Intestinal Microflora Settlement in Patients with Jejunoileal Bypass for Morbid Obesity

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Intestinal microflora settlement was evaluated in this retrospective study of 49 patients with jejunoileal bypass who required reoperation. Colonic microflora was observed in the samples of the contents of the functioning jejunum and ileum but not in 55% of the samples from the middle of the excluded loop. Colonization of the excluded loop was not detected in patients without clinical signs of bacterial overgrowth but was significantly frequent (p < 0.01) in those with clinical signs (bloating, migratory arthralgias, rashes, skin lesions). However, positive excluded loop cultures were not always associated with clinical manifestations. No significant correlation was observed between bacteriology of the contents of the excluded loop and bypass results. The success of an intestinal bypass may depend not only on anatomic and functional adaptation to the new, surgically created conditions, but also to the attainment of microbiological equilibrium in the intestinal ecosystem.

Key words: Morbid obesity, jejunoileal bypass, intestinal microflora.

Introduction

Intestinal microflora plays an important role in the maintenance of body homeostasis, food digestion and absorption, immunological stimulation, and inhibition of colonization of other transient pathogens. Its quality and distribution depend on various control mechanisms that regulate intestinal motility, gastric pH and microbial interactions. However, this ecosystem can be modified by anatomic, functional and environmental changes.

Jejunoileal (JI) bypass for surgical treatment of morbid obesity provides a reliable experimental model in which both short-bowel and excluded-loop conditions coexist. In this study we investigated bacteriological modifications in the functioning (in-continuity) and nonfunctioning (bypassed) small bowel after JI bypass. Clinical signs of bacterial overgrowth and the overall postoperative clinical picture were also considered.

Materials and Methods

Patients

In the period 1984–1992, 49 patients, 33 women and 16 men (age 22–56 years, mean 40 ± 7.3; weight 46–163 kg, mean 94.7 ± 21.2) were reoperated after establishment of a JI bypass for morbid obesity. Four of the first ten patients had end-to-end anastomosis and the other six end-to-side whereas the last 39 had side-to-side anastomosis. The mean interval between the bypass procedure and reoperation was 3.7 ± 3.5 years (range 1–17). The main reoperations were: incisional hernia repair (in 21 patients), cholecystectomy (in five), bypass revision for unsatisfactory weight loss (in 12), bypass reversal (for excessive weight loss in six, diffuse interstitial oxalate nephropathy in two, hepatic failure in two), and nephrectomy combined with JI bypass reversal (in one with kidney cancer). No antibiotics were administered in the preparation of patients for reoperation. The study was approved by our hospital's Ethics Committee and was performed in accordance with the Helsinki declaration. Informed consent was obtained from all patients.

During reoperation, after reviewing the JI bypass and performing a liver biopsy, samples of intestinal content were obtained from three levels, the functioning jejunum, functioning ileum, and the middle of the excluded loop, for bacteriologic examination. It
is very important for the sample to be taken from the middle of the excluded loop, as we have found that samples from near the anastomosis are always contaminated from the in-continuity functioning bowel. The sampling procedure consisted of manipulating a 10 cm segment of bowel, emptying it of its content, and clamping it between two non-crushing clamps; 10 ml of saline solution were then injected, mixed manually and 3–4 ml were aspirated. After expelling any gas from the syringe, the samples were placed immediately in transport media for anaerobic specimens (BBL Port-A-Cul vial) and sent to the laboratory.

The bypass results were defined as good in the presence of satisfactory weight loss (≥25% of preoperative body weight), no metabolic imbalance, and no clinical signs of bacterial overgrowth (bloating, migratory arthralgias, rashes, skin lesions), and as poor when the patient presented at least one of the following: insufficient weight loss (<25% of preoperative body weight), excessive weight loss (<ideal body weight according to Metropolitan Life Insurance Company height/weight tables), hepatic or renal failure, and/or clinical signs of bacterial overgrowth.

Microbiological Determinations

In the laboratory 0.01 ml aliquots of samples diluted to 10⁻³, 10⁻⁵ and 10⁻⁷ in trypticase soy broth were placed using the following media: MacConkey agar, selective enterococcus agar, and Columbia CNA agar (colistin-nalidixic acid) with 5% sheep blood for aerobic incubation, and Schaedler vitamin Kl agar, kanamycin-vancomycin agar, and phenylethyl alcohol agar, all supplemented with 5% sheep's blood, for anaerobic incubation. Aerobic plates were examined after 24 h, and anaerobic plates after 48 h incubation in GasPak jars. The numerically dominant colonies were counted and identified by API System (Analytical Products Inc.) and the count was expressed as log₁₀ colony-forming units (CFU) per ml of enteric aspirate. Our method did not measure bacterial loads of under 10³, as this was the lowest dilution expected; however, 10⁴ was the lowest bacterial load observed.

Statistics

Data were analyzed by means of Fisher's exact test (two-sided), and p values less than 0.01 were considered significant.

Results

The bacteria identified in samples from the three different intestinal levels in the 49 patients are shown in Table 1 as well as the distribution and range of the numerically dominant colonies. The small bowel generally has no bacteria, or only a few gram-positive aerobes, but in our study we observed colonization with aerobic and anaerobic colonic microflora (ratio of aerobes to anaerobes, about unity) in the functioning ileum in all the cases and in the functioning jejunum in 40 (81.6%). On the other hand, of the samples obtained from exactly the middle of the excluded loop, 27 (55%) displayed no bacterial growth, whereas the 22 positive samples (45%) had high concentrations of aerobic and anaerobic colonic microflora.

Clinical signs of bacterial overgrowth were observed in 15 of the 49 patients, all with side-to-side anastomosis, and cultures of the excluded loop specimens were positive in 12 of them (80%). However, ten of the 34 other patients without clinical signs of bacterial overgrowth had positive excluded loop cultures. The frequency of positive cultures of excluded loop samples was significantly higher (p < 0.01) in the patients with clinical signs of bacterial overgrowth than in those without (Figure 1).

The clinical result of the bypass procedure was good in 18 patients and poor in the other 31, as shown in Table 2.

Table 3 lists the patients without clinical signs of