Diffusion weighted magnetic resonance imaging in bladder cancer, is it time to replace biopsy?

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Abstract:

Introduction To assess if the apparent diffusion coefficient (ADC) value of magnetic resonance imaging (MRI) can discriminate between the cell type, histological grade and improve staging of urinary bladder cancer (BC). Material and methods 102 patients with urinary bladder masses underwent MRI using a 1.5 T machine. T2 weighted and diffusion weighted imaging (DWI) using b values of 0, 150, 500 and 1000 s/mm2 were done. The ADC values of bladder masses were measured. These values were correlated with the histopathologic results. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and accuracy of T2WI, DWI and T2WI plus DWI for detecting bladder lesions were evaluated. RESULTS The cut-off ADC value for diagnosing malignant bladder wall pathologies was ≤1 x 10-3 mm2/s with 94.5% sensitivity and 87.5% specificity. The mean ADC value of different malignant cell types was statistically insignificant. A significant difference in ADC values was found between G1 and G3 (P = 0.000), G2 and G3 (P = 0.045) but not between G1 and G2 (p = 0.066). Staging accuracy for differentiation between invasive and non-invasive lesions was nearly the same for all MRI data sets. For differentiation between organ confined (pT1–pT2) and non-organ confined lesions (pT3–pT4), staging accuracy was better in T2WI plus DWI (83%) as compared to DWI alone (77%) or T2WI alone (75%). Conclusions Adding DWI and the ADC value to T2WI improve the accuracy of MRI in BC detection and staging. However, at this time point, MRI cannot replace transurethral resection (TUR) biopsy or distinguish sharply between all different histologic grades and cell types.

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