Antibiotic Commonsense

Clostridium difficile Infection and Acid Suppressing Agents

ANTIBIOTIC RESISTANCE Task Force

Volume 10, Issue 2 August 2016

Editor, Kayla Scrivner

Tacoma - Pierce County Health Department
Healthy People in Healthy Communities

Nastaran Yazdi, PharmD (CHI Franciscan Health)

What is CDI?

Clostridium difficile infection (CDI) is a preventable cause of increased morbidity and mortality in hospitalized patients. It is also associated with prolonged hospital stay and increased costs, with estimated cost of $11,000 per nosocomial case in the US.[1] Studies suggest rising incidence, severity, and mortality of CDI. This could potentially stem from the increased availability of stool toxin testing, but it cannot be the sole reason for the rapid rise in CDI.[2]

What are the risks?

The most common risk factor is the use of antimicrobial therapy, with about 90% of cases occurring within 8 weeks of antimicrobial treatment. Other risk factors include age, severe underlying disease, prolonged duration of hospitalization, and enteral tube feeding.[2] Two systematic reviews have also shown increased risk with reduced gastric acidity. One review reported increased risk with proton pump inhibitors (PPIs) compared to histamine receptor 2 antagonists (H2RA). The idea is that reduced gastric acidity could lead to inadequate sterilization of ingested organisms, thus increasing risk of colonization of the normally sterile GI tract. Moreover, PPIs may disrupt the bowel flora leading to bacterial colonization in the stomach and small intestine.[3,4] Lastly, PPIs seem to have direct effects on leucocyte activity, which may intervene with defense against CDI.[5]

A pooled analysis of 39 studies showed significant association between PPIs and risk of developing CDI with an OR 1.74 (95% CI 1.47-2.05, P<0.001) compared to non PPI users.[2] It is estimated that there is an additional 15 cases of CDI for every 1,000 hospitalized patients who are given PPIs and an additional 45 cases for PPI users who are given antibiotics. Moreover, a study looked at risk of PPIs and recurrence of CDI showing a hazard ratio of 1.5 (95% CI, 1.1-2.0).5 The recurrences are associated with even higher cost, increased length of stay, and greater morbidity and mortality from the initial episode of CDI.

What can we do?

A reasonable approach to preventing recurrence is to minimize modifiable risk factors, which includes use of acid suppressing agents. PPIs are overprescribed and often used inappropriately. The use of PPIs should be critically evaluated and a switch to H2RA considered when appropriate. Furthermore, the appropriate use of high risk antibiotics such as cephalosporins, fluoroquinolones, carbapenems and clindamycin should be reviewed and minimized when possible.[6]

References:

1. McDonald EG, Milligan J, Frenette C, Lee TC. Continuous Proton Pump Inhibitor Therapy and the Associated Risk of Recurrent Clostridium difficile Infection. JAMA Intern Med. 2015; 175(5):784-91.
2. Kwok CS , Arthur AK , Anibueze CI , Singh S , Cavallazzi R , Loke YK . Risk of Clostridium difficile Infection With Acid Suppressing Drugs and Antibiotics: Meta-Analysis. Am J Gastroenterol 2012; 107:1011-1019.
3. Williams C. Occurrence and significance of gastric colonization during acid-inhibitory therapy. Best Pract Res Clin Gastroenterol 2001; 15:511-21.
4. Agastya G, West BC, Callahan JM. Omeprazole inhibits phagocytosis and acidification of phagolysosomes of normal human neutrophils in vitro .Immunopharmacol Immunotoxicol 2000; 22: 357-372.
5. Yoshida N, Yoshikawa T, Tanaka Y et al. A new mechanism for anti-inflammatory actions of proton pump inhibitors inhibitory effects on neutrophil-endothelial cell interactions. Aliment Pharmacol Th er 2000; 14:74-81.
6. Slimings C, Riley TV. Antibiotics and hospital-acquired Clostridium difficile infection: update of systematic review and meta-analysis. J Antimicrob Chemother. 2014; 69(4):881-91.

Contact

Kayla Scrivner

kscrivner@tpchd.org

(253) 798-3828