

Uterine Cervical Cancer; Early Treatment Assessment with T2- And Diffusion-Weighted MRI

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Abstract : Background: Patients diagnosed with locally advanced cervical carcinoma are treated with definitive concomitant chemo-radiotherapy. Treatment failure occurs in 30-50% of patients with very poor prognoses. The treatment is standardized with risk for both over-and undertreatment. Consequently, there is a great need for biomarkers able to predict therapy outcomes to allow for individualized treatment. Aim: To explore the role of T2- and diffusion-weighted magnetic resonance imaging (MRI) for early prediction of therapy outcome and the optimal time point for assessment. Methods: A pilot study including 15 patients with cervical carcinoma stage IIB-IIIB (FIGO 2009) undergoing definitive chemoradiotherapy. All patients underwent MRI four times, at baseline, 3 weeks, 5 weeks, and 12 weeks after treatment started. Tumour size, size change (Δ size), visibility on diffusion-weighted imaging (DWI), apparent diffusion coefficient (ADC) and change of ADC (Δ ADC) at the different time points were recorded. Results: 7/15 patients relapsed during the study period, referred to as "poor prognosis", PP, and the remaining eight patients are referred to "good prognosis", GP. The tumor size was larger at all time points for PP than for GP. The Δ size between any of the four-time points was the same for PP and GP patients. The sensitivity and specificity to predict prognostic group depending on a remaining tumor on DWI were highest at 5 weeks and 83% (5/6) and 63% (5/8), respectively. The combination of tumor size at baseline and remaining tumor on DWI at 5 weeks in ROC analysis reached an area under the curve (AUC) of 0.83. After 12 weeks, no remaining tumor was seen on DWI among patients with GP, as opposed to 2/7 PP patients. Adding ADC to the tumor size measurements did not improve the predictive value at any time point. Conclusion: A large tumor at baseline MRI combined with a remaining tumor on DWI at 5 weeks predicted a poor prognosis.

Keywords : chemoradiotherapy, diffusion-weighted imaging, magnetic resonance imaging, uterine cervical carcinoma

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