

Policy offers recommendations on managing *C. difficile* infections in pediatric patients

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The incidence of *Clostridium difficile* infections (CDIs) among hospitalized children has been increasing in the United States since 1997. While clinical practice guidelines on managing CDIs recently were published, they focus on adults.

To address this gap in knowledge surrounding CDIs in pediatric patients, the Academy has published a new policy statement that provides updated information and recommendations for pediatricians. The statement, *Clostridium difficile* Infection in Infants and Children from the AAP Committee on Infectious Diseases (*Pediatrics*. 2013;131:196-200; <http://pediatrics.aappublications.org/cgi/doi/10.1542/peds.2012-2992>), discusses diagnostic testing, treatment and control.

Incidence of disease, carriage

C. difficile is the most common cause of antimicrobial-associated diarrhea and is a common health care-associated pathogen. The spore-forming, obligate anaerobic, gram-positive bacillus is acquired from the environment or by the fecal-oral route. Toxins A and B are responsible for intestinal disease.

Although testing of infants is not recommended, recent data have shown that 26% of children hospitalized with CDIs were younger than 1 year, and 5% were neonates. What cannot be determined from these data is whether hospitalization rates for CDIs represent true disease or asymptomatic carriage.

C. difficile carriage rates average 37% for infants 0 to 1 month of age and 30% between 1 and 6 months of age. At 6 to 12 months of age, approximately 14% of children are colonized with *C. difficile*, and by 3 years of age, the rate is similar to that of nonhospitalized adults (0%-3%). Carriage rates in hospitalized children and adults approximate 20%. Clinical illness rarely is reported before 12 to 24 months of age.

Diagnostic testing

Clinical symptoms of *C. difficile* vary widely from asymptomatic colonization to pseudomembranous colitis with bloody diarrhea, fever and severe abdominal pain.

The diagnosis of disease is based on the presence of diarrhea and of *C. difficile* toxins in a diarrheal stool specimen. Diarrhea often is defined as three or more stools that take the shape of their container in a 24-hour period.

The most common method of testing for *C. difficile* toxins is the commercially available enzyme immunoassay (EIA), which detects toxins A and/or B. Mean test sensitivities range from 72% to 82%,

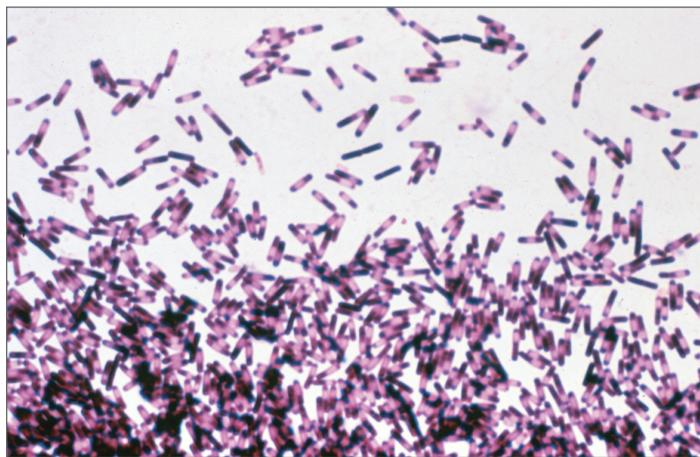


Photo courtesy of the Centers for Disease Control and Prevention/Dr. Gilda Jones

Micrograph of the bacterium *Clostridium difficile*

with mean specificities of 97% to 98%, compared with the cell culture cytotoxicity assay (CCCA).

With low prevalence rates of disease in children, sensitivities and specificities such as these lead to an unacceptably low positive predictive value, thus limiting the usefulness of such testing.

Testing for glutamine dehydrogenase produced by *C. difficile* should be used only as part of a two-step algorithm with a confirmation of positive results by using either a toxin assay A/B EIA or a CCCA.

Molecular assays using nucleic acid amplification tests (NAATs) are approved by the Food and Drug Administration and are preferred by many laboratories. NAATs combine good sensitivity and specificity, have turnaround times comparable to EIAs, and are not required to be part of a two- or three-step algorithm. Many children's hospitals are converting to NAAT technology to diagnose CDIs, but more data are needed before NAATs can be used routinely.

Treatment

Discontinuation of antimicrobial agents is the first step in treating CDIs and may suffice in most instances. Antiperistaltic medications should be avoided because they may obscure symptoms and precipitate complications, such as toxic megacolon.

Metronidazole is the drug of choice for the initial treatment of children and adolescents with mild to moderate disease. Oral vancomycin or vancomycin administered by enema with or without intravenous metronidazole is indicated as initial therapy for patients

with severe disease and for patients who do not respond to oral metronidazole.

Up to 30% of patients treated for CDIs experience a recurrence after discontinuing therapy. Recurrences represent either relapse with the original isolate or reinfection with a new isolate. In clinical practice, the distinction cannot be made.

Patients with a recurrence usually will respond to a second course of the same treatment. Metronidazole should not be used for the treatment of the second recurrence (third episode) or for chronic therapy. Rather, tapered or pulsed regimens of vancomycin are recommended for this situation.

Other antimicrobial agents with activity against *C. difficile* include nitazoxanide, fidaxomicin and rifaximin; criteria for optimal use of these drugs in children are unknown.

Probiotics are not recommended for the prevention or treatment of CDIs because controlled studies in children are lacking.

In rare instances, severely ill patients may require cecostomy for irrigation or a colectomy. Fecal transplantation is used anecdotally. Experience with aggressive management or transplantation is limited in children.

Control

People with *C. difficile*-associated diarrhea should be placed in “standard plus” contact precautions for the duration of their diarrhea. Test of cure is not recommended; the patient may be removed from isolation once the diarrhea has resolved.

Use of gloves is the best proven method for preventing patient-to-patient transmission via the hands of health care personnel. Hand-washing with soap and water is more effective for the removal of spores than is alcohol-based hand sanitizer. Germicidal wipes with 10% sodium hypochlorite are good adjuncts for cleaning the environment, especially in an outbreak situation.



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