

17-8760

Should we aim for the centre of an MRI prostate lesion? Correlation between mpMRI and 3-Dimensional 5mm Transperineal Prostate Mapping biopsies from the PROMIS trial.

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INTRODUCTION AND OBJECTIVES: mpMRI enables a new way to stratify prostate cancer patients through visualisation of a target to biopsy. However, prostate cancer is heterogeneous, even within the same focus. We aimed to determine deploying the needle to the centre of a mpMRI lesion would reflect the true risk of that lesion. Our study involved a unique cohort of men in whom a pre-biopsy mpMRI was carried out prior to Transperineal Prostate Mapping biopsies taken every 5mm within the PROMIS trial.

METHODS: 94 patients included in this analysis comprised the pilot phase of the Prostate MRI Imaging Study (NCT01292291) investigating accuracy of mpMRI against standard of care with 3D 5mm TPM-biopsies as the reference test. All patients were biopsy-naive with a PSA below 15ng/ml, referred for suspicion of prostate cancer. Prior to biopsy, all patient underwent 1.5T mpMRI with standardized protocol (T2W, DWI, DCE) which were reported on a Likert scale, blinded to subsequent histology results. Patients then underwent TPM-biopsies blinded to the mpMRI findings so that the whole prostate was sampled every 5mm. Cores were separately labelled and oriented in space. A 3D digital map of the gland was reconstructed from the TPM-biopsies using in-house software. Prostates and mpMRI lesions were contoured (blind to pathology results), registered to the digital map by aligning gland boundaries.

We identified the MRI lesion centroid and the locations of biopsy cores containing the maximum Gleason score of the lesion. We considered two cores in particular. First, the one closest to the centroid and second, the one with the longest maximum cancer core length. We computed the distance from these two cores to the centroid of the MRI lesion

RESULTS: 41 patients (median PSA 6.5ng/ml, median age 62) were found to harbour cancer at TPM-biopsies in this cohort, leading to 75 MRI lesions correlated with cancer. From the centroid, the mean distance to closest maximum Gleason core was 7.8mm (+/-6.6), and to core with the maximum cancer length was 13.8mm (+/-8.3).

CONCLUSIONS: The histological tissue that harbours the highest Gleason score within a prostate cancer lesion seen on mpMRI is not consistently located near the centre. MRI-lesion-based targeting should include sampling the entire lesion with a number of cores.

Source of Funding: Medical Research Council UK

