1st OR 2nd Episode of CDAD

Consider discontinuation of non-*C. difficile* antibiotics. This is important because reconstitution of normal bowel flora is essential for preventing CDAD and treating CDAD.

Diarrhea AND one of the following:
***C. difficile* toxin test + OR**
***C. difficile* toxin test pending AND**
Clinical Suspicion of *C. difficile*

-Place patient on contact precautions
-Use soap and water to wash hands (DO NOT USE ALCOHOL-BASED HAND WASH)

Metronidazole 500 mg PO Q8h x 10

Evaluation at Day 4-6 of Treatment

Should not be deemed a treatment failure until an adequate course of therapy has been administered
(Infect Control Hosp Epidemiol 1995;16:459-477)

Symptoms Resolving

-Diarrhea should resolve within 2 weeks
-Recurrence expected in 12-20% after 1st episode, 50-60% after 2nd episode

Symptoms NOT Resolving or Worsening

Change to Vancomycin 125 mg PO Q6h to complete 10-14 day course

Evaluation at Day 4 of Treatment

Symptoms NOT Resolving or Worsening

***Consider addition of Rifampin 300 mg PO Q12h to Vancomycin 125 mg PO Q6h to complete 10-14 day course**

Consider consultations (GI, ID)

***C. difficile* suspected/documented AND Ileus OR Toxic megacolon suspected**
GI, SURGICAL CONSULTATION

***AND*: Metronidazole 500 mg IV Q6-8h x 10 days *PLUS CONSIDER*: Intracolonic vancomycin (0.5-1.0 grams vancomycin in 1-2 liters of NS Q4-12hrs)** Given as retention enema: (1) 18 inch Foley cath with a 30 mL balloon inserted into rectum, (2) balloon inflated, (3) vanc instilled, (4) catheter clamped for 60 min., (5) deflate and remove. (Clin Infect Dis 2002;35:690-6)

CDAD Pearls:
This consensus document was assembled bymembers of the Antimicrobial Stewardship Program, Depts. of Gastroenterology, Hospital Epidemiology and Infection Control, Infectious Diseases, and Surgery. It is supported by evidence based strategies for the management of CDAD. If patients are clinically worsening, consultation at any point in the algorithm is warranted.

1. CDAD comprises only ~15-25% of Antibiotic Associated Colitis.

2. CDAD is increasing in incidence nationally. In addition, new strains have been identified and are ostensibly associated with increased severity of disease. (CMAJ 2004;171:466-72)

3. CDAD is unique in that it does not occur in individuals without a recent history of antibiotic use. When antibiotics are prescribed unnecessarily, they put the patient at risk for potentially life threatening side effects such as CDAD. Patients should refrain from requesting antimicrobials when viral infections are suspected, and clinicians should not prescribe them in these circumstances. When infection has been ruled out, antimicrobials should be discontinued. The longer the patient is receiving them, the greater likelihood the patient will acquire CDAD. 20-25% of patients with CDAD will respond to discontinuation of antibiotics without further treatment. (Infect Control Hosp Epidemiol 1995;16:459-477)

4. Studies have shown that CDAD patients incur 54% greater costs and remain hospitalized for an average 3.6 days longer than patients who *do not* develop CDAD during hospitalization. (Clin Infect Dis 2002;34:346-53)

5. *CDAD Testing*: There are two major toxins used to identify CDAD, toxins A and B. As of May 2003, NorDx tests for both toxins. A single toxin test may be ordered per patient, per day (no additional benefit to sending multiple tests per day). There is no need to perform "test of cure" C. difficile toxin tests at the end of therapy. Patients can continue to be positive for C. difficile for up to 2-3 months after being adequately treated for CDAD. (Infect Control Hosp Epidemiol 1995;16:459-477)

6. CDAD is a prominent cause of leukocytosis. (Clin Infect Dis 2002;34:1585-92)

7. *10% bleach* is the only cleaning product capable of reducing C. difficile spores and should be recommended to patients being discharged for cleaning their bathrooms. Elimination of spores in the individual's environment may lead to decreased potential for recurrence of CDAD. (Clin Infect Dis 2000;31:995-1000; Lancet 2000;356:1324.)

8. Alcohol-based hand cleaning agents are ineffective in eliminating C. difficile spores. Therefore, those with CDAD and their caregivers should avoid these products while the patient is symptomatic. HAND WASHING with soap and water IS EFFECTIVE and should be used while the patient is symptomatic. (J Hosp Infect 2004;56:510-12)

CDAD: *Clostridium difficile* associated diarrhea

***Caution: Review drug interaction potential before addition of rifampin to a patient's regimen**

3rd (or more) Episode of CDAD Within One Year

Consider discontinuation of non-*C. difficile* antibiotics. This is important because reconstitution of normal bowel flora is essential for preventing CDAD and treating CDAD.

Diarrhea AND one of the following:
***C. difficile* toxin test + OR**
***C. difficile* toxin test pending AND**
Clinical Suspicion of *C. difficile*
-Place patient on contact precautions
-Use soap and water to wash hands (DO NOT USE ALCOHOL-BASED HAND WASH)

Vancomycin 125 mg PO Q6h x10 days

Evaluation at Day 4-6 of Treatment
Should not be deemed a treatment failure until an adequate course of therapy has been administered
(Infect Control Hosp Epidemiol 1995;16:459-477)

Symptoms Resolving
-Diarrhea should resolve within 2 weeks
-Recurrence expected in 12-20% after 1st episode, 50-60% after 2nd episode

Symptoms NOT Resolving or Worsening

***Consider addition of Rifampin 300 mg PO Q12h to Vancomycin 125 mg PO Q6h to complete 10-14 day course**
Consider consultations (GI, ID)

Evaluation at Day 4 of Treatment

Symptoms NOT Resolving or Worsening

Consider:
-High dose oral vancomycin (500mg PO Q6h) (Am J Gastroenterol 2002;97:1769-75)
-Donor Stool Transplant (Clin Infect Dis 2003;36:580-5)

***C. difficile* suspected/documented AND ileus OR Toxic megacolon suspected GI, SURGICAL CONSULTATION**

***AND*: Metronidazole 500 mg IV Q6-8h x 10 days**
***PLUS CONSIDER*: Intracolonic vancomycin (0.5-1.0 grams vancomycin in 1-2 liters of NS Q4-12hrs)** Given as retention enema: (1) 18 inch Foley cath with a 30 mL balloon inserted into rectum, (2) balloon inflated, (3) vanc instilled, (4) catheter clamped for 60 min., (5) deflate and remove. (Clin Infect Dis 2002;35:690-6)

CDAD Pearls (continued):

9. For primary therapy of CDAD, doses of vancomycin >125mg q6h are equivalent to 125mg q6h. (Am J Med 1989;86:15)

10. *Pregnant patients* should NOT receive metronidazole. Vancomycin is the drug of choice in these patients.

11. *Probiotics* are helpful for antibiotic associated diarrhea, BUT have NOT been proven effective in the treatment of CDAD. They can cause bacteremia/ fungemia in both immunocompromised and immunocompetant patients. Their use in CDAD is not evidence based and may be harmful. (J Hosp Infect 2004;56:1-38; Clin Infect Dis 2004;38:62-9; J Clin Microbiol 2003;41:5340-43; Best Pract Res Clin Gastroenterol 2003;17:775-83)

12. *Binding agents (cholestyramine, colestipol)*, although theoretically beneficial, have been shown to be equivalent to placebo for the treatment of CDAD. In addition, they bind vancomycin in the GI tract, rendering effective treatments ineffective and thus are potentially harmful. (Br J Surg 1982;69:137-9)

13. *Antiperistaltic agents* should not be administered to patients with CDAD as it may predispose them to toxic megacolon. (Dis Colon Rectum 1982;25:478-82; Infect Control Hosp Epidemiol 1995;16:459-477)

14. *Proton pump inhibitors (PPIs)* have been identified as a potential risk factor for CDAD. Unnecessary use of PPIs should be strongly avoided to minimize the risk of CDAD. (J Hosp Inf 2003;54:243-45)

15. CDAD has been reported following treatment with vancomycin+metronidazole. Treatment with vancomycin alone was curative. The combination of these antimicrobials has not been studied, and is harmful to protective flora which may allow prolonged disease. (Postgrad Med J 1987;63:993-994)

After 2nd relapse within 1 year, or if patient worsens significantly after treatment is discontinued, *CONSIDER*:
Vancomycin taper (Am J Gastroenterol 2002;97:1769-75)
Vancomycin pulse therapy (Am J Gastroenterol 2002;97:1769-75)

Vancomycin Taper:
Week 1: 125mg PO Q6hrs
Week 2: 125mg PO Q12hrs
Week 3: 125mg PO QD
Week 4: 125mg PO QOD
Weeks 5&6: 125mg PO Q 3 days

Vancomycin Pulse Therapy:
Vancomycin 125mg-500mg PO administered Q2-3 days over three weeks.