Fat-Water Interface on Susceptibility Weighted Imaging and Gradient Echo Imaging: Comparison of Phantoms to Intracranial Lipomas

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Summary

Objective: In a clinical setting, lipoma can sometime show low signal intensity on SWI mimicking hemorrhage. The purpose of this study is to evaluate the fat-water interface chemical shift artifacts between SWI and T2*WI with a phantom study and evaluate the SWI images in lipoma cases.

Materials and Methods: SWI, magnitude, high-pass filtered phase and T2*WI images of a lard-water phantom were evaluated in the in-phase, out-of-phase and standard partially out-of phase TE settings used for clinical 3T MRI SWI (19.7ms, 20.9 ms and 20.0 ms respectively), to identify the most prominent fat-water interface low signal. SWI of 5 cases of CNS lipoma were retrospectively evaluated by two neuroradiologists.

Results: TE=19.7ms (in-phase) showed the minimum fat-water interface low signal in the phase-encode direction on magnitude, high-pass filtered phase and SWI images. TE=20.9ms (out-of-phase) image showed the maximum fat-water interface in the phase-encode direction on magnitude, high-pass filtered phase and SWI images. TE=20.0ms (partially out-of-phase) image showed more fat-water interface low signal on SWI than T2*WI especially in the phase-encode direction. All lipoma in the 5 patients showed high signal intensity with surrounding peripheral dark rim on SWI.

Conclusion: Fat-water interface is more prominent on standard TE setting used for clinical SWI (TE=20.0ms) than that of T2*WI and shows a characteristic surrounding peripheral low signal rim in lipoma. Knowing the fact of fat-water appearance on SWI is important to avoid misinterpreting intracranial lipomas as hemorrhages.