Received: 31 March 2024 | Revised: 19 June 2024 | Accepted: 13 July 2024

DOI: 10.1002/ccr3.9223

CASE REPORT

Clinical Case Reports Open Access WILEY

Successful transarterial embolization of hemorrhage following percutaneous liver biopsy in hepatic amyloidosis

Sasikorn Feinggumloon[1] | **Tanapong Panpikoon**[1] | **Thanakrit Piyajaroenkij**[2] | **Tanatip Prasertchai**[3] | **Tharintorn Treesit**[1]

[1]Department of Diagnostic and Therapeutic Radiology, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand

[2]Division of Hematology, Department of Medicine, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand

[3]Department of Pathology, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand

Correspondence
Tharintorn Treesit, Department of Diagnostic and Therapeutic Radiology, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok, Thailand.
Email: tharintorn.tre@mahidol.ac.th

Key Clinical Message

Percutaneous liver biopsy is essential for diagnosing hepatic amyloidosis. Post biopsy hemorrhage is unusual but can occur. The potential for bleeding can result from various factors, such as the deposition of amyloid in the hepatic parenchyma or vessel wall, deficiencies in coagulation factors, hyperfibrinolysis, and platelet dysfunction. Transarterial embolization can be a safe and effective method for achieving hemostasis.

KEYWORDS

amyloidosis, hemorrhage, pathology, percutaneous liver biopsy, transarterial embolization

1 | INTRODUCTION

Amyloidosis is a heterogeneous group of diseases with varying pathophysiology resulting from pathological extracellular accumulation and deposition of insoluble, fibril-forming proteins throughout the body. Amyloidosis can be categorized into multiple subtypes based on the amyloid deposits' protein composition, such as light chain amyloidosis (AL amyloidosis), transthyretin amyloid protein amyloidosis, or amyloid A amyloidosis. AL amyloidosis is the most common subtype among these.[1,2] The involvement of the liver is frequently observed in AL amyloidosis. Nonetheless, the diagnosis might be delayed due to the non-specific clinical presentation, such as mildly elevated alkaline phosphatase levels, and non-specific radiological findings, such as hepatomegaly or diffuse liver parenchymal hypoattenuation. Therefore, a liver biopsy is necessary to confirm amyloid deposition for an accurate diagnosis and prompt, appropriate treatment.[3,4] We report a case of bleeding complication following an image-guided percutaneous liver biopsy in hepatic amyloidosis that was successfully treated with catheter-based embolization.

2 | CASE HISTORY

A 54-year-old woman presented with non-pitting edema of bilateral legs concurrent with foamy urine. The laboratory findings showed nephrotic-range proteinuria

with urine protein creatinine ratio of 17.36 g/g, serum creatinine of 70.2 mg/dL, and antinuclear antibody was positive for speckle pattern with a titer of 1:80. The kidney biopsy was performed and demonstrated amyloid deposits compatible with AL amyloidosis lambda (λ) subtype. The serum protein electrophoresis detected polyclonal gammopathy, and serum kappa (κ) and λ free light chain assay were 37.43 and 209.52 mg/L with κ/λ ratio of 0.179. A bone marrow biopsy revealed hypercellular marrow with 5% CD138-positive plasma cells with lambda light chain restriction (κ/λ ratio 1:5–6). Fluorescence in situ hybridization was positive for (11;14), del(13q), and one copy loss of 5'IGH. Liver function tests showed elevated alkaline phosphatase and gamma-glutamyl transferase without any symptoms. The contrast-enhanced computed tomographic (CT) of the whole abdomen showed hepatomegaly, heterogeneous parenchymal attenuation of the liver, and patchy delayed contrast enhancement at the right hepatic lobe in the dynamic phase. The differential diagnoses from CT findings were plasmacytoma or amyloidosis. As a result, she was referred for a liver biopsy to confirm the diagnosis.

Percutaneous liver biopsy was scheduled, and the coagulation profile was checked with a platelet count of 273,000/cu.mm, partial thromboplastin time of 21.9 s, and prothrombin time (PT) of 10.7 s. The biopsy was performed under real-time ultrasound guidance with an 18-G semi-automatic biopsy needle (BARD® MISSION® Disposable Core Biopsy Instrument with 17 G coaxial needle). The tissue was obtained four times using a coaxial technique. After adequate tissue was obtained, the coaxial needle was removed. Post-biopsy ultrasound showed no hematoma or intraperitoneal bleeding.

3 | METHODS (DIAGNOSIS, INVESTIGATIONS, AND TREATMENT)

The patient tolerated the procedure well and was transferred to the inpatient ward for observation after the procedure. Six hours later, the patient developed acute right upper quadrant pain and hypotension with rapidly decreased hematocrit concentration, from 34.2% to 17.5%. The emergency contrast-enhanced CT scan of the whole abdomen showed intraparenchymal hematoma and subcapsular hematoma involving the right hepatic lobe with active contrast extravasation from the biopsy needle tract (Figure 1).

The patient underwent emergency angiography and embolization of the active hemorrhage. The right hepatic angiogram revealed multiple abnormal small outpouching arterial lesions scattering in the right hepatic lobe with active contrast extravasation from the anterior branch of the right hepatic artery. Superselective catheterization into the anterior branch of the right hepatic artery was performed by using a 1.98-Fr Parkway microcatheter (Asahi Intecc Co., Aichi, Japan), followed by embolization with a straight-18 coil 2 mm (Boston Scientific, Massachusetts, USA) and pushable VortX-18 coil 3 × 2.5 mm (Boston Scientific, Massachusetts, USA). Post-embolization angiography showed complete hemostatic control without active contrast extravasation (Figure 2).

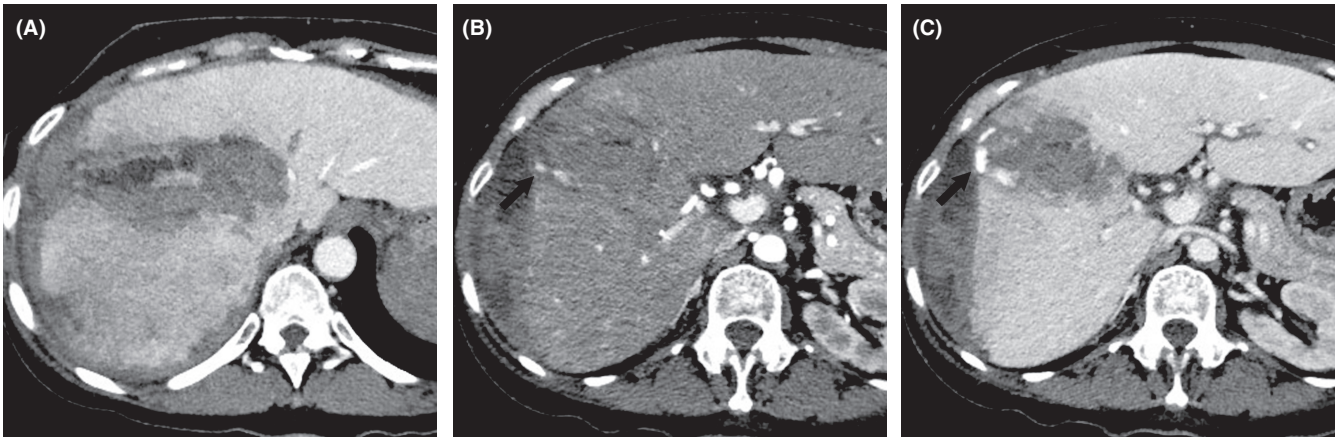

FIGURE 1 The contrast-enhanced computed tomography (CT) image of the whole abdomen showed (A) intraparenchymal hematoma and subcapsular hematoma involving the right hepatic lobe. (B, C) There is active contrast extravasation from the biopsy needle tract (arrow).

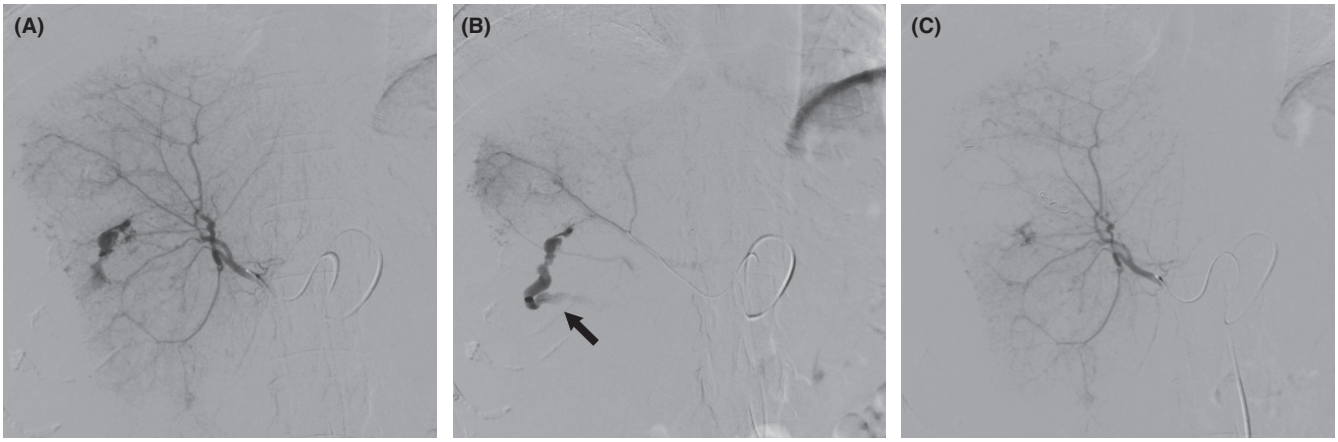

FIGURE 2 Digital subtraction angiography showed superselective catheterization into an anterior branch of the right hepatic artery and (A) subselection into a segmental branch of RHA with (B) evidence of active contrast extravasation (arrow). (C) Complete hemostasis after coil embolization.

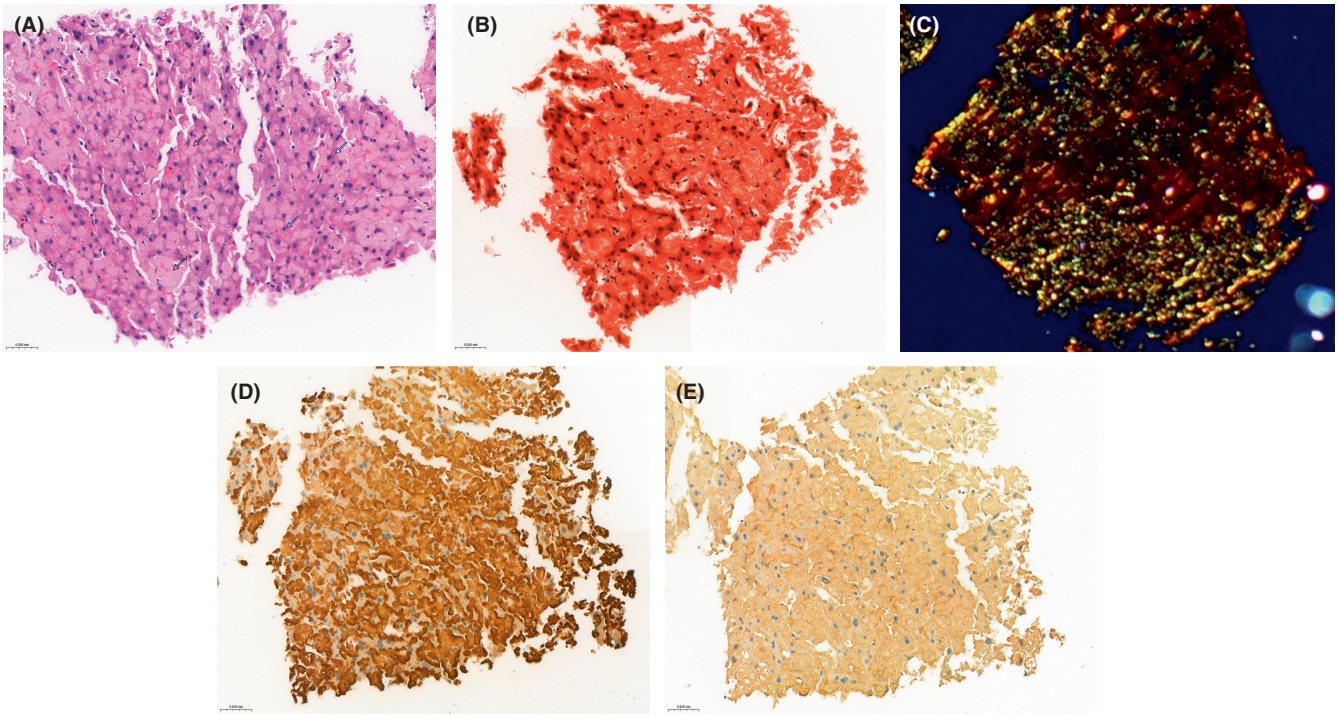

FIGURE 3 (A) The liver biopsy specimen shows pale pink acellular amyloid deposits (black arrow) in hepatic sinusoids with adjacent atrophic hepatocytes (blue arrow) on hematoxylin and eosin stain. (B) Congo red stain of amyloid deposits shows a pale orange appearance under light microscopy and (C) yellow-green birefringence under polarizing light microscopy. Immunohistochemical studies for immunoglobulin light chains show positive for lambda light chain (D) and negative for kappa light chain (E).

4 | OUTCOMES AND FOLLOW-UP

After the procedure, the patient's hemodynamic status was stable without any additional blood product transfusion. The patient was clinically improved and was discharged from the hospital after 7 days. The patient reported no significant abdominal pain during the week of follow-up. The pathological result of the liver revealed lambda light chain AL amyloidosis (Figure 3).

5 | DISCUSSION

There have been reports of bleeding complications following liver biopsy for a patient who was suspected of amyloidosis. Approximately 4% of patients who underwent percutaneous liver biopsies experienced bleeding, of which 2% required blood transfusions, and 3% had a prolonged PT. Nevertheless, it is noteworthy that the majority of patients with prolonged PT underwent percutaneous

liver biopsy without hemorrhage.[5] Corresponding with the previous report by Gertz et al., only one of eight patients required a blood transfusion following liver biopsy. All patients who experience hemorrhage are managed conservatively with blood transfusions and do not require any intervention.[6] On the other hand, among the cases documented by Senecal et al.,[7] there was one example in which a patient experienced cardiac arrest due to massive bleeding after a liver biopsy. Nevertheless, the patient has fully recovered after prolonged treatment in the intensive care unit.

Our case demonstrates post-liver biopsy hemorrhage in hepatic amyloidosis, successfully treated with transarterial embolization. Despite taking precautions such as using the coaxial technique and closely monitoring for bleeding during needle removal, bleeding still occurs. The potential explanation of hemorrhage in the present case may be related to hepatic capsule stiffness resulting from amyloid accumulation, which impairs the closure of the needle tract. Second, the accumulation of amyloid deposits within the vessel wall leads to vessel fragility and the formation of microaneurysms. Lastly, the acquired deficiencies of coagulation factors, hyperfibrinolysis, and platelet dysfunction can result in hemostatic defects.[8,9] Although some authors suggest a method of transjugular liver biopsy to reduce bleeding risk in high-risk patients,[10] there are still certain drawbacks, including higher cost, radiation exposure, and risk of capsular puncture. Giri et al., demonstrate no difference in technical success, diagnostic yield, and complications between percutaneous liver biopsy with needle tract plugging and transjugular liver biopsy in high-risk patients.[11] Accordingly, we recommended sealing the biopsy tract with embolic material, such as a gelatin sponge or coil, while removing the coaxial needle to minimize the risk of bleeding-related adverse events following percutaneous liver biopsy in hepatic amyloidosis patients.

In conclusion, there is a potential risk of bleeding associated with percutaneous liver biopsy in hepatic AL amyloidosis patients. Transarterial embolization can be effectively treated in patients with life-threatening hemorrhage. Using needle tract embolization may provide advantageous outcomes in reducing the risk of bleeding and preventing bleeding-related adverse events consequent to percutaneous liver biopsy in hepatic amyloidosis.

AUTHOR CONTRIBUTIONS

Sasikorn Feinggumloon: Conceptualization; data curation; formal analysis; investigation; methodology; project administration; resources; supervision; validation; visualization; writing – original draft; writing – review and editing. **Tanapong Panpikoon:** Data curation; formal analysis; investigation; validation; visualization; writing – review and editing. **Thanakrit Piyajaroenkij:** Data curation; investigation; resources; validation; visualization; writing – review and editing. **Tanatip Prasertchai:** Data curation; investigation; resources; validation; visualization; writing – review and editing. **Tharintorn Treesit:** Conceptualization; data curation; formal analysis; investigation; methodology; resources; supervision; validation; visualization; writing – review and editing.

FUNDING INFORMATION

None.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

ORCID

Sasikorn Feinggumloon https://orcid.org/0000-0003-1491-3292

REFERENCES

1. Dima D, Mazzoni S, Anwer F, et al. Diagnostic and treatment strategies for AL amyloidosis in an era of therapeutic innovation. *JCO Oncol Pract*. 2023;19(5):265-275.
2. Szor RS, Fernandes F, Lino AMM, et al. Systemic amyloidosis journey from diagnosis to outcomes: a twelve-year real-world experience of a single center in a middle-income country. *Orphanet J Rare Dis*. 2022;17(1):425.
3. Georgiades CS, Neyman EG, Barish MA, Fishman EK. Amyloidosis: review and CT manifestations. *Radiographics*. 2004;24(2):405-416.
4. Sugi MD, Kawashima A, Salomao MA, Bhalla S, Venkatesh SK, Pickhardt PJ. Amyloidosis: multisystem spectrum of disease with pathologic correlation. *Radiographics*. 2021;41(5):1454-1474.
5. Park MA, Mueller PS, Kyle RA, Larson DR, Plevak MF, Gertz MA. Primary (AL) hepatic amyloidosis: clinical features and natural history in 98 patients. *Medicine*. 2003;82(5):291-298.
6. Gertz MA, Kyle RA. Hepatic amyloidosis: clinical appraisal in 77 patients. *Hepatology*. 1997;25(1):118-121.
7. Senecal JB, Abou-Akl R, Allevato P, et al. Amyloidosis: a case series and review of the literature. *J Med Case Rep*. 2023;17(1):1-9.
8. Soares SM, Fervenza FC, Lager DJ, Gertz MA, Cosio FG, Leung N. Bleeding complications after transcutaneous kidney biopsy in patients with systemic amyloidosis: single-center experience in 101 patients. *Am J Kidney Dis*. 2008;52(6):1079-1083.

9. Biying Huang IG, Sparellid E. Amyloidosis and spontaneous liver bleeding: a case report and literature review. *J Surg*. 2019;7(4):96-100.
10. Cardoso BA, Leal R, Sá H, Campos M. Acute liver failure due to primary amyloidosis in a nephrotic syndrome: a swiftly progressive course. *BMJ Case Rep*. 2016;2016:bcr2016214392.
11. Giri S, Agrawal D, Gopan A, Varghese J, Tripathy T. Diagnostic outcome and safety of plugged liver biopsy in high-risk patients: a systematic review and meta-analysis. *Acta Radiol*. 2023;64(5):1775-1782.

How to cite this article: Feinggumloon S, Panpikoon T, Piyajaroenkij T, Prasertchai T, Treesit T. Successful transarterial embolization of hemorrhage following percutaneous liver biopsy in hepatic amyloidosis. *Clin Case Rep*. 2024;12:e9223. doi:10.1002/ccr3.9223