

Diffusion tensor imaging of renal parenchyma in pediatric patients with chronic kidney disease: Correlation with serum biomarkers

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February 3, 2021

Abstract

Purpose: to demonstrate role of diffusion tensor imaging (DTI) in diagnosis of pediatric chronic kidney disease (CKD) using fraction anisotropy (FA) and apparent diffusion coefficient (ADC). Material and methods: Prospective study done on 35 CKD patients (19 boys, 16 girls; mean age 12.2±2.7 years) and 19 age and sex-matched volunteers. Patients with sclerotic (n = 25) and non-sclerotic (n = 10) CKD that underwent DTI of kidney. Results: Mean FA of renal cortex/ medulla in CKD (0.20±0.07, and 0.18±0.08) was significantly lower (p = 0.001) from volunteers (0.27±0.08, 0.31±0.09). Cutoff renal FA of cortex/ medulla used for diagnosis of CKD was 0.23, and 0.22 with AUC of 0.828, 0.828 and accuracy of 82.9%, 80.7%. Mean ADC of renal cortex/ medulla in CKD (1.98±0.23 and 2.03±0.23 X10-3mm2/s) was significantly higher (p = 0.001) that of volunteers (1.65±0.134 and 1.68±0.16 X10-3mm2/s). Cutoff renal ADC of cortex/medulla used to diagnosis of CKD were 1.75 and 1.85X10-3mm2/s with AUC of 0.828, 0.910, 0.828 and 0.81 and accuracy of 82.9%, 84.1%, 80.7% and 79.5%. FA of renal cortex/medulla in sclerotic CKD was significantly different (p = 0.001) than non-sclerotic CKD (0.26±0.07 and 0.25±0.08). The FA of renal cortex/medulla in CKD patients correlated with serum creatinine (r = -0.468; p = 0.000, r = -0.381; p = 0.001), e GFR (r = 0.364; p = 0.002, r = 0.318; p = 0.007). Conclusion: FA and ADC of renal cortex/ medulla can help in diagnosis of CKD, FA cortex/ medulla predicts sclerotic CKD and correlated with some of serum biomarkers.

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