Postoperative Laparoscopic Cholecystectomy Chylous Leakage in an Elderly Patient with Comorbidities: A Case Report and Management Algorithm

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Abstract

Chylous leakage after laparoscopic cholecystectomy (LC) is an exceptionally rare but serious complication that can result in significant morbidity. Fewer than 12 cases have been reported worldwide [1]. Early recognition and multidisciplinary management are essential to prevent complications such as nutritional deficiency, infection, and prolonged hospitalization. We present a case of a 73-year-old woman with hypertension, type 2 diabetes mellitus, dyslipidemia, chronic kidney disease, and ischemic heart disease. She underwent an elective, technically difficult laparoscopic cholecystectomy for recurrent acute cholecystitis, despite having undergone prior endoscopic retrograde cholangiopancreatography (ERCP) and common bile duct (CBD) stenting. During the postoperative period, the patient developed milky, yellow colored fluid in the surgical drain. Fluid analysis revealed high levels of lymphocytes and triglycerides, confirming a Chyle leak. The leak resolved with conservative management, with fat restriction, octreotide injections, and daily output monitoring. The patient also experienced basal atelectasis, pneumonia, and acute kidney injury, which resolved with supportive care. Postoperative chylous leakage, although rare, should be suspected in patients with persistent milky or yellowish drainage, particularly those with prior biliary inflammation or interventions. Early diagnosis, conservative management with fat restriction, octreotide injections, daily output monitoring and combined with coordinated multidisciplinary care to manage respiratory and acute kidney injury, can prevent severe morbidity and lead to excellent outcomes.

Keywords: Chylous leakage, laparoscopic cholecystectomy, acute kidney injury, aspiration pneumonia, postoperative complication

Introduction

Cholelithiasis is a highly prevalent condition, with over 1.2 million cholecystectomies performed annually[1] in the United States. Laparoscopic cholecystectomy (LC) is the gold standard treatment[2] for symptomatic gallstones and chronic calculous cholecystitis, as it offers reduced morbidity and mortality compared to open surgery. Common complications include bile leakage, hemorrhage, infection, and bile duct injury.[3,4]

Chylous leakage is an exceptionally rare postoperative complication of LC, with very few case series reported globally. It arises from iatrogenic injury to lymphatic channels[5,6] in the gallbladder bed or hepatoduodenal ligament, often in the context of chronic inflammation, pancreatitis, or prior ERCP/stenting. Unrecognized chyle leaks can lead to nutritional depletion, immunosuppression, electrolyte imbalance, secondary organ dysfunction and prolonged hospitalization.[1,7]

We present a complex case of postoperative chylous leakage following LC, complicated by aspiration pneumonia and acute kidney injury in an elderly patient with multiple comorbidities. Early recognition of suspicious milky, yellow color of drain fluid, alongside elevated triglyceride and lymphocyte levels, should raise suspicion of a chyle leak. This warrants initiating a low-fat diet,with administering an injection of octreotide to reduce the output is a cornerstone of conservative management. The elderly patient with preexisting comorbidities required a multidisciplinary approach to optimize health before surgery, thereby reducing and managing potential postoperative complications.

This report emphasizes preoperative optimization, early recognition, detailed perioperative documentation, and multidisciplinary conservative management leading to excellent outcomes.

Case Report

A 73-year-old female, with history of hypertension, type 2 diabetes mellitus, dyslipidemia, chronic kidney disease, and ischemic heart disease, as well as past hospitalization for acute cholangitis, underwent an ERCP with common bile duct (CBD) stenting on April 5, 2024. Despite the stenting, she continued to suffer from recurrent attacks, prompting her visit to the surgery clinic on 30th July 2024, requesting cholecystectomy. She also had limited mobility due to osteoarthritis of the knees. She was referred to Internal Medicine, Nephrology and Cardiology for optimization of chronic medical conditions for surgery.

During the preoperative cardiology assessment, her ejection fraction was 64%, and she was declared fit for general anesthesia and surgery. The pulmonologist suggested breathing exercises and regular spirometry. The patient was referred to the nutrition clinic to improve nutritional staus.

Informed consent for surgery and anesthesia was obtained after completion of interdisciplinary preoperative assessment. The patient was categorized as ASA 3.

The pre-operative abdominal ultrasound reported an enlarged liver and a thick-walled gall bladder containing multiple variable size gall stones, largest 1.4 cm, with a wall thickness of 5.5 mm, in addition to an indwelling stent in the common bile duct.

On September 11, 2024 (day of admission) her blood pressure was 135/72 mm of Hg, hemoglobin A1C 7%, and eGFR 44, indicating moderate renal impairment. Her liver functions, amylase, and lipase were within normal range.

During the laparoscopic cholecystectomy, a thickened, fibrosed and inflamed gallbladder wall (Operative Picture. Cystic Duct (green arrow) and CBD (red arrow).) was visualized. There were dense adhesions in the Calot's triangle, and the thickened wall of gallbladder made dissection from the liver bed difficult, requiring both sharp and blunt dissection. There was no abnormal fluid leak from the liver surface, although a few sinuses at the liver bed required pressure over gauge and coagulation to stop the oozing of blood. In Cystic duct, two stones, were removed by milking them towards the gall bladder neck. The Common bile duct with a stent and a large, shiny, coarse-textured fatty liver were observed. The difficult dissection resulted in intraoperative gallbladder perforation, resulting in bile spillage.

The operative area was washed with normal saline. A 16-CH radiopaque drain was left in the subhepatic space.

On postoperative day (POD) 1, there was 60 milliliters (ml) of serosanguineous fluid in the drain. The patient developed hypoxia requiring oxygen via a nasal cannula. Clinically, atelectasis of the right lower lobe of the lung was suspected. The Chest X-ray confirmed basal pneumonia and atelectasis. The patient was shifted to the high dependency unit.

On POD 2, 120 ml of turbid, milky-yellow fluid was drained (Chyle in drain (Black arrow).), raising the suspicion of a chylous leak, and was sent for analysis. Drainage progressively decreased: 70 ml of milky fluid on POD 3, 30 mls on POD 4, and 10 mls on POD 5, with no fluid collection visualized on ultrasound by POD 6.

Table 1: Drain Fluid Analysis & Serum results (POD 2).

DRAIN FLUID ANALYSIS & SERUM RESULT (POD 2)

TEST	DRAIN RESULT	BODY FLUID REFERENCE	SERUM RESULT	SERUM REFERENCE
TRIGLYCERIDES	1340	< 50 mg/dl	110	40 – 70 mg/dl
Amylase	120	Similar to or lower than serum level	310	Up to 110 IU/L
LYMPHOCYTES	99%	< 50% Predominance	26.2	20% - 40%

Fluid analysis showed an amylase level of 120 IU/L (Normal <110 IU/L) and a serum amylase level of 388 IU/L. Additionally, the triglyceride level was 1,340 mg/dL (normal 40–170 mg/dL), and cytology showed the fluid consisted of 99% lymphocytes and 1% polymorphs. Based on these findings, the clinical diagnosis of a chyle leak was confirmed.

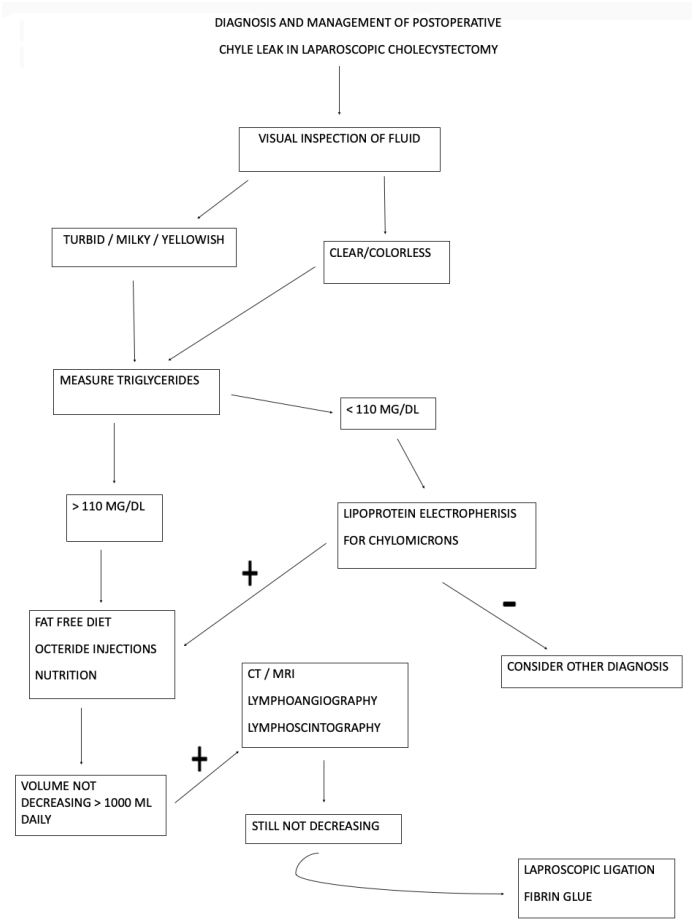

Figure 1: Diagnosis and management of postoperative Chyle Leak in laparoscopic cholecystectomy.

On POD 3, repeat fluid analysis showed amylase 65 IU/L, no bile or red blood cells. The serum amylase had decreased to 88 IU/L The fluid samples collected on post-operative days 1 and 3, which were sent for culture, showed few pus cells and no microbial growth.

On post-operative day 6, the drain was removed.

The patient was managed with a fat-free, high-protein diet, subcutaneous Octreotide 100 mcg[7-9] 8 hourly for 5 days, hydration, electrolyte monitoring and fluid balance correction.

Pulmonary care was provided with chest physiotherapy and incentive spirometry. A broad-spectrum antibiotic, Ceftriaxone for 3 days was prescribed on an empirical basis in consultation with a pulmonologist and infectious disease specialist. Nephrotoxic medications were avoided

The patient recovered from atelectasis and showed a marked reduction in pneumonic changes. The pulmonologist assessed her and advised to continue self-breathing exercises. Patient recovered from acute kidney injury.

Table 2: Pre and Post operative Renal Function). On family's request she was discharged home with early and regular follow up with internal medicine specialties and surgery.

PRE AND POST OPERATIVE RENAL FUNCTION

PRE & POST OPERATIVE DAY	Creatinine (µmol/L)	BUN (mmol/L)	eGFR (mL/min/1.73m^2)
Pre-operative	114	8.3	43
POD 2	362	21.4	11
POD 3	322	21.5	12
POD 4	189	14.5	24
POD 5	172	12.3	26
POD 6	134	10.1	36
POD 88	94	8.9	55
POD 172	90	7.5	57

Histology of the gall bladder confirmed Chronic Calculous Cholecystitis. No complications observed at 3-week, 6-week and 1-year follow-up dates. After her discharge, she was followed up by the Internal Medicine Department for hypertension, diabetes, dyslipidemia and raised serum creatinine and urea. She also attended outpatient surgery consultations on the same days. A follow-up ultrasound was performed after 3 weeks of the surgery; there was no collection in the abdomen.

When last visited one year after surgery, the patient had no symptoms or signs of biliary disease, and she was very reluctant to remove the biliary stent!

Discussion

Chylous leakage after LC is extremely rare, with fewer than 12 cases reported worldwide.[3,4,7,10] This is the first reported case in the United Arab Emirates and the Gulf region. The leak is likely due to iatrogenic injury of lymphatic vessels in the hepatoduodenal ligament or gallbladder bed, especially in inflamed tissues. Risk factors in this case are chronic calculous cholecystitis, prior cholangitis, previous ERCP with stenting, distorted anatomy, and advanced age.

The raised amylase in the drain fluid could be attributed to an increase in serum amylase on POD 2, which may have been caused by the manipulation of biliary passages. The acute kidney injury most likely occurred due to preexisting compromised renal functions, from long-term diabetes and hypertension,

undergoing operative trauma, anesthetic & analgesic drugs, and chest infection, despite all the precautions.

The key clinical feature for diagnosis in these cases is the presence of a milky or yellowish discharge, although in up to 30% of cases the leakage may be colorless.[9] Differential diagnoses considered are bile leak, serosanguineous fluid, and pus. Biochemical confirmation is essential with findings of triglycerides >110 mg/dL and lymphocyte predominance.[11,12] In colorless chyle, electrophoresis and estimating chylomicron levels is helpful.[13] In difficult diagnostic cases, lymphangiography[14] of the biliary system is required. Non-resolving cases can lead to complications of hypoalbuminemia, malnutrition, electrolyte imbalance and immunosuppression.[1,7,15] Secondary organ dysfunction such as acute kidney injury, pneumonia, sepsis risk and prolonged hospitalization, can occur.[7,15]

The cornerstone of therapy is conservative management,[8,9,15] which includes adequate drainage, dietary fat restriction (i.e. fat-free and Medium-chain triglyceride (MCT) diets), octreotide to reduce lymph flow, and fluid and electrolyte monitoring. This requires multidisciplinary support from surgery, nephrology, pulmonary and nutrition teams. For persistent or high-output lymphatic leaks exceeding 1000ml daily, treatment options include lymphangiography with embolization,[14,15] surgical re-exploration with ligation of leaking lymphatic vessels,[4,7,15] the application of fibrin glue[15] to the leaking vessels and rarely requiring peritoneum-venous shunt.[1,15] Options such as Near-infrared Fluorescence (NIRF) Lymphangiography, ICG-guided mapping, contrast-enhanced Magnetic Resonance Lymphangiography and bioengineered sealants, including nanofiber-based adhesives, are emerging tools for operative surgery.[16]

Conclusion

Postoperative chylous leakage after laparoscopic cholecystectomy is exceptionally rare but is potentially serious. Early recognition, drain fluid analysis, combined with dietary modification, octreotide therapy, adequate drainage and multidisciplinary care yield excellent outcomes. Surgeons should maintain a high index of suspicion in patients with persistent postoperative milky yellowish drainage, especially following chronic biliary inflammation or pancreaticobiliary interventions. This is the first case reported from the Gulf region.

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