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Prospective Comparison of the detection rate of 18F-Fluoromethylcholine and 68Ga-PSMA-HBED PET/CT in men with prostate cancer with rising PSA post curative treatment, being considered for targeted therapy.

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Abstract

In prostate cancer (PCa) and biochemical failure following therapy, current imaging techniques have a low detection rate at PSA levels at which targeted salvage therapy is effective. ¹¹C-Choline or ¹⁸F-Fluoromethylcholine (FMC), though widely used, have poor sensitivity at low PSA levels. ⁶⁸Ga-PSMA-HBED (PSMA) has shown promising results in retrospective trials. Our aim is to prospectively compare detection rates of PSMA versus FMC PET/CT in men initially managed with either radical prostatectomy (RP), radiation treatment (RT) or both, being considered for targeted therapy.

METHODS: A sample of men with rising PSA following treatment, eligible for targeted treatment, was prospectively included. Patients on systemic treatment were excluded. PSMA, FMC PET/CT and diagnostic CT were undertaken in all patients sequentially between January and April 2015, and assessed by blinded experienced readers. Scan results and management impact changes, together with histological follow-up when feasible, were documented.

RESULTS: 38 patients (pts) were enrolled. 34/38 pts (89%) were post-RP, 4/38 pts (11%) were post-RT. 12/38 pts (32%) had salvage RT after primary RP. Mean PSA was 1.74 ± 2.54 ng/ml. 68% of pts (26/38) had a positive scan, 32% (12/38) were negative at both tracers. Of the 26 positive pts, 54% (14/26) were positive on PSMA alone, 42% (11/26) on both FMC and PSMA and only 4% (1/26) on FMC alone. With PSA <0.5ng/ml, PSMA detection rate (DR) was 50% vs. 12.5% for FMC. At PSA between 0.5-2.0 ng/ml, DR was 69% for PSMA vs. 31% for FMC, and at PSA >2.0, DR was 86% for PSMA vs. 57% for FMC. On lesion-based analysis, PSMA detected more lesions than FMC (59 vs. 29, P <0.001). The TBR in positive scans was higher in PSMA than in FMC (28.6 for PSMA vs 9.4 for FMC, p<0.001). There was a 63% (24/38 pts) management impact, 54% (13/24 pts) due to PSMA imaging alone. Histological follow-up was available for 9/38 pts (24%), and 9/9 PSMA positive lesions were consistent with Pca (PSMA True Positive). The one lesion positive on FMC and negative on PSMA resulted at biopsy as a false positive of FMC (PSMA true negative).

CONCLUSION: In patients with biochemical failure and low PSA, PSMA demonstrated a significantly higher detection rate with a high overall management impact.

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