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SURGERY FOR OBESITY AND RELATED DISEASES

Video case report

A step-by-step surgical technique video with two reported cases of common channel lengthening in patients with previous stomach intestinal pylorus sparing surgery to treat chronic diarrhea

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Surgical procedures are currently the only effective long-term way to treat morbid obesity. However, these procedures all carry risks, with each procedure having its own unique risks.

In 2007, Dr. Sanchez in Spain first performed a modification of the traditional duodenal switch using a single anastomosis instead of Roux-en-Y reconstruction with the sleeve done over a 56 French bougie [1]. We have modified this further by creating a smaller sleeve (40 French bougie sizing instead of 56) and less malabsorption (300-cm common channel instead of 250 cm) [2]. We have called this modification "stomach intestinal pylorus sparing" (SIPS) surgery to help differentiate it from the common complication of the traditional Roux-en-Y duodenal switch. The preservation of more intestine, along with the ileocecal valve, reduces the risk for malnutrition and diarrhea often associated with the duodenal switch [3,4]. The lack of a distal small bowel enteroenterostomy should eliminate or decrease the chances of internal hernias. Since 2013, we have performed over 300 SIPS surgeries. However, we have encountered 2 patients that developed chronic diarrhea without malnutrition that resulted in the need for common channel lengthening. Chronic diarrhea was defined as loose stools that last for at least 4 weeks. This usually means 4 or more loose stools per day.

We present a step-by-step surgical technique of common channel lengthening (CCL) to treat chronic diarrhea after SIPS surgery. This is the first report in the literature that demonstrates the CCL technique after a SIPS surgery and also reports the first 2 cases.

Patient 1

A 41-year-old woman with a body mass index (BMI) of 42.9 kg/m^2 had planned SIPS in 2014. Her current BMI is 26.5 kg/m^2. Six months after surgery, she began to experience smelly flatulence, bloating, and severe diarrhea (6–8 loose stools/d). Her nutritional status (vitamins A, D, E, K, B1, B12, and copper and zinc) was normal. Her albumin and prealbumin were also normal. Dietary intervention and medical interventions of Lomotil and probiotics did not help.

Patient 2

The second patient was a 63-year-old man with a history of inflammatory bowel syndrome who underwent SIPS surgery a year prior for morbid obesity with insulin dependent diabetes and a BMI of 38.6 kg/m^2. The patient had remarkable weight loss after the SIPS surgery (current BMI, 22.5 kg/m^2) with resolution of pre-existing diabetes and gastroesophageal reflux disease. However, 5 months after surgery the patient began experiencing postprandial diarrhea (6–8 loose stools/d) that was unresponsive to both dietary manipulation and medical interventions of

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probiotics and Lomotil. His protein and nutritional statuses were also normal (albumin, prealbumin, vitamins A, D, E, K, B1, B12, and copper and zinc).

Methods

Data from the patients were drawn from a prospectively kept database. From September 2013 to August 2016, our center performed over 300 laparoscopic SIPS surgeries. Additionally, there were over 50 revisions in which gastric bypass or laparoscopic bands were converted to SIPS cases [5,6]. Two of our patients experienced chronic diarrhea following a SIPS surgery. We elected to perform laparoscopic CCL to increase the absorptive capacity.

The SIPS technique

Our SIPS technique has been described in detail in previous work [2,7].

Management

The CCL technique

Laparoscopic CCL was performed using a standard 4-port technique. Initial access is obtained by means of a Veress needle technique at the left anterior subcostal port site because this site is generally safe from visceral injury. A pneumoperitoneum was established to a pressure of 15 mm Hg using CO_2 gas. A 10-mm 30° laparoscopic camera was used. A liver retractor was placed through the posterior right subcostal port to elevate the left lobe of the liver.

The surgeon (standing on the right side) operates through the right upper abdominal port and right anterior subcostal port. The assistant surgeon (standing on the left side) operates through the 2 left subcostal ports.

Surgical technique

After positioning and port placement, the abdomen was inspected and adhesions were lysed with blunt and sharp dissection as needed.

Construction of enteroenterostomy

In both cases, the first step of this technique was to locate the duodenoileostomy (DI). The efferent limb (common channel) was traced 300 cm from the DI to the ileocecal valve (Fig. 1 A, step 1). Also, 400 cm from the DI to the ligament of Treitz (afferent limb/biliopancreatic limb) was counted out (Fig. 1 A, step 2). A side-to-side enteroenterostomy was performed 15 cm below the DI using a 2 gastrointestinal anastomosis stapler technique (Fig. 1 A, step 3). This step is performed to ensure that, if there is constriction and a division of the small bowel, an obstruction does not form.

Transection of DI. A complete transection was performed at the DI using a gastrointestinal anastomosis stapler (Fig. 1 A, step 4).

Creation of new loop (duodenojejunostomy)

We elected to lengthen the common channel by 200 cm. To do this, we traced 200 cm proximal to the new enteroenterostomy on the afferent limb (biliopancreatic limb) (Fig. 1 A, step 5).

The new loop limb was brought up and the antimesenteric border of the jejunum was attached to the end of the proximal duodenum staple line using a 2.0 Polysorb (Covidien Ltd., Dublin, Ireland). The loop was set up so the efferent limb (approximate 500 cm) was descending on the patient's right and the afferent limb was ascending from the left. Approximately 2-cm duodenotomy and enterotomy were made, and the enterotomy was closed with a running posterior layer and running anterior layer using 3.0 Polysorb (Covidien).

Antiobstruction stitch and antivolvulus stitch

Another 2 interrupted sutures were placed—1 from the afferent limb to the antrum and the other from the afferent limb to the omentum to prevent chronic nausea and volvulus, respectively (Fig. 1 A, steps 6 and 7) [5]. The anastomosis was tested intraoperatively for leaks (using an endoscope). Skin incisions were closed.

Postoperative care. The patients were allowed sips of water on the evening of surgery and full liquids on postoperative day 1. Before discharge, both patients underwent an upper gastrointestinal series to rule out leak. Patients were discharged when oral intake was adequate and pain was well controlled. All patients attended a follow-up visit with the operating surgeon at 4–6 weeks postoperatively.

Results

The mean blood loss was less than 10 cc in both cases and the average operative time was 57 minutes. Both patients showed significant improvement in diarrhea frequency immediately following surgery. No complications or postoperative adverse events were documented at the time of last follow-up.

Weight loss analysis

See Table 1 for weight loss outcomes with SIPS and revision CCL.

Discussion

Being a new procedure, there are very little data describing the rare complications of this unique approach or how to fix them [8,9].

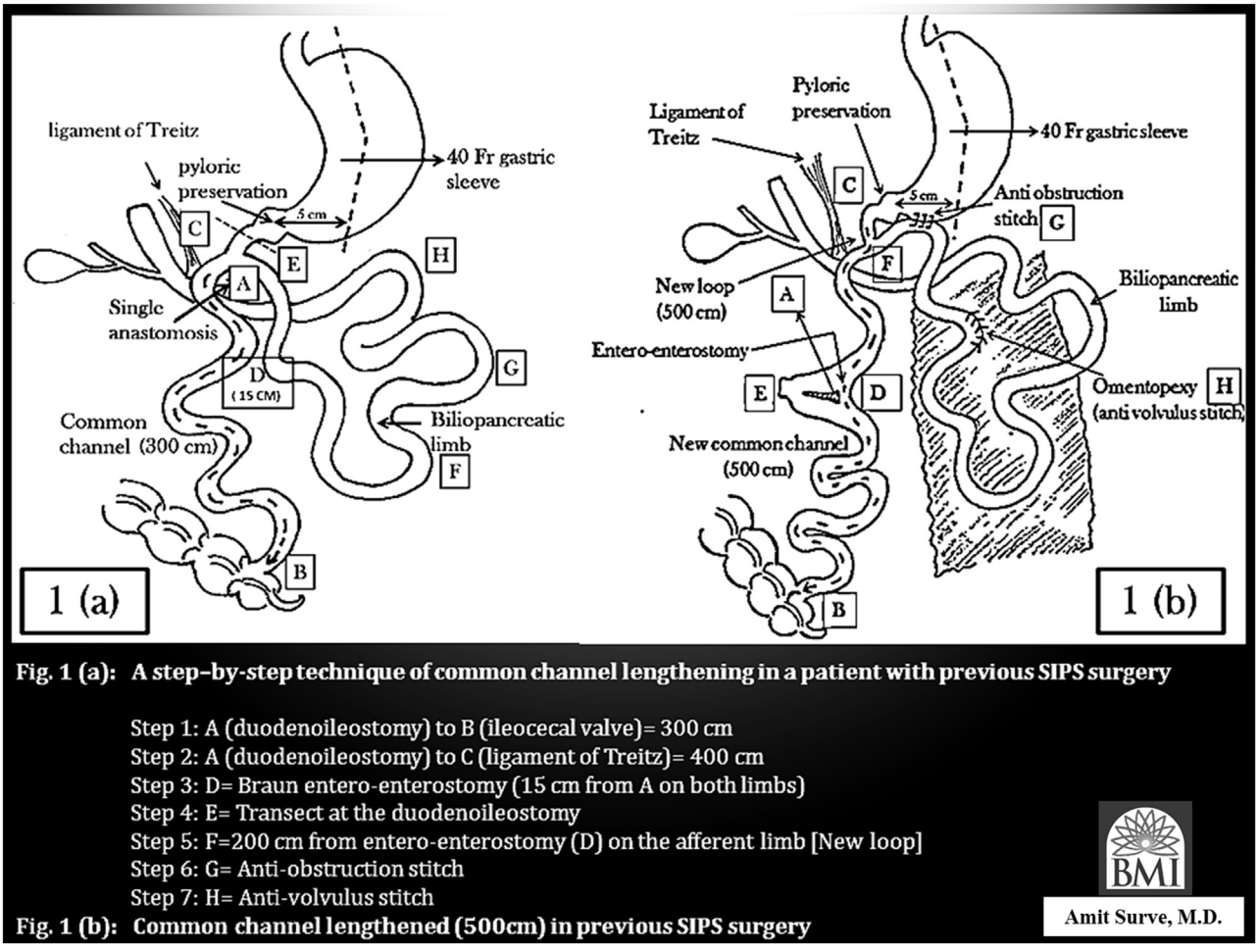

Fig. 1. (A) Hand-drawn sketch of a step-by-step surgical technique of common channel lengthening in a patient with previous stomach intestinal pylorus sparing (SIPS) surgery. (B) Hand-drawn sketch of common channel lengthened in a patient with previous stomach intestinal pylorus sparing surgery.

Dietary manipulation is always the first line of therapy. In general, carbohydrates such as pasta and bread often cause diarrhea in this patient population and should be stopped before considering a revision. This dietary intervention is common knowledge among surgeons who perform duodenal switch. This could represent a dumping type of syndrome. A less common cause of dietary-induced diarrhea is excess fat malabsorption. Many patients can decrease the frequency of their diarrhea by simply eating active culture yogurts.

If these simple interventions fail, then probiotics are the next step. These over-the-counter supplements should ideally have more than 3 types of bacteria and should be taken 3 times a day for 3 weeks before determining if they are not working.

Of note is the fact that our practice does not use pancreatic enzymes in the treatment of diarrhea. We feel it is inappropriate to ask the patients to remain on these prescriptions for the long term and our goal is normal bowel movement without medications. We do not typically do fat analysis of stool since we found it unhelpful in the past. Typically, our

Table 1
Highlights of weight loss outcomes, post SIPS and common channel lengthening

Pt	SIPS	Post SIPS/Pre-op CCL			Post-op CCL		
	Pre-op BMI (kg/m^2)	Last available f/u since SIPS (day)	BMI (kg/m^2)	% Excess body weight loss	Last available f/u since CCL (day)	BMI (kg/m^2)	% Excess body weight loss
1	42.9	853	26.5	65.8	63	26.9	64.1
2	38.6	230	22.5	101.7	56	23.5	95.2

SIPS = stomach intestinal pylorus sparing; CCL = common channel lengthening; BMI = body mass index.
Both patients have slightly regained weight after common channel lengthening.

patients with a 300-cm common channel have approximately 65% fat malabsorption when we have measured it.

If all the above interventions fail, then Lomotil is the last consideration. If Lomotil does not control the diarrhea, then an intervention should be considered.

In both cases, the surgery performed worked and the aftercare was uneventful. However, this is major surgery, and the chances of complication are real and should be explained to every patient considering this operation.

The primary limitation of our study is the sample size, which limits the generalizability of our results to other programs.

Conclusions

Laparoscopic CCL is a safe and feasible option for the treatment of chronic diarrhea in patients who undergo a SIPS surgery.

Disclosures

The authors have no commercial associations that might be a conflict of interest in relation to this article.

Appendix A

Supplementary data

Supplementary data are available in the online version of this article at http://dx.doi.org/10.1016/j.soard.2016.10.012.

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