Kentucky Antimicrobial Stewardship Innovation Consortium

Educational Pearl

Probiotics for *C. difficile* Prevention

Clostridioides difficile infection (CDI) is a bacterial infection of the colon that arises from gut dysbiosis allowing *C. difficile* to proliferate, germinate, and produce toxin. Probiotics are live microorganisms that are available over the counter and are proposed to help establish and maintain healthy gut eubiosis. Can probiotics be used to prevent CDI?

What do guidelines say?

The 2021 American College of Gastroenterology (ACG) *C. difficile* infection guidelines recommend **against** probiotics for the primary prevention of CDI in patients being treated with antibiotics and they recommend **against** probiotics for the secondary prevention of CDI in patients with a history of CDI.[1]

What is the evidence?

Overall data is mixed and limited in application as probiotic formulations and dosages differ across studies. In one large meta-analysis examining primary prophylaxis, a benefit with probiotic primary prophylaxis was seen in a subgroup where patients had > 5% baseline risk for CDI.[2] However, in one large randomized controlled trial, no benefit was seen with the use of probiotic primary prophylaxis (0.8%) compared with placebo (1.2%) (RR 0.71; 95% CI 0.34 – 1.47).[3] In a trial examining adjunct *Saccharomyces boulardii* with oral vancomycin in the treatment of recurrent CDI, reduced recurrence was seen with *S. boulardii* compared with placebo. However, the duration of vancomycin was only 10 days, which is not recommended in recurrent CDI.[1] The study was small with only 18 patients receiving *S. boulardii* and high dose oral vancomycin.[3]

A single center study showed no difference in the rate of hospital-onset CDI with a protocol to administer *S. boulardii* to all non-neutropenic patients receiving concomitant broad spectrum/high risk antibiotics.[4]

Are there any harms with probiotics?

Generally, probiotics are safe in immunocompetent patients. However, there are case reports of patients with *Lactobacillus* spp. bacteremia where genomic testing linked the infecting strain with a probiotic that the patient was taking. In all reports, patients had underlying conditions including short gun syndrome, ulcerative colitis, immunocompromised, or critical illness.[5] *S. boulardii* fungemia has also been linked to probiotic use including risk by being near another patient receiving *S. boulardii* suggesting environmental contamination.[6] Additionally, most probiotics are dietary supplements and therefore are not subject to FDA standards for safety, effectiveness, manufacturing and testing. In 2014, the FDA released a warning about the use of supplements in immunocompromised patients after an infant died of a *Rhyizopus oryzae* infection due to a contaminated probiotic.[7]

Key Takeaway: It is unclear if probiotics are beneficial in primary CDI prevention. Data in secondary prevention is limited, and alternatives are available. Probiotics may cause harm in immunocompromised or critically ill patients.

References:

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