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Case Report

Spontaneous falciform ligament necrosis: A rare case report[☆]

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ABSTRACT

Spontaneous and isolated necrosis of the falciform ligament is a rare condition. A 55-year-old lady presented with sudden onset of epigastric pain, fever and vomiting. Laboratory studies revealed less than three-fold increase in serum amylase and lipase levels. Ultrasound examination and contrast enhanced computed tomography (CECT) revealed features suggestive of inflammation and necrosis of the falciform ligament involving ligamentum teres hepatis and extending to the lesser omentum with an adjacent minimal ill-defined collection. Then, conservative management was started. However, the symptoms did not resolve completely. Therefore, CECT scan was repeated 12 days later which showed findings similar to previous scan with expansion and organization of the collection anterior to lesser omentum with peripheral enhancement, suggestive of an abscess. A minimally invasive approach to treatment was adopted. Aspiration of the collection was performed under ultrasound guidance. This was followed by continuation of supportive management. The patient improved clinically and was discharged. This case study highlights the importance of imaging in the diagnosis of falciform ligament necrosis. An innovative minimally invasive approach to treatment in the form of ultrasound guided aspiration may be considered when a collection is present adjacent to the necrosed falciform ligament.

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Introduction

The falciform ligament connects the liver to the anterior abdominal wall, diaphragm, and ligamentum teres hepatis [1,2].

It is also the landmark that separates the right and left lobe of the liver. Physiologically, the falciform ligament consists only of a double fold of peritoneum and connective tissue [1,2].

Pathologies of the falciform ligament including malignancies and infections due to secondary spread from the liver and

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Table 1 – Blood test parameters at various points during treatment.

Laboratory Parameter	Level at presentation	Day 2	Day 6	Day 13	Laboratory reference range
Total leukocyte count	11,860		8110	5400	4000-11,000 /cumm
Differential leukocyte count					
Neutrophils	78		81	57	40%-70%
Lymphocytes	19		16	35	20%-45%
Hemoglobin	10.8		9.9	10	12-16 gm%
Platelets	2,72,000		2,19,000	3,50,000	1,50,000-4,00,000 /cumm
Serum Amylase		154			0-100 U/L
Serum Lipase	796	464			23-300 U/L

portal circulation have been documented [3,4]. The spread is attributed to the close proximity to the liver and porta hepatis as well as the lymphatic communication with the liver. However, the falciform ligament is seldom associated with any primary pathology [2].

Very rarely, the falciform ligament may undergo inflammation and necrosis [2,5]. This can lead to clinical features of inflammation including abdominal pain in the epigastric and right hypochondriac regions [5,6]. Due to the rarity of this condition and the clinicians' tendency to prioritize other common causes of abdominal pain, the diagnosis may be delayed or missed [6,7].

Here we report a case of a 55-year-old, otherwise healthy lady who suffered from spontaneous falciform ligament necrosis. We also discuss on our unique approach in the treatment of the condition. This study has been performed in accordance with the Case Report (CARE) guidelines [8].

Case presentation

A 55-year-old lady presented to the emergency department complaining of abdominal pain in the epigastric region for 2 days, fever for 2 days and 4 episodes of vomiting over 1 day. She did not suffer from any chronic illnesses, did not smoke and did not consume alcohol. On examination, tenderness was present over the epigastric region. All other parameters of systemic examination, general physical examination and vital signs were within the normal limits.

The patient was initially managed with intravenous fluid resuscitation, intravenous paracetamol as an antipyretic, intravenous pantoprazole, intravenous tramadol, intravenous ondansetron, regular monitoring of vital signs and continuous observation.

Complete blood count revealed leukocytosis with neutrophilia as listed in Table 1. Liver function test and renal

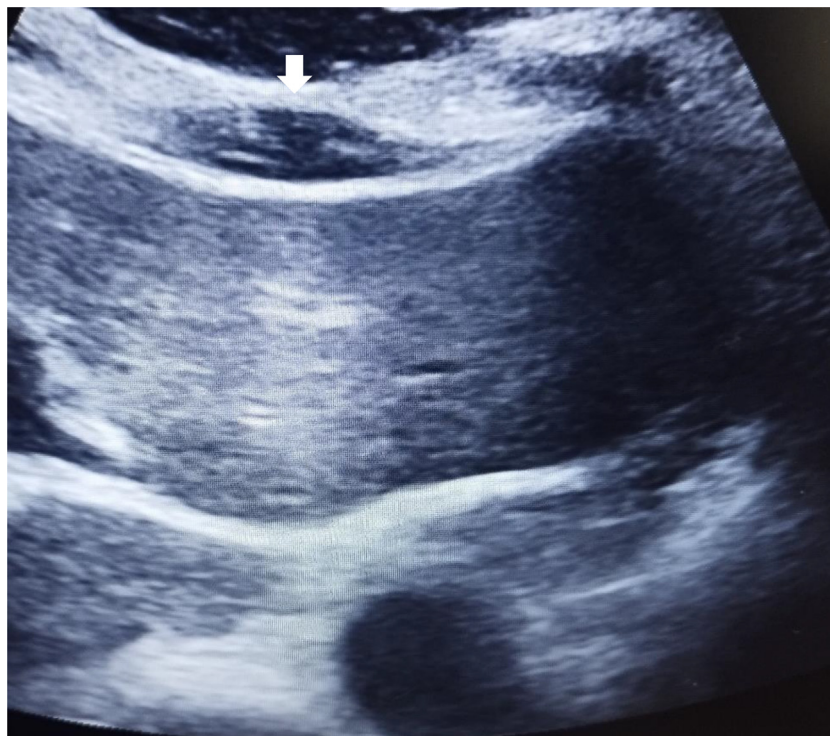


Fig. 1 – Showing ill-defined hypoechoic area along the course of falciform ligament (Bold white arrow).

function test parameters were all within the normal limits. Serological tests for enteric fever, *Leptospira*, scrub typhus, malaria, kalazar, were all negative.

Ultrasound examination revealed increased echogenicity in the region of the falciform ligament (not shown) with ill-defined hypoechoic area along the course of falciform ligament (Fig. 1). Following this, Contrast enhanced computed tomography (CECT) was done for further characterization which revealed an ill-defined heterogeneously hypodense lesion of soft tissue attenuation along the fissure for falciform ligament with areas of fluid and fat attenuation within. Gall bladder and pancreas were normal without evidence of inflammation or fat strandings ruling out acute cholecystitis or acute pancreatitis as a cause of pain (Fig. 3).

The lesion extended along the free edge of the falciform ligament involving the ligamentum teres hepatis and also extending out of the fissure inferiorly in the lesser omentum just proximal to the level of umbilicus (Fig. 4). These findings were suggestive of inflammation and necrosis of the falciform ligament.

The patient was managed conservatively with antibiotics (injection meropenem and injection levofloxacin), intravenous fluid resuscitation, intravenous antipyretic (paracetamol), intravenous analgesic (tramadol) and intravenous antiemetic (ondansetron). The patient's symptoms gradually improved. By the fifth day of admission, fever as well as vomiting had subsided and abdominal pain had decreased in severity. Total leucocyte count had normalized but neutrophilia was still present as shown in Table 1. However, the patient's abdominal pain did not subside completely despite 12 days of conservative in-patient management.

Hence, CECT scan was repeated 12 days later which showed similar features of inflammation and necrosis of the falciform ligament with similar extensions. Furthermore, the fluid collection had become organized with peripheral enhancement on post-contrast study (Fig. 5). These features were suggestive of an abscess. The collection amounted to approximately 13 mL.

Then, ultrasound was used to visualize the collection as shown in Fig. 2. Under ultrasound guidance approximately 10 mL of purulent material was aspirated from the collection adjacent to the falciform ligament using a Chiba needle as shown in Fig. 6. Culture and sensitivity examination of the aspirated purulent material did not show growth of any organism.

After aspiration of the purulent material, supportive management was continued. Thereafter, the patient's symptoms decreased significantly. The patient was discharged on the 17th day of admission with a prescription of tablet pantoprazole and tablet paracetamol for 2 days. The patient did not have any medical complaints on her follow-up visits 2 weeks and 2 months after discharge.

Discussion

Inflammation of the falciform ligament is reported to be common in patients with inflammatory conditions affecting the adjacent structures. Such conditions include

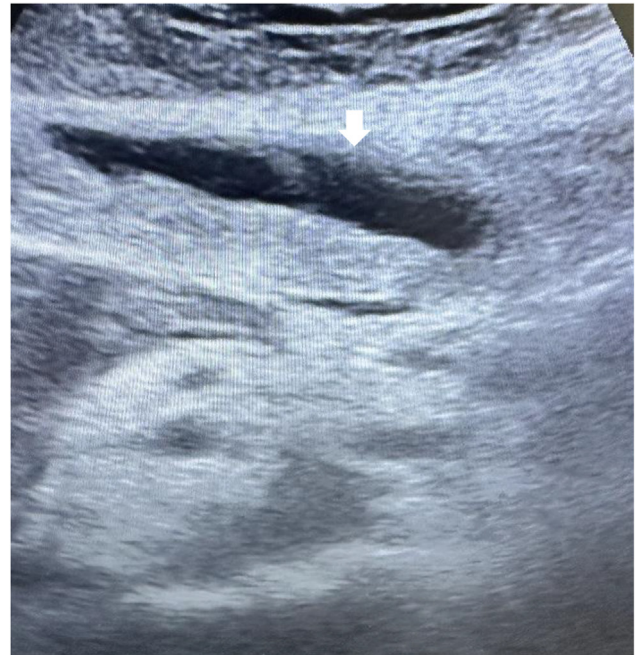


Fig. 2 – Showing well defined hypoechoic collection in the region of falciform ligament (Bold white arrow) extending adjacent to anterior abdominal wall (Open white arrow). The collection has increased and have become organized as compared to previous USG.

acute cholecystitis, acute pancreatitis, tumors, and internal hernias [9].

Isolated inflammation of the falciform ligament without any primary pathology is rare. It is thought to be a subset of pathologies called intra-peritoneal focal fat infarction. Some possible causes of a focal and isolated inflammation of the falciform ligament include torsion of a fatty appendage of the falciform ligament, arterial embolization and spontaneous

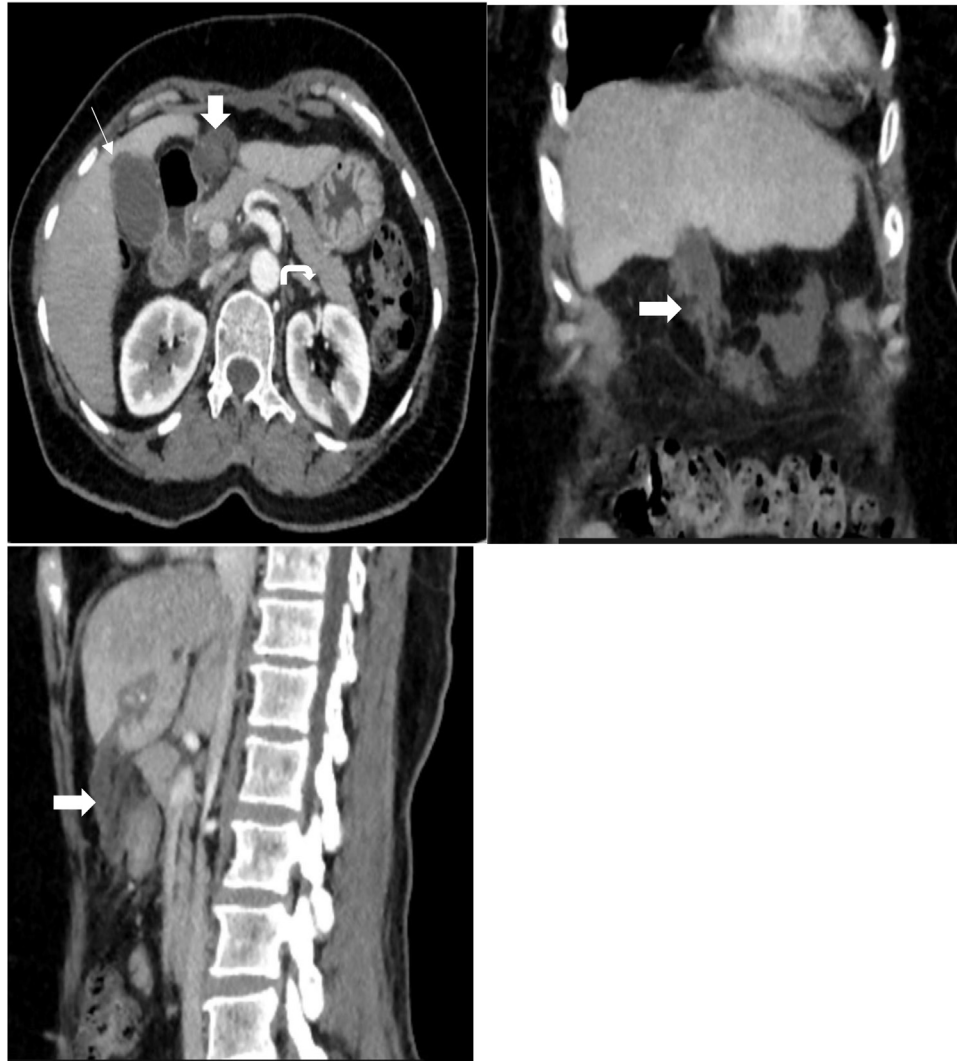


Fig. 3 – Axial, coronal, and sagittal CECT (Abdomen and pelvis) findings showing ill-defined non enhancing soft tissue attenuating lesion along fissure for falciform ligament with areas of fluid and fat attenuation (White bold arrow). Gall bladder (thin white arrow) and pancreas (Curved white arrow) are normal without evidence of inflammation or fat strandings.

thrombosis of the central draining vein [10,11]. It is proposed that twisting of an appendage of falciform ligament can cause narrowing of the blood vessels leading to ischemia, thrombosis, infarction, and necrosis [5].

Patients with falciform ligament necrosis usually present with a sudden onset of epigastric or right hypochondriac pain [5]. Previous reports indicate that lab studies may show findings suggestive of inflammation including increase in white blood counts and CRP [5]. However, lab findings were normal in a significant number of reported cases [5]. The clinical and lab findings in our case were consistent with this previously reported pattern of presentation of falciform ligament necrosis.

Owing to the nonspecific clinical and laboratory findings, this condition can mimic other common surgical pathologies including acute appendicitis, cholecystitis, pancreatitis, hepatitis and bowel perforation [5]. Hence, imaging is of

paramount importance in the diagnosis of falciform ligament necrosis. In our case, elevated levels of serum amylase and lipase led to an initial suspicion of acute pancreatitis. However, the levels weren't raised 3-folds, hence further imaging was performed [12].

Ultrasound examination of the abdomen is usually the first imaging modality used [5]. Findings include increased size and echogenicity of falciform ligament with hypoechoic areas within it denoting fat necrosis [9]. Probe tenderness in the epigastric area has been reported in some cases [9]. Associated lipomas, cysts or abscesses may also be seen. Contrast enhanced computed tomography (CECT) is used as a confirmative test. It usually shows a thickened falciform ligament with fat stranding and variable enhancement on postcontrast study [9,13]. The diagnosis in our case was based on the presence of thickened falciform ligament with features of inflammation and adjacent collection. Presence of other associated

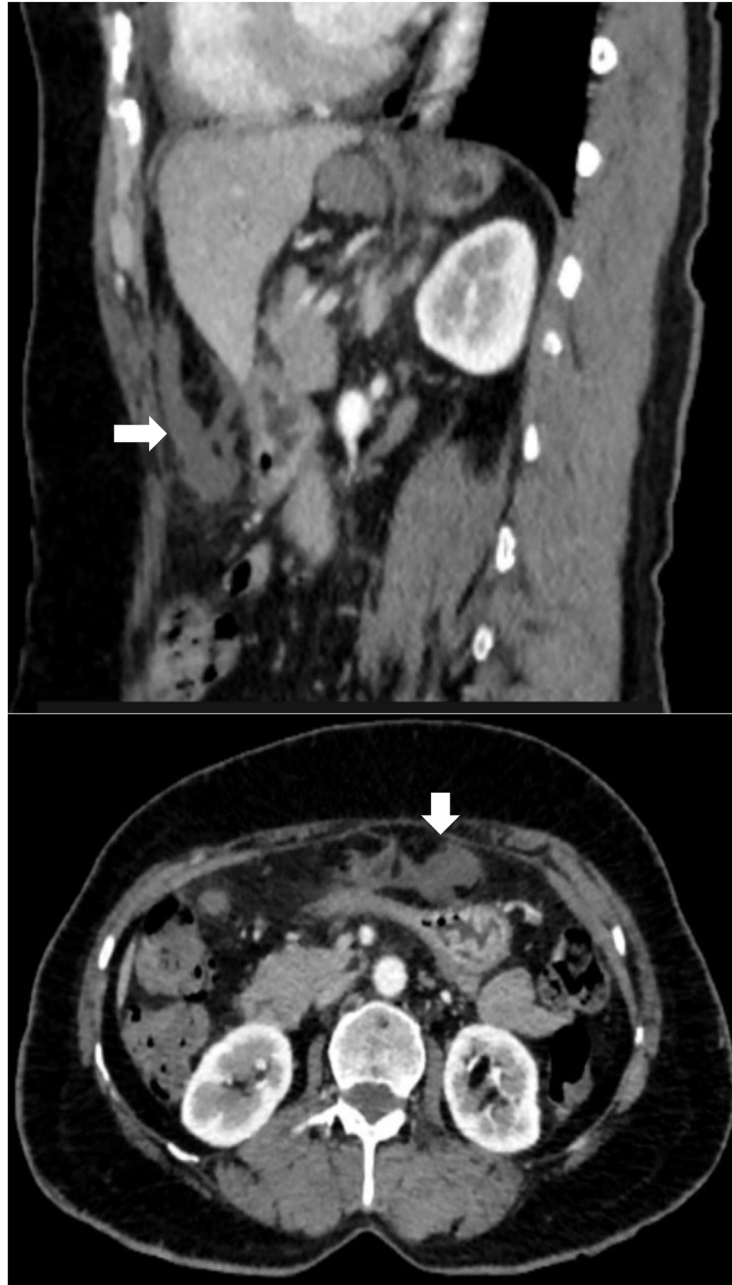


Fig. 4 – CECT sagittal and axial CECT (Abdomen and pelvis) showing extension of the soft tissue areas inferiorly in the lesser omentum just proximal to umbilicus (White bold arrow).

pathologies was excluded on the basis of laboratory and imaging findings.

Two approaches to the treatment: conservative and operative have been described previously [5]. Conservative management consists of fluid supplementation, electrolyte correction, analgesics, and close observation [6]. In a significant number of patients, failure of conservative management and subsequent surgery has been documented [5,6]. Surgical approaches

include laparotomy or laparoscopy with resection of the falciform ligament [6]. Following thorough discussions within the Department of Gastrointestinal Surgery as well as with the patient and her family, a conservative approach to her treatment was started. When the patient's symptoms did not subside, we opted for a minimally invasive approach in the form of ultrasound guided aspiration of collection.

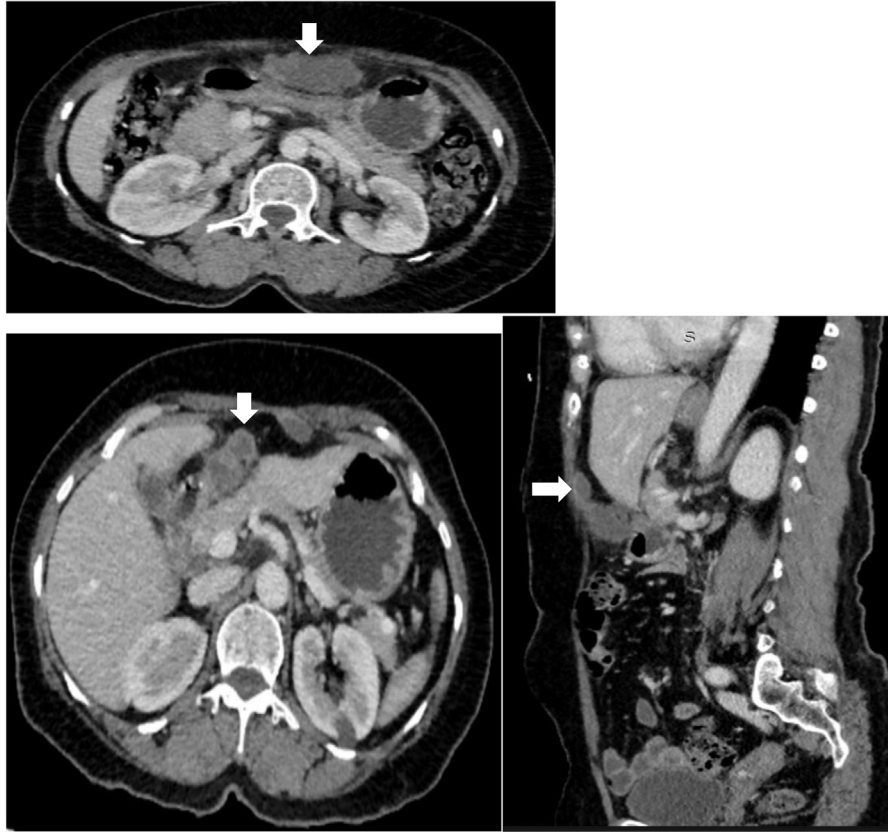


Fig. 5 - Axial and sagittal CECT (Abdomen and pelvis) showing collection along falciform ligament and lesser omentum has increased and become organized with peripheral enhancement on contrast suggestive of abscess (white bold arrow).



Fig. 6 - Ultrasound guided aspiration of purulent collection.

Conclusion

Falciform ligament necrosis is a rare condition that presents with clinical features that can mimic other common abdominal pathologies. Hence, this condition should be kept under consideration as a rare possibility when evaluating a patient with epigastric or right upper quadrant pain. Imaging is crucial for diagnosis and exclusion of other pathologies. When a collection is present adjacent to the necrosed falciform ligament, minimally invasive approach to treatment in the form of ultrasound guided aspiration of the collection may be considered.

Patient consent

Informed consent has been obtained to include case details, personal information and images of the patient in publication.

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