Duodenal stump leak following a duodenal switch: A case report

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ABSTRACT

INTRODUCTION: Duodenal switch (DS) is a superior choice for surgical weight loss in the super obese patient population. However, there is an associated risk of adverse events following a DS procedure including vitamin deficiencies, bleeding, obstruction, stricture, and leakage.

PRESENTATION OF CASE: A 37-year-old female with body mass index of 67 kg/m² and multiple comorbidities underwent a Da Vinci-assisted, laparoscopic, one-stage, single-anastomosis DS procedure. On postoperative day 11, the patient developed persistent nausea, fatigue, and severe abdominal pain. She underwent diagnostic laparoscopy and was found to have hemoperitoneum, which was evacuated, but active bleeding source was not identifiable. Three days later, the patient underwent exploratory laparotomy, for bleeding with duodenal stump blowout.

DISCUSSION: Duodenal stump blowout is the result from increased pressure caused by distal obstruction with the back up of duodenal contents. Anastomotic leakage/blow-out following surgery when suspected, should be individualized and management strategy should be implemented according to the size of the leak, extent of the abscess, and status of the patient.

CONCLUSION: Duodenal stump leaks must be diagnosed as early as possible, and treated appropriately with operative intervention. Regardless of the operative technique the key to appropriate treatment is stabilize the patient, repair the duodenal stump, and adequate drainage.

1. Introduction

The surgical management of obesity has shown sustainable durable results for comorbidity resolution and weight loss. The use of drugs to lower glucose, lipid, and blood pressure levels decreased significantly after bariatric surgical procedures[1]. Of the surgical procedure options, duodenal switch (DS) is a superior choice for surgical weight loss in the super obese patient population [2]. It has had excellent results and outperformed other bariatric procedures in terms of weight loss and comorbidity resolution [3]. However, there is an associated risk of adverse events following a DS procedure including vitamin deficiencies, bleeding, obstruction, stricture, and leakage [4–8]. We report a rare case of a duodenal stump blowout in a patient who underwent DS procedure.

2. Case report

A 37-year-old female was admitted with body mass index of 67 kg/m² and multiple comorbidities including back pain, gastroesophageal reflux disease, obstructive sleep apnea, hyperlipidemia, and hypertension. She tried to lose weight without success, so the patient underwent a Da Vinci-assisted, laparoscopic, one-stage, single-anastomosis DS procedure.

The terminal ileum was identified and ran 250 cm proximally up the ileum, which defined the length of the common channel and marked the site of our duodeno-ileal anastomosis. Next, the greater omentum was taken from the greater curvature distally 3 cm from the pylorus. A window was created for transection of the duodenum. Sleeve gastrectomy was done loosely over a 34 French bougie-sized Edlich tube (Covidien, Mansfield, MA), and the staple line was oversewn. Next, the duodenum was transected 3 cm from the pylorus, and the duodenal stump was oversewn with a running absorbable suture. A two-layer hand sewn anastomosis between the duodenum and the ileum was created at the 250 cm mark. The anastomosis was tested with methylene blue and air and it showed no leakage. A drain was placed in left upper quadrant and the stomach was removed. An upper gastrointestinal study (UGI) on postoperative day (POD) 2 was negative for a leak. Bariatric phase 1 diet was started and the patient tolerated it well. She was discharged on POD 3.

On POD 11, the patient developed persistent nausea, fatigue, and severe abdominal pain. She came to the emergency department and was found to be tachycardic and anemic with a leukocytosis. Abdominal exam revealed significant distension with guarding. An UGI was negative followed by a computed tomography (CT) of the abdomen showing free fluid suggestive of a leak or bleeding.
received 5 units of PRBCs and 4 units of fresh frozen plasma intraoperatively. She was transferred to the ICU, and her post-operative course was complicated by hemorrhagic fluid collections seen on CT scan and atelectasis. She also developed acute thrombosis of the left internal jugular and subclavian veins at a previous central catheter site without pulmonary embolism. The patient was placed on therapeutic Lovenox and octreotide. She was given intravenous piperacillin/tazobactam which was later changed to cefazolin. The patient was successfully discharged on POD 17 to her home with home health care for dressing changes and total parenteral nutrition.

3. Discussion

An anastomotic leak is one of the most serious complications following bariatric surgery. It can result in significant morbidity and could even lead to mortality, as the associated intra-abdominal sepsis carries a high mortality rate [9]. The most common location for leaks after a DS procedure is staple lines of the sleeve gastrectomy [10]. However, Biertho et al [11] reported duodenal leak after a DS at a rate of 1.5%.

Duodenal stump leaks have been reported in the general surgical and surgical oncology literature with a rate of approximately 1–6% [12]. Following these procedures there have been reports of duodenal stump blowouts that resulted in a range of 77% in mortality rates in the early years to approximately 12% in more recent years [13, 14].

Duodenal stump blowout is the result from increased pressure caused by distal obstruction with the back up of duodenal contents. Obstructive causes result from post-operative adhesions, intra-luminal hematoma, and narrowing at the duodenojejunal anastomosis causing a back up in the biliopancreatic limb. Inadequate stump closure, localized staple-line hematoma/devascularization, or thermal injury from the electrocoagulation device can also predispose the stump staple line itself to an early blow-out or leakage [15]. Other factors involved include: excessive skeletalization for more than 2 cm of the first part of the duodenum, overzealous suturing of the duodenal stump resulting in ischemia and necrosis, or local pancreatitis causing stump break-down [16]. The goal should be to minimize or prevent these complications from occurring intraoperatively by meticulous dissection, stapling, and closure of the duodenal stump. If these issues arise they should be managed appropriately. Our patient developed a duodenal stump blowout with simultaneous gastroduodenal artery (GDA) bleeding following a da Vinci assisted single-stage duodenal switch procedure and a diagnostic laparoscopy. This was due to adhesions of the biliopancreatic limb to the anterior abdominal wall resulting in obstruction and duodenal stump blowout with erosions into the GDA. The patient demonstrated signs of sepsis and hemorrhagic shock in the early post-operative period mandating emergent operative exploration and treatment.

Management of all anastomotic leaks and/or staple line blowouts follow the same basic principles. Stabilize the patient, drain the abscess, close the defect, and restore intestinal continuity. Anastomotic leakage/blow-out following surgery when suspected, should be individualized and management strategy should be implemented according to the size of the leak, extent of the abscess, and status of the patient [17]. As duodenal stump blowouts can result in massive staple line leakages with peritonitis and shock, all patients should be managed aggressively with resuscitation, antibiotic therapy, and reoperation [18].

Re-exploration and wash-out with duodenostomy tube placement can be done as an operative management as in this case report. In addition, Vasiliadis et al. [15] described placement of a retrograde duodenostomy decompressing tube. In this case, the
patient developed delayed duodenal stump blowout following a gastrectomy with reconstruction due to distal obstruction. The stump was mobilized and re-stapled and a retrograde duodenostomy tube was placed through the proximal jejunum. Regardless of the technique, the abdomen must be fully explored to find and relieve the distal obstruction in all duodenal stump blowouts. Adhesions must be taken down as in our patient, and hernia must be reduced and repaired with possible bowel resection.

Our patient presented with initial findings of hemoperitoneum which was evacuated with limited exploration. She deteriorated again and was taken back for open exploratory laparotomy with GDA ligation and Malecot tube placement to obtain hemostasis and control the duodenal stump leak, respectively. The obstruction was due to multiple adhesions which were taken down. At initial operation we over-sewed the duodenal stump staple line with an absorbable suture, but it did not prevent the blow out. We have been using non-absorbable sutures after this case, and have not encountered any other stump leaks in 40 consecutive cases.

Bariatric surgeons should be aware of this rare serious complication after a DS. This complication must be diagnosed as early as possible, and treated appropriately with operative intervention. Regardless of the operative technique the key to appropriate treatment is stabilize the patient, repair the duodenal stump, and adequate drainage.

Conflict of interest

Dr. Jawad, Teixeira, and Moon are consultants of Ethicon-Endosurgery and received consultant fees.

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Author’s contribution

Lars Nelson—data collection, writing the paper.

Rena Moon—data analysis, writing the paper.

Andre Teixeira—study concept.

Muhammad Jawad—study concept.

Guarantor

Muhammad Jawad.

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