Successful Fecal Microbiota Transplantation as an Initial Therapy for *Clostridium difficile* Infection on an Outpatient Basis

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Abstract

A 64-year-old woman developed diarrhea after taking clindamycin for a dental infection. We diagnosed her with *Clostridium difficile* infection (CDI) and performed fecal microbiota transplantation (FMT) as the initial therapy using colonoscopy on an outpatient basis. The frequency of her bowel movements decreased from 10 times per day to two times per day three days after the procedure. The key component of FMT is to restructure the protective microbiome of the natural intestinal flora. We consider that FMT could be used as an effective first-line therapy for CDI if the efficacy and safety of this procedure is established in the future.

Key words: *Clostridium difficile* infection, fecal microbiota transplantation, initial therapy

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Introduction

*Clostridium difficile* infection (CDI) causes antibiotic-associated diarrhea and colitis, and the pathogenic mechanism is considered to involve dysbiosis due to the overgrowth of *C. difficile*. The incidence of CDI in the US has gradually increased, from 30 per 100,000 in 1996 to 84 in 100,000 in 2005 (1). Although some therapeutic options for CDI exist, including antibiotics, recurrent cases frequently occur due to the abuse of antibiotics and increased drug resistance. Recently, a high success rate of fecal microbiota transplantation (FMT) for recurrent CDI was reported in more than 300 patients (2). FMT restores the diversity of the patient’s intestinal flora. However, whether FMT is suitable as a first-line treatment for CDI remains unknown. We herein report a case of CDI treated using FMT as an initial therapy in Japan.

Case Report

A 64-year-old American woman consulted us as an outpatient with a history of jaw injury from a previous car accident. She had been experiencing complications from the jaw injury for some time, including dental pain and infections. After undergoing teeth removal, she was administered clindamycin, which consequently resulted in severe diarrhea as an adverse event. She had not taken any other drugs, including antibiotics. A physical examination showed that she had apyrexia, with a blood pressure of 118/55 mmHg, heart rate of 76 beats/min, and no remarkable abdominal physical findings. The findings of both a complete blood count and biochemical examination were almost within the normal range, including the level of inflammatory markers, such as C-reactive protein (CRP). A stool specimen was positive for *C. difficile* toxin and glutamate dehydrogenase (GDH) on an enzyme immunoassay (EIA), and she was diagnosed with CDI. Although we recommended treatment with oral antibiotics, such as metronidazole or vancomycin, for CDI, the patient declined this therapy due to anxiety regarding worsening of her condition as a result of taking more antibiotics, as she feared that the use of additional antibiotics would lead to disease exacerbation. Her request was to receive FMT only; therefore, we decided to perform FMT. After acquiring permission from the ethics committee and obtaining informed consent from the patient, a stool sample from a
healthy donor (an unrelated man in his thirties) was evaluated microbiologically according to a previous study (3). The patient’s blood samples were also screened for pretransplantation parameters, including cytomegalovirus (IgG and IgM), Epstein-Barr virus (viral-capsid antigen (VCA) IgM, VCA IgG, and anti-EBNA), hepatitis A (antibody), hepatitis B (HBsAg, HBsAb), hepatitis C (anti-HCV antibody), human immunodeficiency virus (HIV-1/2 antigen/antibody test), human T-lymphotropic virus type 1 (HTLV-1 antibody) and Treponema pallidum (TPHA). We mixed 80 g of the donor’s stool with 500 mL of normal saline and filtered the mixture using gauze. Then, we performed FMT via colonoscopy. When the tip of the colonoscope reached the ileocecal region, the suspension was dispersed. The frequency of her bowel movements decreased from 10 times per day to two times per day three days after the procedure, and no adverse events were observed. Ten weeks after the FMT procedure, a stool specimen was negative for both toxins and GDH according to EIA and a C. difficile culture. Furthermore, we confirmed that the patient’s condition was stable, without diarrhea or other adverse events, four months after the procedure.

Discussion

This case suggested that FMT can be a successful therapeutic option as an initial treatment for CDI. Furthermore, there is a strong possibility that FMT may become a key component of treatment for CDI.

CDI results from perturbations of the intestinal microbiota. Although the initial treatment for CDI generally includes oral antibiotics, such as metronidazole or vancomycin, the relapse rate for this therapy is approximately 20-40% (4). While it has been reported that there is an association between the rate of relapse, a low antibody titer and the human immunodeficiency virus (HIV-1/2 antigen/antibody test), human T-lymphotropic virus type 1 (HTLV-1 antibody) and Treponema pallidum (TPHA). We mixed 80 g of the donor’s stool with 500 mL of normal saline and filtered the mixture using gauze. Then, we performed FMT via colonoscopy. When the tip of the colonoscope reached the ileocecal region, the suspension was dispersed. The frequency of her bowel movements decreased from 10 times per day to two times per day three days after the procedure, and no adverse events were observed. Ten weeks after the FMT procedure, a stool specimen was negative for both toxins and GDH according to EIA and a C. difficile culture. Furthermore, we confirmed that the patient’s condition was stable, without diarrhea or other adverse events, four months after the procedure.

The supporting function of FMT is to restructure the protective microbiome of the natural intestinal flora, which may be disrupted by many causes, including antibiotics. Following FMT, the intestinal microbiota of the recipient resembles that of the donor (7). In one case, it was reported that an increased relative abundance of Bacteroides and decreased abundance of Proteobacteria were observed after FMT (8). This fact indicates that the donor’s bacteria are capable of restoring the structure and function of the recipient’s intestinal microbial community.

FMT is effective for both new-onset and recurrent CDI. The mechanism of FMT is to restore the normal intestinal flora. However, additional data are required regarding changes in the intestinal flora during CDI and after FMT. We consider that restoring the normal intestinal flora after performing FMT must be good for the patient’s condition. If it were to become possible to identify the type of patients or C. difficile strain that exhibit a tendency to relapse in the course of treatment, FMT could thus become a first-line therapy for CDI.

The authors state that they have no Conflict of Interest (COI).

References


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