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Multidetector CT findings of spontaneous rupture of hepatic adenoma in a patient with hepatic adenomatosis

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ABSTRACT
Hepatic adenomatosis (HA) is characterized by more than 10 adenomas in the liver, frequently scattered within both lobes. The potential for spontaneous bleeding, rupture, and malignant transformation is known. In HA, tumors show hypervascularization on arterial angiography, computed tomography (CT), and magnetic resonance imaging. We report the case of a 32-year-old woman who presented with a large intraparenchymal and subcapsular hematoma in the liver, and an underlying large adenoma with atypical radiologic characteristics detected with multidetector CT imaging. On follow-up CT examination, a large adenoma was clearly visualized at the site of the previous hematoma.

Key words: • *adenoma* • *liver* • *computed tomography*

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Hepatic adenoma is a rare, primary, benign liver tumor of uncertain origin. It is generally solitary, but several tumors may be present. Hepatic adenomatosis (HA) is a less common liver disease, characterized by more than 10 adenomas scattered frequently within both lobes of the liver (1). The potential for spontaneous bleeding, rupture, and malignant transformation is common in hepatic adenomas and HA (2). In HA, tumors show hypervascularization on arterial angiography, computed tomography (CT), and magnetic resonance imaging (MRI). Occasionally, the only finding on ultrasonography (US), CT, or MRI is a subcapsular hematoma secondary to bleeding of a small adenoma in the periphery of the liver that is not detected by imaging (3). In the case presented here, we report a 32-year-old woman who presented with a large intraparenchymal and subcapsular hematoma in the liver, and an underlying large adenoma with atypical radiologic characteristics detected with multidetector CT imaging. On follow-up CT examination, a large adenoma was clearly visualized at the site of the previous hematoma.

Case report

A 32-year-old woman presented at the emergency department with the sudden onset of abdominal and right shoulder pain. She had nausea and biliary vomiting. She had a history of oral contraceptive (OC) use. Laboratory tests on admission showed an increase in serum transaminase levels (AST 101 U/L [0–41 U/L], ALT 86 U/L [0–40 U/L], ALP 368 U/L [15–250 U/L], GGT 84 U/L [5–36 U/L]), a decrease in hemochrome (RBC 3.91 M/μL [4–5.2 M/μL], Hb 11.9 g/dL [12–16 g/dL]), an increase in leucocyte level (17.3×10^9/L [$4.5–11 \times 10^9$/L]), and an increase in CRP (99.2 mg/L [0–10 mg/L]). On physical examination, right upper quadrant tenderness was detected. An abdominal US examination showed a 12 × 11 cm heterogeneous hyperechoic mass on the posterior segment of the right lobe of the liver. In addition, there were multiple nodular hyperechoic lesions in both lobes of the liver. On precontrast abdominal CT examination, there was a 12 × 11 cm heterogenous hyperdense mass on the posterior segment of the right lobe of the liver (Fig. 1a). We detected minimal contrast enhancement in the anterior part of the lesion during the portal phase (Fig. 1b), which showed washout in the late phase (Fig. 1c). In addition, subcapsular hemorrhage was detected in the right lobe which was 4 cm thick. On late-phase imaging, there was contrast extravasation in the anterosuperior part of the intraparenchymal hematoma and in the subcapsular hematoma, which were consistent with active bleeding (Fig. 2). In addition, approximately 10 smaller lesions with similar densities were seen in the right and left lobes of the liver, the largest measuring 4 cm in diameter. Some of the lesions were round and some were geographical. The patient underwent a celiac angiography,

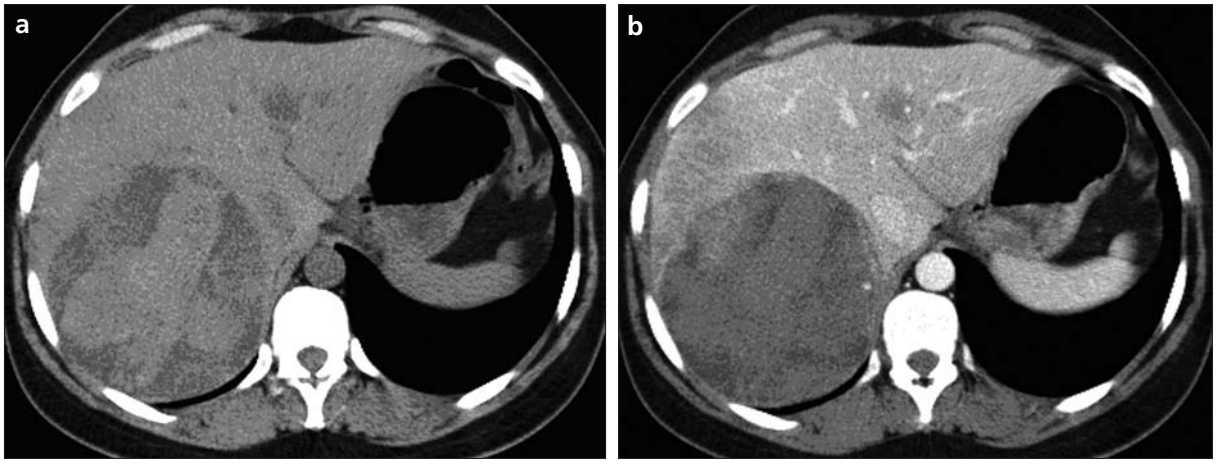

Figure 1. a–c. Precontrast transverse CT image **(a)** shows heterogenous mass in the posterior segment of the right lobe of the liver. In the postcontrast portal phase **(b)**, there is minimal enhancement in the anterior part of the lesion which showed a washed-out appearance in late phase **(c)** imaging. There was another hypodense mass in left lobe of the liver.

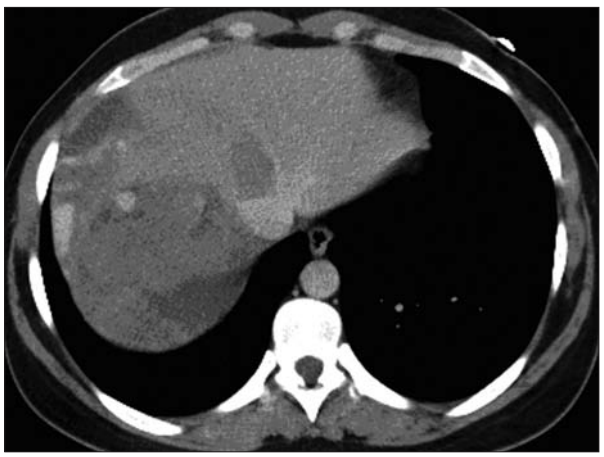

Figure 2. Postcontrast transverse CT image shows contrast extravasation in the anterior superior part of the intraparenchymal hematoma and in the subcapsular hematoma consistent with active bleeding in the late phase imaging. There was another hypodense mass next to the inferior vena and middle hepatic vein.

and selective embolization of the hepatic artery branches was performed with glue injection. On control CT examination, owing to the interventional procedures, the size of the intraparenchymal and perihepatic hematoma on the right lobe of the liver was shown to have increased (Fig. 3). The most likely diagnosis was multiple adenomas with active bleeding, with OC use as a contributing factor. Differential diagnostic considerations included metastases, and hypovascular hepatocellular carcinomas. A Tru-cut biopsy of the mass showed hepatic tissue containing cytoplasmic vacuolization and focal fatty changes. There was no cytologic atypia. The lesion was found to be consistent with hepatic adenoma. The laboratory values of the patient were stable, and the patient was discharged from the hospital. Eight months later, on follow up abdominal CT examination, an 8.5-cm mass was seen in the posterior segment of the right lobe of the liver at the site of the earlier hematoma. The mass was isodense with liver parenchyma in the arterial phase, had mild contrast enhancement on the portal phase, and had a central cystic component. In the late phase, the contrast material washed out (Fig. 4). Subsequently, some of the lesions with geographic borders in the right lobe of the liver parenchyma disappeared; this was thought to be related to hypoperfusion.

Discussion

Hepatic adenomatosis is an entity distinct from hepatic adenoma. Hepatic adenoma occurs in young women undergoing long-term estrogen therapy, individuals receiving anabolic steroid therapy, and patients with glycogen storage disease. On the other hand, HA affects both men and women; in women, it is associated with OC use. Jovine et al. identified the percentage of OC use in patients with HA as 46%: in 28 patients presenting with intra- or extratumoral bleeding, 13 had a history of OC use (4). These data suggest a role of OCs in the evolution of at least some forms of HA. Our patient also had a history of OC use. HA also has been reported to be associated with primary or secondary hemochromatosis (5, 6). Excessive iron deposition may play a

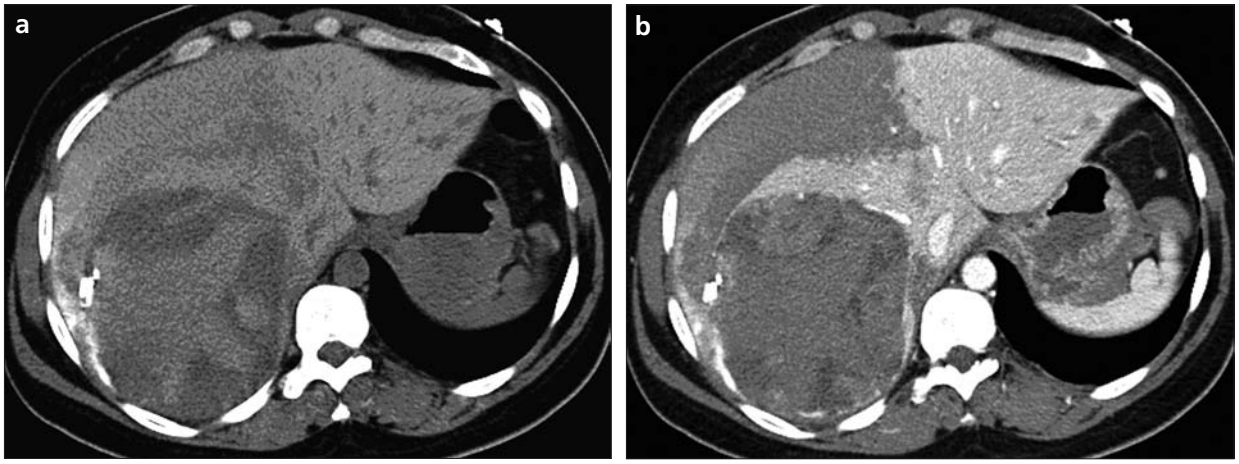

Figure 3. a, b. On control CT examination, precontrast **(a)** and postcontrast portal phase **(b)** images show that the sizes of intraparenchymal and perihepatic hematomas on the right lobe of the liver were increased owing to ongoing bleeding. However, there was no active bleeding. The glue materials and contrast material that were present in the perihepatic and intraparenchymal hematomas are seen clearly on the precontrast image **(a)**. The enhancing parts of the tumor were visualized in anterior and posterior part of the lesion in the portal phase **(b)**.

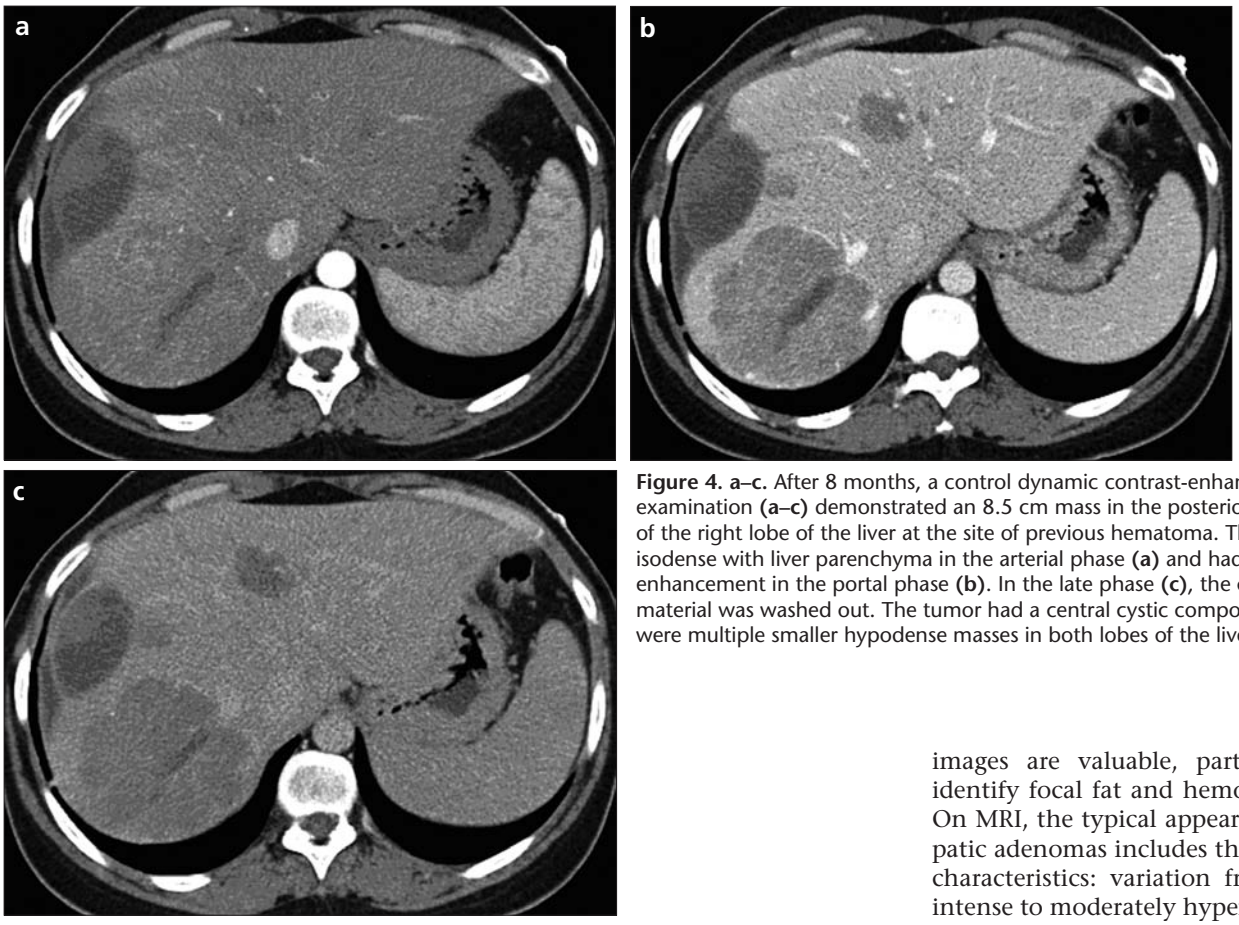

Figure 4. a–c. After 8 months, a control dynamic contrast-enhanced CT examination **(a–c)** demonstrated an 8.5 cm mass in the posterior segment of the right lobe of the liver at the site of previous hematoma. The mass was isodense with liver parenchyma in the arterial phase **(a)** and had contrast enhancement in the portal phase **(b)**. In the late phase **(c)**, the contrast material was washed out. The tumor had a central cystic component. There were multiple smaller hypodense masses in both lobes of the liver.

role in tumorigenesis. Hemorrhage of the lesions is a frequently encountered complication in HA. Adenomas larger than 4 cm have a higher risk of bleeding (1). Hemorrhage may be intratumoral or extratumoral (intraperitoneal, subcapsular). Malignant transformation, although rare, has been reported in HA (7).

With the exception of areas of focal fat, hemorrhage, or calcification, adenomas consist almost entirely of uniform hepatocytes. However, hepatocytes may contain large amounts of lipids and glycogen. Most hepatic adenomas are uniform, or heterogeneously hyperattenuated on hepatic arterial phase images. Noncontrast CT images are valuable, particularly to identify focal fat and hemorrhage (7). On MRI, the typical appearance of hepatic adenomas includes the following characteristics: variation from mildly intense to moderately hyperintense on T1-weighted images, loss of signal on out-of-phase images and isointensity on T2-weighted images. Tumors have a characteristic homogenous blush that fades rapidly on images taken immediately after gadolinium administration. Tumors have a mixed high-signal intensity on T1- and T2-weighted images owing to the presence of hemorrhage and necrosis (8). In our patient, the complicated mass was isointense with

liver parenchyma on arterial-phase, had contrast enhancement on portal-phase, and washout on late-phase imaging. In our patient, the tumor that bled was large and intraparenchymal but could not be seen clearly inside the hematoma except for a small portion of the anterior part of the lesion. In the differential diagnosis of our patient, we included nontraumatic hemorrhagic hepatic lesions (hepatic adenomas), hypovascular metastases, and hepatocellular carcinoma. Hepatic metastases from lung carcinoma, renal carcinoma, and melanoma are common causes of hepatic bleeding. On imaging, a diagnosis of hemorrhagic metastasis is suggested if blood is identified in one or more liver lesions in a patient with known hepatic metastases or primary tumor elsewhere.

Since there is a chance of malignant degeneration and hemorrhage, resection of adenomas, or resection of at least the largest and most vulnerable lesions (subcapsular, exophytic, and hemorrhagic lesions) seems to be warranted in many cases (9). Surgical resection is recommended for adenomas with an initial diameter of 5 cm or more or in symptomatic patients even during pregnancy. Selective arterial embolization for ruptured and hemorrhaging hepatocellular adenomas is a safe and effective method of hemodynamic stabilization. A few minor complications including fever (probably caused by tissue necrosis after embolization) have been reported (10). Orthotopic liver transplant may be reserved for patients who have progressive signs or symptoms after partial resection or arterial embolization.

In conclusion, HA is a rare tumor of the liver that has potentially lethal complication of hemorrhage. If a young adult with a history of OC use has a hemorrhagic liver mass (or masses), hepatic adenoma must be included in the differential diagnosis. Biopsy is necessary if the mass cannot be differentiated from hepatocellular carcinoma.

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