論 文 要 旨

Gd-EOB-DTPA-enhanced magnetic resonance imaging features of hepatic hemangioma compared with enhanced computed tomography

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AIM: To clarify features of hepatic hemangiomas on Gadolinium-ethoxybenzyl-diethylenetriaminpentaacetic acid (Gd-EOB-DTPA)-enhanced magnetic resonance imaging (MRI) compared with enhanced computed tomography (CT).

Methods: Twenty-six patients with 61 hepatic hemangiomas who underwent both Gd-EOB-DTPA-enhanced MRI and enhanced CT were retrospectively reviewed. Hemangioma appearances (presence of peripheral nodular enhancement, central nodular enhancement, diffuse homogenous enhancement, and arterioportal shunt during the arterial phase, fill-in enhancement during the portal venous phase, and prolonged enhancement during the equilibrium phase) on Gd-EOB-DTPA-enhanced MRI and enhanced CT were evaluated. The degree of contrast enhancement at the enhancing portion within the hemangioma was visually assessed using a five-point scale during each phase. For quantitative analysis, the tumor-muscle signal intensity ratio, the liver-muscle signal intensity ratio, and the attenuation value of the tumor and liver parenchyma were calculated. The McNemar test and the Wilcoxon's signed rank test were used to assess the significance of differences in the appearances of hemangiomas and in the visual grade of tumor contrast enhancement between Gd-EOB-DTPA-enhanced MRI and enhanced CT.

Results: There was no significant difference between Gd-EOB-DTPA-enhanced MRI and enhanced CT in the presence of peripheral nodular enhancement (85% vs. 82%, respectively, $P = 0.754$), central nodular enhancement (3% vs. 3%, respectively, $P = 1.000$), diffuse enhancement (11% vs. 16%, respectively, $P = 0.508$), or arterioportal shunt (23% vs. 34%, respectively, $P = 0.065$) during arterial phase, or fill-in enhancement (79% vs. 80%, respectively, $P = 1.000$) during portal venous phase. Prolonged enhancement during equilibrium phase was observed less frequently on Gd-EOB-DTPA-enhanced MRI than on enhanced CT (52% vs. 100%, respectively, $P < 0.001$). On visual inspection, there was significantly less contrast enhancement of the enhancing portion on Gd-EOB-DTPA-enhanced MRI than on enhanced CT during the arterial (3.94 ± 0.98 vs. 4.57 ± 0.64, respectively, $P < 0.001$), portal venous (3.72 ± 0.82 vs. 4.36 ± 0.53, respectively, $P < 0.001$), and equilibrium phases (2.01 ± 0.95 vs. 4.04 ± 0.51, respectively, $P < 0.001$). In the quantitative analysis, the tumor-muscle signal intensity ratio and the liver-muscle signal intensity ratio observed with Gd-EOB-DTPA-enhanced MRI were, respectively, 0.80 ± 0.24 and 1.28 ± 0.33 precontrast, 1.92 ± 0.58 and 1.57 ± 0.55 during the arterial phase, 1.87 ± 0.44 and 1.73 ± 0.39 during the portal venous phase, $1.63 \pm 0.41$and 1.78 ± 0.39 during the equilibrium phase, and 1.10 ± 0.43 and 1.92 ± 0.50 during the hepatobiliary phase. The attenuation values in the tumor and liver parenchyma observed with enhanced CT were, respectively, 40.60 ± 8.78 and 53.78 ± 7.37 precontrast, 172.66 ± 73.89 and 92.76 ± 17.92 during the arterial phase, 152.76 ± 35.73 and 120.12 ± 18.02 during the portal venous phase, and 108.74 ± 18.70 and 89.04 ± 7.25 during the equilibrium phase. Hemangiomas demonstrated peak

enhancement during the arterial phase, and both the signal intensity ratio with Gd-EOB-DTPA-enhanced MRI and the attenuation value with enhanced CT decreased with time. The signal intensity ratio of hemangiomas was lower than that of liver parenchyma during the equilibrium and hepatobiliary phases on Gd-EOB-DTPA-enhanced MRI. However, the attenuation of hemangiomas after contrast injection was higher than that of liver parenchyma during all phases of enhanced CT.

Conclusions: Prolonged enhancement during the equilibrium phase was observed less frequently on Gd-EOB-DTPA-enhanced MRI than enhanced CT, which may exacerbate differentiating between hemangiomas and malignant tumors.