**Clostridium Difficile**

### Epidemiology

**Source:** Soil, environment

++CDAD patients

± Colonized pts

**Transmission**

++ Direct contact - hands

+ Indirect contact

+ Fomites,

+ Environmental surfaces

**CDAD infection or CDAD Associated Disease (CDAD)**

Diarrhea, nausea, vomiting, lower abdominal pain and tenderness, fever, anorexia, malaise. Stools are watery, voluminous, lacking gross blood or mucus.

**C. diff infection or C. Diff Associated Disease (CDAD)**

**Incubation 7d**

Difficult to determine because of carriers

Communicability: Mostly CDAD, lesser from colonization

### Diagnosis

Most diagnostic tests detect the toxin:

- Enzyme immuno-assay for toxins: Enzyme immunoassay (EIA) or cell cytotoxin assay
  Sensitive, cheap and easy to perform.

- EIA for toxins A and B, or EIA for toxin A & toxin B cell culture cytotoxicity assay
  Latex agglutination tests should not be used.

- Cell cytotoxicity assay: Stool extract added to tissue cell culture with / without neutralizing antibotin. Toxin present if cytotoxic effect in cultures not neutralized and no cytotoxic effect in neutralized cultures. Most specific for CDAD, not very sensitive. 48-72 hours for result.

- Stool culture: Oncycloserine-cefoxitin-fructose agar selective medium. Plates in anaerobic environment (4 hrs) then inoculation. Very sensitive but false positive due to non-toxigenic isolates and result in > 72hrs

- Glutamate dehydrogenase (GDH) test: Screening test (inexpensive, fast, sensitive but not specific (positive with other bacteria). Negative test useful to rule out CDAD.

- Positive test is often a flase positive due to non-toxigenic isolates and result in > 72hrs

- Sigmoidoscopy or colonoscopy visualization of pseudo-membranes = pseudo-membranous colitis (PMC) is caused by C. diff in 90% of cases.

- Latex agglutination tests should not be used.

- EIA for toxins A and B, or EIA for toxin A & toxin B cell culture cytotoxicity assay
  Sensitive, cheap and easy to perform.

### Treatment

**Simple measures**

- Sufficient for 20% of patients, particularly mild disease

- 1. All CDAD patients need fluid and electrolyte replacement,

- 2. Avoid anti-peristaltic agents and opiates

- 3. Discontinue antimicrobial therapy ASAP in patients in whom clinically significant diarrhea or colitis develops.

- **Asymptomatic persistence of C. diff and its toxins in stools following treatment is common. DO NOT repeat stool testing or re-treatment.**

- **Non resonders to mild measures, patients with severe symptoms, patients who absolutely require specific therapy against C. diff.**

  1. **First line:** Oral metronidazole 500mg 3 times a day or 250mg 4 times a day for 10 days

     Metronidazole cheaper & not prone to promote VRE. IV therapy only until oral ingestion possible.

  2. **Second line:** Oral vancomycin 125mg every 6 hours.

     1V vancomycin does not deliver sufficient concentration in the gut lumen

     3-Other drugs are:

     - Nitazoxanide, an anti-protozoal used against cryptosporidium and giardia, at a dosage of 500 mg 2 times per day for 7 days, or at a dosage of 500 mg 2 times per day for 10 days

     - Bacitracin 25,000 units four times daily for 7-10 days

     - Telcooiplan orally 100-400mg twice a day for 10 days

     - Fusidic acid orally 500mg 3 times a day for 10 days

     **Recurrents are found in 10% to 20% of cases.** Early recurrences within 30 days are usually due to the same strains. Later recurrences are usually caused by new strains.

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Control

Surveillance
- A case of CDAD is defined as an individual patient with diarrhea in which
  1. The patient has a diarrheal stool sample positive for C. diff toxin A or B
     or a toxin-producing C. diff or
  2. Pseudomembranous colitis found in endoscopy or surgery or
     3. Pseudomembranous colitis at histologic examination
- A case of healthcare facility associated CDAD is defined as above with onset of symptoms more than 48 hours after admission or less than 4 weeks after discharge
- A case of community associated CDAD is defined as above with onset of symptoms in the community or less than 48 hours after admission, or more than 12 weeks after last discharge
- A asymptomatic patient with an additional positive toxin assay within 2 weeks or less after the last specimen tested positive is a continuation of the same CDAD and not a new case
- A symptomatic patient with an additional positive toxin assay within 2 to 8 weeks after the last specimen tested positive is a recurrent CDAD
- A symptomatic patient with an additional positive test more than 8 weeks after the last specimen tested positive is a new case of CDAD

NO active case finding
- Only test patient who are suspected of having C. Diff infection (CDAD), patients with diarrhea
- Do not screen asymptomatic patients
- Do not repeat a negative test
- Do not perform a test of cure
- Do not place asymptomatic patients in contact precautions

Prevent onset of CDAD
- Limit the use of antimicrobial agents: Restrict the use of clindamycin and of broad-spectrum antibiotics (particularly cephalosporins);
- Encourage the proper use of antibiotics.
- Carriers of the organism appear to be resistant to acquisition of outbreak-associated strains. Individuals with asymptomatic colonization are no more likely to develop C. Diff diarrhea than are those with negative stool cultures.
- Metronidazole not effective in eradicating asymptomatic carriage with C. Diff, and treatment with oral vancomycin results in only transient elimination of fecal carriage of the organism.
- Antibiotic treatment of asymptomatic patients excreting C. Diff is not recommended.

Disinfectants
- C. diff spores are fairly resistant to quaternary ammoniums and phenolic compounds which are not sporicidal.
- Only chlorine based (bleach) or vaporized hydrogen peroxide disinfectants are active on spores
- A 10% solution of sodium hypochlorite (household bleach has about 6% ClONa) is adequate. It must be made fresh daily (one part bleach and 9 parts tap water). The addition of 1 part vinegar (5% acetic acid) may improve the germicidal action.

Cleaning
- Thorough cleaning is necessary to maximize the disinfectant action of the germicide. Use a commercially available solution which contains a detergent or use a detergent for thorough cleaning before applying the bleach solution.
- Contact time of 1 minute should be sufficient. Wetting the surface with the bleach solution and allowing it to dry should provide sufficient contact time.

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