

The efficacy of signal intensity change map images obtained using first pass dynamic Ferucarbotran-enhanced MR imaging for assessment of focal hepatic lesion vascularity.

S. Kumano¹, K. Kikuchi¹, T. Tsuda¹, H. Miki¹, T. Mochizuki¹

¹Radiology, Ehime University, Toon, Ehime, Japan

purpose

Ferucarbotran is the first approved liver-specific iron oxide contrast-media that can be applied in a fast bolus. First pass dynamic ferucarbotran-enhanced MRI also can be evaluated the vascularity of hepatic focal lesion by using single shot GRE EPI sequence. We tried to make the signal intensity map images for assessment of hepatic lesion vascularity based on GRE EPI sequence data set. The purpose of this study was to evaluate the efficacy of the signal intensity map images for the detection of hypervascular hepatocellular carcinomas..

Method and material

Twenty patients with 32 hypervascular hepatocellular carcinomas (HCCs) underwent ferucarbotran-MRI. Diagnosis of HCCs were based on surgical resection (n=4), biopsy (n=5) or a combination of CT during arterial portography (CTAP), CT during hepatic arteriography (CTA) and/or follow up CT (n=23). First pass dynamic ferucarbotran-MRI were acquired with a 1.5-T MR system. MR imaging of the entire liver was performed with single shot GRE EPI sequences during a single breath-hold. Parameters were section thickness=8mm, interscan gap=1mm, TR=1000, TE=25, FOV=340-400, image matrix=128x 128, SENSE factor=2. Dynamic MRI started 10s after initiation of the injection of Ferucarbotran. Continuous 25 phase images were obtained to include the entire liver. All dynamic MR imaging data were transferred to a postprocessing workstation (Octane; SGI, Mountain View, CA), and signal intensity change map images were generated using our proprietary software. Signal intensity change was calculated as exponential fraction ($SI=A^{-kt}$) with pixel by pixel basis. Signal intensity change map images were generated by using k value.

Results

For the lesions less than 2cm in diameter, the detection sensitivity for tumors was 43%. For the larger lesions (>2cm in diameter), the detection sensitivity was 73%. The positive predictive value was 85% for all tumors. The signal intensity change map images tend not to be detected the tumors located at peripheral in the liver.

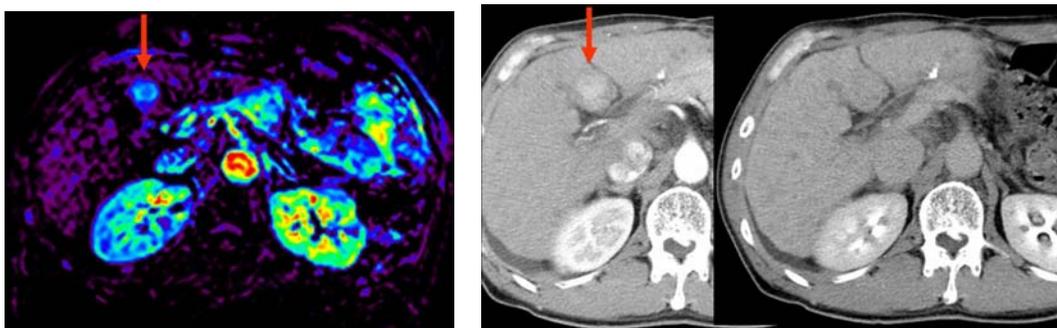


Fig.1 Signal intensity change map and dynamic CT: On signal intensity change map, tumor was seen at segment 4 in the liver (arrow). The tumor corresponds to the hypervascular lesion on dynamic CT (arrow).

Conclusion

Signal intensity map images using first pass dynamic Ferucarbotran-enhanced MRI can be helpful in determining the vascularity, especially in lesions larger than 2cm. the technique is less valuable for small size lesions and peripherally based lesions.