

CASE OF THE MONTH

Incidental focal hepatic mass

^{1,2}Y C KIM, MD, ¹J K KIM, MD and ¹J H LEE, MD

¹Department of Radiology, Ajou University School of Medicine, Suwon, Republic of Korea, and ²Department of Radiology, Yonsei University Health System, Seoul, Republic of Korea

Received 18 August 2011
Accepted 8 September
2011

DOI: 10.1259/bjr.20110659

© 2013 The British Institute of
Radiology

A 64-year-old male presented to our hospital with a focal hepatic mass that was detected incidentally on a screening ultrasound. He had a medical history of viral hepatitis B, and his serum alpha-fetoprotein (5.6 ng ml^{-1}) level was within normal limits. A contrast-enhanced CT scan was performed for the evaluation. Subsequently, a series of enhanced T_1 weighted MR images were

acquired at 28s, 42s, 5 min and 20 min after the administration of $0.025 \text{ mmol kg}^{-1}$ of body-weight Gd-EOB-DTPA (gadolinium ethoxybenzyl diethylenetriaminopentaacetic acid; gadoxetic acid; Primovist®; Bayering Schering Pharma AG, Berlin, Germany).

What is the most likely diagnosis? What is the mechanism of these imaging findings?

Address correspondence to: Professor Dr Jai Keun Kim, Department of Radiology, Ajou University School of Medicine, San 5, Wonchondong, Yeongtong-gu, Suwon, Gyeonggi-do 443-721, Republic of Korea. E-mail: kimjk@ajou.ac.kr

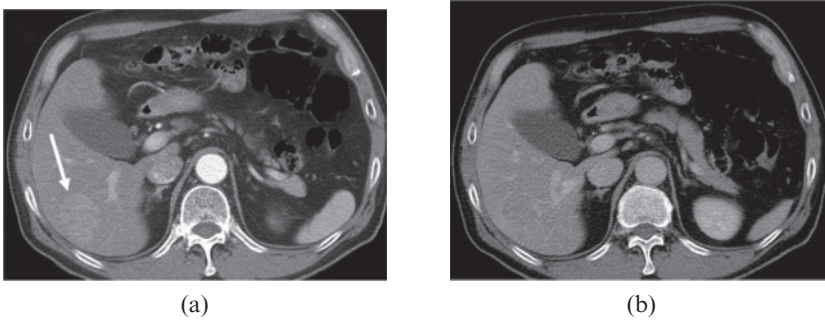


Figure 1. Contrast-enhanced axial CT image of the liver: (a) arterial and (b) equilibrium phase.

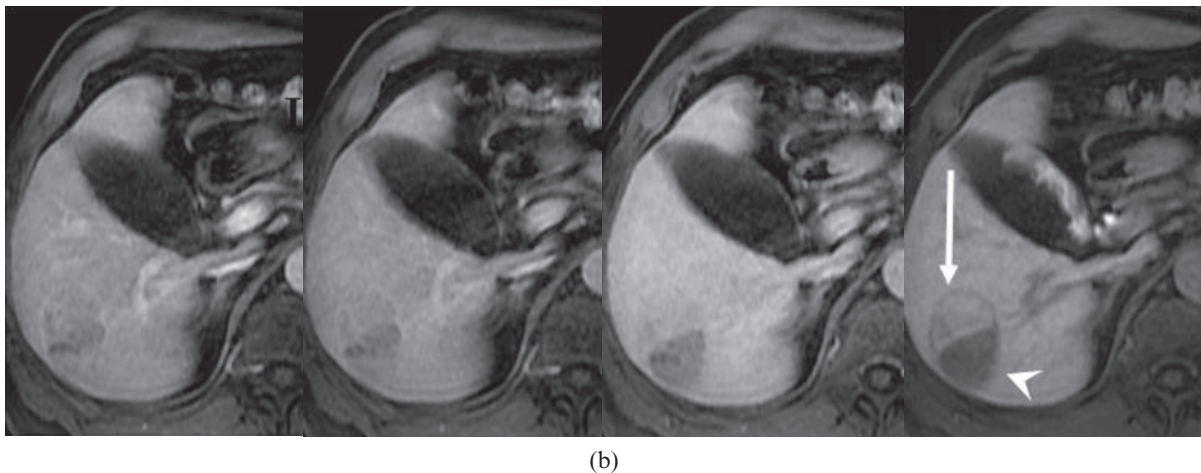
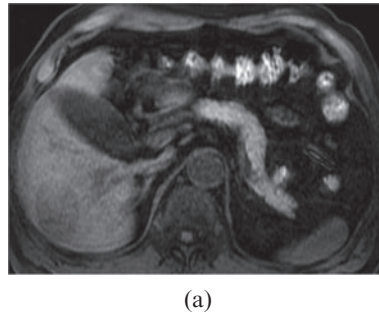


Figure 2. (a) Pre-contrast T_1 weighted axial MRI of the liver. (b) A series of enhanced T_1 weighted MRI images at (left-right) 28 s, 42 s, 5 min and 20 min after the administration. The anterior portion of this lesion demonstrates a similar degree of enhancement to the surrounding liver parenchyma (arrow), while the posterior portion exhibits reduced enhancement (arrowhead).

Findings

CT revealed a hypervascular mass in the sixth segment of the liver during arterial enhancement (Figure 1a). This lesion exhibited slight hypointensity on pre-contrast T_1 weighted MRI (Figure 2a). The anterior portion of this lesion demonstrated a similar degree of enhancement to the surrounding liver parenchyma (Figure 2b, arrow), while the posterior portion exhibited reduced enhancement (Figure 2b, arrowhead).

Diagnosis

The patient underwent the right posterior segmentectomy. The surgical specimen was a well-demarcated, round mass measuring 4.5 cm in diameter (Figure 3a).

Histological diagnosis of both portions was moderately differentiated hepatocellular carcinoma (HCC). However, the microscopic specimen obtained at the junction of the tumour consisted of two different subtypes (Figure 3b): pseudoglandular (Figure 3c) and microtrabecular (Figure 3d). On immunochemical staining, the tumour cells were positive for Glycan, CD13 and CD34, but negative for AFP and CK19.

Discussion

HCC occurs frequently in patients with chronic liver disease, which is related with viral hepatitis B and C. Gd-EOB-DTPA is a newly developed hepatocyte-specific agent, which transports into the hepatocyte through organic anion transporting polypeptides (OATPs) and is

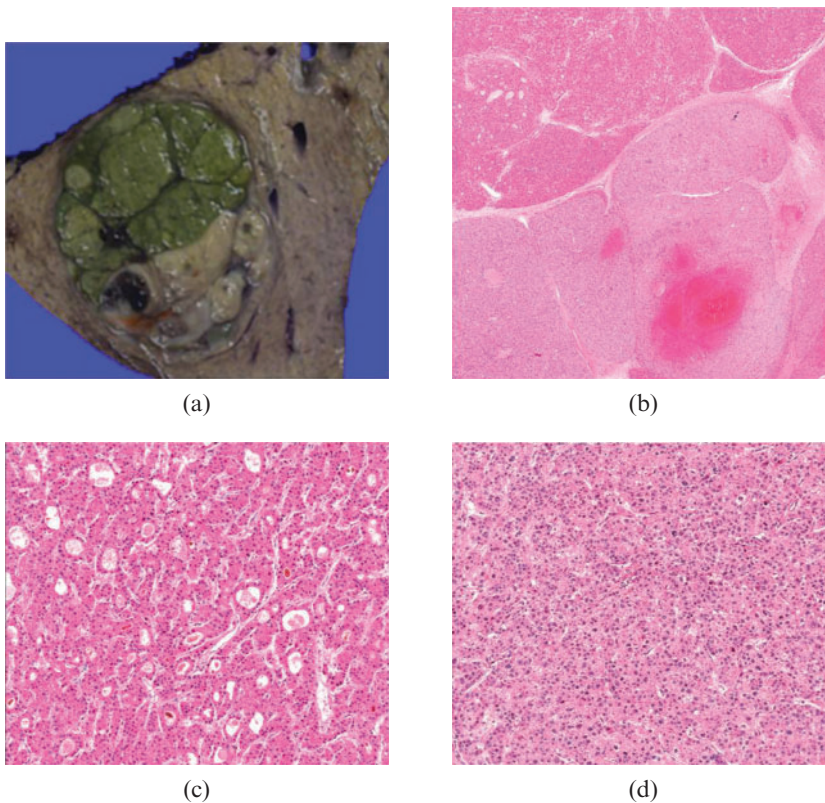


Figure 3. (a) The surgical specimen showed a greenish and yellowish portion within a well-demarcated and round mass. (b) A microscopic specimen obtained at the junction revealed two different subtypes (haematoxylin and eosin stain, ×40 magnification). (c) Pseudoglandular and (d) microtrabecular subtypes were demonstrated on high-power field (haematoxylin and eosin stain, ×100).

excreted into bile through canalicular multiorganic anion transporters [1, 2]. Because Gd-EOB-DTPA uptake is usually reduced in HCC cells, this agent may help estimate histological grading [3]. To the best of our knowledge, there have been few reports of the simultaneous high and low accumulation of Gd-EOB-DTPA in solitary and moderately differentiated HCC. Recently, it has been proposed that OATP 1B1/3 mediates the uptake of Gd-EOB-DTPA from sinusoid to tumour, whereas the multidrug resistance-associated protein 2 (MRP2) mediates the secretion of Gd-EOB-DTPA from tumour to lumen [4].

Although the histological findings of most tumour cells display some degree of Gd-EOB-DTPA content, HCCs exhibit different levels of enhancement on Gd-EOB-DTPA-enhanced MRI according to the positive expression of the two transporters. Therefore, awareness of these properties may contribute to the accurate diagnosis of HCC.

References

1. Nilsson H, Nordell A, Vargas R, Douglas L, Jonas E, Blomqvist L. Assessment of hepatic extraction fraction and input relative blood flow using dynamic hepatocyte-specific contrast-enhanced MRI. *J Magn Reson Imaging* 2009;29:1323–31.
2. Kim SH, Lee J, Kim MJ, Jeon YH, Park Y, Choi D, et al. Gadoteric acid-enhanced MRI versus triple-phase MDCT for the preoperative detection of hepatocellular carcinoma. *AJR Am J Roentgenol* 2009;192:1675–81.
3. Kogita S, Imai Y, Okada M, Kim T, Onishi H, Takamura M, et al. Gd-EOB-DTPA-enhanced magnetic resonance images of hepatocellular carcinoma: correlation with histological grading and portal blood flow. *Eur Radiol* 2010;20:2405–13.
4. Tsuboyama T, Onishi H, Kim T, Akita H, Hori M, Tatsumi M, et al. Hepatocellular carcinoma: hepatocyte-selective enhancement at gadoteric acid-enhanced MR imaging—correlation with expression of sinusoidal and canalicular transporters and bile accumulation. *Radiology* 2010;255:824–33.