EVALUATION OF 3.0T MR DIFFUSION-WEIGHTED IMAGING IN RENAL MALIGNANT TUMOR

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Objective: To evaluate 3.0T MR diffusion-weighted imaging and apparent diffusion coefficient value in different pathological type of renal malignant tumor.

Materials and methods: Retrospective study was performed on 66 patients of renal malignant tumors proved by surgery and pathology. The cohort was composed of 51 cases of clear cell carcinoma (10 in gradeI, 14 in gradeI-II, 14 in grade II, 4 in grade II-III ,8 in grade III,and 1 with sarcomatous change), 9 cases of chromophobe cell carcinoma , 3 cases of papillary cell carcinoma, 1 case of collecting duct carcinoma, carcinoid and rhabdoid tumor each. DWI of all were acquired by single-shot EPI sequence with b =800 s/mm² at 3.0T MR. ADC values of tumor and the corresponding regions of normal opposite renal cortex were measured. The data were analyzed by independent t test of SPSS 13.0 software. One-way Anova and LSD multi-comparison were conducted within different pathological grade groups of clear cell carcinoma, and ROC curve was used to determine the best diagnostic threshold value of ADC .

Result: ADC values of normal renal cortex($2.315\pm0.213\times10^{-3}$ mm²/s) and clear cell carcinoma ($1.988\pm0.491\times10^{-3}$ mm²/s)were significantly higher than those of renal carcinoma($1.864\pm0.523\times10^{-3}$ mm²/s) and non-clear cell carcinoma ($1.443\pm0.399\times10^{-3}$ mm²/s) respectively($P<0.01$). The ADC values of clear cell carcinoma in gradeI, II (including gradeI-II) and III (including grade II-III and with sarcomatoid change) were $2.136\pm0.462\times10^{-3}$ mm²/s, $2.065\pm0.460\times10^{-3}$ mm²/s and $1.710\pm0.504\times10^{-3}$ mm²/s respectively. One-way Anova showed statistic difference within groups of clear cell carcinoma($P=0.05$).Multiple comparison analysis indicated that there were statistic differences between gradeI and III($P=0.04$), grade IIand III ($P=0.03$) respectively. However, no statistic difference was observed among gradeI and II($P=0.68$).ROC curve showed that cutoff value of 1.70×10^{-3} mm²/s (for differentiating clear cell and non-clear cell carcinoma) and 1.77×10^{-3} mm²/s (for differentiating clear cell carcinoma in grade I and IIfrom other renal carcinoma) resulted in sensitivity ,specificity and accuracy of 72.5% and 73.3%, 73% and 72.4%,71.4% and 71% respectively.

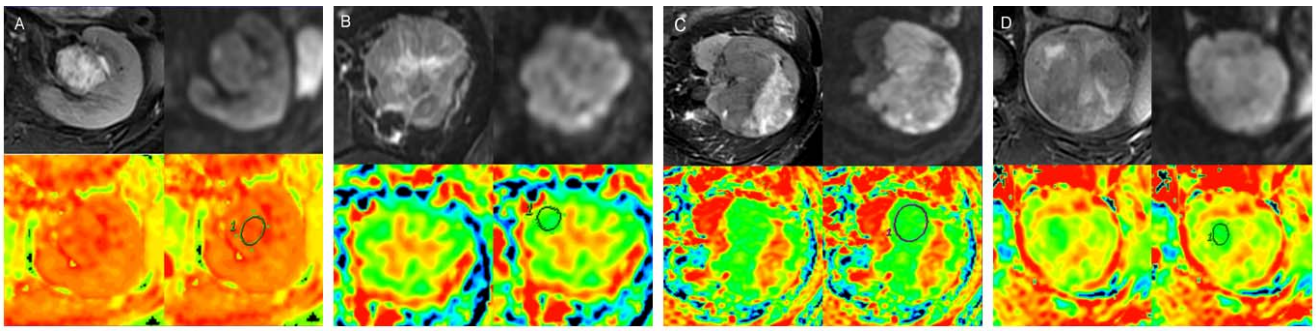

Figure A-D MR demonstration of renal clear cell carcinoma of gradeI, II, III and chromophobe cell carcinoma. Every figure was composed of Axial fat-suppressed T2-WI, DWI, ADC map and ROI on ADC map. The ADC values were 2.71×10^{-3}mm²/s,1.40×10^{-3}mm²/s,1.11×10^{-3} mm²/s and 1.17×10^{-3}mm²/s.

Conclusion: 3.0T MR-DWI can be used in diagnosis of renal malignant tumor , while ADC value has the potential in differentiating its pathological type and grade.