P-13

Can multiparametric MRI accurately detect local prostate cancer recurrence in patients treated with radiotherapy, before focal salvage therapy?

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Introduction: Biochemical failure occurs in almost 30% of men previously treated with radiation therapy. Multiparametric MRI (mp-MRI) may have clinical utility by localizing individual cancer foci within the gland to facilitate focal salvage therapy. We evaluated the accuracy of mp-MRI in detecting local recurrence of prostate cancer, in patients with biochemical failure after radiotherapy.

Methods: 40 consecutive men with evidence of biochemical failure after radiotherapy for prostate cancer, underwent mp-MRI (index test) followed by 5mm template prostate mapping (TPM) biopsy (reference test). Mp-MRI (comprised of T2-W, DW and DCE imaging) was scored on an ordinal scale of 1-5 (1=highly likely no cancer, 5=highly likely cancer).

A score of ≥4 was considered positive for primary analyses and validated against 2 target conditions on TPM to represent clinically significant prostate cancer as well as 'All cancer'.:

1- UCL definition 1: Gleason ≥4+3 and/or maximum cancer core length (MCCL) ≥ 6 mm

2-UCL definition 2: Gleason ≥3+4 and/or MCCL ≥ 4 mm

Analysis was performed at half prostate level equating to 80 sectors of analysis.

Results: Median age was 72 years (mean, 71.8±SD5.7), median PSA before radiotherapy was 14.5ng/ml (mean, 19.2±SD21.4), median time from radiotherapy to biochemical failure was 61 months (mean, 69.2±SD31) and median PSA at MRI time was 5.2 ng/ml (mean, 7.6±SD11.2).

Cancer was detected in 37/40 patients at TPM biopsy.

With respect to clinically significant disease, sensitivity, specificity, positive and negative predictive values were as follows:

UCL Def.1: 70%, 70%, 67% and 73%.

UCL Def.2: 72%, 90%, 92% and 66%.

For "All cancer" these values were: 67%, 88%, 92% and 56%.

Conclusion: In the detection of local recurrence of prostate cancer in men previously treated with radiotherapy, mp-MRI had encouraging performance characteristics. This may facilitate planning for subsequent focal salvage therapy.