

Chylous Ascites Following Bariatric Surgery Report of Two Cases

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Chylous ascites is a rare complication following bariatric surgeries. Little data is available regarding chylous ascites following bariatric surgeries per se or in association with internal hernias. Herein we present two cases of chylous ascites following Roux-En-Y gastric bypass; the first one is a 60-year-old male who was presented to the ER six months after a gastric bypass operation suffering from abdominal pain, CT scan and upper endoscopy were normal, however chylous ascites and internal hernia were found during exploratory laparoscopy. The second case is a 39-year-old female patient who was admitted three years following the gastric bypass operation and diagnosed to have small bowel obstruction due to internal hernia, and during exploratory laparoscopy a chylous ascites was found.

Key Words: Chylous ascites, Gastric bypass, Internal hernia

INTRODUCTION

Chylous ascites is a rare complication following bariatric surgeries. It is the accumulation of milk-like peritoneal fluid rich in triglycerides and is defined by triglycerides levels of above 110 mg/dl [1].

Etiologies for postoperative chylous ascites are uncommon and are usually secondary to operations that interrupt the retroperitoneal lymphatics, such as abdominal aortic aneurysm repair or retroperitoneal lymph node dissection for malignancies [2]. Little data is available in regards of chylous ascites following bariatric surgeries by themselves, or in association with internal hernias. The growing number of these procedures mandates an accurate identification of this possible complication [3].

Herein we describe two cases of patients who developed chylous ascites following laparoscopic Roux-En-Y gastric

bypass (RYGB) surgery and review the relevant literature.

CASE REPORT

1. Case 1

A 60-year-old male presented to clinic seeking bariatric surgery due to morbid obesity. His past medical history was significant for gastro-esophageal reflux disease (GERD), hypertension, coronary artery disease (CAD) and smoking.

He had previously undergone a laparoscopic vertical (sleeve) gastrectomy with an uneventful course and achieved an excess body weight loss (EBWL) of 95% over the course of one year. Three years later the patient presented with dysphagia and epigastric pain, related partial torsion of the gastric sleeve proved by barium swallow study. Conservative treatment had failed, and a revision with conversion to RYGB was perused. During

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surgery after hiatal hernia reduction, a RYGB was performed with an uneventful recovery.

The patient presented 5 months later with epigastric pain, pallor and perspiration. Computerized tomography (CT) scan showed no signs of internal hernia and esophago-gastro-duodenoscopy (EGD) was unrevealing, as was transabdominal ultrasound. A decision was made to perform an elective exploratory laparoscopy to rule out internal hernia. A month later the patient presented to the emergency department (ED) with worsening abdominal pain. A repeat CT scan was performed, revealing a hiatal hernia without any signs of internal hernia or lymphadenopathy. He was admitted for exploratory laparoscopy, during which chylous peritoneal fluid was identified, along with a torsion around the jejuno-jejunal anastomosis and an internal hernia of the common channel through Peterson's space. The hernia was reduced, Peterson's space was closed, and the ascetic fluid was sent for analysis. The triglyceride level was 1250 mg/dl. The patient made uneventful recovery, and is still symptom free.

2. Case 2

A 39-year-old female presented to clinic seeking bariatric surgery for morbid obesity. Her past medical history was significant for atrophic gastritis, incomplete right bundle branch block (RBBB), appendectomy, gallstone lithotripsy, three caesarian sections and bilateral tubal ligation. She underwent an uneventful laparoscopic RYGB and achieved an EBWL of 75% over 2 years of follow-up.

The patient presented three years later with complaints of acute diffuse abdominal pain, nausea and vomiting. She did complain of bouts of diffuse abdominal pain during the past months. An abdominal CT scan showed evidence of internal hernia, intraperitoneal fluid, and mesenteric lymphadenopathy. She was admitted for an emergency laparoscopic exploration that showed milky fluid in the abdominal cavity and a herniation of the Roux limb through an enteromesenteric defect without strangulation. The herniation was reduced, the defect was closed. The Peterson's space was closed as well. Upon analysis of the intra-abdominal fluid; triglyceride was 700 mg/dl. The patient made an uneventful recovery. She did, however,

present to the ED two months later with similar complaints of abdominal pain. A CT scan showed no evidence of internal hernia but did include the old finding of left ovarian cyst.

3. Cases reported in the literature

A comprehensive literature search identified 8 relevant case-reports, of which two were excluded due to the involvement of gastric carcinoma at diagnosis, and one was excluded due to gastric carcinoma being the indication for the gastric bypass surgery. This article reviews the relevant 5 case-reports that presented with the complication of chylous ascites following RYGB.

The first case [4] described in the literature of chylous ascites following gastric bypass surgery, was that of a 40-year-old male who underwent an uneventful laparoscopic Roux-en-Y gastric bypass (LRYGB) in May 2007. His medical history included shortness of breath on exertion, carpal tunnel syndrome and joint disease. The patients presented one year later with symptoms of mild abdominal pain and nausea. His physical exam was unremarkable besides mild diffused tenderness. An abdominal CT was performed which showed a small amount of intraperitoneal fluid as well as mesenteric adenitis. The patient was admitted one month later for an elective diagnostic laparoscopy. A large amount of chylous fluid was identified along with internal herniation. The hernia was repaired and the jejunojejunal mesenteric defect was sutured and closed using a running 2-0 silk suture. The patient made an uneventful recovery. The specimen sent for analysis showed elevated triglyceride content and was negative for any bacteria or lymphocytes.

The second case [5], is that of a 22-year-old female who underwent LRYGB on 2007 in California. Since her surgery she had maintained a 90 lb weight loss. Her past medical history included hypertension, pseudotumor cerebri for which she had had a ventriculoperitoneal shunt placed, and a cesarean section. She presented to the ED in Guam with acute severe abdominal pain, and reported several previous episodes of abdominal pain. An abdominal CT scan showed mesenteric swirl and a large amount of mesenteric free fluid. She was taken for an exploratory laparotomy which revealed a twisted Roux limb causing

internal herniation of the common channel with 4 L of white fluid consistent with chylous ascites. The hernia could not be repaired without taking down the anastomosis, and since no bowel obstruction was evident the plan was to close the abdomen and transfer the patient to a bariatric service. She was eventually re-operated on POD 7, during that time she continued to complain of abdominal pain and obstipation. During re-operation the internal hernia was reduced with no need for small bowel resection, and the jejunojejunal mesenteric defect was closed. Peterson's space was closed as well. No ascites was seen during reoperation. Recovery was unremarkable. Analysis of the ascites drained during the exploratory surgery showed elevated triglycerides levels of 388 mg/dL, consisted with chylous fluid.

The third case [3] is that of a 36-year-old female who underwent LRYGB for morbid obesity. A year after her operation she presented to the ED with severe postprandial pain, with no signs of bowel obstruction. Physical examination revealed a tender abdomen without signs of peritonitis. Laboratory tests showed an elevated white count 12,8 cells per mm. An abdominal CT scan showed signs of internal hernia with small bowel obstruction with a large amount on intraperitoneal fluid. An emergency laparoscopy was performed, revealing the presence of what appeared to be chylous ascites and secondary changes at the mesenteric root level predominantly in the proximal jejunum suggesting lymphatic leakage. A Peterson's hernia was found and repaired. A sample of ascites was taken for analysis which revealed elevated triglycerides levels of 466 mg/dL, and negative gram stain. The patient had an uneventful recovery.

The fourth case [6] is that of a 46-year-old female who underwent an open RYGB (Her past medical history was significant for open ventral hernia repair without mesh, panniculectomy, cesarean section and laparoscopic cholecystectomy. She presented with an acute left upper abdominal pain, nausea without vomiting and obstipation. History revealed previous bouts of abdominal pain - she had two previous similar episodes which have resolved spontaneously. She was febrile. Physical examination revealed no signs of peritonitis. Her labs were normal,

including lactate. An abdominal CT scan revealed mesenteric and small bowel edema with a mesenteric twist, poor enhancement of the distal superior mesenteric vein, and a large amount of free abdominal fluid. Considering either mesenteric volvulus and/or internal hernia the patient was taken for a diagnostic laparoscopy. A jejunojejunostomy mesenteric defect was found, and internal hernia was identified and repaired, the bowel appeared healthy with no signs of ischemia or infarction. Engorged lymph vessels within the bowel wall at the jejunojejunostomy and a large amount of cream-colored intraperitoneal fluid were observed as well. The fluid was sent for analysis, which demonstrated elevated triglycerides levels of 771 mg/dL consistent with chylous ascites, with no evidence of bacteria. Recovery was unremarkable.

The fifth case [7] is of a 57-year-old female who underwent an uneventful LRYGN. She had maintained a weight loss of 120 lb, corresponding to 91% of excessive weight loss. She presented 18 months following her surgery with symptoms of constant worsening lower abdominal pain and constipation, with no nausea or vomiting. Physical examination revealed no signs of peritonitis. Labs were normal as well. Abdominal CT scan revealed findings consistent with internal hernia with no signs of bowel obstruction, and a large amount of peritoneal fluid suggesting lymphatic obstruction or mesenteric congestion. The patient was taken for a diagnostic laparoscopy where an internal hernia of the common channel was identified along with what appeared to be chylous ascites. Adhesions were taken down, the internal hernia reduced and the mesenteric defect was repaired. A specimen of the fluid was taken for analysis which revealed elevated triglycerides levels of 5259 mg/dL. Patient's recovery was uneventful.

DISCUSSION

Chylous ascites is defined as a peritoneal fluid that contains triglycerides levels of above 110 mg/dL. Symptoms of chylous ascites may include progressive abdominal distension and pain, diarrhea and steatorrhea, malnutrition, edema, nausea, dyspnea, weight loss, fever, night sweats and enlarged lymph nodes. It can be identified

using radiological studies such as CT scans that help identify its underlying cause, or lymphangiography and lymphoscintigraphy that help localize the source of leak, although these studies are not always fruitful. Laparotomy carries the highest diagnostic value [1].

There are many possible etiologies for chylous ascites, with cirrhosis and malignancies being the leading causes in western countries, accounting for over two thirds of the cases, and infectious etiologies such as tuberculosis being the leading causes in developing countries. Other etiologies may include congenital, inflammatory, traumatic, miscellaneous disorders and postoperative [1]. Chylous ascites may be a complication of abdominal surgeries, with resection of abdominal aortic aneurysm or retroperitoneal lymph node resection for malignant causes being the most reported [2].

There are several possible mechanisms for the development of chylous ascites [6]:

- Obstruction of the lymphatic vessels at the root of the mesentery or at the cisterna chyli, resulting in lymph vessels dilation and exudation of lymph fluid. This mechanism can be seen in cirrhosis and peritoneal malignancies.
- Retroperitoneal lymphatic vessels dilation and

exudation of lymph fluid due to lymphangiectasis or thoracic duct obstruction.

- Injury to lymph vessels or nodes resulting in a lymph-peritoneal fistula, due to direct trauma such as abdominal surgery.

The underlying mechanisms may influence the management of chylous ascites, which can be non-surgical or surgical. Conservative management usually begins with a low-fat diet and medium-chained triglycerides or total parenteral nutrition if ascites persists. Surgical intervention is usually perused if conservative treatment fails, and may be indicated for neoplastic, congenital or postoperative causes [1]. However, not all postoperative cases are treated surgically and it is important to note the timing of development of this complication. Acute onset may point to lymph vessel injury that should be treated conservatively, while a delayed presentation after weeks or months following the initial operation can be a result of adhesions and obstruction secondary to internal herniation and require surgical intervention [4,6].

Reports of chylous ascites following bariatric surgeries, and RYGB specifically are scarce due to the rarity of internal hernias, and considering that not all develop chylous ascites [3]. However, a close examination of this

Table 1. Clinical characteristic and treatment of case series

	Case 1	Case 2
Patient age & gender	60-year-old male	39-year-old female
Bariatric surgery performed, date	laparoscopic vertical (sleeve) gastrectomy in May 2014, with conversion to LRYGB in March 2017	LRYGB in March 2014
Complication after bariatric surgery	No complications	No complications
Weight loss at presentation	EBWL 95%	56 kg
Symptoms at presentation	Acute on chronic epigastric pain, pallor and perspiration	Acute on chronic diffuse abdominal pain, nausea and vomiting
Time between bariatric surgery and symptoms	5 months from LRYGB, three years and 5 months from sleeve gastrectomy	Three years
Diagnostic method & results	Abdominal CT scan only revealed hiatal hernia with no enlarged lymph nodes, dilation of intestinal loops or peritoneal fluid. Gastroscopy and US were not indicative	Abdominal CT scan with evidence of internal hernia and fluid in the abdominal cavity, enlarged mesenteric lymph nodes and a cyst in the left ovarian
Treatment	Exploratory laparoscopy with internal hernia reduction, closure of the Peterson space and analysis of ascites	Emergency exploratory laparoscopy with internal hernia reduction, closure of mesenteric defect and Peterson space, and analysis of ascites
Ascites fluid analysis	1250 mg/dl	600 mg/dl

EBWL = Estimated body weight loss.

review and of the cases we have presented helps draw a connection between chylous ascites and internal hernias following bariatric surgeries (Table 1, 2):

- All patients had bouts of intermittent abdominal pain, often prior to an acute presentation. These symptoms are suggestive of internal hernia but are nonspecific.
- When timing was reported, all symptoms were in delay of months and years to the initial bariatric surgery. The timing of presentation is consistent with adhesion-induced lymphatic disruption.
- All but one of the cases had CT scan findings

suggestive of internal hernias. Free peritoneal fluid was also detected in most cases.

- All peritoneal fluid analysis revealed, in fact, chylous ascites, with triglycerides levels above 110 mg/dL and reaching up to 5259 mg/dL.
- All cases were resolved by reducing the internal hernia and closing the mesentery defect.

In summary, chylous ascites is a rare complication of internal hernia following RYGB surgery. These hernias are not always easily diagnosed based upon patient's symptoms or imaging, and it is important for clinicians

Table 2. Detailed of previous reported cases

	Case 1	Case 2	Case 3	Case 4	Case 5
Author et al.	Hidalgo et al. [4]	Hanson et al. [5]	González-Chávez et al. [3]	Zayan et al. [6]	Cinnamond et al. [7]
Patient age & gender	40-year-old male	22-year-old female	36-year-old female	46-year-old female	57-year-old female
Operation performed	LRYGB	LRYGB	LRYGB	Open RYGB	LRYGB,
Complication after surgery	No complications	Unspecified	Unspecified	Unspecified	No complications
Weight loss at presentation	Unspecified	90 lb	Unspecified	Unspecified	120 lb, 91% index weight loss
Symptoms at presentation	Mild abdominal pain, nausea	Acute on a year of chronic abdominal pain	Abdominal pain, nausea, malaise, sweating and paleness, bloating, constipation and obstipation	Acute on chronic left upper abdominal pain, nausea without vomiting, obstipation and febrile	Constant worsening lower abdominal pain and constipation
Interval between surgery and symptoms	Approximately one year	Unspecified	One year	Unspecified	One and half years
Diagnostic method & results	Abdominal CT scan with contrast showing free abdominal fluid and mesenteric adenitis	Abdominal CT scan showing mesenteric free fluid and mesenteric swirl	Laboratory showing leukocytosis, abdominal CT scan showing free fluid, signs of secondary intestinal occlusion and changes in mesenteric fat	Abdominal CT scan with contrast showing free abdominal fluid and findings suggestive of either internal hernia or mesenteric volvulus	Abdominal CT scan showing findings consistent with internal hernia and a large amount of peritoneal fluid
Treatment	Elective diagnostic laparoscopy with herniation reduction, closure of mesenteric defect and ascites analysis	Emergency exploration with 4 L ascites drainage and analysis, followed by a reoperation 7 days later with herniation reduction and mesenteric defect closure	Emergency laparoscopy with herniation reduction, closure of mesenteric defect and ascites analysis	Diagnostic laparoscopy with reduction of internal hernia, closure of mesenteric defect and analysis of peritoneal fluid	Diagnostic laparoscopy with separation of adhesions, reduction of internal hernia closure of mesenteric defect and analysis of peritoneal fluid
Ascites fluid analysis	High triglyceride content no evidence of bacteria or lymphocytes	High triglyceride content (388 mg/dL),	High triglyceride content (466 mg/dL), negative gram stain	High triglyceride content (771 mg/dL), no evidence of bacteria	High triglyceride content (5259 mg/dL),

and surgeons to be aware of their association with chylous ascites. Although it is considered a rare complication, it can be an indicator of internal hernias when there is a diagnostic inconclusiveness and may well be resolved during diagnostic laparoscopy by reducing the internal hernia and closing the mesentery defect.

CONFLICT OF INTEREST

There are no declared conflicts of interest of any of the authors of this manuscript which could lead to bias and there were no external funding sources used for this work.

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