

## CASE REPORT

# Chylous Ascites Post Open Cholecystectomy After Severe Pancreatitis

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### ABSTRACT

**Context** Chylous ascites a rare complication post cholecystectomy. There are to our knowledge only 3 reported cases in the literature. We describe a case of chylous ascites post open cholecystectomy in a patient with recent severe pancreatitis. We propose a potential relationship between acute biliary pancreatitis and the development of chylous ascites. **Case report** We present a 37 year old man with a history of severe biliary pancreatitis 10 months prior. He was electively admitted for laparoscopic cholecystectomy. His surgery was converted to open cholecystectomy due to adhesions. A closed, non suction drain was placed intraoperatively draining serosanguinous fluid. Two days post operatively the draining fluid changed to a milky colour fluid with high triglyceride level. Chylous ascites was confirmed clinically with a 24 hour fast. He was treated with total parenteral nutrition. His chylous ascites resolved with conservative management and his drain was removed. **Conclusion** We describe the diagnosis and management of chylous ascites post cholecystectomy. We propose the hypothesis to the aetiology of this rare condition, based on ours and one previous case, that a history of recent severe acute pancreatitis poses a risk factor in the development of chylous ascites.

### INTRODUCTION

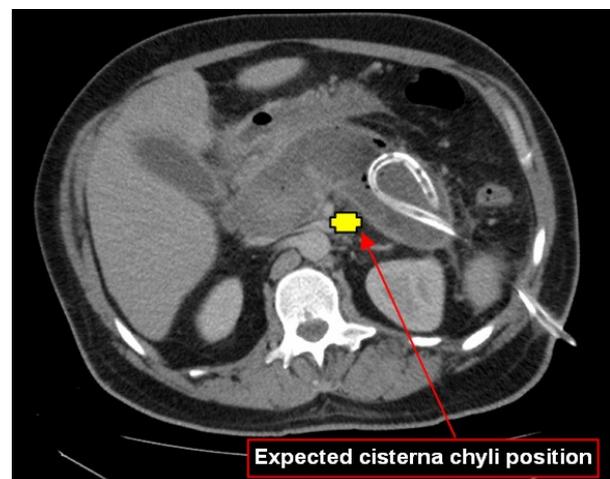
Chylous ascites is defined as the presence or accumulation of a milky triglyceride rich peritoneal fluid in due to the presence of thoracic or intestinal lymph in the abdominal cavity and has a wide range of causes [1]. It is a rare post-operative complication especially in cholecystectomy where major lymphatics are unlikely to be damaged [2]. There are to our knowledge only 3 reported cases of chylous ascites post-cholecystectomy [2, 3, 4]. Due to its infrequent occurrence, an evidence based approach to the investigation and management of this condition is unlikely to be constituted [2]. Although rare, it still has the potential to significantly increase length of stay and the complications associated with parenteral feeding at present. Historically it had been associated with high mortality rate.

Chylous ascites is more commonly associated with abdominal aortic surgery, accounting for 81 % of postoperative chylous ascites, or retroperitoneal lymph node dissection where there is significant injury to the cisterna chyli [5, 6]. In cholecystectomy it is uncertain what degree of injury has occurred for the development of chylous ascites. We describe the diagnosis and

management of chylous ascites post cholecystectomy. We propose a novel hypothesis to the cause of chylous ascites, elucidating to a potential relationship between acute biliary pancreatitis and the development of chylous ascites [2].

### CASE REPORT

A 37-year-old Caucasian male was transferred to our service for management of severe acute biliary pancreatitis. His clinical course necessitated intensive care admission and was treated with percutaneous image guided pancreatic bed drainage and antibiotics (Figure 1). He developed a resistant Enterococcus infection (vancomycin resistant Enterococci) and was



**Figure 1.** CT abdomen showing haemorrhagic pancreatitis with drain in situ.

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treated with meropenem, linezolid and fluconazole. Aetiological work up included a magnetic resonance cholangiopancreatography (MRCP) showing a thickened gallbladder with multiple calculi and a dilated common bile duct. Subsequent endoscopic retrograde cholangiopancreatography (ERCP) revealed sludge in the common bile duct which was cleared. Given his severe course associated with significant collection, his cholecystectomy would be performed on an interval basis. Therefore, an endoscopic sphincterotomy was performed. A pancreas duct stent was not employed in this case.

He was discharged after 2 months with his peripancreatic drain in situ and long acting octreotide depot intramuscularly. Ongoing drainage from his peripancreatic drain settled and it was removed at nine months. He was electively admitted for laparoscopic cholecystectomy at ten months. Due to inability to safely discern relevant anatomy from dense adhesions, he was converted to open cholecystectomy. A right subcostal incision was made and an open near total cholecystectomy was performed. The small remnant gallbladder neck was oversewn. Extensive dissection around the gallbladder bed was performed with some dissection of the hepaticoduodenal ligament using LigaSure™ (Covidien, Boston, USA). There was no retropancreatic or midline dissection undertaken and the long term pancreatic bed drain was not repositioned. A closed, non-suction drain was placed in the pouch of Rutherford Morrison.

Post-operatively, patient recovered well, tolerating diet and the drain was draining minimal serosanguinous fluid. However, day two post operatively there was an acute increase in the volume in the drain, from 20 mL to 950 mL in 24 hours and the fluid drained changed to a white milky colour. Patient was clinically well throughout and vitals were stable. No rise in C reactive protein or white cell count was noted. Analysis on the fluid drained showed a triglyceride of 7.64 mmol/L (reference range: 0-1.7 mmol/L) and no microbial growth. Chyle leak was clinically suspected. A 24-hour fast decreased the drainage volume significantly to 50 mL and the fluid became serous again, confirming the clinical impression of chyle leak. A lymphoscintigram was felt not to be necessary given the clear cut clinical presentation. This was managed aggressively but in a non-interventional manner. He was kept nil by mouth and parenteral nutrition was commenced. The drainage amount continued to decrease and drain was removed 14 days postoperatively. The patient remained well, tolerated oral low fat diet and was discharged seventeen days post initial surgery.

## DISCUSSION

Chylous ascites is a rare postoperative complication. In the past mortality associated with this complication is up to 70% [7]. This was due to a combination of a lack of knowledge in the pathophysiology of the condition and a lack of management options. Continual protein losses lead to malnutrition, weight loss and

complications including tetany, steatorrhea and oedema [7]. The advent of parenteral nutrition significantly improved outcomes and mortality rates in chylous ascites but associated morbidities still make it a significant complication especially when it occurs in the setting of a common procedure such as cholecystectomy.

Gaspare Asello, who first documented the lymphatic system, described a cream coloured liquid as he transected the “nerve like” lacteals in a dog [8]. Lymph travel in lymphatics, which returns interstitial fluid back to the circulation. Lymphatics from the intestinal tract merge with those draining the lower limbs to form the saccular cisterna chyli at the level of L1 and L2 which joins with the thoracic duct in the thorax [7]. These vessels are vulnerable to damage along its course especially at the cisterna resulting in chylous ascites. Surgery related chylous ascites are rare and occur during extensive retroperitoneal dissection where the cisterna is vulnerable. However, damage to major lymphatics during cholecystectomy that will result in chylous ascites is rare. It is difficult to explain how major lymphatic leak can occur during cholecystectomy. Usually minor lymphatic channels are encountered. We postulate that the degree of injury to lymphatics during cholecystectomy is small and that a derangement of anatomy must exist, making it more vulnerable to the development of chylous ascites.

The cisterna chyli lies at the level of the pancreatic head and inflammation can cause chylous compression and direct enzymatic damage to the cisterna [5]. Our patient's recent severe pancreatitis may be a factor in his post operative chylous ascites. We hypothesize, supporting the only other case post pancreatitis, that acute pancreatitis causes compression of the cisterna chyli resulting in backflow and dilatation of lymph vessels upstream [2]. This pre-existing diversion of flow pre-existed in the hepatoduodenal ligament and the use of force device (LigaSure™, Covidien, Boston, USA) contribute to the development of chylous ascites in cholecystectomy. There should be no risk to the cisterna itself. This derangement in anatomy can predispose lymph vessels to operative damage or spontaneous chyle leak. Incidence of post-pancreatitis chylous ascites is unknown as most are asymptomatic and therefore undetected. In this case chylous ascites was detected day two post-cholecystectomy and is suggestive of operative damage to predisposed vessels. Chylous ascites can generally diagnosed by the presence of a cream coloured ascitic fluid on paracentesis or drainage with a triglyceride level above 200 mg/dL (2.28 mmol/L) [1, 2]. However, this can be confirmed using the criteria of characteristics that Jahsman outlined: milky odourless fluid that is alkaline and sterile, separates into two layers on standing, specific gravity greater than 1.012, has bacteriostatic properties, contains 3% total protein content, 0.4% to 4% fat content, total solids more than 4% and stains fat globules with Sudan red stain [9]. In our case, the knowledge of these characteristics and the presence of

a closed drain in situ enabled a clinical suspicion of chylous ascites and its confirmation using a controlled 24-hour fast and laboratory analysis. There are also various imaging modalities to diagnose and assess the extent of chylous ascites. Computerised tomograms show low attenuated fluid collection with a fat fluid level [9]. Lymphangiography is the gold standard for diagnosis and localisation of chyle leak but it is limited by due to its invasiveness and contrast related complications [7]. Lymphoscintigraphy uses technetium (<sup>99</sup>Tc) labeled contrast which is injected into the dermis of interdigital web spaces, taken up by lymphatics and any leakages with the system can be visualised [7, 10]. We did not perform any additional imaging in our case as the diagnosis was clear from the nature of the fluid and the non invasive confirmatory test. Our case demonstrates the important role of clinical diagnosis of chylous ascites and further imaging techniques should be reserved for cases where there is doubt in the clinical diagnosis and laboratory tests are inconclusive.

Once diagnosis is made, we initiated aggressive management to minimise symptoms and complications arising from lymph loss. We have developed an algorithm for management of chylous ascites highlighting the differences in treatment between acute and subacute causes (Figure 2). There are currently many modalities to treatment available. We, however still advocate the use of short term total parenteral nutrition as the first line of management for the subgroup of acute chylous ascites as it is the most reliable and immediate way to decrease intestinal lymph flow allowing damaged lymphatics to heal [2, 11]. Total parenteral nutrition alone is successful in

resolving chylous ascites in 60-100% of cases [12, 13, 14, 15, 16]. We are aware that current practice is encouraging the early introduction of a low fat diet with medium chain triglycerides in the management of chylous ascites. Medium chain triglycerides bind to albumin and enter the portal system directly bypassing the lymphatic and have the advantage of maintaining enteral feeding [17, 18]. However, in the subgroup where onset is acute and probable cause of the chylous ascites is known, as in our case, short term parenteral nutrition will allow for a more prompt response in an inpatient setting. We advocate the use of a medium chain triglyceride diet to manage sub acute chylous ascites or chylous ascites refractory to initial parenteral nutrition where treatment in an outpatient setting is more manageable compare to long term parenteral nutrition.

In the 33% that dietary manipulation is not efficacious pharmacological agents may be useful [7]. Effects are variable and further studies are needed to support their widespread use [19]. Somatostatin analogues, such as octreotide, are thought to reduce chyle volume by reducing intestinal blood flow [20]. Etilefrine is sympathomimetic used in postural hypotension [21]. It is shown to decrease chyle leak, by acting on smooth muscle cells to constrict lymphatics. Repeated paracentesis relieves symptoms in high volume chylous ascites but needs simultaneous replacement of fluid and protein loss in the process [2, 7]. Surgical intervention with direct ligation is generally reserved for refractory cases or when chylous peritonitis warrant immediate treatment [7, 22]. Peritoneovenous shunting is an alternative in refractory patients who are not fit for surgery, oncological and paediatric patients [7, 23].

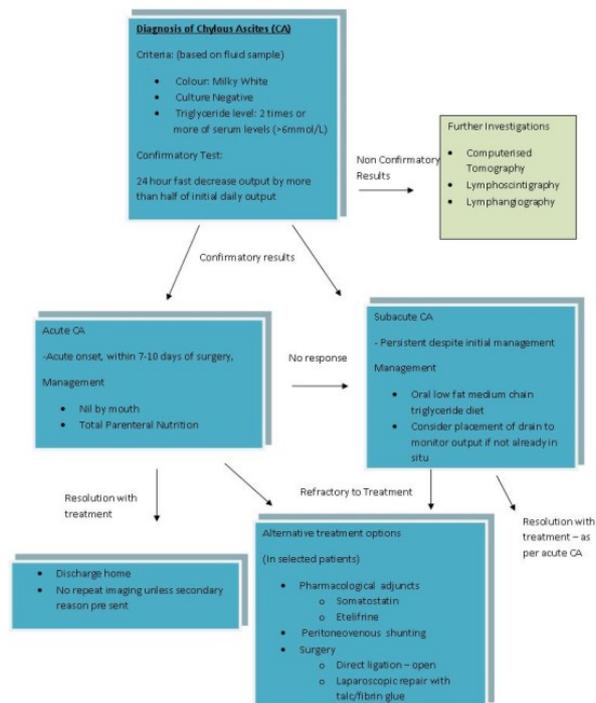
**CONCLUSION**

Chylous ascites is a rare complication post cholecystectomy. This case highlights that previous acute severe pancreatitis is a risk factor in its development due to the deranged anatomy of the lymphatics. From the case and literature review, we suggest the use of aggressive but non interventional management of chylous ascites in the first instance, where we believe that the degree of injury to the lymph channels in these cases is minimal.

**Conflict of interest** The authors have no potential conflict of interest

**References**

1. Cárdenas A, Chopra S.. Chylous ascites. Am J Gastroenterol. 2002 Aug;97(8):1896-900.
2. Huang YM, Chen JH, Liu SH, Lin MT: Chyle leakage after laparoscopic cholecystectomy for acute biliary pancreatitis: a case report. Hepatogastroenterology, 2009 Jan-Feb;56(89):39-42
3. Jensen EH Weiss CA, 3rd: Management of chylous ascites after laparoscopic cholecystectomy using minimally invasive techniques: A case report and literature review. Am Surg 2006; 72:60-63
4. Gogalniceanu P, Purkayastha S, Salding D, Zacharakis E: Chyle leak following laparoscopic cholecystectomy: a rare complication. Ann R CollSurgEngl 2010 Oct;92(7):W12-4. Epub 2010 Aug 9.



**Figure 2.** Algorithm for the management of post-operative chylous ascites.

5. Leibovitch I, Mor Y, Golomb J, Ramon J: The diagnosis and management of postoperative chylous ascites (review). *J Urol* 2002;167:449-457
  6. Baniel J, Foster RS, Rowland RG, et al: Management of chylous ascites after retroperitoneal lymph node dissection for testicular cancer. *J Urol* 1993; 150:1422-1424
  7. Oliver O, Aalami, MD, Daniel B. Allen, MD, and Claude H. Organ, Jr, MD: Chylous ascites: A collective review, *Surgery* 2000; 128:761-78
  8. Wegner R. *Das Anatomienbildnis: seine Entwicklungim Zusammenhangmit der Anatomischen Abbildung.* Basel,Switzerland: BennoSchwabe and Co; 1939.
  9. Hibbeln J, Wehmueller M, Wilbur A. Chylous ascites: CT and ultrasound appearance. *Abdominal Imaging* 1995; 20:138-40
  10. Wu Zhao, Guan Rui, HuiNing, XuMingjuan. Chylous ascites after whole pelvis suspension case report and literature review. *Journal of Medical Colleges of PLA* 25 (2010) 58-61
  11. Halloul Z, Meyer F, Burger T Lippert H: Chylous ascites, a rare complication of aortic surgery. *Vasa* 1995;24:377-381
  12. Malik HZ, Crozier J, Murray L, Carter R: Chyle Leakage and early enteral feeding following pancreatico- duodenectomy: management options. *Dig Surg* 2007;24:418-422
  13. Haug ES, Saether OD, OdengaardA ,Johnsen G, Myhre HO: Chylous complications after abdominal aortic surgery. *IntAngiol* 1998; 17:244-247
  14. Petrasek AJ, Ameli FM: Conservative management of chylous ascites complicating aortic surgery: a case report. *Can J Surg* 1996;39:499-501
  15. Geisler JP, Foster RS, Sutton GP: Chyloperitonerm following treatment for advanced gynaecologicmalignancies. *ObstetGynecol* 1994;83:883-885
  16. Bhat AL, Lower GI: Chylous injury following anterior spinal surgery: case reports. *Eur Spine J* 1997;6:270-272
  17. Elwart Garret H jr, Richardson JW, Howard HS, Garret. Retroperitoneal lymphocele after abdominal aortic surgery. *J VascSurg*1989; 10: 245-253
  18. Fleisher HL, Oren LW, Summer DS. Chylous ascites after abdominal aortic aneurysmectomy. Successful management with a peritoneovenous shunt. *J VascSurg*1987; 6: 403-407
  19. Guillem P, Papachristos I, Peillon C, Triboulet JP. Etilefrine use in the management of post-operative chyle leaks in thoracic surgery. *Interactive Cardiovascular and thoracic surgery* 2004;3 : 156-160
  20. BhatiaC, PratapU, Slavik :Octreotide therapy: A new horizon in treatment of iatrogenic chyloperitoneum. *Arch Dis Child* 2001;85:234-235
  21. Miller E, Wiener L, Bloomsfield D. Etilefrine in the treatment of levodopa-induced orthostatic hypotension. *Arch Neurol.* 1973;29:99-103
  22. Milsom JW, Kron IL, Rheuban KS, Rodgers BM. Chylothorax: an assessment of current surgical management. *J ThoracCardiovasc Surg.* 1985;89:221-227
  23. Kaas R, Rustman LD, Zoetmulder FAN. Chylous ascites after oncological abdominal surgery: incidence and treatment. *EJSO* 2001; 27: 187-189
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