Infectious disease specialists at Penn Medicine are performing an investigational procedure, fecal microbiota transplantation, to treat patients with resistant and recurrent *Clostridium difficile* (C diff) infections.

*Clostridium difficile* (now properly *Clostridioides difficile*) is the most common cause of hospital-based diarrhea in the United States, and is identified with life-threatening pseudomembranous colitis and toxic megacolon. For these reasons, the presence of C diff is of great concern to infectious disease specialists. According to the Centers for Disease Control, in 2015 C diff caused almost half a million infections in the US, and was a direct cause of an estimated 15,000 deaths.

An irony linked to C diff is its opportunistic expansion in the wake of antibiotic therapy. Antibiotic treatment for any infection will kill a preponderance of the bacteria inhabiting the gut, most of which multiply by mitosis. By contrast, C diff is an anaerobic spore-forming bacillus unhindered by the need for survival to reproduce. Following antibiotic therapy, C diff spores emerge in the now unchallenged environment of the gut and spread rapidly, exuding cytotoxins as a component of propagation.

These toxins bind to and penetrate the gut epithelium and mucosa, destroying cell structure, cleaving the water-tight junctions between cells and contributing to profound colonic mucosal injury and inflammation. The normal balance in the gut then shifts from absorption of fluids and electrolytes to excretion, leading to profound diarrhea.

**Treatment**

Because antibiotic therapy can contribute to the proliferation of C diff, eliminating the bacteria can be extremely difficult. For this reason, Penn infectious disease specialists are now treating selected patients with recurrent C diff infection with an investigational biological alternative to antibiotic therapy.

Known as fecal microbiota transplantation (FMT), the therapy involves restoring the normal gut microbiome in patients following repeated recurrences of C diff with antibiotic therapy. At Penn Medicine, and a broad array of observational studies and trials, >80% of refractory C diff infections are cured with a single application of FMT, and 90% with repeat dosing.1

The probability of successful FMT is reduced, however, for inpatients, as well as among patients with severe, complicated C diff infection and patients with concurrent inflammatory bowel disease, particularly if diarrheal symptoms are attributable to the condition itself.

Specialists in the Division of Infectious Diseases at Penn Medicine offer consultation regarding infectious disease problems, such as viral infections, diarrhea, tuberculosis, osteomyelitis, parasitology, and HIV. In particular, treatment is available for patients with problems associated with immunosuppression and international travel. Primary care is also available for HIV, hepatitis B, and hepatitis C patients.

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