



The tiny threat to a hospital's bottom line

By Peter Barnes | August 22, 2016

Of all the medical challenges ripe for innovation, damaged gut flora might not be the first that springs to mind.

But consider this: A single species of intestinal bacteria, *Clostridium difficile*, contributed to an estimated 29,000 U.S. deaths in 2011 and infected nearly half a million people. More than 65 percent of those cases were connected to healthcare.

The battle against *C. diff* highlights a challenge for hospitals: How to gain control over a small but mighty threat that can extend hospital stays, hit weakest patients the hardest, and send costs spiraling. But some promising new research – and the revival of some old techniques – offers hope for the future.

The dangers of “*C. diff*” are well-known to hospitals. Physicians first began attributing diarrheal infections to the bacteria in the 1970s, and the number of inpatient stays for principal *C. diff* diagnoses quadrupled between 1993 and 2009. Patients 65 and older account for two in three healthcare-associated *C. diff* infections and 80 percent of deaths.

While initial treatment for *C. diff* is usually effective – about 9 in 10 infected patients respond to antibiotics when first diagnosed – those who relapse face a 40 percent to 65 percent chance of developing symptoms again after a second round of antibiotics.

From there, treatment options become limited. That's why some hospitals have been developing innovative ways to treat infections, or prevent them from happening in the first place. Here are a few:

Recruiting robots

Norton Audubon Hospital in Kentucky recently purchased robots that disinfect rooms using high-intensity ultraviolet light. Spores from *C. diff* bacteria can survive on surfaces for months, including those cleaned with many EPA-registered hospital disinfectants.

Robot manufacturer Xenex claims its 12-minute disinfection cycle is 20 times more effective than traditional methods. The company also points to customer studies reporting a 70 percent reduction in *C. diff* infection rates, as well as a 57 percent reduction for MRSA.

Screening patients

Also this year, an acute-care facility in Canada reported success in reducing C. diff infections with an approach focused on asymptomatic patients. For more than a year, the Quebec Heart and Lung Institute screened 7,599 newly admitted patients using a rectal swab and placed those carrying the bacteria under contact isolation precautions. In that time, the rate of healthcare-associated C. diff infections dropped by more than half.

A paper published in April in JAMA Internal Medicine said the tactic, if proven, “could potentially prevent thousands of cases ... every year in North America.”

Curbing antibiotics

Along with reducing exposure, public health agencies place a heavy emphasis on curbing overuse of antibiotics. The Centers for Disease Control and Prevention highlight studies showing that 30 to 50 percent of hospital antibiotic prescriptions are inappropriate or incorrect. Unrelated antibiotic treatments are particularly important to monitor during C. diff treatment, as they are a substantial risk factor for recurrence.

Clinical decision-support software continues to gain attention as a tool to better track complex drug regimens created by multiple physicians. Research published in the American Journal of Infection Control in January found that using such a system to monitor antibiotics at a tertiary-care hospital reduced both their use and rates of antibiotic-resistant infections.

Potential vaccines and new drugs

Researchers in Germany recently created a synthetic molecule that could hold the potential to immunize patients against the infection. Their paper, published in April's Nature Communications, describes a compound that resembles the surface sugars of C. diff and stimulated antibody production in mice.

And scientists at Baylor College of Medicine explored how hydrogen bonds affect molecules that control how C. diff bacteria release their toxins. The investigation led to the modification of a natural inhibitor of the toxins that increased its ability to bond to them by a factor of 26, potentially paving the way for drug development.

An old treatment, revived

Additional research published this year validates an older C. diff treatment that's gaining more acceptance as an alternative to antibiotics: the fecal microbiota transplant, which uses healthy stool to send good bacteria into the system.

A review of 18 studies on fecal microbiota transplantation published in February found that its primary cure rate for C. diff averaged more than 90 percent. The success rate among younger patients was closer to 99 percent, while patients over 65 had an average cure rate of 87 percent.

Peter Barnes is a writer based in Portland, Oregon.

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