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Massive spontaneous nontraumatic subcapsular hepatic hematoma treated using arterial embolization: A case report and review of the literature

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Abstract

A nontraumatic and idiopathic spontaneous subcapsular hepatic hematoma is a rare but often fatal condition. Herein, we report a case of nontraumatic progressive massive subcapsular hepatic hematoma that straddled both liver lobes and was successfully treated by repeated arterial embolization. Following treatment, the hematoma did not progress.

Keywords

Idiopathic subcapsular hematoma, liver, computed tomography, arterial embolization, bleeding

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Introduction

Nontraumatic subcapsular hematoma of the liver is a rare yet life-threatening condition because of its typically late diagnosis and challenging multidisciplinary management. It can be caused by severe pre-eclampsia, hemolytic anemia, elevated liver enzyme levels, low platelet count syndrome,[1,2,3] ruptured hepatic tumor,[4] and iatrogenic complications of treatments, such as interventional radiology and surgery.[5,6,7,8,9] Idiopathic spontaneous subscapular hematoma is very rare, and only a few spontaneous cases have been previously reported.[1,2,3]

We herein present a case of subcapsular hematoma caused by isolated arteries that grew and spread to the contralateral lobe and led to active bleeding. This hematoma was treated by repeated arterial embolization.

Case report

A 44-year-old woman was presented to our hospital with upper abdominal pain. She had a history of breast cancer 1.5 years earlier and had been on hormone therapy (tamoxifen) and trastuzumab.

Dynamic contrast-enhanced computed tomography (CT) was performed, and a subcapsular hepatic hematoma with extravasation of the contrast medium was detected (Figure 1). Her vital signs were stable (heart rate, 65 bpm; blood pressure, 121/82 mmHg), and her anemia was mild (hemoglobin, 11.9 g/dL). Her coagulation and platelet values were within normal limits (prothrombin time [PT], 10.9 s; PT %,114.5%; international normalized ratio, 0.94; activated partial thromboplastin time, 26.3 s; fibrinogen, 282 mg/dL; and platelets, 243 × 10^3/μL); thus, she was treated conservatively with bed rest and analgesia.

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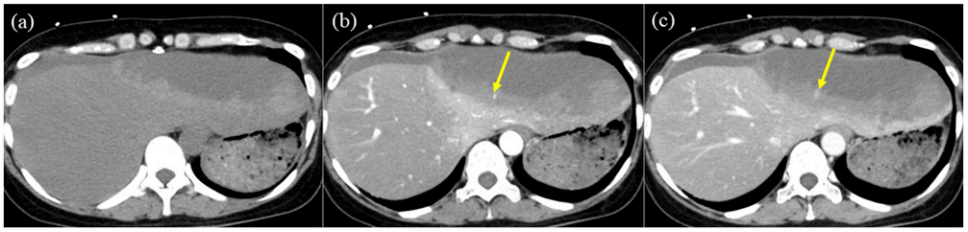

Figure 1. Abdominal computed tomography (CT) on the day of admission. (a) Noncontrast-enhanced CT image (axial image). (b) Contrast-enhanced CT image (axial image, arterial phase). (c) Contrast-enhanced CT image (axial image, equilibrium phase). Dynamic contrast-enhanced CT revealed a subcapsular hematoma in the left lobe of the liver. The subcapsular hematoma contained a slightly low-density fluid on the ventral side and a high-density area, that is, a fresh hemorrhage, on the parenchymal side. Extravasation of the contrast enhancement medium (visible venous pooling sign), as a proof of active bleeding, was observed on the parenchymal side of the liver (Figure. 1(c), arrow).

A day after admission, the patient's clinical symptoms suddenly worsened, that is, hemorrhagic shock occurred (heart rate, 120 bpm; blood pressure, 80/50 mmHg). Biological tests revealed a low hemoglobin (7.6 g/dL) level, and emergency arterial embolization was performed (Figure 2). A 4-Fr sheath (Super Sheath®; Medikit, Tokyo, Japan) was inserted into the right femoral artery. Celiac arteriography was performed using a 4-Fr shepherd-hook type catheter (SHC® 80 cm; Medikit) and a 0.035-inch guidewire (Radifocus® 150 cm; Guidewire; Terumo Clinical Supply Co, Ltd, Gifu, Japan). In celiac arteriography, the bleeding point was unclear; however, the left hepatic artery was confirmed as the source of bleeding in left hepatic arteriography (Figure 2(a)) and CT during hepatic arteriography (Figure 2(b)). Next, the left hepatic artery was selected using a 2-Fr microcatheter (Sniper 2®, 110 cm: Terumo Clinical Supply Co, Ltd, Gifu, Japan) with a 0.016-inch guidewire (ASAHI Meister®, ASAHI INTECC, Nagoya, Japan). Left hepatic arterial embolization with gelatin sponge particles was performed. Gelatin sponge particles were obtained by cutting a 2.5 × 2.5-cm^2 gelatin sponge sheet (Serescue®; Astellas, Tokyo, Japan) into 1–1.5-mm squares. When the hepatic peripheral contrast enhancement was slightly reduced, the catheters and sheath were removed. Moreover, blood transfusion was performed. Thereafter, the patient's abdominal pain improved, her anemia was alleviated, and her condition improved.

However, on the fifth day of admission, her anemia worsened (hemoglobin, 6.8 g/dL). The patient was highly anxious regarding the frequent usage of contrast agents. We obtained her consent to perform noncontrast-enhanced CT first, followed by angiography if necessary. Noncontrast-enhanced CT (Figure 3) revealed an enlarged subcapsular hematoma in the right lobe. Second embolization was performed for only the right hepatic artery with the same items and procedure as the previous angiography (Figure 4). Recanalization of the previously embolized left hepatic artery was not observed.

On the eighth day of admission, the patient's abdominal pain and feeling of fullness worsened despite the absence of recurrent bleeding. Percutaneous echo-guided drainage was performed for the hematoma (8.5-Fr Dawson-Mueller drainage catheter®; Cook Canada Inc, Stouffville, Ontario, Canada) to relieve these symptoms, and approximately 500 mL of dark red blood was drained.

On the 25th day of admission, the patient showed good recovery and was discharged from the hospital. CT performed after 7 months illustrated that the subcapsular hematoma had shrunk and remained small (Figure 5) and the symptoms did not recur.

Discussion

The patient reported herein underwent embolization twice for a subcapsular hepatic hematoma of unknown cause, and the treatment stopped its progression. Although the left hepatic artery, that is, the site responsible for bleeding was embolized, repeated bleeding rebleeding occurred due to hematoma progression and development, and the hepatic capsule and liver parenchyma were widely separated in the right lobe due to hematoma bleeding.

Initially, we assumed that spontaneous hemostasis would be obtained for subcapsular hepatic hemorrhage because the patient did not take antiplatelet or anticoagulant drugs, had normal coagulability, and had mild active bleeding on initial CT. However, considering that the initial CT findings revealed active hemorrhage, we would have at least performed angiography. If arterial embolization could be performed selectively at that time, then wide-area embolization would not have been necessary in this case.

The bleeding source of the subcapsular hematoma is presumed to be isolated arteries originating from intrahepatic arteries.[10] As an arterial origin was observed on prior contrast-enhanced CT, percutaneous arterial embolization was effective. Arterial bleeding may be intermittent or in a state of primary hemostasis, and arteries derived from extrahepatic arteries might not be identifiable as the bleeding source using hepatic arteriography. If the bleeding source is not determined to be arterial, then hepatic and

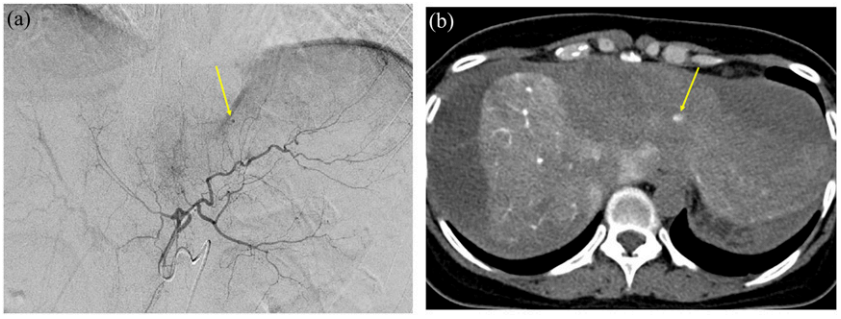

Figure 2. Arteriography and CT during hepatic arteriography. (a) Left hepatic arteriography. (b) CT during hepatic arteriography. Spotty extravasation of the contrast enhancement medium was observed in the left lobe (Figure. 2(a), arrow). CT during hepatic arteriography revealed the bleeding point from the left hepatic artery (Figure 2(b), arrow). Therefore, left hepatic arterial embolization was performed and right hepatic arterial embolization was omitted.

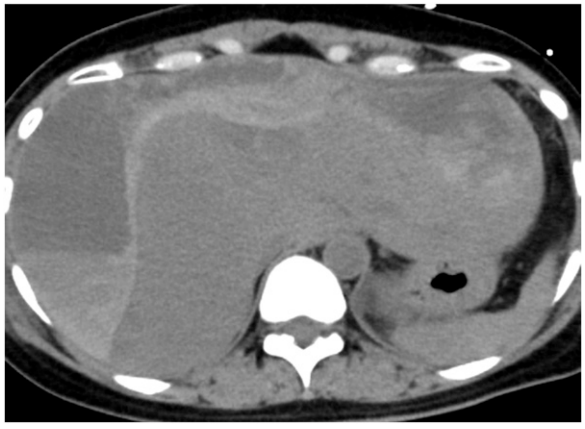

Figure 3. Abdominal noncontrast-enhanced CT on the fifth day of hospitalization. Noncontrast-enhanced CT revealed an unchanged subcapsular hematoma in the left lobe and an enlarged subcapsular hematoma with a fluid–fluid level in the right lobe.

Figure 4. Right hepatic arteriography. No clear extravasation of contrast enhancement medium was observed. Right hepatic arterial embolization was performed to the extent that the hepatic peripheral contrast enhancement was slightly reduced.

portal vein sources should also be considered. Even with possible bleeding sources other than the arteries, performing minimally invasive angiography first is more appropriate than surgical treatment. In case of arterial embolization, the extent of embolization and its effects on liver function should be fully considered. In the case reported here, on the first angiography, only left hepatic arterial embolization with gelatin sponge particles was performed and right hepatic arterial embolization was not performed in consideration of liver function and because there was no evidence of bleeding from the right hepatic artery.

Previous reports have revealed that gelatin sponges are commonly used for embolization of subcapsular hepatic hemorrhage of the liver, whereas microcoils and N-butyl cyanoacrylate (NBCA) mixed with lipiodol are used less frequently.[10,11,12] We did not use microcoils or NBCA mixed with lipiodol, which are permanent embolization agents, because they cause permanent reductions in arterial blood flow, carry a risk of rebleeding via collateral vessels in case of proximal embolization, and increase the risk of liver infarction in case of extensive embolization with NBCA mixed with lipiodol.

Subcapsular hepatic hematoma is caused by damage to the subcapsular blood vessel. In a report on subcapsular hemorrhage after cholecystectomy,[8] Fusco et al. highlighted the possibility of small blood vessel damage between the liver parenchyma and Renek's capsule by pulling the gallbladder in various directions. Apart from surgery, Erstad et al. reported that nonsteroidal anti-inflammatory drugs may be involved in the production of thromboxane.[7] Bleeding factors include untreated hypertension, oral aspirin use, and untreated abnormal coagulation.[13] In this case, there were no applicable drugs or medical history. The association between hormone therapy and trastuzumab

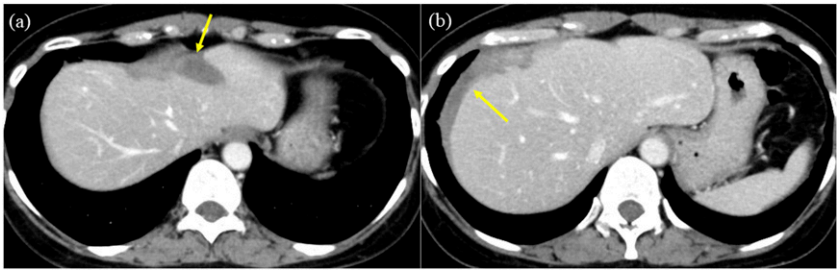

Figure 5. Abdominal contrast-enhanced CT 7 months after discharge (axial image, equilibrium phase). Contrast-enhanced CT revealed a residual subcapsular hematoma on the liver surface (arrow).

remains unknown based on our literature review. Consequently, the left subcapsular hepatic hematoma was believed to be idiopathic and spontaneous; however, the right subcapsular hematoma was considered an expanded left subcapsular hepatic hematoma that promoted right subcapsular micro vessel rupture.

Surgical treatment may cause liver capsule rupture, resulting in intra-abdominal hemorrhage and bleeding exacerbation. For the same reason, subcapsular hematoma drainage should not be actively used except for compartment syndrome or complicated infections because of the possibility of increased bleeding and a risk of retrograde infection.[14] In this case, the patient's abdominal pain and feeling of fullness were strong; thus, a drainage tube was temporarily placed and then removed thereafter to relieve symptoms.

In conclusion, we reported a case of massive subcapsular hematoma derived from isolated arteries with progression stopped by the second embolization.

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Declaration of conflicting interests

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Ethical approval

All procedures performed in this case report involving human participants were conducted in accordance with the ethical standards of the institutional and national research committees and the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards where appropriate.

Informed consent

We obtained informed patient consent for all procedures. This case report has been approved by the Institutional Review Board, and the formal informed consent of this patient has been waived.

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