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A unique case report of jejunoileal bypass reversal with review of the literature

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ABSTRACT

INTRODUCTION: Jejunoileal bypass (JIB) was an effective treatment for morbid obesity in the 1970s, but shortly after it fell out of favor due to horrific side effects, including liver failure, nephrolithiasis and drastic vitamin deficiencies. Although there are few living people with JIB, the management of these patients can be challenging.

CASE PRESENTATION: We describe a case of a 58-year-old female with a history of JIB 46 years prior who had an impending renal failure due to nephrolithiasis. She underwent a jejunostomy feeding tube prior to reversal. After reversal, our patient developed failure to thrive with functional obstruction of the newly incorporated small bowel. This bypassed bowel underwent a severe inflammatory transformation after the introduction of enteric feeds, suggesting an immunological type response to antigens in food. It wasn't until a long and debilitating 12 months and resection of this inflamed bowel that our patient was able to regain bowel function and gain weight.

CONCLUSION: Jejunoileal bypass is an archaic procedure for morbid obesity. Due to its debilitating and at times lethal side effects, it has been replaced with newer techniques. Despite advances, there are still patients out there who have had a jejunoileal bypass. This case report and review of the literature details our experience with this procedure.

1. Introduction

Jejunoileal bypass (JIB), popular in the 1960s, was one of the first bariatric procedures that achieved dramatic weight loss. Typically, 35 cm of proximal jejunum is anastomosed to the distal 10 cm of ileum [1] (Fig. 1. Diagram of JI bypass). This produces a malabsorptive mechanism, which results in massive weight loss. Not long after the initial weight loss success reports, many deleterious side effects, including nephrolithiasis, severe nutritional deficiencies, hepatic cirrhosis and ultimately death began to emerge. Other procedures, such as roux-en-y gastric bypass and sleeve gastrectomy, have since replaced the JIB. There is only a small amount of current literature on these patients as many of these patients were either reversed or died from liver failure.

Here we discuss a case of a patient with longstanding history of JIB complicated over time by nutritional deficiencies and recurrent kidney stones resulting in advanced kidney disease approaching dialysis, in which reversal of JIB ultimately resulted in improvement of her nutritional deficiencies and kidney disease. The reversal process was initially complicated by nutritional deficiencies and recurrent small bowel obstruction due to unexpected changes in the reversed proximal small bowel, characterized by severe and dense fibrotic "foreign-body" like Giant-cell reaction in the small bowel serosa causing recurrent "functional" small bowel obstruction. She endured a long clinical course, however her condition improved after removal of this diseased bowel.

2. Case presentation

Our patient is a 58-year-old Caucasian female who underwent a jejunoileal bypass in 1971 when she was 18 years old. She was compliant with vitamin supplementation and had great results with the weight loss. Over the years, she developed chronic diarrhea and was treated intermittently with metronidazole for enteritis with partial improvement. All colonoscopies performed showed normal appearing mucosa. The patient also developed recurrent calcium oxalate kidney stones, however her first symptomatic stone was discovered in 1999. She underwent four lithotripsy procedures and even a ureteral stent. In 2016, her baseline creatinine was 1.2 mg/dL with a GFR of 49 mL/min but continued to worsen over the following year partially in part due to worsening of her chronic diarrhea. Her GFR declined to 23 mL/min, which diagnosed her with stage 4 chronic kidney disease. Patient was having up to 8 bouts of diarrhea daily. Ultrasound of her kidneys demonstrated left sided hydronephrosis with multiple calculi as well as a normal appearing right kidney with multiple small non-obstructing

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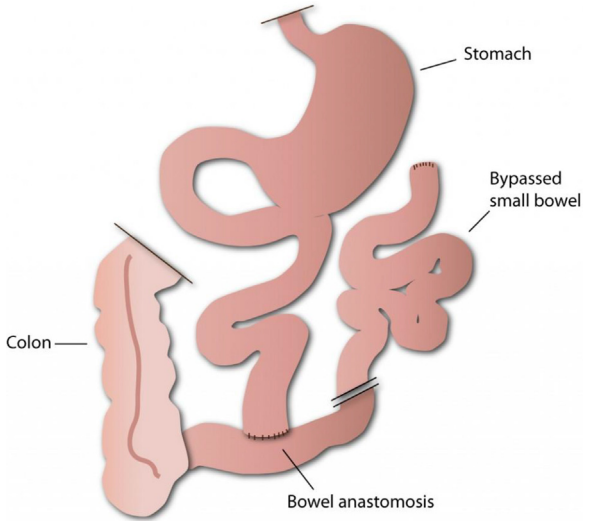

Fig. 1. Schematic of Jejunoileal bypass.

calculi. Ultimately, patient's renal function worsened to stage 4 kidney disease. Due to the threat of hemodialysis, our patient elected to undergo bypass reversal.

Prior to the reversal, we performed an open jejunostomy feeding tube placement for enteral nutrition to condition and stimulate hypertrophy of the excluded portion of the bowel, as we suspected this could be narrower and that may cause some challenges in creating her anastomosis. At this time, her serum albumin was ranging between 3.5 to 3.9 g/dL and prealbumin around 18 mg/dL. She did not have any micro-nutritional deficiencies as this was being managed closely with supplementation. This was a laparoscopic converted to open procedure due to extensive adhesions. She was initially started on elemental half strength tube feeds at 35 cc/hr for 12 h daily, however, it took several weeks for her to tolerate full strength feedings for 5 h daily. She was also eating a regular diet and her weight increased from 50 kg to 53 kg.

Six months later, she underwent open reversal of jejuno-ileal bypass. Multiple adhesions were present as would be expected, but the portion of proximal jejunum that housed the jejunostomy tube appeared to be unusually more thickened than the rest of the small bowel, and around 15 cm of involved jejunum was resected. The jejuno-ileal anastomosis was approximately 25 cm away from the ileocecal valve and the anastomosis was widely patent. The anastomosis was taken down with a stapling device, and a stapled side-to-side jejuno-jejunostomy was created. Patient's post-operative hospitalization was uneventful. She began a regular diet on post-operative day four, and was discharged the following day. Her weight at the initial post-operative visit was 51.6 kg and her albumin was 2.5 g/dL.

Three weeks after reversal, she was admitted to the hospital for nausea/vomiting and dehydration. An oral contrasted CT revealed dilation of her proximal jejunum with smaller appearing ileum. Subsequent small bowel follow through study revealed patent small bowel with contrast seen in the colon at 1.5 h, therefore ruling out mechanical obstruction as the culprit. Patient was still unable to tolerate adequate oral intake, with serum albumin down to 1.6 g/dL, so a peripherally inserted central catheter (PICC) was placed, and patient was discharged on Total Parenteral Nutrition (TPN).

During this time, patient's stool habits changed from chronic diarrhea to constipation requiring daily large volume enemas and laxatives for relief. Her TPN was discontinued, as she was able to eat in smaller portions. Monthly clinic visits revealed chronic upper abdominal pain with ability to palpate "rope-like" bowel underneath her skin. Repeat small bowel follow through showed rapid transit of contrast to colon but dilated segments of proximal small bowel. Her renal function was not improving, continuing to fluctuate between stage 3 and 4 renal disease, and overall nutrition status was poor with serum prealbumin of 21 mg/dL and an albumin of 2.5 g/dL.

Six months after JIB reversal and further 15 pounds of weight loss, she was re-admitted to the hospital with concerns for high-grade small bowel obstruction requiring surgical intervention. During surgery, the proximal small bowel appeared to be very dilated and thickened with transition to more normal appearance distally. There were unusually dense adhesions between multiple small bowel segments that precluded safe resection, so the abnormally appearing small bowel was bypassed with an enteroenterostomy between normal appearing distal and proximal small bowel. She also received a gastrostomy feeding tube as well as another PICC line for parenteral nutrition. Her main source of nutrition became the TPN as her gastrostomy tube output was copious and became a decompressive gastrostomy tube rather than a feeding tube. The patient continued to complain of palpating hard, "rope-like" bowel underneath her skin, borborygmi, and continued to be in a weak and debilitated state.

Patient's nutritional status continued to decline after the next couple of months and her pre-albumin dropped to 10.3 mg/dL and albumin to 1.6 g/dL. She complained of lethargy to the point of having to resign from her job, however continued to be consistent with office visits.

Due to poor quality of life and inability to fully resolve her "functional" small bowel obstruction, we decided to proceed with elective resection of defunctionalized proximal small bowel bearing in mind concerns for short gut syndrome. After extensive lysis of dense and severely fibrotic adhesions, 133 cm of hardened, diseased proximal small bowel was resected and a stapled side-to-side jejuno-ileal anastomosis was created, leaving approximately 120 cm of small bowel (30 cm jejunum and 90 cm of ileum) with preservation of the ileocecal valve.

One month post-operatively, she gained 6 pounds with the ability to tolerate regular diet without the need to vent her gastrostomy tube. Her bowel movements became more regular and spontaneous without the frequent use of laxatives or enemas. The gastric tube was subsequently removed and renal function has improved from stage 4 to stage 3, ultimately avoiding dialysis. She continues to follow-up routinely with the operative surgeon.

3. Discussion

The treatment of patients who underwent JIB can be very challenging. The wide array of chronic long-term complications can be detrimental. The task of restoration of bowel continuity can be problematic not only because of the atrophic mucosa but due to discrepancy of bowel lumen caliber. There are several learning points from our patient in which to discuss further. Here we summarize the most frequent complications these patients develop after JIB.

3.1. Liver failure

The most frequently reported complication in the literature. Approximately 30% of these patients went on to develop hepatic fibrosis and 10% died from liver failure. Liver failure normally occurred within the first two years of surgery. The cause of liver disease is thought to be multi-factorial, including increased fat deposition, protein deficiency, and exposure to toxins from bacterial overgrowth in bypassed small bowel [2,5].