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ENDOSCOPIC DRAINAGE OF AN INTRA-ABDOMINAL CHYLOUS COLLECTION

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ABSTRACT

Introduction: Chylous leak is an increasingly recognised complication following pancreatic surgery. It results from the disruption of the lymphatic system and may lead to persistent chylous ascites or collection. Ongoing chyle loss is associated with significant morbidity including malnutrition, dehydration, electrolyte disturbance, hypoalbuminaemia, immunosuppression and impaired wound healing. Clinicians managing patients in the perioperative setting should remain vigilant for the development of chylous leak, particularly following high-risk surgery. While most cases respond to conservative management with dietary modification and use of somatostatin analogues, refractory cases remain challenging and may require technically demanding or morbid interventions. We report a novel minimally invasive approach using endoscopic ultrasound-guided cyst gastrostomy for a post-operative chylous collection.

Case description: A 53-year-old woman underwent distal pancreatectomy, splenectomy and lymph node clearance for pancreatic ductal adenocarcinoma with associated extensive lymphadenopathy. On post-operative day seven, she developed abdominal pain and elevated inflammatory markers. Computed tomography demonstrated a 14 × 5 cm thin-walled collection within the lesser sac. Percutaneous drainage yielded turbid milky fluid consistent with chyle. Despite initial conservative management, a persistent high output chyle leak developed. EUS-guided cyst gastrostomy was performed, allowing internal drainage of chyle into the stomach. The patient recovered without complications, resumed oral intake and was discharged two days following the procedure.

Conclusion: EUS-guided cyst gastrostomy may represent a safe, minimally invasive therapeutic option for selected patients with persistent chylous collections. This approach may mitigate risks associated with prolonged or repeated external drainage and facilitate earlier discharge, allowing ongoing outpatient conservative management.

KEYWORDS

Chylous leak, chylous ascites, endoscopic ultrasound, pancreatectomy

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LEARNING POINTS

- Post-operative chylous leak and chylous collections are associated with significant morbidity, particularly when diagnosis is delayed. Perioperative medical teams should maintain a high index of suspicion and actively monitor for this complication following high-risk surgery.
- Persistent chyle loss can lead to malnutrition, dehydration, electrolyte disturbances, immunosuppression, hypoalbuminaemia and impaired wound healing, highlighting the importance of early nutritional, fluid and electrolyte support.
- Endoscopic ultrasound-guided cyst gastrostomy may represent a safe, minimally invasive alternative which allows internal drainage of a chylous collection, ameliorating risks associated with repeated or prolonged external drainage.

INTRODUCTION

Chyle is a milky, lipid-rich lymphatic fluid formed in the small intestine during digestion and transported via the lymphatic system. A chylous leak (CL) is an increasingly recognised complication following pancreatic surgery, occurring in approximately 10% of patients following pancreatic resection[1-3]. In the post-operative setting, CL occurs due to disruption of the lymphatic system. Other aetiologies of CL include cirrhosis, congenital lymphatic malformation, and malignant, traumatic and infective pathologies. CL in the post-operative setting typically presents as ascites, with free fluid within the peritoneum. This often occurs after resumption of enteral intake, with symptoms of increasing abdominal distension and pain. The diagnosis is suspected clinically with the appearance of milky fluid within drainage tubes, with a biochemical profile consistent with chyle; chylomicron-rich fluid with a triglyceride concentration ≥110 mg/dl and low amylase and bilirubin concentrations. CL is associated with increased morbidity and mortality in the setting of sequelae including hypoalbuminaemia, immunosuppression, malnutrition, dehydration and impairment of wound healing[1,4]. Conservative management primarily revolves around dietary intervention, often in combination with somatostatin analogues to reduce production of chyle. Refractory cases may require interventions such as lymphangiography with embolisation, a highly specialised and technically difficult treatment, or surgical treatment which may be associated with increased morbidity and mortality[3]. This is a case of a persistent chylous collection (CC) following distal pancreatectomy successfully managed with minimally invasive endoscopic ultrasound (EUS)-guided cyst

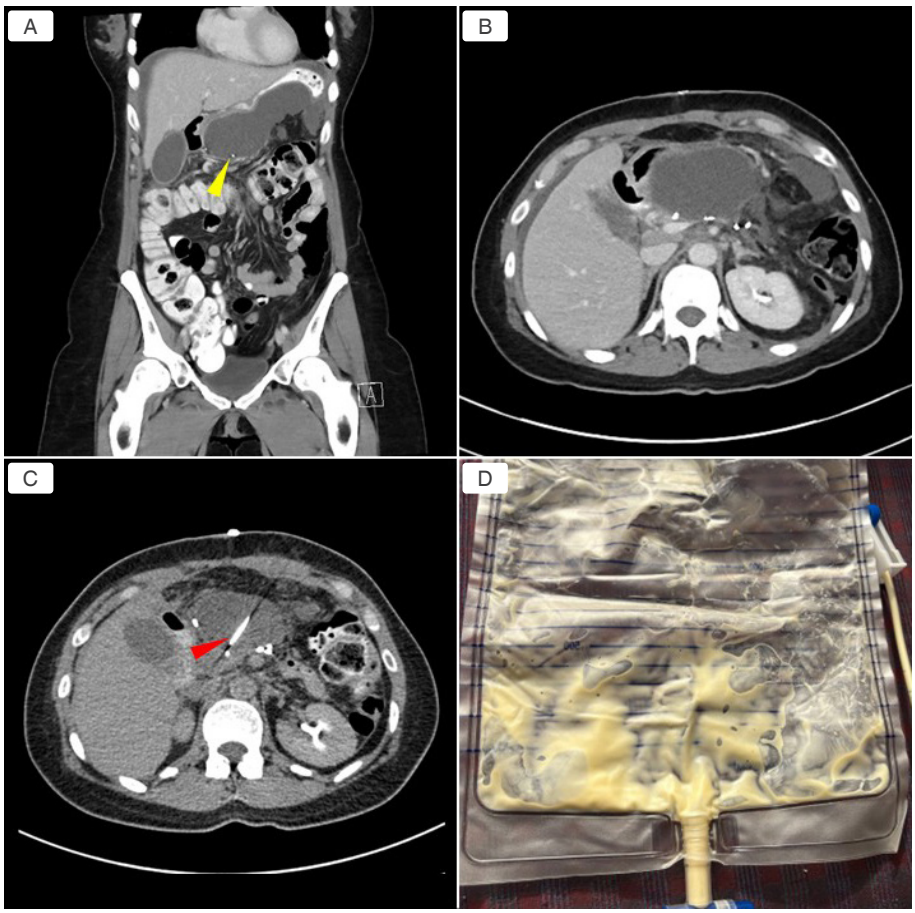


Figure 1. *A) Coronal and B) sagittal views from the initial computed tomography (CT) scan of the abdomen and pelvis demonstrating a 14 × 5 cm thin-walled collection (yellow arrow) within the lesser sac of the abdomen, anterior to the peripancreatic surgical bed; C) CT-guided percutaneous drainage of the chylous collection (red arrow); D) Appearance of chyle within the drain bag.*

gastrostomy, highlighting a novel therapeutic approach in this setting.

CASE DESCRIPTION

A 53-year-old woman presented with abdominal pain and weight loss. Imaging demonstrated a pancreatic mass and extensive upper abdominal and mediastinal lymphadenopathy concerning for lymphoma. An EUS-guided fine needle biopsy of the pancreatic mass confirmed pancreatic ductal adenocarcinoma. The patient subsequently underwent distal pancreatectomy and splenectomy with lymph node clearance. The latter component was completed to assess for metastatic disease versus a potential concomitant lymphomatous process. The early post-operative period was uncomplicated. On post-operative day seven, the patient developed upper abdominal pain radiating to the left shoulder tip. Laboratory investigations demonstrated leucocytosis (14.6 $\times 10^9$/l) and C-reactive protein of 56 mg/l. Computed tomography of the abdomen demonstrated a thin-walled 14 × 5 cm fluid collection within the lesser sac, anterior to the pancreatic surgical bed *(Fig. 1A and 1B)*.

Radiological percutaneous drainage was performed with placement of a pigtail drain tube, which yielded a turbid milky fluid consistent with CL *(Fig. 1C and 1D)*. Fluid analysis demonstrated low amylase and negative microscopy and culture results. Despite conservative management with fasting, there was ongoing drain output of 700–800 ml per day. Given persistently high output, a decision was made to pursue EUS-guided drainage with cyst gastrostomy.

During the EUS procedure, a 5 × 6 cm hypoechoic collection abutting the posterior gastric wall was identified. An EUS-guided cyst gastrostomy was performed under fluoroscopic guidance as follows *(Fig. 2)*: (i) needle puncture across the gastric wall into the collection using a 19 G FNA needle (Expect™ Slimline, Boston Scientific); (ii) placement of a guidewire (450 cm Hydra Jagwire™, Boston Scientific); (iii) dilatation of the tract using a 6 mm dilation catheter (Hurricane™ RX, Boston Scientific); (iv) placement of a 10 Fr catheter over the wire to facilitate insertion of a second 450 cm guidewire; (v) insertion of two 7 Fr × 4 cm double pigtail plastic stents (DPPS), followed by brisk drainage of milky fluid into the stomach. The post-procedure course was uncomplicated, with the patient being discharged two days later after resumption of a normal diet. On follow-up, the patient remained well without nutritional compromise, with normalisation of laboratory results. She went on to have systemic therapy for metastatic pancreatic adenocarcinoma.

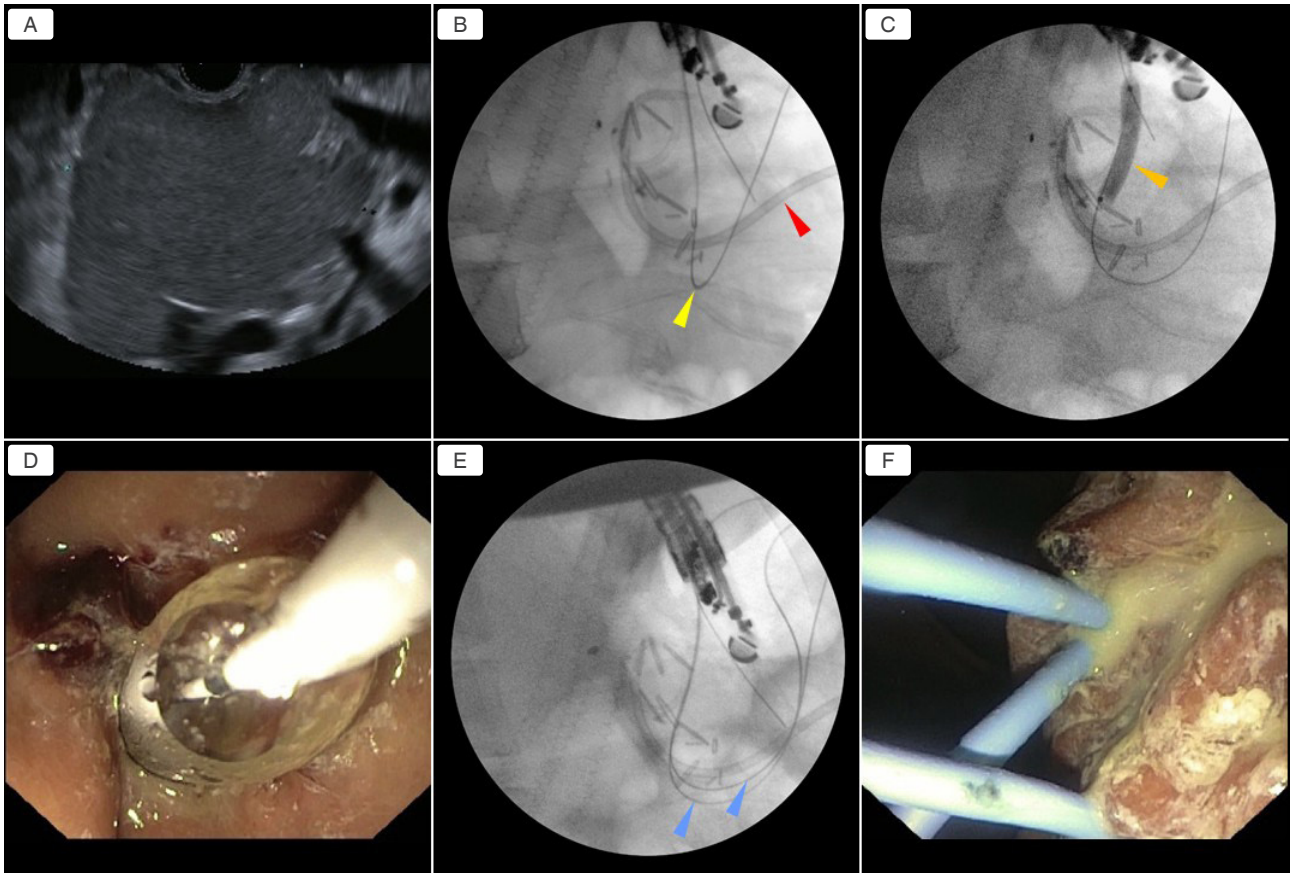


Figure 2. *A) Endoscopic ultrasound demonstrating a 5 × 6 cm uniformly hypoechoic collection abutting the posterior gastric wall; B) Fluoroscopic image of initial needle puncture and placement of guide wire (yellow arrow). The external percutaneous drain tube (red arrow) is superimposed; C) Fluoroscopic image and D) endoscopic image of dilatation of needle tract using dilation catheter (orange arrow); E) Fluoroscopic image demonstrating placement of both guidewires (blue arrows); F) Endoscopic image of two double pigtail plastic stents with drainage of chyle into the stomach.*

DISCUSSION

Post-operative CL is a recognised complication of abdominal surgery, particularly following pancreatic surgery. The risk increases in operations involving extensive lymphadenectomy, where inadvertent disruption of the lymphatic drainage system can occur, most notably at the level of the cisterna chyli or its major tributaries[1,4]. In this case, key risk factors for the development of CL were pancreatic surgery with extensive para-aortic lymphatic clearance and possible malignant obstruction of the thoracic duct secondary to significant mediastinal lymphadenopathy.

The initial management of a CL is typically conservative. First-line therapy involves dietary intervention with a high protein, low fat diet enriched with medium-chain triglycerides to reduce lymphatic flow from the intestine. Total parenteral nutrition is an alternative option, particularly in patients who are unable to meet nutritional requirements, or those who fail initial dietary intervention; resolution rates range from 60–100%[5]. Somatostatin analogues can further reduce lymphatic flow, and in combination these strategies can successfully manage most CLs[3], but management of refractory CL remains challenging. While percutaneous drainage can be a temporising measure, repeated or prolonged external drainage can exacerbate malnutrition, dehydration and electrolyte imbalance. Lymphangiography and lymphoscintigraphy are minimally invasive options with success rates from 35–70%[3]; however, these approaches are technically demanding and not widely available[6]. Surgical approaches, including lymphatic ligation or peritoneovenous shunt placement, are generally reserved for persistent cases due to their association with significant morbidity and mortality[5].

This case demonstrates the successful use of EUS-guided cyst gastrostomy to manage a CC following post-operative CL, utilising techniques analogous to those established for pancreatic fluid collections. Similar endoscopic techniques have been described in a small number of reports involving chylous collections arising in non-operative settings, including pancreatic cystic lymphangiomas[7,8]. There are several potential advantages to EUS-guided cyst gastrostomy in the management of isolated CL and CC. EUS-guided transmural drainage is a well-established, safe and efficacious technique used to manage pancreatic collections. Compared with percutaneous drainage, it is associated with shorter hospital stays, improved patient satisfaction and reduced risk of external fistula formation, while maintaining comparable clinical efficacy[9]. Internal drainage of CCs may provide additional physiological advantages; by diverting extravasated chyle into the gastrointestinal lumen, this approach facilitates reabsorption and recycling of lost lymphatic fluid, thereby mitigating the risks of malnutrition, dehydration and electrolyte imbalance associated with prolonged external drainage. Additionally, DPPS can remain in situ long term, while adjunctive conservative therapies can be continued as needed.

There are several important considerations to guide patient selection for EUS-guided cyst drainage. Individuals must be fit for anaesthesia, as the procedure is performed under general anaesthesia, although procedural duration is relatively short (generally between 30 and 40 minutes). The anatomical position of the CC is also critical; the collection must be accessible and closely apposed to the gastrointestinal lumen to permit safe drainage. In this case, the collection was located within the lesser sac abutting the gastric body. In addition, the stent type and size warrant careful consideration. In this case, two 7 Fr DPPS were placed, with the intention to leave them in situ indefinitely. This has the advantage of requiring only one procedure, with the plastic stents carrying a low risk of post-procedural complications such as haemorrhage. The main disadvantage of using DPPSs relates to the technical challenges of their placement, with the need for multiple instrument exchanges to facilitate tract dilatation and stent insertion. While CCs are by definition fluid-filled, the viscous nature of chyle conveys a risk of stent occlusion. Similar challenges have been observed historically with peritoneovenous shunts, where frequent blockage has been reported[4,6]. An alternative would be to use lumen apposing metal stents which provide a larger diameter (6–20 mm), reducing the risk of stent occlusion. Despite this theoretical advantage, these stents may not be ideal for this indication due to the associated risk of bleeding, their short-term utility (4–6 weeks) and the need for a further endoscopic procedure to remove the stent[9].

This case demonstrates the successful use of EUS-guided cyst gastrostomy for a CC complicating distal pancreatectomy, splenectomy and lymph node clearance. EUS-guided cyst drainage may represent a valuable addition to the treatment algorithm for selected patients with post-operative CCs.

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