Experimental Hepatic Abscess : MRI Findings Using Liver Specific Gd-EOB-DTPA and MnDPDP

손경식, 박현정, 여정훈, 장용민, 염헌규, 이종민, 강덕식

경북의대 진단방사선과학교실

Purpose: The new liver specific MR contrast agents Gd-EOB-DTPA and MnDPDP were evaluated in a rabbit liver abscess model and compared with the extracellular agent, Gd-DTPA, examining lesion conspicuity and characterization.

Materials and Method: The liver abscess was experimentally induced in adult New Zealand white rabbits (3.1-5.5 kg: mean 4.2 kg). Abscesses were made in both right and left lobe of the rabbit liver in two and in right lobe in one by injection of 0.3 to 0.5 ml suspension of 10^7/ml or 10^8/ml organisms of Escherichia Coli with an 18-guage needle under ultrasonographic guidance. The animals were anesthetized with an IM injection of Ketamine (90 mg/kg) and diazepam (10 mg/kg) and the contrast agents were injected via an ear vein. MR imaging studies were performed on a 1.5 T scanner (Vision Plus, Siemens) before and after injection of contrast media and sequential MR images were obtained in time. Both Turbo-FLASH (TR/TE = 11/4.2, flip angle 15°) and spin-echo (TR/TE = 418/12) sequences were employed in this study. The lesion conspicuity was evaluated for post contrast images of Gd-EOB-DTPA, MnDPDP and Gd-DTPA and compared with that of pre-contrast images. The enhancement patterns of the rim of abscess also evaluated to estimate the characteristic features of each agents.

Results: Among three agents, Gd-EOB-DTPA scores highest lesion conspicuity (LC). The maximum LC of Gd-EOB-DTPA was 21 (×100 %) at 10 minutes after IV injection of the agent. After reaching the maximum value, the lesion conspicuity was continuously decreased in time. For MnDPDP, the maximum LC was 13 (×100 %) at 10 minutes and the maximum LC was kept constant over time. However, Gd-DTPA showed much lower maximum lesion conspicuity than liver-specific agents, Gd-EOB-DTPA and MnDPDP. The duration of this maximum LC with Gd-DTPA was also much shorter than that of liver-specific agents in time. In regard to rim enhancement, Gd-EOB-DTPA and Gd-DTPA showed uniform rim enhancement characteristics while MnDPDP showed darker rim intensity than normal parenchyma. This characteristic feature of MnDPDP was more severe on late phase as normal cells gradually uptake MnDPDP.

Conclusion: The clinical utility of new liver-specific MR agents, Gd-EOB-DTPA and MnDPDP were evaluated using a rabbit hepatic abscess model. Compared to unenhanced and the Gd-DTPA enhanced images, the postcontrast images with liver-specific agents showed higher lesion conspicuity and characterization. These agents also showed the great ability to detect small lesions, which were hard to find on unenhanced images.