


Cyanoacrylate injection complications: septic emboli and abscess within the falciform ligament - a case report

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ABSTRACT

Background: Falciform ligament abscesses are uncommon. The few cases reported in the literature are associated with infectious or inflammatory conditions such as acute cholecystitis and omphalitis in pediatric patients. However, it has only been rarely described as a complication for some therapeutic procedures.

Case Presentation: A 23-year-old female with primary portal vein thrombosis, portal hypertension, and gastric varices with a history of upper gastrointestinal bleedings. The last episode required cyanoacrylate injection. After administering the injection, septic emboli obstructed the splenic vein causing the recanalization and thrombosis of the paraumbilical veins. Therefore, an abscess formed within the falciform ligament. The treatment consisted of surgical drainage and antibiotics.

Conclusion: Diagnosis of falciform ligament abscesses requires a high degree of clinical suspicion and vast knowledge of anatomy. It is important to recognize its pathophysiology and consider the possible differential diagnosis to offer the best approach and treatment for its underlying cause.

Keywords: Abscess, septic emboli, cyanoacrylate, falciform ligament, portal thrombosis, case report.

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Background

The falciform ligament extends from the anterior abdominal wall (umbilicus) towards the liver. It is an embryological vestige of the ventral mesentery. It is mainly a virtual cavity bounded by two layers of the peritoneum containing the round ligament and the umbilical veins. The formation of an abscess inside this space is exceptional, with only a few reported cases, remaining as a condition with unknown global incidence [1].

To the authors' knowledge, there is no prior report of a falciform ligament abscess after a cyanoacrylate injection causing splenic and umbilical veins thrombosis.

Case Presentation

It is the case of a 23-year-old female diagnosed with cryptogenic cirrhosis and primary portal thrombosis, and a history of two episodes of gastric variceal bleeding. The second one was treated by cyanoacrylate injection 5 months before this hospitalization. She showed up in the emergency room with cough, jaundice, fever, and epigastric pain. During the examination, a non-pulsatile, soft and tender abdominal mass was discovered. Medical therapy started with propranolol, spironolactone and omeprazole. Her blood test results showed hemoglobin of 10 g/dl, white

blood cell count of 19.4, sodium 122 mEq/l, calcium 7.9, bilirubin 5.23 (conjugated 3.09, non-conjugated 2.14), alkaline phosphatase 1,035 and albumin of 2.8 g/dl along with an incipient coagulopathy. An abdominal computed tomography (CT) scan revealed left basal pneumonia and hyperdense embolization material within the portal and splenic veins (Figure 1). An epigastric mass corresponding with the recanalization of the paraumbilical veins was also described. She was admitted for intravenous antibiotics and an assessment of her coagulopathy. Results came back as follows: V factor 111.8, antithrombin III 61.7, C protein 63.1, anticardiolipin antibodies IgM 8.5, IgG 5.5, IgG1 B2 8.4, antimitochondrial, anti-smooth muscle, and hepatitis B and C profiles were negative.

Due to scarce clinical improvement, a new abdominal CT scan was completed. The scan reported ascites and thrombosis of the recanalized paraumbilical veins (Figure 2). The epigastric mass showed heterogeneous contents. Its dimensions were 5.7 × 9.7 × 8.2 cm, and some local clinical changes, including fluctuation, pain and erythema, appeared. The diagnosis of a falciform ligament abscess was made. The patient had surgical drainage through a small midline incision with 400 ml of purulent material

discharge and 200 ml of blood. A drain was placed in the cavity and removed after 4 days without incidents. An ampicillin-resistant *Klebsiella pneumoniae* was isolated in cultures requiring an oral antibiotic regimen with quinolones. She was discharged without complications but reserved prognosis.

Discussion

Falciform ligament abscesses are extremely rare. The few cases reported on this condition include the rupture of a

gangrenous gallbladder, portal pyemia, omphalitis, pancreatitis, an infected ventriculoperitoneal shunt [2], or the infection of a pre-existing falciform cyst [3].

The occlusion of the portal system, whatever its etiology, leads to portal hypertension and to collateralization of the portal vein and portosystemic shunting, this being the cause of esophageal and gastric varicosity (GV). About 18%-70% of patients with portal hypertension are at risk of having gastric variceal bleeding during their lifetime. The mortality rate for this is about 45% [4].

The cyanoacrylate is a tissue adhesive first described for endoscopic treatment of GV by Ang et al. [5] in 1986. It is used as a first-line treatment for gastric and esophageal varices. Its success rate ranges between 89%-100% with a recurrence probability under 30%. After a varicosity injection, the substance polymerizes once it makes contact with the blood turning into a hard material that obstructs the lumen of the vessel. The infusion is often combined with lipiodol which slows the polymerization process, allowing more time for injection and post-procedural radiological examination for its radio-opaque nature [6].

Complications from this type of procedure are generally minor such as abdominal pain, nausea, vomit and ulceration of the injection site. Major adverse effects including embolization, local venous thrombosis, fistulation,



Figure 1. Thrombosis of the portal, splenic and mesenteric vessels with evidence of hyperdense material within their lumen.

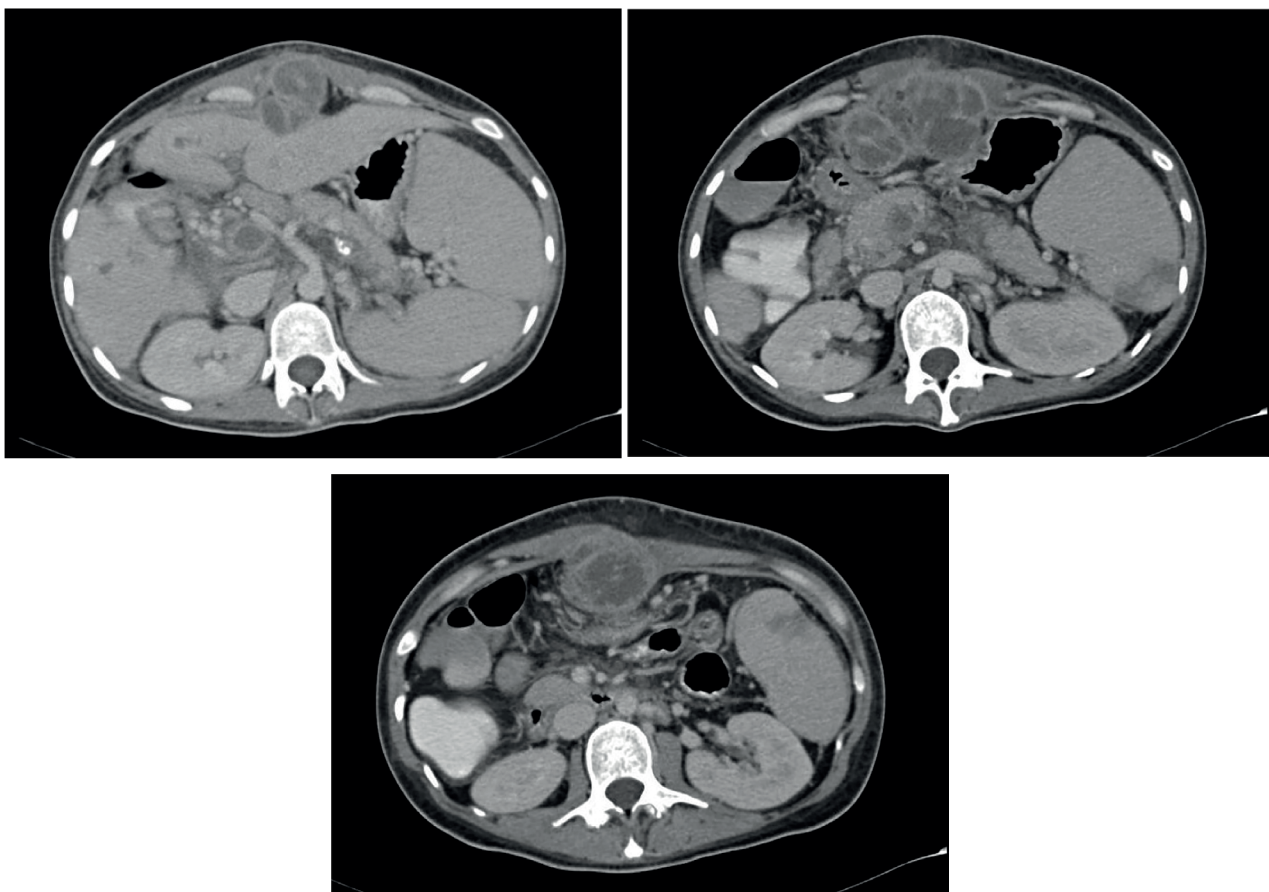


Figure 2. Thrombosed paraumbilical veins with a midline loculated lesion consistent with an abscess within the falciform ligament.

ulceration, extrusion, stricture and chronic sepsis may show. A retrospective review looking at a 25-year experience with glue injection by Saraswat et al. [7] identified a risk of embolization of 0.5%-4.3%. The cerebral, right atrium and pulmonary embolization's are mentioning the most [8].

Several reports of sepsis are associated with embolized glue, either as a retained foci or as the origin for septic emboli [9]. There seems to be a direct relation between the amount of polymer injected and the risk for this adverse event. Mechanisms described include bacterial invasion because of the rupture of the gastric epithelium; the use of an already infected needle; contamination due to the establishment of communication between the intestinal tract and the intravascular space; or, in case of an embolus, chronic bacteremia. Embolized glue may persist beyond 24 weeks and should be considered if a recurrent infection develops [10].

The venous system formed in patients with portal hypertension in addition to the existence of septic emboli may explain the colonization of the space within the falciform ligament, which combined with the stasis caused by the thrombosis makes possible the formation of an abscess [11]. The clinical presentation consists of a palpable mass with or without pain, nausea and bloating. Less common signs include tenderness in the upper abdomen, fever and leukocytosis [12].

The radiological description includes a mass underlying the abdominal wall in continuity with a thickened round ligament. Still, due to its rarity and localization, a definitive diagnosis is complex. Ultrasound and CT should be employed. On CT scan, free air limited to the area surrounding the falciform ligament might suggest the diagnosis [13].

Treatment options comprehend percutaneous drainage, antibiotic therapy and surgery. Conservative management should always consider a chance of relapse due to residual cavities and the paucity of the vascular network; this approach is more common in children. For adults, excision of the ligament is usually the initial treatment [14]; it can be done either by laparoscopic or open approach, depending on the surgeon's expertise and the patient's condition. The choice of antibiotics depends on the type of organism cultured. Gram-negative bacilli are frequently found in adults, while Gram-positive cocci are found mostly pediatric cases [15].

Conclusion

Suspicion of a falciform ligament abscess requires accurate knowledge of anatomy and embryology. Its recognition leads to better and prompt treatment. It can either be a consequence of an inflammatory/infectious disease or a complication from a therapeutic procedure, just like the cyanoacrylate injection for variceal bleeding. As supervising and teaching surgeons, we acknowledge that

its physiopathology and early identification is the most important message to share with this case. It is essential to comprehend what it is that you are looking for to solve it.

What is new?

Its novelty lies within the sequence of events and the pathophysiology that made possible the development of the abscess. A rare entity that requires a simple surgical management. The management has been described before and that is why we did not emphasize it.

List of Abbreviations

CT Computed tomography

Conflict of interests

The authors declare that there is no conflict of interests regarding the publication of this case report.

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Consent for publication

Written informed consent was taken from the patient.

Ethical approval

Ethical approval is not required at our institution for publishing an anonymous case report.

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Summary of the case

1	Patient (gender, age)	Female, 23-years-old
2	Final diagnosis	Severe upper right quadrant, falciform ligament abscess, methylprednisolone, heparin, nausea, gastric vomiting
3	Symptoms	Abdominal tender mass, pain and jaundice
4	Medications	Immunology, propranolol, spironolactone, omeprazole, quinolones
5	Clinical procedure	Surgical drainage
6	Specialty	General Surgery