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Case Report

# Chylous Peritonitis and Chylothorax Presenting with Acute Abdomen after Heavy Lifting

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ABSTRACT

Acute abdominal pain with signs and symptoms of peritonitis due to sudden extravasation of chyle into the peritoneal cavity is a rare condition often mistaken for other disorders. Diagnosis is rarely definite preoperatively. Acute chylous peritonitis is generally idiopathic and diagnosed with laparoscopy or laparotomy. Intra-abdominal lavage and drainage are often used as treatment methods. We report a case of spontaneous chylous peritonitis due to elevated intra-abdominal pressure, which was diagnosed intraoperatively by observation of chylous fluid leakage from the retroperitoneum. The patient was treated with peritoneal lavage and drainage with primary suture ligation at the level of leakage.

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**Summary**

Acute chylous peritonitis is characterized by fluid accumulation in the peritoneal cavity and usually occurs idiopathically. It can only be differentiated from chronic chylous peritonitis on the basis of its acute clinical presentation and diagnosed with laparoscopy or laparotomy. Peritoneal lavage and drainage are essential in treatment. Postoperative somatostatin administration may be beneficial. We report the case of a patient who presented with acute abdomen following heavy lifting and underwent operation due to extensive intra-abdominal fluid. Intraoperatively, chylous peritonitis and subsequent chylothorax were detected. Peritoneal lavage and drainage were performed, and the chylothorax was drained by thoracentesis. The possible causes of the chylous peritonitis were the increased intra-abdominal pressure and lymphatic injury at the retroperitoneal level. The patient was followed up in the third postoperative month without any problem.

## Introduction

Chylous acid is the accumulation of triglyceride-rich lymphatic fluid in the peritoneum. Lymphatic fluid in the peritoneal cavity is a rare condition that occurs from many causes such as abdominal surgery and trauma, malignant masses, cirrhosis, pelvic radiotherapy, and abdominal radiotherapy. The most common causes of chylous acid in Western countries are abdominal malignancies and cirrhosis, whereas in developing and Eastern countries, infections such as tuberculosis and filariasis are among the most common causes [1]. Chylous acid can occur as a complication of abdominal or thoracic surgery and trauma [2]. Minimal leakage can occur owing to excessive filling of the lymphatic chain after a high-fat diet [3]. Although congenital chylous acids are the most common causes of chiloperitoneum in children, other causes include malrotation, intussusception, incarcerated hernia, lymphangioma, liver diseases, and abdominal tuberculosis [4]. Here, we present the case of a patient with acute abdomen treated surgically and was found to have chylous acid intraoperatively and chylothorax postoperatively. Increased intra-abdominal pressure was thought to be the cause of the chylous pathologies.

## Case Presentation

A 44-year-old male patient was admitted to the emergency department because of an aggravating abdominal pain that started the day before. He was conscious and cooperative. His body temperature was 36.6°C; arterial blood pressure, 124/67 mmHg; SpO2, 96%; heart rate, 109

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beats/min; and respiratory rate, 20 breaths/min. On physical examination, diffuse tenderness was found in the abdomen, with defense and rebound tenderness in all the quadrants. He had no known systemic diseases, penetrating or blunt trauma, or previous abdominal operation. He carried 2 bins weighing approximately 40 kg with both arms the day before the onset of abdominal pain. His white blood cell count was 13,240/mm$^3$; creatine kinase (CK) level, 2529 U/L; and CK-MB level, 59 U/L. The values of the other biochemical parameters were within the normal range (Table 1). No obvious pathology was found on posteroanterior erect abdominal radiography (Figure 1). Abdominal ultrasonography revealed free fluid in all quadrants, reaching 4 cm in the deepest part of the pelvis. Contrast-enhanced abdominal computed tomography (CT) revealed free fluid in the perihepatic and pelvic areas, reaching 1.5 cm in its thickest portion, and an associated stranding in the mesenteric fat planes (Figure 2).

**Table 1:** Laboratory findings at admission.

| Parameter | Result | Reference Values |
|---|---|---|
| **Glucose** | 86 mg / dL | 74-106 mg / dL |
| **Urea** | 43 mg / dL | 19-49 mg / dL |
| **Creatinine** | 0.99 mg / dL | 0.7-1.2 mg / dL |
| **Total Bilirubin** | 0.23 mg / dL | 0-1.2 mg / dL |
| **Direct Bilirubin** | 0.15 mg / dL | 0-0.3 |
| **AST** | 63 U / L | 0-40 U / L |
| **ALT** | 21 U / L | 0-41 U / L |
| **Calcium** | 8.2 mg / dL | 8.6-10.2 mg / dL |
| **CK- MB** | 59 U / L | 0-25 U / L |
| **CK** | 2529 U / L | 0-190 U / L |
| **Amylase** | 50 U / L | 28-100 U / L |
| **Na** | 140 mEq / L | 136-145 mEq / L |
| **K** | 4.20 mEq / L | 3.5-5.1 mEq / L |
| **Cl** | 106 mEq / L | 98-107 mEq / L |
| **WBC** | 13.24 × $10^3$ / L | 3.57-11.01 × $10^3$ / L |
| **Hgb** | 16.8 g / dL | 13.2-17.3 g / dL |
| **Plt** | 179 × $10^3$ / L | 150-372 × $10^3$ / L |

**Figure 1:** Posteroanterior erect abdominal radiograph showing no obvious pathology at admission.


**Figure 2:** Contrast-enhanced abdominal computed tomography image of the patient.

Diagnostic laparoscopy for the acute abdomen revealed diffuse chylous acid in the abdomen. Thus, the procedure was switched to laparotomy with an upper and lower median incision. Chylous acid was found in all the intestinal segments. Biochemical (triglyceride and cholesterol) and microbiological samples were taken from the intra-abdominal fluid. All intestinal segments were explored, and no pathology was found. Chylous fluid leakage from the retroperitoneum at the lateral aspect of the descending colon was observed; hence, the area was sutured primarily. No obvious macroscopic pathology was detected in the solid organs (Figure 3). The peritoneal cavity was irrigated with approximately 3000-4000 cc of isotonic fluid. The surgery was terminated by placing 2 drains in the retrovesical and left paracolic areas, extending from the primarily sutured area. The result of the microbiological examination of the intra-abdominal fluid was normal. The triglyceride and cholesterol levels were 472.9 and 69 mg/dL in the fluid, respectively, compatible with the chylous content. Postoperative chest CT revealed pleural effusion. Chylous-like pleural fluid was aspirated under ultrasonography guidance from left hemithorax. The results of the biochemical analysis of the fluid were as follows: glucose, 114 mg/dL; albumin, 9.1 g/L; lactate dehydrogenase, 158 U/L; total protein, 21.1 g/L; triglyceride, 529.8 mg/dL; and cholesterol, 38.5 mg/dL. A diagnosis of chylothorax was made. No re-accumulation of fluid was observed in the left hemithorax on the subsequent chest radiography. The pleural effusion on the right hemithorax was spontaneously absorbed. Although the possibility of a primary injury was not considered, the chylothorax was thought to be due to the increased pressure in the thoracic duct (Figure 4).

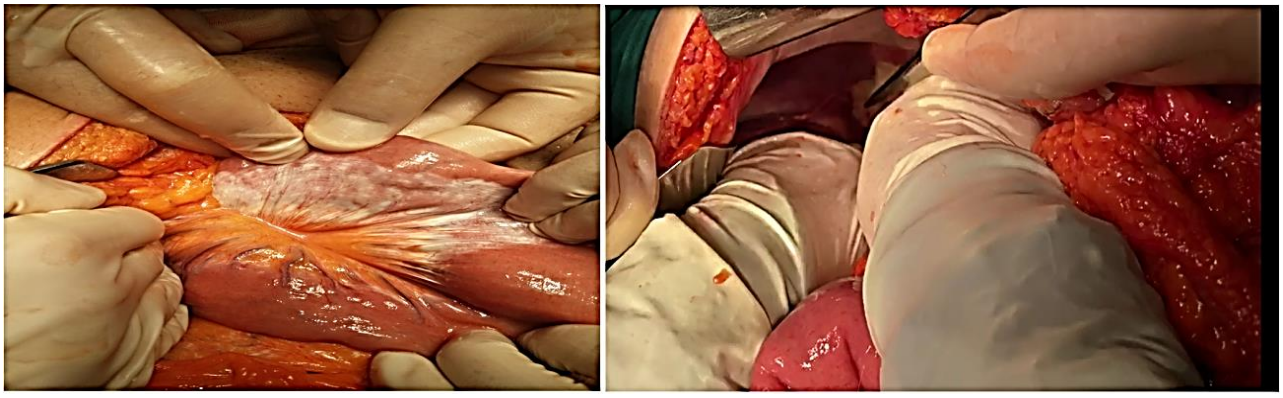

**Figure 3:** Chylous appearance in the intestinal walls, mesocolon, and the area where chylous fluid is leaking from the retroperitoneum.

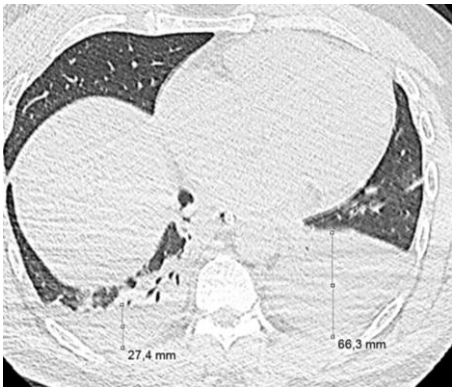


**Figure 4:** Pleural effusion view of the thoracic computed tomography image of the right and left hemithoraxes.

A total of 300 cc of chylous fluid was drained from the abdomen on the first postoperative day. Oral intake was prohibited for 5 days. Total parenteral nutrition was initiated with poor medium-chain fatty acids and somatostatin (Somatosan 3 mg). Chylous drainage from the abdominal drains continued to decrease up to the fifth postoperative day. By then, a low-fat oral regimen was introduced. The abdominal drains were removed on the eighth postoperative day, and a low-fat diet was prescribed at hospital discharge. In the third month of follow-up, a contrast-enhanced thoracoabdominal CT for malignancy screening revealed no abnormalities. The patient was followed up till the fifth postoperative month with no further complaints.

## Discussion

The gastrointestinal system facilitates lymphatic transport of chylomicrons from the small intestines to the vascular system via the thoracic duct. Although the flow rate ranges from 50 to 200 mL/h, it increases after fatty meals [3-6]. The thoracic duct carries the whole-body lymphatics except that on the right side of the head and neck regions, right arm, and right hemithorax [7]. Chylous peritonitis is a disease entity that occurs after the onset of milky lymphatic fluid leakage into the peritoneal cavity. Chylous peritonitis is rare, with an incidence of 1 in 20000 persons [7]. The many causes include abdominal surgery, trauma, malignancy, cirrhosis, and pelvic and abdominal radiotherapies Minimal leakage due to excessive filling of the lymphatic chain can occur after a high-fat diet [3].

A study with 140 cases of chylous peritonitis reported that of all cases of chylous acid, 21% occur in adults and 14% occur in children acutely [8]. Our patient, who had an acute clinical presentation, did not have a history of previous abdominal surgery, trauma, abdominal malignancy, liver disease, or radiotherapy. He had no history of eating a heavy fatty meal 48 hours before presentation.

Although intra-abdominal lymphatic fluid is known as a non-irritant to the serosal surfaces, pain occurs due to the stretching of the retroperitoneum and mesenteric serosa [3]. Chylous acid in the long term may be asymptomatic and not show symptoms other than distension. Acute chylous peritonitis, on the other hand, is a symptomatic condition and presents with acute abdominal findings, which may be mistaken for other acute pathologies. Symptoms such as anorexia, nausea, vomiting, and abdominal pain may be present. Abdominal pain and physical examination findings are most often localized in the right lower quadrant; hence, cases misdiagnosed as acute appendicitis have been reported [2, 9, 10]. Smith *et al*. presented a case of chylous peritonitis mimicking acute appendicitis in a 38-year-old male patient with chronic pancreatitis due to chronic alcoholism [2]. The patient presented with diffuse pain in the right iliac fossa. On laparoscopy followed by laparotomy, chylous peritoneal fluid was aspirated, and the pancreatic head was mal-rotated, swollen, and erythematous. It was diagnosed as chylous peritonitis due to acute pancreatitis, and the patient was treated with abdominal drainage, as in our case [2].

Goel *et al*. described an 8-year-old patient who presented with fever, nausea and vomiting, and pain in the periumbilical region [11]. On the laparotomy performed under the pre-diagnosis of acute appendicitis or small bowel perforation, chylous peritoneal fluid and mesentery fat tissue plastered with chylous fluid were observed, as in our case. Tuberculosis and malignancy were excluded, and abdominal drainage was initiated. No pathologies were found in the first postoperative year [11]. Our patient, who was from a tuberculosis-epidemic country, did not have any active symptoms of pulmonary tuberculosis or contact history. He was reevaluated at the third month of follow-up for tuberculosis and malignancy. Neither the physical examination nor thoracoabdominal CT findings indicated tuberculosis or malignancy.

Acute chylous peritonitis resulting from acute extravasation of lymphatic fluid is usually idiopathic. A review reported that 56% of acute chylous peritonitis cases were idiopathic; 22% caused by lymphatic obstruction due to various diseases; 12% by trauma; and 10% by mesenteric cyst rupture [8]. Herein, we present the first reported case of acute chylous peritonitis caused by retroperitoneal injury due to increased intra-abdominal pressure after heavy lifting. Although chylous fluid leakage from the retroperitoneum was found preoperatively, we could not fully demonstrate the damage to the retroperitoneal area. Although the mechanism of the chylothorax could not be fully elucidated in this patient, we think that lymphatic fluid passed into the pleural space owing to the pressure increase in the thoracic duct at the thoracic level.

In patients presenting with acute abdomen, paracentesis should be considered in the forefront of treatment if ascites are present. Chylous fluid has a milky or creamy characteristic appearance. The triglyceride level in the fluid is 2 to 8 times higher than the plasma triglyceride level, which is diagnostic for chylous acid [6, 12]. On abdominal exploration, if lymphatic leakage can be localized, as in our case, primary suture ligation is a sufficient and safe option. Peritoneal lavage is also an effective treatment option for cases without lymphatic leakage and underlying additional pathologies [13, 10].

Özgüç *et al.* described a 32-year-old female patient who presented with a 24-history of abdominal and back pains had extensive ascites and mesenteric fat stranding on abdominal CT and fluid accumulation in the right retroperitoneal space [13]. On laparotomy, chylous fluid was found to extend from the posterior right colon to the posterior of the duodenum. The origin of the lymphatic fluid could not be determined intraoperatively. As no additional pathology was found during follow-up, the case was considered idiopathic.

## Conclusion

In conclusion, to the best of our knowledge, this is the first reported case of acute chylous peritonitis and chylothorax, resulting from increased intra-abdominal pressure due to heavy lifting. When ascites are present in a patient with acute abdomen, paracentesis should be performed. Though rare, a history of weight bearing in a patient with acute abdomen should alert clinicians for the possibility of chylous peritonitis.

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## Conflicts of Interest

None.

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