

# Necrotizing Fasciitis and Barotrauma-Induced Pneumatocele Following Conversion of Gastric Bypass to Duodenal Switch: A Case Report

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## Abstract

Conversion of Roux-en-Y gastric bypass (RYGB) to biliopancreatic diversion with duodenal switch (BPD-DS) is one of the options for RYGB patients who fail to lose sufficient weight or weight gain.

The conversion can be done in a single or staged approach which is dependent on surgeon preference and patient factors. While the conversion can be performed relatively safely through experienced hands, it still carries complication risks. The risks associated with the conversion are similar to those of primary BPD-DS and include anastomotic leak, bleeding, bowel obstruction, stricture of the gastro-jejunal anastomosis, wound infection, and deep vein thrombosis. We present a case of a single stage conversion of RYGB to BPD-DS which was complicated by necrotizing fasciitis of the abdominal wall and barotrauma-induced pneumatocele.

**Keywords:** necrotizing fasciitis, pneumatocele, bariatric surgery, duodenal switch, weight regain

## Introduction

Conversion of Roux-en-Y gastric bypass (RYGB) to biliopancreatic diversion with duodenal switch (BPD-DS) is one of the options for RYGB patients who fail to lose sufficient weight or weight gain [1, 2]

The conversion can be done in a single or staged approach which is dependent on surgeon preference and patient factors [1]. While the conversion can be performed relatively safely through experienced hands, it still carries complication risks [3]. The risks associated with the conversion are similar to those of primary BPD-DS and include anastomotic leak, bleeding, bowel obstruction, stricture of the gastro-jejunal anastomosis, wound infection, and deep vein thrombosis [3]. We present a case of a single stage conversion of RYGB to BPD-DS which was complicated by necrotizing fasciitis of the abdominal wall and barotrauma-induced pneumatocele.

## Case Presentation:

A 44-year-old female presented for an elective, robot-assisted conversion of RYGB to BPD-DS in a single stage operation. The patient had undergone RYGB 13 years prior but had weight regain; at the time of conversion her body mass index (BMI) was 71 kg/m<sup>2</sup>. The case was performed without complication and a 19 Fr drain was left in the subhepatic space near the duodenal stump. The Roux limb from the gastric bypass was left in place.

On the second postoperative day the patient was noted to be in shock. Computed tomography (CT) scan was negative for pulmonary embolism but was notable for significant intra-abdominal hematoma and

subcutaneous emphysema tracking along the right, lateral abdominal wall. She was also noted to have significant erythema of the skin surrounding the right abdominal trocar sites. The patient was taken back to the operating room for diagnostic laparoscopy converted to exploratory laparotomy with washout, jejunostomy feeding tube placement and debridement of right, lateral abdominal wall. During the second operation, the patient was noted to have significant intra-abdominal hematoma without evidence of active bleeding and turbid fluid from the debridement of the right lateral abdominal wall concerning for necrotizing fasciitis. Intra-operative cultures from the abdominal wall debridement grew *Klebsiella pneumoniae* and yeast.

The patient remained intubated for several days until she was able to be weaned to bi-level positive airway pressure (BiPAP). Post-extubation chest X-Ray (CXR) demonstrated right pneumothorax and pleural effusion. CT of the chest demonstrated loculated, right pneumothorax that measure 9 cm in size. We placed pigtail catheter and sent cultures. Pleural fluid cultures were negative and pneumothorax persisted despite tube placement which was concerning for pneumatocele due to barotrauma. Pulmonology was consulted and recommended endobronchial ultrasound with possible aspiration of the pneumatocele. The patient had acute respiratory decompensation during the procedure requiring emergent re-intubation. She remained intubated for six more days before being extubated back to BiPAP. She was eventually discharged to a long-term acute care facility with negative pressure wound therapy to the debridement site. All intra-thoracic drains were removed prior to discharge despite persistent pneumatocele on CXR. At her 7-month follow up visit, the patient had lost 103 lbs and her BMI had decreased to

56 kg/m<sup>2</sup>. Her debridement site was nearly completely healed and she had no respiratory sequelae from her pneumatocele.

## Discussion

Conversion of gastric bypass to BPD-DS is generally considered safe among experienced surgeons [1]. However, conversions carry greater risks than primary procedures and devastating complications can still occur [2]. Our patient underwent a single stage conversion of RYGB to BPD-DS and had a good weight loss following her procedure. However, her operation was complicated by necrotizing fasciitis requiring unplanned re-operation and barotrauma induced pneumatocele leading to re-intubation due to respiratory distress.

Necrotizing skin and soft-tissue infections (NSTI) can be challenging to diagnose early in their clinical pathway because they tend to resemble more benign processes [4]. Hemodynamic instability may or may not accompany the disease process and hemodynamic instability during the postoperative period can be due to several different etiologies. Although we are not entirely sure of the cause of NSTI in our patient, it was likely due to poor irrigation at the extraction site of the stomach. We routinely remove the stomach without the aid of a specimen retrieval device (such as Endo Catch), copiously irrigate the extraction site, and then close the site with skin staples. Given that the culture from the debridement site grew *Klebsiella pneumoniae* and light yeast, this was likely the culprit of the NSTI.

Pneumatocoles are defined as thin-walled, air-filled intraparenchymal pulmonary cysts and typically occur in association with pneumonia or pulmonary trauma [5]. In our case, the patient had pleural fluid cultures that were negative and never had any clinical signs of pneumonia. The etiology in this case was likely due to barotrauma from her multiple, prolonged periods of mechanical ventilation. As in our case, the diagnosis is usually made with CXR and/or CT scan of the chest. The majority of pneumatocoles appear to involute over time requiring no invasive interventions [6]. But surgery is indicated for complex pneumatocoles, infected lesions refractory to antibiotics and drain, uncontrolled hemorrhage or clinical deterioration [7]. Our patient had a large pneumatocele and difficulty weaning from the ventilator which was thought to be due to the compressive nature of the cyst. Therefore, multiple attempts to decrease the size of the pneumatocele using intrathoracic catheters and bronchoscopy were made without success. Ultimately, she was able to be weaned off mechanical ventilation despite the presence of the pneumatocele. The patient did not have long term adverse sequelae because of the pneumatocele during the follow-up period.

These types of complications after bariatric surgery are rare due to the minimally invasive nature with which these procedures are performed; requiring minimal time for mechanical ventilation and significantly decreasing the risk of postoperative wound infections. However, when the patient strays from the usual postoperative course the surgeon must be prompt to diagnose the underlying disease process in order to limit the morbidity and mortality associated with such processes.

## Disclosures

Dr. Bornstein has no conflicts of interest or financial ties to disclose. Dr. Teixeira is a consultant for Intuitive Surgical and Ethicon Endo-surgery. Dr. Jawad is a consultant for Ethicon Endo-surgery.

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