

Comparison of the Classification of Cystic Renal Lesions Using the Bosniak Classification System with Contrast Enhanced Ultrasound and Magnetic Resonance Imaging to Computed Tomography: A Prospective Study

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Abstract : In addition to computed tomography (CT), contrast enhanced ultrasound (CEUS), and magnetic resonance imaging (MRI) are being increasingly used for imaging of renal lesions. The aim of this prospective study was to compare the classification of complex cystic renal lesions using the Bosniak classification with CEUS and MRI to CT. Forty-eight patients with 65 cystic renal lesions were included in this study. All participants signed written informed consent. The agreement between the Bosniak classifications of complex renal lesions (\geq BII-F) on CEUS and MRI were compared to that of CT and were tested using Cohen's Kappa. Sensitivity, specificity, positive and negative predictive values (PPV/NPV) and the accuracy of CEUS and MRI compared to CT in the detection of complex renal lesions were calculated. Twenty-nine (45%) out of 65 cystic renal lesions were classified as complex using CT. The agreement between CEUS and CT in the classification of complex cysts was fair (agreement 50.8%, Kappa 0.31), and was excellent between MRI and CT (agreement 93.9%, Kappa 0.88). Compared to CT, MRI had a sensitivity of 96.6%, specificity of 91.7%, a PPV of 54.7%, and an NPV of 54.7% with an accuracy of 63.1%. The corresponding values for CEUS were sensitivity 100.0%, specificity 33.3%, PPV 90.3%, and NPV 97.1% with an accuracy 93.8%. The classification of complex renal cysts based on MRI and CT scans correlated well, and MRI can be used instead of CT for this purpose. CEUS can exclude complex lesions, but due to higher sensitivity, cystic lesions tend to be upgraded. However, it is useful for initial imaging, for follow up of lesions and in those patients with contraindications to CT and MRI.

Keywords : Bosniak classification, computed tomography, contrast enhanced ultrasound, cystic renal lesions, magnetic resonance imaging

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