Differentiation of Vascular Patterns of Hemangioma by Superb Microvascular Imaging in Liver Sonography at Chulabhorn Hospital

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Introduction: Hemangioma is the most common benign tumor in the liver. Ultrasound is the first modality for screening that is cheap, accessible, and real-time. If lesions were found, CT or MRI could be confirmed, but they are expensive, time-consuming, limiting their widespread use and contraindication to contrast agents. Information on vascularity with enhancement patterns provides an essential clue for the characterization of hepatic tumors. SMI is an innovative ultrasound Doppler technique that allows visualization of micro-slow flow vessel. This technique makes it possible to create highly detailed and accurate images of blood vessels.

Purpose: To explore Superb Microvascular Imaging (SMI)'s role in characterizing vascular patterns of hepatic hemangioma.

Methods: In this retrospective study, we included 29 patients who were diagnosed as having 29 true hepatic lesions, size between 0.8-4.0 cm. All hepatic lesions had been proved by CT and/or MRI to confirm the hepatic lesions' diagnosis. Size, margin, and features of the SMI pattern are evaluated between two groups. We also compared the malignant tumor (metastasis and hepatocellular carcinoma) with benign tumors (HEs and inflammation), using Fischer exact test.

Results: Twenty-nine true hepatic lesions included 19 HEs, 7 metastases, 2 inflammations, 1 HCC. The vascular patterns of HEs appear in 5 SMI vascular patterns: nodular rim patterns (n=6), nodular rim with dot-like patterns (n=4), nonspecific patterns (n=5), staining patterns (n=1), and no signal patterns (n=3). The inflammations were classified into 2 SMI vascular patterns: nodular rim patterns (n=1) and no signal patterns (n=1). Metastases were classified into 2 SMI vascular patterns: non-specific patterns (n=6) and no signal patterns (n=1). HCC was observed as a staining pattern. The SMI vascular patterns of HCCs and metastatic lesions were significantly different from those of HEs ($p = 0.012 < 0.05$).

Conclusion: SMI can provide useful information for significantly differential diagnosis of HCCs and metastatic lesions from HEs.

Keywords: hemangioma / SMI / vascular pattern

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Abbreviations:

SMI: Superb Microvascular Imaging

HE: hemangioma

HCC: Hepatocellular carcinoma

CT: Computed tomography

MRI: Magnetic resonance imaging

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