GADOXETIC ACID-ENHANCED MRI OF LIVER: CAN 5 MIN-DELAYED HEPATOCYTE-PHASE IMAGING WITH HIGH FLIP ANGLE (30°) REPLACE 20 MIN-DELAYED HEPATOCYTE-PHASE IMAGING WITH LOW FLIP ANGLE (10°)?

Eun-Suk Cho[1] and Jeong-Sik Yu[1]
[1]*Radiology, Yonsei University College of Medicine, Gangnam Severance Hospital, Seoul, Korea*

Background: To increase the flip angle (FA) from 10-15° to 30–35° in gadoxetic acid-enhanced hepatocyte phase MR imaging (HPI) improved focal hepatic lesions (FHLs) detection and increased lesion-to-liver contrast noise ratio (CNR) because higher FA increases T1-weighting (1, 2). The sensitivity for hepatic metastases detection on HPI with 30° FA was significant higher than that on HPI with 10° FA at both 5 and 10 min delay time. But there were no significant differences of sensitivities between HPIs with 10° and 30° FA at both 15 and 20 min delay time (2).

Introduction: To compare 5 min-delayed HPI using 30° FA and 20 min HPI using 10° FA, regarding FHLs detection and lesion-to-liver CNR. And to determinate whether 5 min-delayed HPI using 30° FA could replace 20 min HPI using 10° FA, which led to 15 min timesaving.

Methods: 116 patients with 282 FHLs (malignancy n=146, benign n=136) underwent gadoxetic acid-enhanced MRI with 5min-delayed HPI using 30° FA and 20 min HPI using 10° FA. Lesion-to-liver CNRs at both two HPI sets were calculated and compared. Three radiologists judged independently the presence of FHLs using a four-point scale.

Results: Mean CNR for FHLs on 5 min-delayed HPI using 30° FA (167.9 ± 84.1) were significantly higher than that on 20 min HPI using 10° FA (160.2 ± 79.5) (Fig. 1 and 2). However, mean CNR difference between two HPI sets was very small, such as 7.8 – 22.6. There was no significant difference at sensitivity of FHLs detection on two HPI sets for all three readers, irrespective of lesions' malignancy or benignity and the size of FHLs.

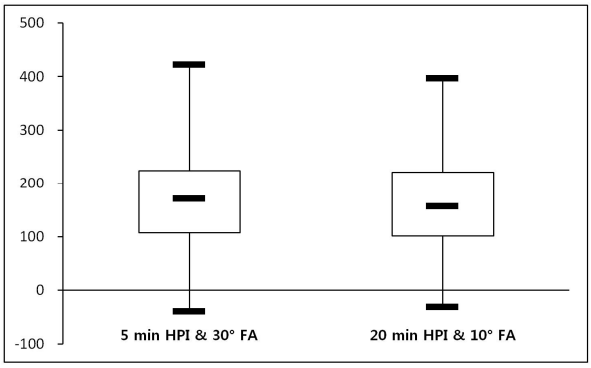

Fig 1. CNRs of FHLs on two HPI sets

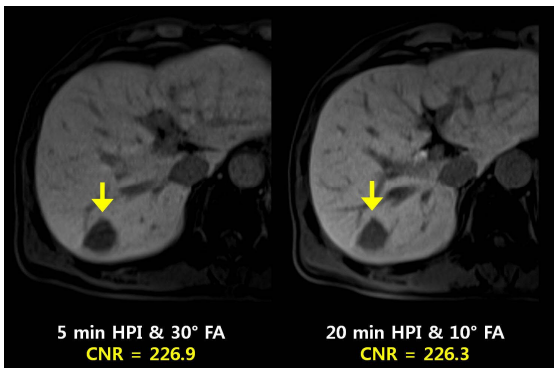

Fig 2. A 66-year-old man with liver metastasis.

Conclusion: Lesion-to-liver CNR and sensitivity of detection of FHLs on 5 min-delayed HPI using 30° FA were higher or similar to those on 20 min HPI using 10° FA in gadoxetic acid-enhanced MRI. This finding indicates that 5 min-delayed HPI using 30° FA provides similar diagnostic performance compared to 20 min-delayed HPI using 10° FA and could replace 20 min-delayed HPI with 15 min time-saving.

References

1. Bashir MR, Merkle EM. Eur Radiol 2011;21:291-294.
2. Haradome H, Grazioli L, Al manea K, et al. J Magn Reson Imaging 2012;35:132-139.