

**The Evaluation of the Pattern of Contrast-to-Noise Ratio Change in Rat Hepatoma Model
using Dynamic USPIO-enhanced Snapshot Echoplanar Imaging**

Byung-Moon Kim, Jin-Suk Suh, Yong-Min Huh

Department of Diagnostic Radiology, Medical College, Yonsei University

Purpose: To demonstrate the pattern of signal intensity (SI) change and contrast-to-noise ratio (CNR) change in the rat hepatoma model using USPIO-enhanced spin echo echoplanar imaging (SEPI).

Materials and Method: Dynamic SEPI was performed during and just after an intravenous bolus injection of USPIO iron oxide-oleate colloid (6-9nm core, T2-relaxivity 0.2×10^{-6} (mol/L) $^{-1}$ S $^{-1}$, 1.7mg of iron/kg B.W.) 3 weeks after direct implantation of N1-S1 hepatoma cell line in the liver of 6 rats (12 sites). We obtained 125 sequential images at 1.5 sec intervals at the 4 different levels respectively and analyzed temporal SI change of the hepatomas and liver and CVR ((SI of hepatoma - SI of liver)/Noise).

Results: SI of normal liver rapidly decreased within 30 sec (average=70% of maximum signal loss) and slowly did thereafter. SI of small hepatoma group (n=6, range: 0.3-1.0cm, mean: 0.7cm) decreased during first 25-27 sec, but slowly increased up to the initial level near the end. In large hepatoma group (n=6 range 1.7-3.0cm, mean 2.0cm), SI did not decrease from the early images to the end. CNR of the small hepatomas did not change during the initial 24-27 sec and subsequently increased linearly up to an average 2.7 times of initial CNR at the end. In the large hepatomas, CNR rapidly increased during initial 30-37 sec and then showed a plateau with average 4.5 times of the initial CNR.

Conclusion: Dynamic USPIO-enhanced SEPI demonstrated a difference between the small hepatoma group and the large hepatoma group in the patterns of SI and CNR changes, and the maximum degree of CNR increase. This may be suggestive of the presence of perfusion discrepancy between the two group.