Correct fluid and electrolyte balance
- Regular,low residue diet (lactose-free not required)
- Avoid anti-diarrheal agents/narcotics
  - Unless difficulty keeping up with fluid losses
  - Providing there is no evidence of ileus or colonic distention
- Appropriate antibiotic treatment for C difficile if sxs persist

Infection control

- Antibiotic stewardship
  - Appropriate antibiotic use based on evidence-based prescribing
  - 2021 study by CDC found that 56% of ABX use in US hospitals in 2015 was unsupported because patients didn't have signs or symptoms of a bacterial infection, the wrong antibiotic was prescribed, or the length of treatment was too long.
  - Avoid overuse
    - Simple UTIs can be treated with 1-3 days of antibiotics
    - Most hospital pneumonias can be treated with 5-7 days of antibiotics
    - 2016 data from BJM suggests 3 days adequate for mild to moderate outpt pneumonia
  - Do not treat asymptomatic bacturia
- Early detection and isolation
  - Single room/single toilet/try to avoid taking patient out of room for tests
  - Cohort cases. Routine cleaning of rooms prior to disinfection.
  - EPA-registered sporicidal disinfectants (at least 10% bleach)
  - Avoid rectal thermometers
- Contact precautions – gloves and gowns (mask unnecessary)
- Chlorhexidine patient baths (limited success).
- Appropriate hand hygiene.
  - EtoH gel hand sanitizers do not kill spores
  - Wash hands with soap and water for >=20 seconds

Hand washing

UV Light Disinfection Significantly Reduces Clostridium difficile Incidence

Oct 6,2016 *Infection Control & Hospital Epidemiology*

- Ultraviolet C light germicidal irradiation disinfection reduced C. *difficile* infections (CDI) in high-risk patients who later occupied those rooms
- The study was conducted in three hematology-oncology units at the Hospital of the University of Pennsylvania during a one-year period (February 2014-January 2015).
- Results showed that adding UV disinfection to typical disinfection protocols reduced the incidence of CDI by 25 percent among new patients in these units, compared to the prior year.
- At the same time, CDI rates increased 16 percent in the non-study units during this period. According to this study, room cleaning took only five minutes longer on average compared to non-study units.
- The no-touch device, used after patients with CDI were discharged from the hospital, also resulted in substantial healthcare savings, estimated between $350,000 and $1.5 million annually.

C. difficile disease severity

- Nonsevere CDI
  - <= WBC 15K
  - Serum creatinine < 1.5 mg/dL
- Severe CDI
  - > WBC 15K
  - Serum creatinine >= 1.5 mg/dL
- Fulminant colitis (Previously referred to as severe, complicated CDI)
  - Hypotension, shock, ileus, or megacolon
  - Hospitalization required


IT'S OKAY...
I'VE GOT DIARRHEA!

1ST Line Antibiotic Treatment

- Metronidazole 500mg PO tid x 10-14 days if:
  - WBC<15,000
  - Cr <1.5x baseline
  - Cost $11-36
- Vancomycin 125mg PO qid x 10-14 days if:
  - WBC>15,000
  - Cr>1.5x baseline
  - Patient is severely ill or has NAP1 strain
  - Cost $75-1000

2018

IV metronidazole can be effective but IV vancomycin does not work

1ST Line Antibiotic Treatment

2021

- Fidaxomicin 200mg PO bid x 10 days:
  - Cost $4,800-5,200
- Vancomycin 125mg PO qid x 10 days
  - Cost $1000 (GoodRX price $75-309)

For nonsevere CDI, metronidazole 500mg PO tid x 10-14 days is an alternative if other agents are not available. Avoid if frail, >65yo, or have inflammatory bowel disease.

TOM FINALLY FOUND PEACE. THE DIARRHEA MEDICATION WORKED.

Recurrent C. difficile

- 1st episode – 25% chance of recurrent infection
- 2nd episode – 45% chance of recurrent infection
- 3 or more episodes – >60% chance of recurrent infection

Relapse CDI

Fidaxomicin (Dificid) 200mg po bid x10 days is effective alternative and has a 15% relapse rate as compared to vancomycin with a 25% relapse rate

Relapse CDI

- 1st relapse retreat like initial treatment
- 2nd or more relapses
  - Fidaxomicin 200mg bid x 10 days OR...
  - Fidaxomicin 200mg bid x 5 days then once every other day for 20 days
  - Vancomycin 125mg po qid x 10-14 days then...
    - add “rifaximin chaser" following initial vanco course using rifaximin 400mg po tid x 20 days OR...
    - taper to Vancomycin 125mg po bid x 7 days followed by 125mg po daily x 7 days then every 2-3 d x 2-8 weeks

Bezlotoxumab 10mg/kg IV once during antibiotic therapy especially if vanco used and there is no hx of significant CHF

Bezlotoxumab for Prevention of Recurrent Clostridium difficile Infection

January 26, 2017
N Engl J Med 2017; 376:305-317
DOI: 10.1056/NEJMoa1602615

- MODIFY I and MODIFY II, two double-blind, randomized, placebo-controlled, phase 3 trials, involving 2655 adults receiving oral standard-of-care antibiotics for primary or recurrent C. difficile infection.
- Actoxumab and bezlotoxumab are human monoclonal antibodies against C. difficile toxins A and B, respectively
- Participants received an infusion of bezlotoxumab (10 mg per kg of body weight), actoxumab plus bezlotoxumab (10 mg/kg each), or placebo. (Actoxumab alone (10 mg/kg) ineffective)
- Among participants receiving antibiotic treatment for primary or recurrent C. difficile infection, bezlotoxumab was associated with a substantially lower rate of recurrent infection than placebo and had a safety profile similar to that of placebo. The addition of actoxumab did not improve efficacy.

2021 Guideline Changes

- Fidaxomicin now first-line therapy for first and second C. difficile episodes (non-fulminant)
- The 2021 IDSA/SHEA guidelines suggest using bezlotoxumab as a co-intervention along with standard antibiotics in primary infection only if the patient is at high risk for recurrence and has severe CDI, whereas ESCMID suggests it is relevant for high-risk patients only if fidaxomicin is not available.

Do probiotics work for C difficile?

- Hempel et al reported a 42% reduction in the risk of developing AAD with the use of probiotics (relative risk [RR] =0.58; 95% confidence interval [CI], 0.50–0.68; *P*<0.001).
- In a meta-analysis by Johnston et al, a 66% reduction in the risk of CDI with the use of probiotics (RR =0.34; 95% CI, 0.24–0.49; *P*<0.001) was observed.
- A Cochrane Review reported similar results with a 64% reduction in the risk of CDI.

Probiotics are effective at preventing Clostridium difficile-associated diarrhea: a systematic review and meta-analysis

Lau CS1, Chamberlain RS2.
Int J Gen Med. 2016 Feb 22;9:27-37.
doi: 10.2147/IJGM.S98280.
eCollection 2016.

Int J Gen Med Feb 2016

- Twenty-six RCTs involving 7,957 patients were analyzed.
- Probiotic use significantly reduced the risk of developing CDI by 60.5% (relative risk [RR] =0.395; 95% confidence interval [CI], 0.294-0.531; P<0.001).
- Probiotics proved beneficial in both adults and children (59.5% and 65.9% reduction), especially among hospitalized patients.
- Lactobacillus, Saccharomyces, and a mixture of probiotics were all beneficial in reducing the risk of developing CDI (63.7%, 58.5%, and 58.2% reduction).

Do probiotics work for C difficile?

Society for Healthcare Epidemiology of America. "Probiotics useful in the fight against Clostridium difficile infection: New research shows probiotics may be a prevention tool for Clostridium difficile infections."

ScienceDaily. ScienceDaily, 26 April 2018.

2021 CDI Guidelines re probiotics

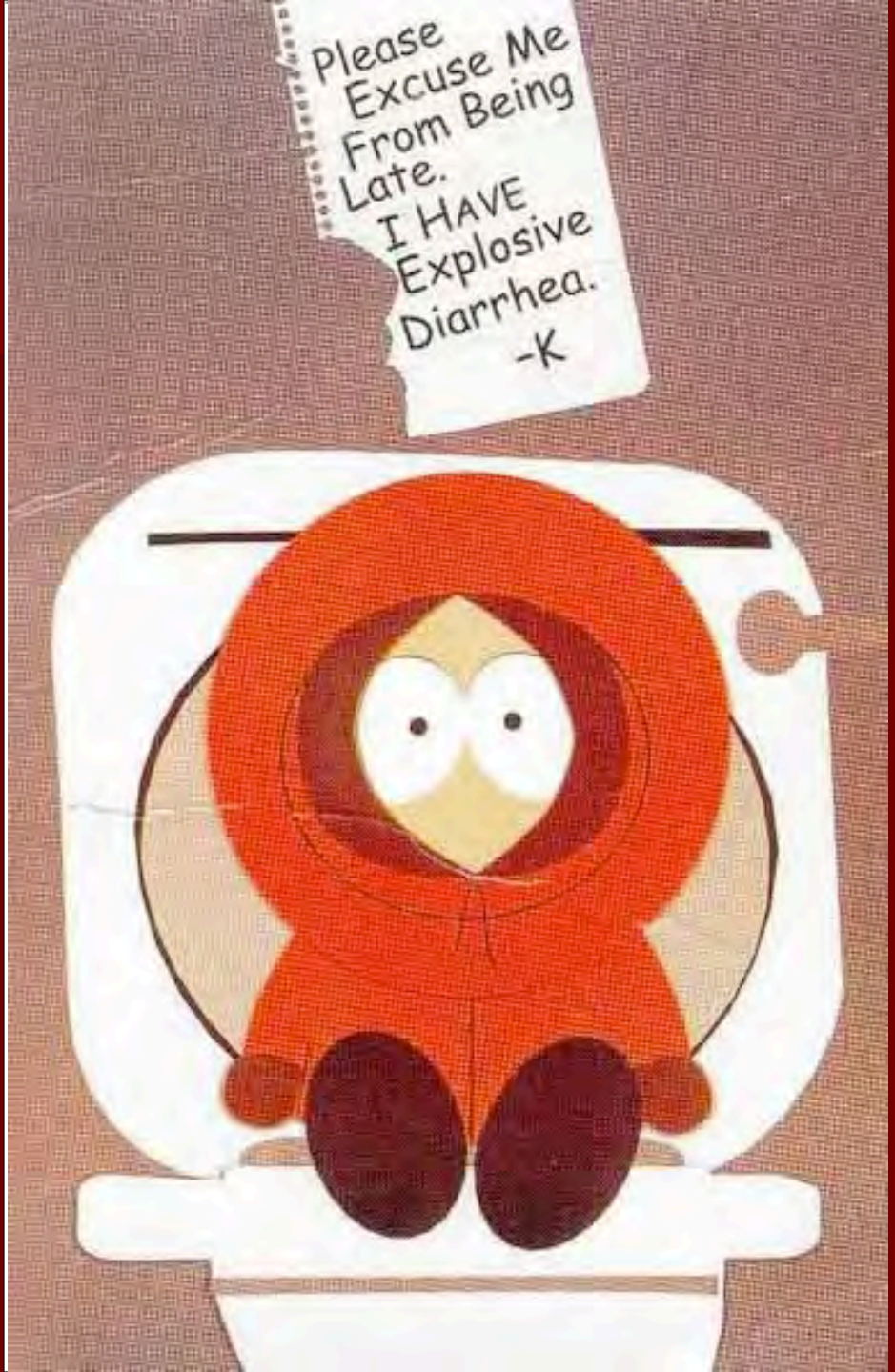
- ACG (American College of Gastroenterology) advised against use of probiotics for primary prevention in patients receiving antibiotics or for secondary prevention of CDI recurrence
- AGA (American Gastroenterological Association) guidelines suggest that probiotics may be used in patients (especially high-risk patients) receiving antibiotics in order to prevent CDI using specific strains and combinations of strains:
  - Saccharomyces boulardia
  - Lactobacillus acidophilus CL1285 and Lactobacillus casei LBC80R
  - Lactobacillus acidophilus, Lactobacillus delbrueckii, Bifidobacterium bifidum with or without Streptococcus salivarius

Are there adverse effects with probiotics?

- Although some case studies have reported fungemia, bacteremia, and sepsis associated with probiotic use, the incidences of these adverse events are inconsistent and not statistically significant across studies.
- Most studies showed no statistical significance between patients receiving probiotics and the control group with respect to nausea, abdominal cramping, constipation, and urticaria.
- Several studies even noted that probiotics were associated with decrease in length of stay, fever, and nausea/vomiting.

Not all probiotics are the same: 3 probiotic products with the best data for primary prevention of CDAD

- A proprietary mixture of three Lactobacilli strains: Lactobacillus acidophilus CL1285®, Lactobacillus casei LBC80R® and Lactobacillus rhamnosus CLR2® ($P<0.001$)
- Mixture of L. acidophilus with B. bifidum ($P=0.002$)
- Saccharomyces boulardii ($P=0.003$)


Please
Excuse Me
From Being
Late.
I HAVE
Explosive
Diarrhea.
-K


Diarrhea
in the News

September 7, 2023

Microbiome-based therapeutics

fecal microbiota, live – jslm 11/30/2022

SER-109 04/26/2023

Fecal microbiota, live – jslm
AKA RBX2660 approved by FDA 2022

- RBX2660 is the first fecal microbiota transplantation product for the prevention of recurrence of Clostridioides difficile infection (CDI) in people >=18 years of age
- RBX2660 studied in largest clinical trial program in the field of microbiome-based therapeutics, including five clinical trials with more than 1,000 participants.
- It is administered rectally as a single dose and is prepared from stool donated by qualified individuals. The donors and the donated stool are tested for a panel of transmissible pathogens.
- Cost of the single dose 150 ml treatment is $9,000
- It is reimbursed by Medicare B with appropriate J code in patients >50y.o. with Medicare

Cost-Effectiveness Analysis of REBYOTA™ (Fecal Microbiota, Live-jslm [FMBL]) Versus Standard of Care for the Prevention of Recurrent Clostridioides difficile Infection in the USA

Published online Apr 24, 2023
Adv Ther. 2023; 40(6): 2784–2800

FMBL was found to be cost-effective compared to SOC for the prevention of recurrent CDI with more benefits among patients at first recurrence. Patients >60y.o. treated with FMBL experienced higher total quality-adjusted life year and reduced healthcare resource utilization, including reduced hospitalizations.

SER-109 (Vowst) approved by FDA 2023

- SER-109 is the first FDA approved orally administered fecal microbiota therapy for prevention of recurrent C difficile./
- The safety of SER-109 was evaluated in a randomized, double-blind, placebo-controlled, clinical study and an open-label clinical study conducted in the U.S. and Canada. The participants had recurrent CDI, were 48 to 96 hours post-antibacterial treatment and their symptoms were controlled.
- Across both studies, 346 individuals 18 years of age and older with recurrent CDI received SER-109 .
- Among 90 SER-109 recipients, (compared to 92 placebo recipients), the most common side effects by SER-109 recipients were bloating, fatigue, constipation, chills and diarrhea.
- In the 8 week randomized, placebo-controlled clinical study (89 participants received SER-109 and 93 participants received placebo), CDI recurrence in SER-109-treated participants was lower compared to placebo-treated participants (12.4% compared to 39.8%).

BEFORE FIRST DOSE OF VOWST

1

Antibacterials[1]
Finish antibacterial treatment for recurrent *C. diff*

2

Laxative[1]
Drink 10 oz of magnesium citrate* within 1-3 days of finishing antibacterials

* In clinical studies, participants with impaired kidney function received polyethylene glycol electrolyte solution (250 mL GoLYTELY®, not approved for this use).

VOWST DOSING

3

Start VOWST the next day, before the first meal on an empty stomach
Do not eat or drink (except for a small amount of water) for at least 8 hours before starting the 1st dose of VOWST
-This will be 2-4 days after finishing antibacterials

The dosage of VOWST is 4 capsules taken orally once daily for 3 consecutive days

SER-19 available as of June 2023 for a cost of $17,500 per prescrption


MARVEL STUDIOS
WHAT IF...?

What if offending antibiotics cannot be stopped (e.g. osteomyelitis treatment)?

Try to switch to low risk antibiotic such as

IV vancomycin, aminoglycoside, linezolid, or narrow spectrum beta-lactam

Consider continued Vancomycin 125mg daily and the possible addition of an appropriate probiotic and continue both for 5 days after completion of the offending antibiotic.

What if CDAD treatment isn't working?

- Suspect noncompliance
- Consider other causes of diarrhea
- Escalate therapy
  - If on metronidazole, switch to fidaxomicin or vancomycin (especially if no benefit in 5-7 days)
  - If on fidaxomicin or vancomycin repeat course and consider tapering course of fidaxomicin for 20 days or vancomycin over 2 to 8weeks. If on Vancomycin, consider "Xifaxan chaser" (and/or add IV bezlotoxumab to prevent reoccurrence)

What if EIA assay is negative but symptoms are suggestive?

Repeat EIA assay due to 20-30% false negative rate and begin empiric antibiotic treatment if patient is seriously ill

Alternate option is to order NAAT/PCR or GDH if available. A negative result rules out *C. difficile* and therapy could be discontinued

What if CDI reoccurs after completion of an initial successful treatment?

1) Rechallenge with 10-14 day course of same antibiotic which was successful the first go around
2) If 2nd reoccurrence then continue for a longer course and taper gradually over 1-2 months
3) For any reoccurrence, consider IV Bezlotoxumab, rifaximin chaser during treatment - OR - after treatment consider new microbiome therapeutics with single dose enema or 3-day course of capsules

Studies using Bezlotoxumab with fidaxomicin are limited

What if patient has severe ileus or is vomiting?

Fecal microbiota transplantation (FMT) vs. IV metronidazole 500mg q 8hours with rectal vancomycin 500mg qid by retention enema and surgical consult

IV metronidazole has been used with rectal vancomycin in combination in patients with ileus but with increased mortality

No current evidence to support fidaxomicin for fulminant CDI

What if a 75 y.o. patient has been recently hospitalized for CDI and now requires antibiotics?

Updated ACG guidelines state that oral vancomycin prophylaxis to prevent recurrence may be considered in patients at high risk with a suggested dosage of vancomycin 125 mg once daily continued for 5 days after completion of antibiotic therapy

Addition of a probiotic such as Saccharomyces boulardii could be considered as well but is not part of the current ACG guidelines

What if your patient has multiple reoccurrences of CDI and not responding to oral antibiotics?

Fecal microbiota transplant!

Donor stool is screened (for risk of transferable pathogens) then stool is homogenized and filtered and inserted by NG tube or colonoscopy


LET'S TAKE THE POOP FROM
THIS HEALTHY GUY
AND PUT IT INTO THE GUY
WITH C. DIFF

Stool transplant

Fecal transplant ready to be delivered to a patient.

- Cammarota et al conducted an RCT involving 39 patients with recurrent CDI
- 20 patients receiving fecal transplantation and 19 patients receiving vancomycin
- Conclusion: significantly higher rates of resolution with the use of fecal transplantation (90% versus 26%, $P<0.0001$).

Q: How do you pick the stool transplant donor?

A: It's never the first person...
IT'S ALWAYS THE NUMBER 2 DONOR

The CDI guidelines now recommend Fecal Microbiota Transplantation (FMT) therapy for the treatment of multiple recurrences of CDI.


I JUST PERFORMED
A FECAL TRANSPLANT!
makeameme.org

What if patient is seriously ill with ileus, sepsis, toxic megacolon, colonic wall thickening, WBC >20, serum lactic acid >5mmol/L, ARF, and not responding to other therapies (e.g. antibiotics, FMT?)

Loop ileostomy may be better alternative than total colectomy

- Loop Ileostomy Vs. Total Colectomy As Surgical Treatment For Clostridium Difficile Associated Disease: An Eastern Association for the Surgery of Trauma Multicenter Trial J Trauma Acute Care Surg. 2017 Jul; 83(1): 36–40.
- Conclu eostomy

Pearls: True or False

Recent studies show increases in CDI with the use of alcohol-based hand rubs versus soap and water.

FALSE: No studies show increases in CDI with the use of alcohol-based hand rubs versus soap and water. Furthermore, several studies have found reductions in MRSA or VRE with the use of alcohol-based hand rubs compared with soap and water. Gloves remain the mainstay of hand hygiene with CDI.

Pearls: True or False

- It is mandatory to retest stool for CDI after completion of antibiotic therapy before isolation can be discontinued to be certain that the patient is no longer infectious .

FALSE: Isolation can be discontinued once the patient has completed therapy and has formed stools. Retesting should not be performed.

Pearls: True or False

New therapies including Bezlotoxumab, SER-109 and fecal microbiota, live – jslm are now FDA approved to treat CDI

FALSE: These therapies are FDA approved to prevent C diff reoccurrence (but not approved to treat CDI).

Poop Pearls

- Fidaxomicin is now recommended 1st line medication for C dfficile although cost considerations will generally require us to use vancomycin
- Metronidazole is not recommended for most CDI episodes
- Treat for C diff if suspicion is high despite (-) toxin
- Use short courses of low-risk ABX when possible
- Do not send formed stools for C. diff testing
- Do not retest stool once infection is treated and symptoms resolve
- Fecal Microbiota Transplant has >90% cure rate

Poop Pearls

- One last pearl… If you are flying Delta Airlines, be aware of new airline explosive diarrhea warning lights

What's more fun than riding around on motorized toilets?

Finishing this crappy lecture.

THE END