**Fecal Microbiota Transplantation for recurrent *Clostridium difficile* infection**

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### OVERVIEW

**Clostridium difficile infection (CDI)**

- *Clostridium difficile* is an obligate anaerobic, gram positive spore-forming bacterium that belongs to Firmicutes group.
- It is the major causative agent for antibiotic-associated diarrhea, representing 2-3% within nosocomial infections with a high economic significance.
- Its pathology is through the production of toxin A (enterotoxin) and toxin B (cytotoxin). Furthermore, some strains (PCR ribotype 027) produces a binary toxin, which is related to increased severity.
- Current treatment based on antibiotics: Vancomycin, Metronidazol and Fidaxomycin

**Risk factors for *Clostridium difficile* infection are:**

- Elderly
- Prolonged length of hospital stay
- Antibiotic exposure
- Immunosuppression
- Other disease (diabetes, cirrhosis,...)
- Use of proton pump inhibitors

### MATERIALS AND METHODS

**Table 1: strategy for treatment recurrent CDI**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Treatment</th>
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<tr>
<td>First recurrence</td>
<td>125mg oral Vancomycin for 14 d</td>
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<tr>
<td>Second recurrence</td>
<td>Pulsed Vancomycin: 225mg oral Vancomycin for 7 wk</td>
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<tr>
<td>Three or more recurrences</td>
<td>Stool or fecal microbiota therapy</td>
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**Screening test to donor stool**

- **Blood analysis:**
  - Total blood count
  - C-reactive protein
  - Creatinine
  - Liver enzyme levels
- **Stool testing:**
  - *C. difficile* toxin A/B and culture
  - Enteric pathogens
  - Parasites (e.g., Giardia)
  - HIV (1 and 2), HBV, HCV
  - Other: illicit drugs, tattoos, other diseases (e.g., inflammatory bowel disease)

### RESULTS

**After Fecal Microbiota Transplantation:**

- 90% of infection resolution, depending on the procedure characteristics of FMT:

**OUTCOMES IN PATIENTS TREATED WITH FMT FOR CDI**

- High cure rates
- Few adverse effects

### DISCUSSION

**Advantages of FMT**

- Inexpensive material (stool)
- High reported cure rate (average of 80-90%)
- Insignificant adverse effects
- Fast response to the treatment (hours to days)
- Antibiotic resistance avoided
- Corrected imbalance of the microbiota in bowel

**Disadvantages of FMT**

- Expensive screening for donors
- Laborious and time consuming technique (laboratory technicians are required for the screening of donor material)
- Invasive method of administration (nasoduodenal tube, colonoscopy, enemas,...)
- Possible long term effects (autoimmune diseases, allergies and functional intestinal diseases)
- Needing of standardized, licensed and ready to use method.

### CONCLUSIONS

- *Clostridium difficile* is a current issue, with high mortality and very high costs.
- Consequently to the analysis of advantages/disadvantages and classification as an *unapproved new drug* by FDA, Fecal Microbiota Transplantation is systematically recommended only for recurrent cases of *Clostridium difficile* infection.
- Nevertheless, is a safety process with a high efficacy rates (80-90% depending on procedure characteristics).
- New generation FMT, like fecal pills or other methods, are under investigation for replacing the FMT available nowadays.

### REFERENCES