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**Diffusional magnetic resonance imaging for the evaluation of
immunoglobulin A nephropathy by DTI and IVIM DWI**

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Objectives : To explore the efficacy of diffuse magnetic resonance imaging (MRI) for identifying clinicopathological changes in immunoglobulin A nephropathy (IgAN) patients.

Methods : The study enrolled IgAN patients and healthy volunteers. Intravoxel incoherent motion diffusion-weighted imaging (IVIM-DWI) and diffusion tensor imaging (DTI) were performed via 3.0 T magnetic resonance. Diffuse MRI data and clinical and pathological indicator data were collected and analyzed. $P < 0.05$ was considered statistically significant.

Results : Forty-six IgAN patients and twenty-seven volunteers were enrolled. IgAN patients were divided into 3 subgroups: group 1 (estimated glomerular filtration rate (eGFR) ≥ 90 ml/min/1.73m²), group 2 ($60 \leq$ eGFR < 90 ml/min/1.73m²), and group 3 (eGFR < 60 ml/min/1.73m²). The apparent diffusion coefficient (ADC), diffusion coefficient (D), perfusion fraction (f), and fractional anisotropy (FA) were significantly different among IgAN subgroups and controls. These parameters were positively correlated with eGFR and negatively with creatinine, and inversely correlated with the proportion of glomerular sclerosis, interstitial fibrosis, and tubular atrophy (all $P < 0.05$). The area under the curve (AUC) of ADC, D, f, and FA were significantly high for distinguishing IgAN patients from controls, while FA had the highest AUC (cortex: 0.929, 95% confidence interval (95% CI) 0.844-0.976; medulla: 0.900, 95% CI 0.807-0.958). FA also had the highest AUC when distinguishing Group 1 IgAN patients from volunteers ($P < 0.05$).

Conclusions : DTI and IVIM-DWI have the advantage of evaluating clinical and pathological changes in IgAN patients. DTI was superior at distinguishing early IgAN patients from healthy individuals and might be a noninvasive marker for screening early IgAN patients.