

Weight Gain After Fecal Microbiota Transplantation

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Fecal microbiota transplantation (FMT) is a promising treatment for recurrent *Clostridium difficile* infection. We report a case of a woman successfully treated with FMT who developed new-onset obesity after receiving stool from a healthy but overweight donor. This case may stimulate further studies on the mechanisms of the nutritional-neural-microbiota axis and reports of outcomes in patients who have used non-ideal donors for FMT.

Keywords. *Clostridium difficile* infection; fecal microbiota transplantation; gut microbiota; obesity.

Clostridium difficile infection (CDI) is characterized by a high recurrence rate after treatment. Fecal microbial transplantation (FMT) is a promising approach to recurrent CDI that is being increasingly used clinically, although data remain limited on the full spectrum of possible adverse effects. We report a case of significant weight gain in a woman after FMT from an overweight stool donor.

CASE REPORT

A 32-year-old female with recurrent CDI underwent FMT at our center. She had initially presented several months previously with a 2- to 3-week history of diarrhea and abdominal pain after antibiotic treatment for bacterial vaginosis and exposure to a family member who had CDI. She was treated empirically for CDI by her primary care physician with a 10-day course of oral

metronidazole with only partial improvement. Her diarrhea and abdominal pain escalated after completing the metronidazole treatment, and her stool tested positive for *Clostridium difficile* toxin polymerase chain reaction (PCR). She was treated with a 14-day course of oral vancomycin. Testing done around the same time showed *Helicobacter pylori* infection (positive fecal antigen). Nausea and abdominal pain persisted after treatment of the CDI, so the *H. pylori* was treated with a course of triple therapy (amoxicillin, clarithromycin, and proton pump inhibitor). Her abdominal pain and diarrhea escalated again a few weeks later, and her stool tested positive for *C. difficile* toxin PCR. She was treated with a 12-week tapering course of oral vancomycin with improvement, but diarrheal symptoms recurred again within 2 weeks of completing the course, and she was prescribed a course of rifaximin with *Saccharomyces boulardii*. Around this time, she underwent esophagogastroduodenoscopy, which showed persistence of *H. pylori* infection. She had no significant past medical history and had always been of normal weight. Review of systems was positive for diarrhea, and there was frustration over her ongoing diarrheal symptoms. Her weight before FMT was stable at 136 pounds (body mass index of [BMI] 26). Physical examination was unremarkable.

After extensive discussion, the patient elected to undergo fecal transplant. As per the patient's request, her 16-year-old daughter was chosen as the stool donor. At the time of FMT, her daughter's weight was ~140 pounds (BMI of 26.4), but it increased later to 170 pounds. Her daughter had no other health problems, and screening for human immunodeficiency virus 1 and 2, syphilis, and viral hepatitis A, B, and C, *C. difficile*, *Giardia lamblia*, and routine stool culture for enteric pathogens were negative. The patient was retreated for *H. pylori* with quadruple therapy (metronidazole, tetracycline, bismuth, and proton pump inhibitor), and the FMT was performed 2 weeks later via colonoscopy. A total of 600 cc of the suspension of donor stool in sterile water was infused through the colonoscope starting in the terminal ileum. The colon and the terminal ileum appeared normal at the time of the procedure. She improved and did not suffer a further CDI recurrence after FMT.

The patient presented again 16 months after FMT, and reported an unintentional weight gain of 34 pounds. She weighed 170 pounds and had become obese (BMI of 33). She had not lost any weight over the months she was being treated for CDI. She had been unable to lose weight despite a medically supervised liquid protein diet and exercise program. Her serum cortisol and thyroid panel were normal. She has continued to gain weight despite efforts to diet and exercise, and at 36 months post-FMT her

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weight was 177 pounds (BMI of 34.5). She has also developed constipation and unexplained dyspeptic symptoms.

DISCUSSION

Our patient reported unintentional rapid weight gain after FMT. There are several possible contributions to the weight gain, including the resolution of CDI (with subsequent increased appetite) and concurrent treatment of *H. pylori*. There is a known association between *H. pylori* treatment and weight gain, especially in children, thought to be due to restoration of ghrelin levels after eradication of the bacteria [1]. However, it is notable that she was never obese prior to FMT, and that the stool donor similarly experienced significant weight gain, raising the possibility that the obesity was at least in part a consequence of FMT. The hypothesis of FMT triggering or contributing to obesity is supported by animal models demonstrating that an obese microbiota can be transmitted [2]. An important limitation in our case is that the microbiome sequencing comparing the patient and the donor is not known.

With the occurrence of weight gain after FMT in this case, it is now our policy to use nonobese donors for FMT. The untoward consequences of using nonideal FMT donors are important, because patients may prefer to use a family member rather than an

unrelated or unknown stool donor due to the perception that these sources are safer. However, studies have shown that FMT using a frozen inoculum from unrelated donors is effective in treating relapsing CDI [3]. In addition, most “professional” stool donors for FMT are selected on the basis of good health, including a normal BMI. This case serves as a note of caution when considering the use of nonideal donors for FMT, and we recommend selecting non-overweight donors for FMT.

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Both authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest.

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