

# SPIO ENHANCED MR IMAGING PERMITS ACCURATE DIFFERENTIATION OF BENIGN FROM MALIGNANT FOCAL HEPATIC ARTERIAL PHASE GD-ENHANCING LESIONS IN END STAGE LIVER DISEASE

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## Background

Small hypervascular lesions are frequently observed on gadolinium-enhanced magnetic resonance (MR) images in cirrhotic patients being screened for hepatocellular carcinoma (HCC). It has been reported that 43 to 93% of those small arterially enhancing lesions are benign [1-6]. These lesions are difficult to characterize, are a major source of diagnostic confusion, and may lead to errors in patient management and prognosis.

## Objective

To test the hypothesis that diminished reticuloendothelial (RE) function in hypervascular lesions, as assessed on superparamagnetic iron oxide (SPIO) enhanced MR images, may be an accurate predictor of malignancy.

## Methods

We retrospectively identified in 43 cirrhotic patients a total of 80 hypervascular lesions ( $\leq 2$ cm in diameter) described prospectively on clinical MR reports. MR exams were performed at 1.5T and included (a) SPIO (10 micromol/kg)-enhanced 2D T2\*-weighted spoiled gradient echoes (SGEs) followed immediately afterward by (b) gadolinium chelate (Gd, 0.1 mmol/kg)-enhanced 3D T1-weighted dynamic SGEs. Blinded to final diagnosis, one radiologist reviewed each MR exam on PACS and electronically flagged each lesion. A different radiologist, also blinded, scored RE function (binary score) in each lesion as reduced (lesion had lower SPIO uptake than background liver) versus not reduced (lesion had similar or higher uptake than liver). The reference standard was liver explant histology (27 lesions), biopsy (6 lesions), or long-term imaging follow up (47 lesions). Accuracy of SPIO uptake as a predictor of malignancy was analyzed.

## Results (Table 1, Figure 1)

There were 40 malignant and 40 benign hypervascular lesions (4 to 20mm in diameter). As assessed on SPIO-enhanced images, RE function was reduced in 47 lesions: 39 were HCCs (positive predictive value 83%). RE function was not reduced in 33 lesions: 32 were benign (negative predictive value 97%). Thus, reduced RE function as assessed on SPIO-enhanced images had 98% (39/40) sensitivity and 80% (32/40) specificity for discrimination of malignant from benign hypervascular lesions. Tumor grade was assessable in 10 HCCs. Six were well and four moderately differentiated; all 10 showed reduced RE function on MR.

## Conclusion

In cirrhotic patients, reduced RE function as assessed non-invasively on SPIO-enhanced MR accurately characterizes small hypervascular lesions as malignant. SPIO-enhanced increases specificity when differentiating malignant from benign small hypervascular lesions.

## REFERENCES

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	SPIO uptake		
	reduced	not reduced	
HCC	39	1	40
benign	8	32	40
	47	33	80

Table 1 Reduced RE function as assessed on SPIO-enhanced images had 98% (39/40) sensitivity and 80% (32/40) specificity for discrimination of malignant from benign hypervascular lesions.

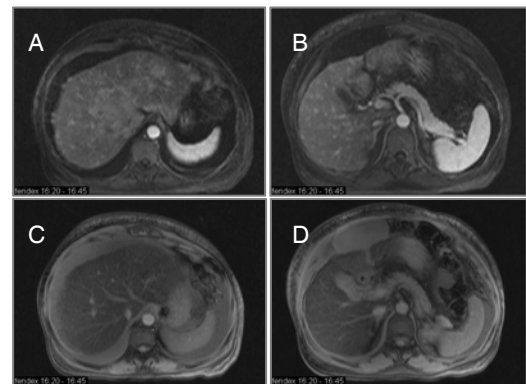


Figure 1. Multiple Pseudolesions. A 57-year-old female with a history of hepatitis C, cryoglobulinemia and nephrotic syndrome. Abdominal MR imaging showed innumerable focal enhancing lesions in the liver (A, B) in arterial phase and the initial diagnosis was extensive HCC. No lesion showed abnormal RE function as assessed on SPIO-enhanced images (C, D). Four transjugular liver biopsies were performed that showed no malignant cells. Follow up MRI 3 months later showed no liver lesions.