FEASIBILITY OF 10-MINUTE DELAYED HEPATOCYTE PHASE IMAGING WITH 30° FLIP ANGLE IN GD-EOB-DTPA-ENHANCED MRI FOR DETECTION OF HEPATOCELLULAR CARCINOMA, COMPARED TO 20-MINUTE DELAYED HEPATOCYTE PHASE IMAGING

Inhwan Jeon[1], Dahye Lee[1], Eun-Suk Cho[1], and Jeong-Sik Yu[1]

[1]*Radiology, Yonsei University College of Medicine, Gangnam Severance Hospital, Seoul, Korea*

Target Audience: Abdominal Imaging Radiologists

Background: According to previous reports[1, 2], 10-min delayed hepatocyte phase imaging (HPI) provided satisfactory information for detection of focal hepatic lesion (FHL) in Gd-EOB-DTPA-enhanced liver MRI. However, lesion-to-liver contrast-to-noise ratio (CNR) was significantly lower than 20-min delayed HPI. By increasing the flip angle (FA) from 10° to 30° in HPI, increased lesion-to-liver CNR and improved FHL detection were achieved since the higher FA increases T1-weighting [3, 4].

Purpose: To compare the lesion-to-liver CNR and FHL detection sensitivity between 10-min delayed HPI with a 30° FA (10min-FA30) and 20-min delayed HPI with a 10° FA (20min-FA10) in patients with hepatocellular carcinoma (HCC). And, to determine whether 10min-FA30 could replace 20min-FA10, thus saving time of 10 minutes in acquiring HPI.

Methods: 83 patients with 112 HCCs and 38 benign hepatic lesions underwent Gd-EOB-DTPA-enhanced liver MRI with 10min-FA30, 20min-FA10, and 20-min delayed HPI with a 30° FA (20min-FA30). According to Child-Pugh score, the patients were divided into two groups: group A (with Child-Pugh score 5-6, n = 66) and group B (with Child-Pugh score 7-15, n = 17). CNRs of three HPI sets were calculated and compared at each group. Two radiologists assessed independently the presence of FHLs using a four-point scale. Bonferroni correction was applied and differences were considered to be significant when the P-value was less than 0.025.

Results: The mean CNR on 10min-FA30 was significantly higher than that of 20min-FA10 in group A (155.7 ± 83.8 and 104.5 ± 64.7, respectively). However, there was no significant difference between them in group B (56.5 ± 37.6 and 49.6 ± 31.8, respectively). The mean CNRs on 20min-FA30 in both group A and B (195.7 ± 113.1 and 68.5 ± 43.3, respectively) were significantly higher than those of 10min-FA30. There were no significant differences on detection sensitivity for HCCs between 10min-30FA and 20min-10FA or between 10min-30FA and 20min-30FA in group A. However, sensitivity on 10min-30FA and 20min-30FA were higher than on 20min-10FA and there were no significant differences between 10min-30FA and 20min-30FA.

Conclusion: The 10min-FA30 in Gd-EOB-DTPA-enhanced MRI had higher or similar lesion-to-liver CNR and detection sensitivity, compared to the 20min-10FA. This result indicates that 10-min delayed HPI with a 30° FA could replace 20-min delayed HPI with a better or similar diagnostic performance for detection of HCC and also allows 10 minutes of time-saving.

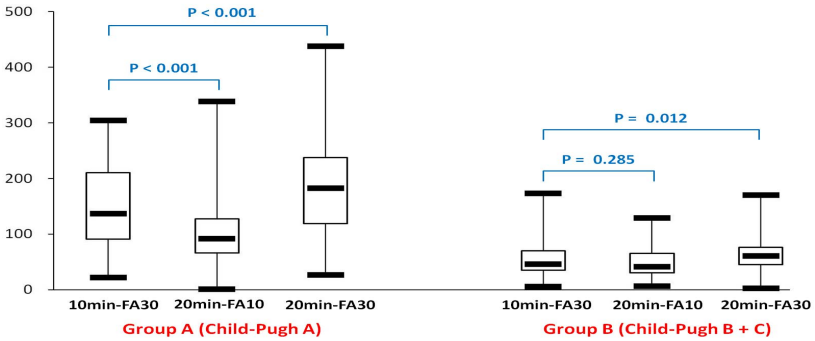

Fig 1. CNR of HCCs on three HPI sets at group A and B

References

1. Sofue K, Tsurusaki M, Tokue H, et al. Eur Radiol. 2011;21:2336-2343.
2. Jeong HT, Kim MJ, Park MS, et al. J Magn Reson Imaging. 2012;35:635-643.
3. Bashir MR, Merkle EM. Eur Radiol. 2011;21:291-294.
4. Haradome H, Grazioli L, Al manea K, et al. J Magn Reson Imaging. 2012;35:132-139.