Session 6. Up-to-Date Information on Precancerous GB Lesions

Emerging modalities to evaluate obscure GB lesions

Jae Young Lee

Department of Radiology, Seoul National University College of Medicine, Korea

Curriculum Vitae

Prof. Lee received his medical degree from Seoul National University, Korea, in 1992. Following this, he finished one-year-internship and four-year-radiology residency program in Seoul National University Hospital from 1992 to 1997. After finishing 3 year obligatory military service as a medical officer, he completed a clinical fellowship in abdominal section of the department of radiology in Seoul National University Hospital under the guidance of Prof. Byung Ihn Choi and Prof. Joon Koo Han in 2001. Experiencing professorship from 2001, he became professor at the department of radiology in Seoul National University College of Medicine in 2015. He received his PhD in medical science in 2009 from Seoul National University Graduate School of Medicine in Korea.

Prof. Lee has published more than 150 scientific articles in international peer-reviewed journals as well as more than 20 domestic scientific papers. He has also delivered more than 100 invited lectures in his area of expertise to international audiences. Prof. Lee serves as a member of the Korean Society of Ultrasound in Medicine (KSUM), as chair of the International Liaison Committee (2009-2016) and as chair of the Academic Committee (2016-). He is also a vice-President of the Korean Society of Therapeutic Ultrasound (KSTU), Secretary General of the Korean Society for Quality in Health Care (KoSQua), and Secretary General (2014-2016) and vice-President (2016-) of the Asian Federation of Societies for Ultrasound in Medicine and Biology (AFSUMB).

Prof. Lee's research focuses on research of diagnostic and therapeutic ultrasound. Recent publications are "Comparison of reliability of acoustic radiation force impulse imaging and supersonic shear imaging in measurement of liver stiffness"; "Hepatic steatosis: Assessment with acoustic structure quantification of ultrasound"; and "Radiofrequency ablation using a directional internally cooled monopolar electrode: Ex vivo and in vivo experimental studies", all of which were published in a row in the journal named "Radiology".

Emerging modalities to evaluate obscure GB lesions

Conventionally, for the diagnosis of GB lesions, ultrasound (US), endoscopic US (EUS), CT and MRI have been being used. US is generally considered the first line study due to its high diagnostic performance for the detection of stone and polypoid lesion of > 5mm and high availability. However, US is limited by the artifacts that it has and the use of low MHz frequency probe. EUS is considered to be superior to conventional US for imaging GB lesions because EUS can provide high resolution images of small lesions with higher US frequencies (7.5-12 MHz). However, EUS is limited in terms of discomfort that patients have during examination and the use of sedation.

Recently, we had significant advances in US technology to overcome these drawbacks of conventional US. Among them, harmonics, compounding technique, and speckle reduction imaging were proven to enhance contrast/spatial resolution and to reduce the artifacts and noise, which are available in high MHz transducer as well as in low MHz transducer (1-3). Combination of these techniques and high MHz transducer, named "high resolution ultrasonography (HRUS)" enabled to evaluate GB wall clearer and more accurately than conventional US (4,5). Regarding differentiation of adenomyomatosis of the gallbladder from early-stage, wall-thickening-type gallbladder cancer using HRUS, Az values of HRUS in the diagnosis of adenomyomatosis were 0.915 to 0.948 (6). The sensitivity, specificity, and accuracy of intramural cystic spaces/echogenic foci for the diagnosis of adenomyomatosis were 80.0%, 85.7%, and 82.2% (6). Regarding diagnostic performance of HRUS in comparison to CT and MRI for the differentiation of adenomyomatosis and gallbladder cancer, HRUS, CT, and MRI showed mean accuracies of 88.8%, 82.5%, and 92.5%, respectively (7). CT showed the lowest sensitivity (46.1% to 53.8%) for this issue (7). In terms of preoperative differentiation between T1a and >T1b gallbladder cancer, combined HRUS and MDCT interpretation may improve the diagnostic accuracy and specificity for differentiating between T1a and > T1b GB cancers.

References

1. Crawford DC, Cosgrove DO, Tohno E, et al. Visual impact of adaptive speckle reduction on US B-mode images. Radiology. 1992;183(2):555-61.
2. Oktar SO, Yucel C, Ozdemir H, Uluturk A, Isik S. Comparison of conventional sonography, real-time compound sonography, tissue harmonic sonography, and tissue harmonic compound sonography of abdominal and pelvic lesions. AJR American journal of roentgenology. 2003;181(5):1341-7.
3. Yen CL, Jeng CM, Yang SS. The benefits of comparing conventional sonography, real-time spatial compound sonography, tissue harmonic sonography, and tissue harmonic compound sonography of hepatic lesions. Clinical imaging. 2008;32(1):11-5.
4. Jang JY, Kim SW, Lee SE, Lee JY, et al. Differential diagnostic and staging accuracies of high reso-

lution ultrasonography, endoscopic ultrasonography, and multidetector computed tomography for gallbladder polypoid lesions and gallbladder cancer. Annals of surgery. 2009;250(6):943-9.

5. Lee JY, Choi BI, Han JK, et al. High resolution ultrasonographic evaluation of the gallbladder: value of advanced imaging techniques. Journal of Korean Society of Ultrasound in Medicine. 2005;24(4):169-75.
6. Joo I, Lee JY, Kim JH, Kim SJ, Han JK, Choi BI. Differentiation of adenomyomatosis and wall thickening type gallbladder cancer on high resolution ultrasonography. Eur Radiol. 2013 Mar;23(3):730-8.
7. Bang SH, Lee JY, Woo H, Joo I, Lee ES, Han JK, Choi BI. Differentiating between Adenomyomatosis and Gallbladder Cancer: Revisiting a Comparative Study of High-Resolution Ultrasound, Multidetector CT, and MR Imaging. Korean J Radiol. 2014 Mar;15(2):226-34.
8. Joo I, Lee JY, et al. Preoperative differentiation between T1a and and ≥T1b Gallbladder Cancer: Combined Interpretation of High-Resolution Ultrasound and Multidetector-row Computed Tomography. Eur Radiol. 2014 Aug;24(8):1828-34.