Probiotics and the Prevention of Clostridium difficile in Patients Receiving Antibiotic Therapy: Review of the Literature

Andrea Onstad, BSN, RN
Center for Advanced Endoscopy
Family Nurse Practitioner Student
Minnesota State University-Mankato

Background

- Leading cause of infectious diarrhea
  (Vernaya, McAdam, & Hampton, 2017)
- 453,000 infections reported in the US in 2011
- 29,300 deaths within 30 days of diagnosis
  (Lessa et al., 2015)
- 6.5% of infections resulted in death
- 12.1% of all healthcare associated infections
  (CDC, 2018b)
- Patient impact
  (CDC, 2018a)

Risk Factors

- Antibiotic therapy
- Type of antibiotic
- Number of antibiotics
- Age
- Immune status
- Stays in hospitals and nursing homes
- Previous C.diff infection or exposure
- PPI's & H2 Blockers
- GI surgery

(CDC, 2018a; CDC, 2018b; Goldenberg et al., 2017; Johnston et al., 2018; Lau & Chamberlain, 2016)

Current Approach

- Management
  - Confirmatory testing
  - Discontinue antibiotics
  - Treatment
    (CDC, 2018b)
- Prevention
  - Isolation precautions
  - Hand hygiene
  - Environmental cleaning
  - Antibiotic stewardship
  - Probiotics?
    (CDC, 2019; Vernaya et al., 2017)

PICO Question

In inpatients and outpatients receiving antibiotic therapy how does receiving probiotics versus not receiving probiotics affect the prevention of Clostridium difficile?

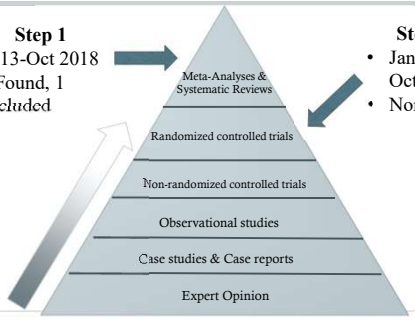
Purpose

- Conduct literature review

Methods

Step 1
- 2013-Oct 2018
- 7 Found, 1 excluded

Step 2
- Jan 2018-Oct 2018
- None found



Methods

- Search Criteria
  - Peer reviewed
  - Scholarly research
  - Published in English
- Databases searched
  - MedLine, PubMed, CINAHL, Cochrane, EMBASE.
- Search terms
  - "Clostridium Difficile," "AAD," "Antibiotic Associated Diarrhea," "Probiotic," "Probiotics," "C.Diff," "CDAD," "Clostridium Difficile Associated Diarrhea," " C.Diff Associated Diarrhea," "C.Difficile," "Prevention," and "Prophylaxis."

Research Design

- Population
  - 3x Adults & Peds, inpatients & outpatients
  - 2x Adults only, inpatients only
  - 1x adults >60 y/o, inpatients only
- Intervention
  - Varied in probiotic strain, dose, formulation, and duration
  - 1 study looked at lactobacillus only
- Varied quality of evidence

Key Findings

- 58%-75% reported risk reduction
  (Goldenberg et al., 2017; Johnston et al., 2018; Lau & Chamberlain, 2016; Shen et al., 2017; Sinclair et al., 2016)
- Probiotics no more effective than placebo in reducing CDI's in one study
  (Vernaya, McAdam, & Hampton, 2017)
- Adverse events reported to be the same or less in the probiotic group than the control group
  (Goldenberg et al., 2017; Johnston et al., 2018; Shen et al., 2017)

Key Findings

- Patient populations with a background risk of ≥ 5-6% for CDI's, may benefit the most from probiotics
  (Goldenberg et al., 2017; Johnston et al., 2018; Sinclair et al., 2016)
- Probiotics reduce the risk of CDI in both adults and children
  (Goldenberg et al., 2017; Johnston et al., 2018; Lau & Chamberlain, 2016)
- Probiotics are most effective when administered closest to the first antibiotic dose
  (Shen et al., 2017)

Implications for Practice

- Consideration of using probiotics in immunocompetent patients receiving antibiotic therapy, especially those at high risk for CDI's
- Administer probiotic as close to the first antibiotic dose as possible, ideally within 2 days
- Continue existing CDI prevention practices

Implications for Research

- Optimal probiotic?
  - Species, formulation, dose, duration of treatment, and route of administration
- Safety and efficacy of probiotics in certain patient populations?
  - Immunocompromised, pregnant patients, elderly, critically ill patients, surgical patients, and patients with prosthetic heart valves

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Questions?