

ESMO ABSTRACT –

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Declaration of interest statement from authors

A prospective study of diffusion-weighted magnetic resonance imaging for predicting outcome following chemoradiotherapy, in squamous cell carcinomas of the anus.

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Background

Anal Squamous Cell Carcinoma (ASCC) is radically treated by chemoradiotherapy (CRT). The use of DW-MRI as a predictive marker of outcome would enable early individualisation of treatment. We aimed to quantify the changes in mean apparent-diffusion-coefficient (ADC_{Mean}) between a DW-MRI at diagnosis and on fraction 8-10 of CRT as a biomarker for cellularity, and correlate these with outcome.

Methods

This prospective study recruited patients with ASCC between October 2014 and November 2017. DW-MRI was performed at diagnosis and after fraction 8-10 of radical CRT. A region of interest (ROI) was delineated for all primary tumours and any lymph nodes >2 cm on high-resolution T₂ –weighted images and propagated to the

ADC map. A pre-defined cut-off for percentage change in ADC_{Mean} (ΔADC) was set at $<20\%$. Complete response (CR) was assessed 3 months following completion of CRT. Routine clinical follow up data from patients were collected from NHS electronic systems.

Results

Twenty-three of 29 recruited patients underwent paired DW-MRI scans. The median (range) tumour volume was 13.6 cm^3 (2.8 cm^3 to 84.9 cm^3). The median ΔADC_{Mean} between scans was 20.7% (95% CI: 12.7% , 34.1%). Nine of 23 (43%) patients had a change of $ADC_{Mean} <20\%$. Two patients failed to achieve a CR, with ΔADC_{Mean} of 14.6% and 20.3% , respectively. On routine follow up, 2 further patients had relapsed, with ΔADC_{Mean} of -1.2% and 6.8% .

Conclusions

In a subset of patients, $<20\% \Delta ADC_{Mean}$ on DW-MRI between diagnosis and day 8-10 of CRT was observed. Four patients in the study demonstrated persistent or recurrent disease, all of whom demonstrated an ADC on or below the pre-specified cut-off. Further investigation of the predictive merit of DW-MRI change, and the optimum cut-off is needed in larger cohorts.

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