Clostridium difficile (C. Diff), a potentially deadly bacterium

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Clostridium difficile infection (CDI) is one of the most rapidly growing health care associated infections in the United States. In 2011, there were almost half a million reported infections in the United States and 29,000 patients died within 30 days of the initial diagnosis of CDI. It was initially believed to be an infection associated with the use of antibiotics. However, recent epidemiological studies have shown CDI to be an increasingly common cause of community-acquired infectious diarrhea. Additionally, the conventional risk factors associated with CDI, such as old age, comorbid conditions and previous use of antibiotics, are less common in cases acquired outside of hospital settings.

As a result of these observations, the Infectious Diseases Society of America proposed a classification of CDI as community-acquired if symptoms occur in the community or within 48 hr of admission to a hospital or following no hospitalization in the past 12 weeks. The term “hospital-acquired” CDI was used if onset of symptoms occurred >48 hr after admission to or < 4 weeks after discharge from a health care facility; or indeterminate if symptom onset occurs in the community between four and 12 weeks after discharge from a hospital. Further studies assessing the outcome of treatment showed that community-acquired CDI can be associated with complications and poor outcome including recurrence.

The majority of CDI cases are effectively treated with oral metronidazole or vancomycin. However, the overall risk of relapse after conventional therapy can range from 20-30%. One recent study reported a recurrence rate of 28% in community acquired CDI. Following one relapse, the risk of additional relapses can be as high as 65%. These recurrences are usually treated with prolonged courses of vancomycin or fidoxomicin with some success.

Although known since the 1950s, Fecal microbiota transplant (FMT) was rarely used until a few years ago. The transplant simply involves taking bacteria from the stool from someone who is healthy and transferring it to a patient suffering from the disease. The procedure has been revived because a new and more virulent strain of C. diff is infecting young, healthy people across the United States and Europe at an alarming rate. The Gastroenterology division at the University of Toledo Medical Center was the first hospital in Toledo to offer fecal transplantations, starting in 2012, first on patients in critical condition in the hospital, then to the outpatients with recurrent episodes of C. Diff infection. After performing several of these transplants, data for outcome of the first 22 patients was presented at the American College of Physicians Annual Meeting and published in the Canadian Journal of Gastroenterology and Hepatology in September of 2014. Results of the
study showed that nine patients met the criteria for community-acquired CDI whereas 11 were categorized as hospital-acquired CDI. The primary cure rate was 100% (nine of nine) and 81.8% (nine of 11 patients) in community- and hospital acquired CDI groups, respectively (P=0.189). Overall, FMT was a highly successful and very acceptable treatment modality for treating both community- and hospital-acquired CDI. A report of the first patient benefiting from this treatment has appeared in the Toledo Blade.

Clinical Research Snippets

Anand B. Mutgi, MD
Sadik A. Khuder, PhD

Evolving modernization of the society is leading to reduced physical activity and increasingly time is spent sitting. This includes driving time, sitting in front of a computer and television time. There is increasing evidence that this is harmful to general and cardiovascular health and may lead to obesity. This month we review a paper which characterized average sitting duration and assessed the mortality attributable to sitting.

The data for this study were gathered from published meta-analyses that investigated the effect of sitting time among a large number of countries, worldwide. Worldwide sitting time was obtained from three sources: 1) Eurobarometer (prevalence and correlates of sitting in European adults-a comparison of 32 countries), 2) WHO STEPwise approach to Surveillance (94 country reports on the STEPS website), and 3) the International Prevalence Study.

The average sitting time across countries was 4.7 hours/day, ranging from 4.2 hours/day in the United States to 6.2 hours/day in Australia. Removal of sitting time had the largest effect in Lebanon (11.6%) and the lowest in Mexico (0.6%). Reductions of 0.5, 1, and 2 hours/day in sitting time would decrease the total mortality by 0.6, 1.1, and 1.9 percentage points, respectively. Projected reductions, such as a 10% reduction in the mean sitting time or a 30-minute decrease of sitting time per day, reduces mortality by 0.6%; and 50% decrease or 2 hours fewer reduces mortality by 1.8%.

The findings of this analysis support the importance of reducing sitting time as an important aspect for mortality reduction. In the U.S., it has been estimated that 4.2% of all deaths are attributable to sitting ≥ 3 hours/day. Eliminating sitting time would increase life expectancy for an individual by 0.23 years on average. This study however did not assess the effect of higher physical activity but focused on sitting time only. It is unclear if these two are correlated or independent. Detrimental effect of sitting time may be related to lower expression of endothelial nitric oxide synthase (related to increased vascular oxidative stress and impaired endothelial function) and reduction in glucose transporter type 4; lipase lipoprotein (importantly related to triglyceride catabolism, high-density lipoprotein cholesterol, and other metabolic risk factors); and glucose uptake.

Based on this study we feel that there is substantial mortality benefit if sitting time is reduced. One possible solution is to implement standing work station.

New Clinical Trials

SOPRANO: Macitentan in pulmonary hypertenSiOn Post-left ventRiculAr assist device implantation,
Dr. Bonnell - Surgery

IRB Corner

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