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Fecal microbiota transplantation: A 'How-To' guide for nurses

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Summary Fecal microbiota transplantation is emerging as one of the most exciting treatments of this century. Rarely has one treatment provided the opportunity to treat a myriad of diseases, not only within the gastrointestinal tract but also in extra-intestinal organs; such is the power of the gastrointestinal microbiota to modulate the immune system and eradicate infections, even where antibiotics have previously failed. The demand for this therapy, both among patients and physicians, is increasing, and a search of the literature reveals numerous reviews, case reports and discussion on the topic. However, to date, much of the literature addresses the procedure from a physician's point of view, and can therefore be lacking in practical detail. As nurses are often the 'unsung heroes' of the procedure, it is timely to address the subject from a nursing perspective.

1. Introduction

Fecal microbiota transplantation (FMT), the infusion of fecal flora from a healthy donor into a patient with colonic disease, is becoming increasingly popular, due in part to its effectiveness in treating epidemic *Clostridium difficile* infection (CDI). It has been proven to be the most effective therapy for the treatment of relapsing *C. difficile* colitis (Smits, Bouter, De Vos, Borody, & Nieuwdorp, 2013; Rohlke & Stollman, 2012), with a success rate of >90% in a recent randomized controlled trial (van Nood et al., 2013). This treatment has been available since 1988 at the Centre for Digestive Diseases in Sydney, Australia (Borody & Campbell, 2011; Borody et al., 1989), and following its success in this indication, has expanded into other intestinal and extra-intestinal illnesses, many of which have been first reported from our clinic. These conditions include ulcerative colitis, Crohn's disease, irritable bowel syndrome, constipation, multiple sclerosis, idiopathic thrombocytopenic purpura, sclerosing cholangitis, acne vulgaris, obesity and the metabolic syndrome (Borody, Khoruts, & Campbell, 2012; Borody, Paramsothy, & Agrawal, 2013; Borody et al., 2004). As such, the demand for FMT in clinical practice is now escalating and a number of centers across Australia,

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the United States and Europe are beginning to incorporate FMT into their treatment algorithms (Borody et al., 2012; Brandt, Borody, & Campbell, 2011). Despite this, many health professionals remain unsure of the practicalities and considerations required to institute FMT in their clinic(s). Several reviews have addressed the clinical aspects of FMT (Brandt & Aroniadis, 2013; Gough, Shaikh, & Manges, 2011; Kassam, Lee, Yuan, & Hunt, 2013; Rohlke & Stollman, 2012), including a comprehensive review by a group of international infectious disease and gastroenterology specialists who have published formal practice guidelines outlining the process of donor selection, methods, material preparation, rationale and administration of the procedure (Bakken et al., 2011). However, despite nurses being the primary health professionals to prepare and often administer the FMT material, much of the literature to date has focused on describing the procedure from a physician perspective (Marinska, 2013). As nurses are often the 'unsung heroes' of the procedure, this paper serves to articulate the steps involved in performing FMT from a nursing perspective, with the aim of assisting in the implementation of nurse-run FMT clinics. It also serves to clarify the numerous issues encountered, which require consideration when performing this procedure and managing patients undergoing this unique therapy.

2. Initial consultation

The nursing FMT consultation is generally conducted for patients with relapsing CDI who have previously been reviewed by the attending physician and transferred to the nursing staff to discuss the finer points of the procedure. A stool test may be performed to confirm the ongoing presence of CDI, and many patients will remain on metronidazole or vancomycin to suppress the CDI symptoms. Following CDI confirmation, treatment options (including FMT) as well as their respective adverse effects should be discussed with the patient. It is likely that the scientific rationale underpinning FMT has been explained briefly to the patient, however at this stage the patient or their family may have a number of unanswered questions regarding the procedure. Relevant publications (Bakken et al., 2011; Borody et al., 2012; Brandt et al., 2011; Gough, Shaikh, & Manges, 2011) can assist in this matter by providing the patient with information regarding the relative efficacy of the procedure, as well as the procedure itself and expected outcomes. In a non-emergency situation, a follow-up consultation should be conducted by the nursing team, as they will serve as the patient's main point of contact leading up to the initial infusion.

2.1. Donor selection

At this time the patient will need to consider not only the information provided, but deliberate over a potential donor. For many patients, a healthy family member, friend or partner is selected as a potential donor. Potential donors must undergo an extensive screening process to assess lifestyle and health history, as well as laboratory testing to minimize the risk of infection transmission (see *screening procedures*). In our experience, approximately 50% of patients are unable to locate a suitable donor, and thus decide to use a donor provided by the clinic. At the Centre for Digestive Diseases we provide a 'bank' of universal donors who undergo regular screening procedures. Such a donor bank is particularly important in a hospital, where urgent FMT may be required to eradicate severe CDI. A date is then set for the procedure.

3. Follow-up nursing consultation

At the follow-up nursing consultation, further information is provided based on questions arising from the initial consultation. This is particularly important as patients with relapsing CDI are frequently elderly patients with multiple co-morbidities. Due to the unusual nature of the procedure, patients will often have a myriad of questions concerning the treatment and will initially be hesitant or afraid of the procedure: reassurance is therefore important. Adequate familiarization with the literature surrounding the procedure will help nurses to confidently answer any questions and ensure informed consent is obtained.

Some common questions include:

- Are there any side effects with the treatment?
  A: The patient can be reassured that in well over 500 published cases of FMT, no serious FMT-related side effects have occurred, although such a potential does theoretically exist (Borody et al., 2012; Borody, Peattie, & Kapur, 2014). Mild and transient side effects reported with the procedure include abdominal cramping, discomfort and bloating, belching, diarrhea, constipation, nausea and flatulence, which can occur while the infused bacteria are establishing themselves. A case of worsening inflammatory bowel disease, two cases of norovirus gastroenteritis and one case of *E. coli* bacteremia have also been reported, however FMT could not be established as the cause of these events (De Leon, Watson, & Kelly, 2013; Quera, Espinoza, Estay, & Rivera, 2013; Schwartz, Gluck, & Koon, 2013). Similarly, the only medium-term adverse events recorded thus far have no clear causal relationship with FMT (Brandt et al., 2012).
- Am I at increased risk if I am taking immunosuppressive drugs?
  A: Although new bacterial species from a healthy donor are being introduced into the colon, it has been shown that even in immunosuppressed patients and those after organ transplantation FMT can effectively and safely cure CDI (Brandt et al., 2013).
- How much will the procedure cost?
  A: The cost of the procedure will vary from clinic to clinic and is not currently covered by the Australian Medicare system although there is partial cover in the United States. As such, the cost incurred by the clinic with respect to staff, stool preparation, equipment and consumables will vary.
- How many infusions will I need?
  A: For CDI patients, it is widely reported that a single infusion is needed to obtain a 90% cure (Borody et al., 2012; Brandt et al., 2011, 2012), however in our experience two consecutive FMT infusions appear to achieve a cure rate approaching 100%. Hence, we recommend that two infusions are routinely carried out as most CDI patients