

Intraperitoneal Focal Fat Infarction of the Falciform Ligament: A Report of Two Cases

Chen MY, BA¹ | Pahwa A, MD² | Beckett K, MD²

Author Affiliation: ¹Tulane University School of Medicine
²Department of Radiological Sciences, David Geffen School of Medicine at UCLA

Corresponding Authors: M.Y.C. (mchen23@tulane.edu)

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Abstract: Falciform ligament appendagitis (FLA) is a rare cause of intraperitoneal focal fat infarction (IFFI) characterized by the torsion of a fatty appendage related to the falciform ligament. FLA demonstrates characteristic features on computed tomography (CT), especially the hyperattenuating ring sign. Because of these characteristic features, a diagnosis of FLA can be achieved with CT alone. By recognizing the signs of FLA, radiologists can prevent unnecessary surgical intervention. We report two cases of FLA with associated images to assist radiologists in diagnosing this rare entity.

Keywords: *falciform ligament, epigastric pain, appendagitis, focal fat infarction, epiploic appendagitis*

Case Presentation 1

An 84-year-old man with a history of atrial fibrillation, hypertension, hypercholesterolemia, obstructive sleep apnea, and obstructive uropathy presented with abdominal pain. The patient reported the pain began suddenly the previous day when it awoke him from sleep. Subsequently, the patient experienced 3 episodes of nonbilious and nonbloody emesis. The patient reported having experienced a similar episode 6 months prior. Thickening of the gallbladder wall was visualized on ultrasound, and bloodwork revealed transaminitis, direct hyperbilirubinemia, and leukocytosis. As a result, the patient was admitted under suspicion of cholecystitis.

Computed tomography (CT) of the abdomen revealed a thin, high-density ring encapsulating the falciform ligament and surrounded by fat stranding (Figures 1A, 1B, and 1C). Prior magnetic resonance cholangiopancreatography (MRCP) revealed no gallstones or biliary ductal dilatation but did reveal mild edema along the falciform

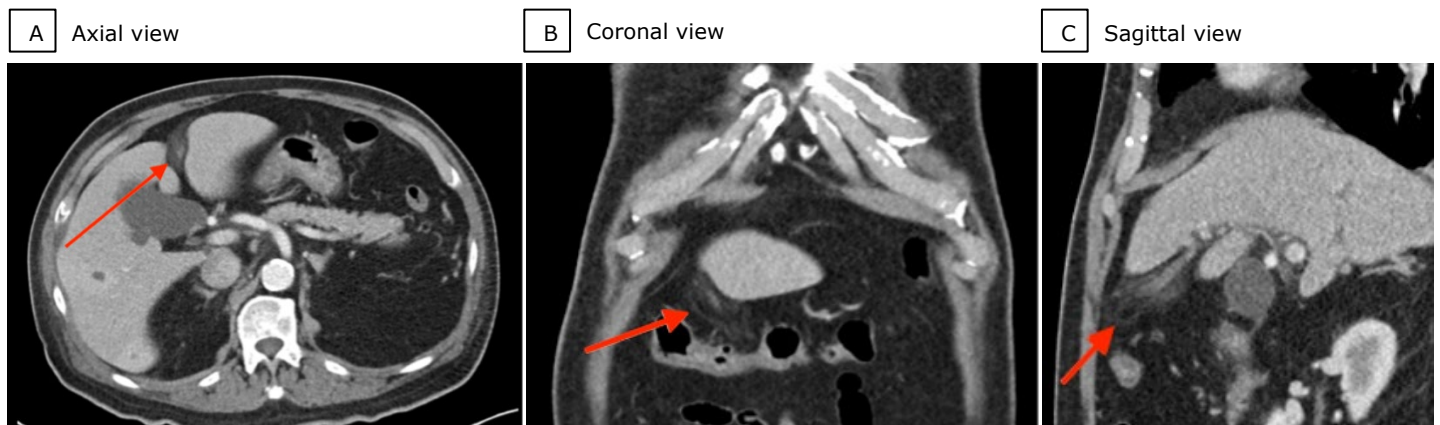
Key Points

- CT can be an effective imaging modality when diagnosing intraperitoneal focal fat infarction, including cases caused by falciform ligament appendagitis, due to the characteristic hyperattenuating ring and central dot signs.
- Accurate and early diagnosis of FLA by CT can prevent unnecessary surgical intervention.

ligament that was not recognized on CT (Figures 2A and 2B).

Elective cholecystectomy was deferred due to acute hypoxic respiratory failure and the absence of conclusive evidence indicating pathology of the gallbladder on subsequent imaging. The results of a later laboratory workup, which included tests for bilirubin and creatinine levels, showed that the patient's liver function had improved significantly since the time of presentation. Consequently, the patient was discharged, mirroring the hospital course typically observed in documented cases of falciform ligament appendagitis (FLA).

Figure 1. Computed Tomography (CT) of the Abdomen of an 84-Year-Old Man (Case 1).



(A) Axial CT revealed fat stranding around the falciform ligament (A, red arrow). (B) Coronal and (C) sagittal reconstructed images visualize an ovoid hyperattenuating ring sign in the anterior perihepatic space adjacent to the falciform ligament with surrounding inflammatory changes (B and C, red arrows), characteristic of focal fat infarction.

Timeline 1. A Timeline of the Diagnosis and Treatment of FLA in an 84-Year-Old Man (Case 1).

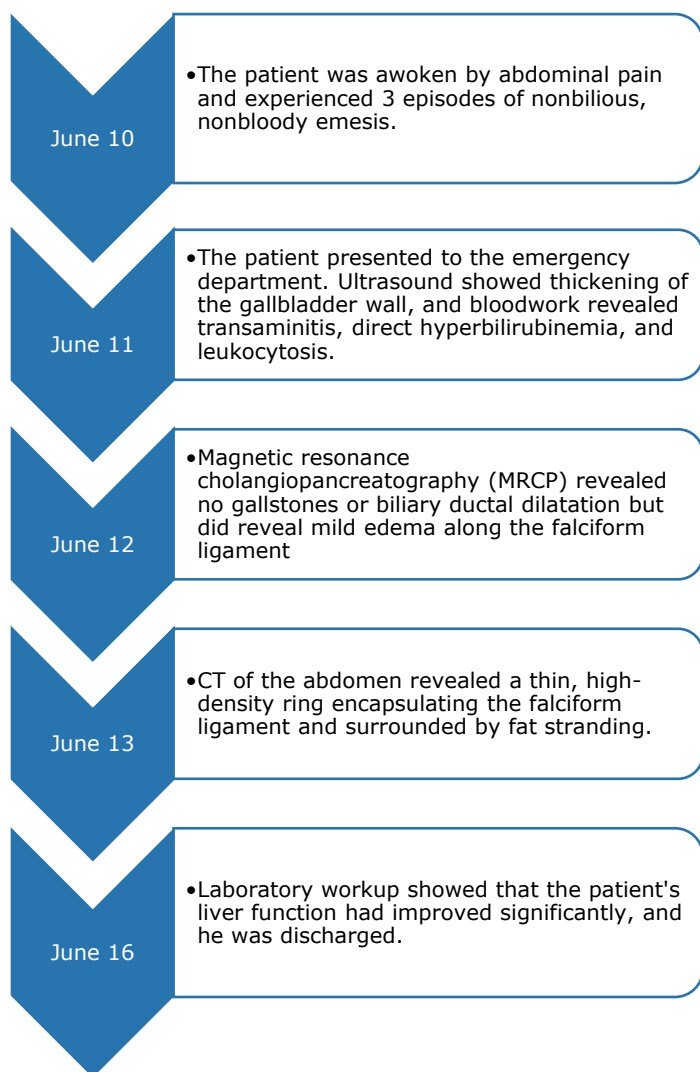
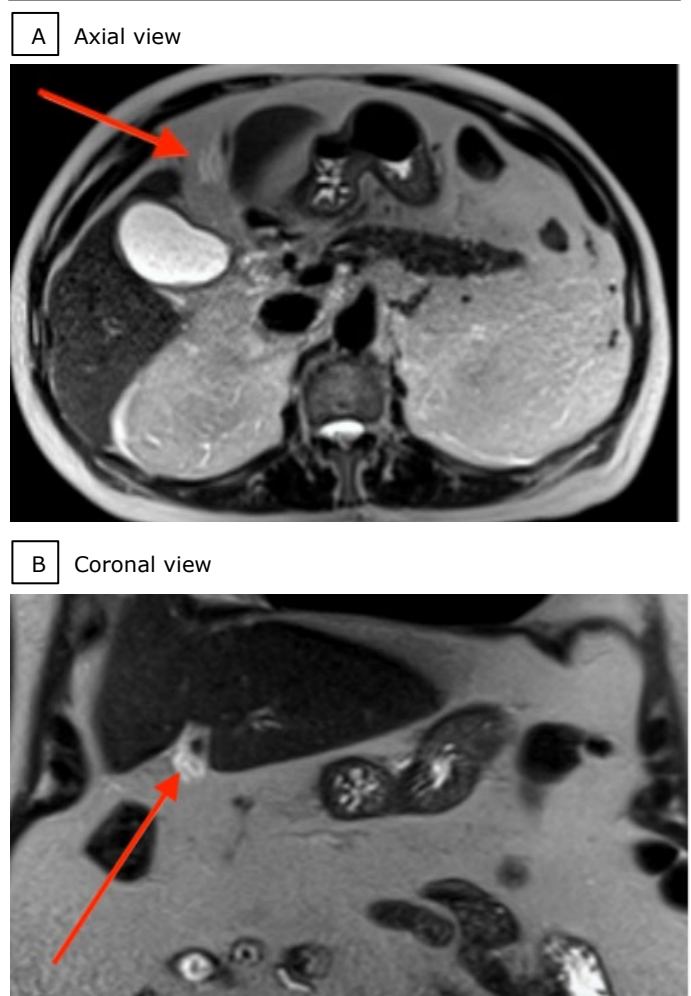


Figure 2. Magnetic Resonance Cholangiopancreatography (MRCP) of the Abdomen of an 84-Year-Old Man (Case 1).



(A) Axial and (B) coronal views demonstrate focal T2 hyperintensity along the falciform ligament.

Case Presentation 2

A 29-year-old woman with a history of type 2 diabetes presented for epigastric abdominal pain, nausea, and vomiting. The patient stated that the nausea began 3 weeks prior and that the nonbilious, nonbloody emesis began 4 days before presentation. She described the pain as non-radiating with an intensity of 7 out of 10 at its worst. The patient was hospitalized for acute hepatitis, which was likely multifactorial given new diagnoses of hepatitis C, ischemic hepatitis, and underlying nonalcoholic fatty liver disease.

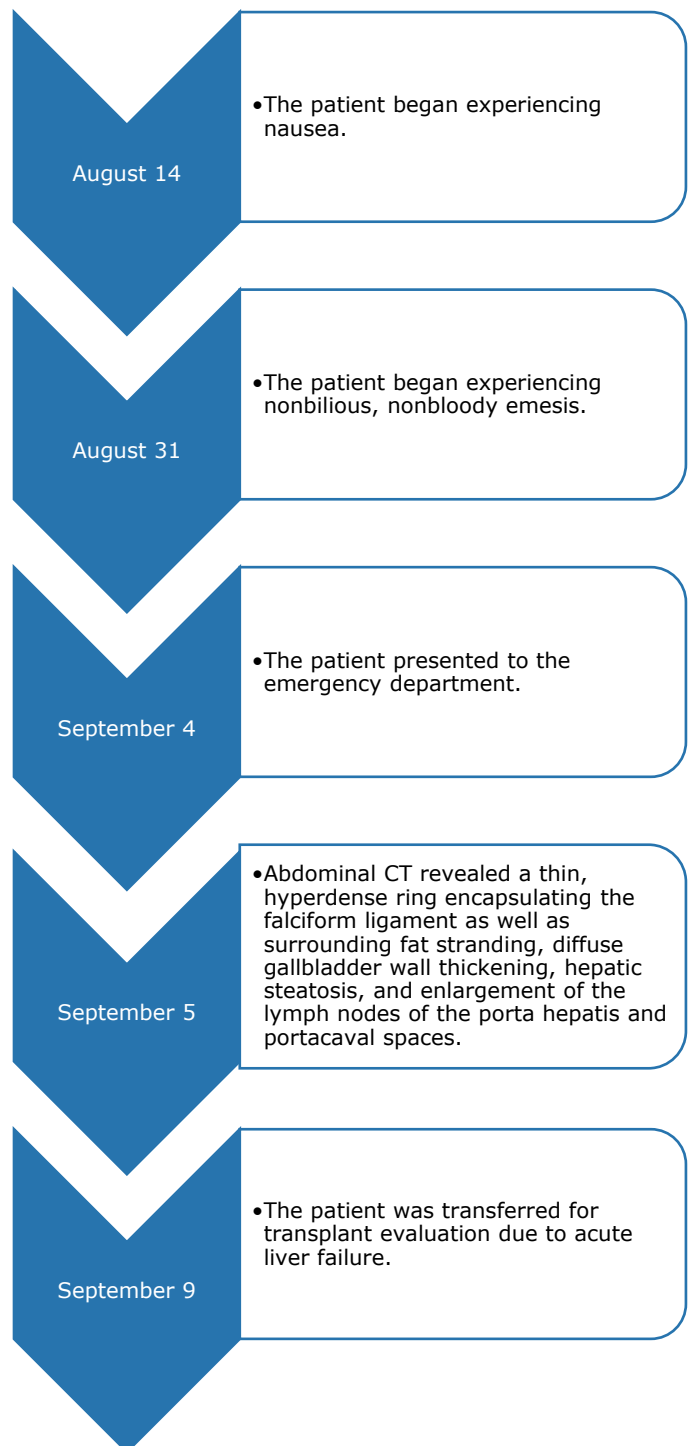
Abdominal CT revealed a thin, hyperdense ring encapsulating the falciform ligament, as well as surrounding fat stranding, diffuse gallbladder wall thickening, hepatic steatosis, and mild enlargement of the lymph nodes of the porta hepatis and portacaval spaces (Figures 3A and 3B). The gallbladder wall thickening and mild lymphadenopathy were thought to be secondary to acute hepatitis, and the patient was diagnosed with intraperitoneal focal fat infarction (IFFI) related to torsion of a fatty appendage of the falciform ligament. The patient was transferred for transplant evaluation due to acute liver failure.

Discussion

IFFI commonly involves epiploic appendages—protrusions of subserosal colonic fat that line the peritoneum adjacent to the anterior and posterior tenia coli—and the greater omentum.¹⁻³ However, IFFI can also rarely involve perigastric ligaments, including the gastrohepatic, gastrosplenic, and falciform ligaments,³ the latter of which is a bilayered peritoneal fold that runs from the upper edge of the liver to the lower margin of the diaphragm, creating a structural division between the liver's right and left lobes. This ligament extends from the parietal peritoneum, which lines the front of the abdominal wall, to the visceral peritoneum, covering the surface of the liver. This separation plays a role in dividing the upper part of the supramesocolic region into distinct right and left subphrenic spaces.

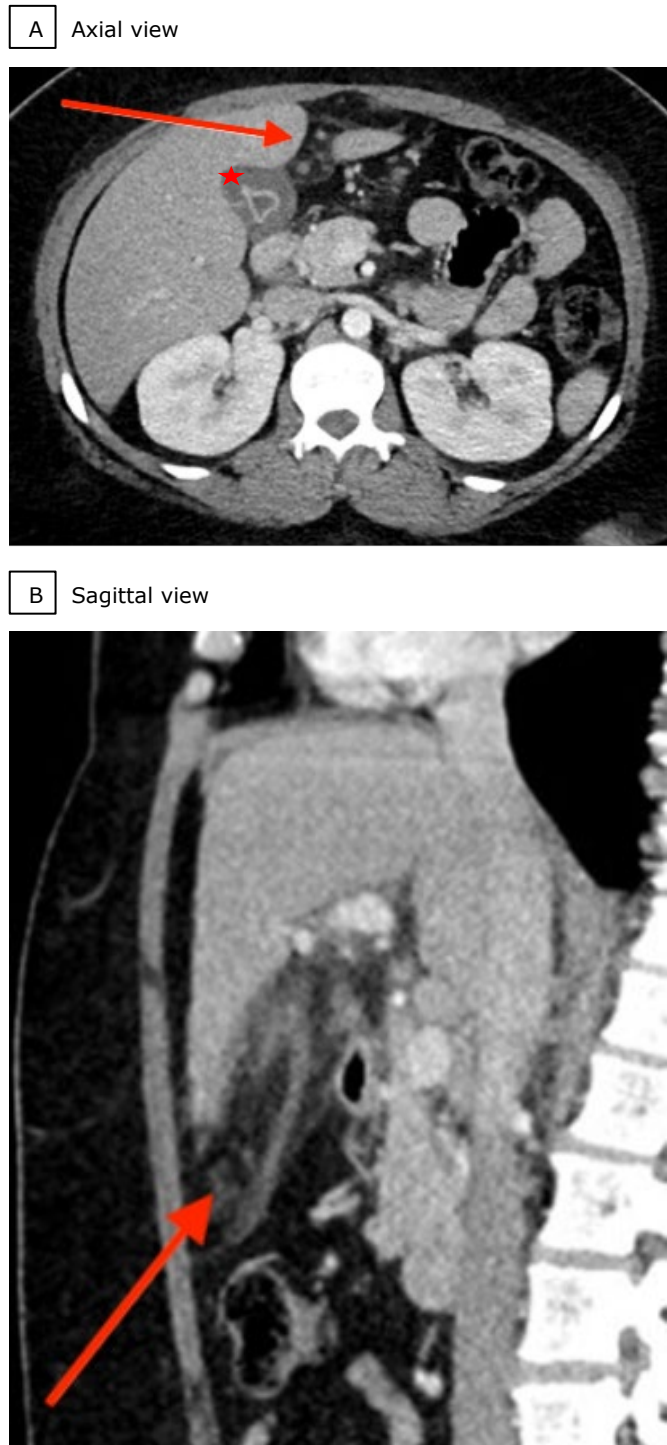
IFFI involving the falciform ligament is caused by FLA. This is a rare entity, with just over 20 cases reported in the literature; however, the occurrence may be much higher, as reports have

Timeline 2. A Timeline of the Diagnosis and Treatment of FLA in a 29-Year-Old Woman (Case 2).



increased dramatically in recent years due to improvements in imaging technology.¹ Patients typically present with nonspecific localized epigastric pain that can mimic cholecystitis, pancreatitis, or gastritis.¹

Figure 3. Computed Tomography (CT) of the Abdomen of a 29-Year-Old Woman (Case 2).



(A) Axial and (B) sagittal views show characteristic findings of focal fat infarction along the falciform ligament with surrounding inflammatory changes (A and B, red arrows). Severe edema of the gallbladder wall, likely a reaction to acute hepatitis, can also be seen (A, red star).

CT can be an effective diagnostic imaging modality due to the characteristic imaging features of FLA.³ CT scans of intra-abdominal focal fat infarction and epiploic appendagitis typically reveal an area of fat density accompanied by a thin peripheral ring of hyperattenuation, commonly referred to as the hyperattenuating ring sign.⁴ A hyperattenuating ring sign near the colon wall is a distinctive feature of epiploic appendagitis, but it can also be seen near the falciform ligament in cases of IFFI caused by FLA⁵, as shown in Figures 1B and 1C. Occasionally, a central dot sign, which is characterized by a small, dense spot corresponding to a thrombosed vein, may also be observed.⁴

While acute transaminitis is not otherwise reported in the literature, it is noteworthy that both of our cases displayed acute transaminitis. This observation prompts consideration of a potential link between FLA and acute hepatitis.

In most patients, IFFI is a self-limiting condition that typically resolves within one week without medical intervention.³ However, in rare instances, IFFI can lead to complications such as adhesions, peritonitis, necrosis, abscess formation, and the development of calcified peritoneal loose bodies.³ In such cases, conservative treatment may not be sufficient. Some patients with IFFI have undergone surgery if necrosis is suspected or if abdominal pain continues to worsen.⁶ Due to the rarity of the condition, prompt diagnosis is important to confirm that first-line treatment is nonoperative.⁶

Conclusion

FLA is a rare cause of IFFI, which is more commonly caused by epiploic appendagitis. The cases reported here provide CT and MRCP findings characteristic of this diagnosis. Since treatment is typically conservative, early and accurate diagnosis can prevent unnecessary surgical intervention.

Author Contributions

Conceptualization, A.P., K.B.; Acquisition, analysis, and interpretation of data, A.P., K.B., M.Y.C.; Writing – original draft

preparation, M.Y.C.; Review and editing, A.P., K.B., M.Y.C.; Supervision, A.P., K.B. All authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All authors had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Disclosures

None to report.

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