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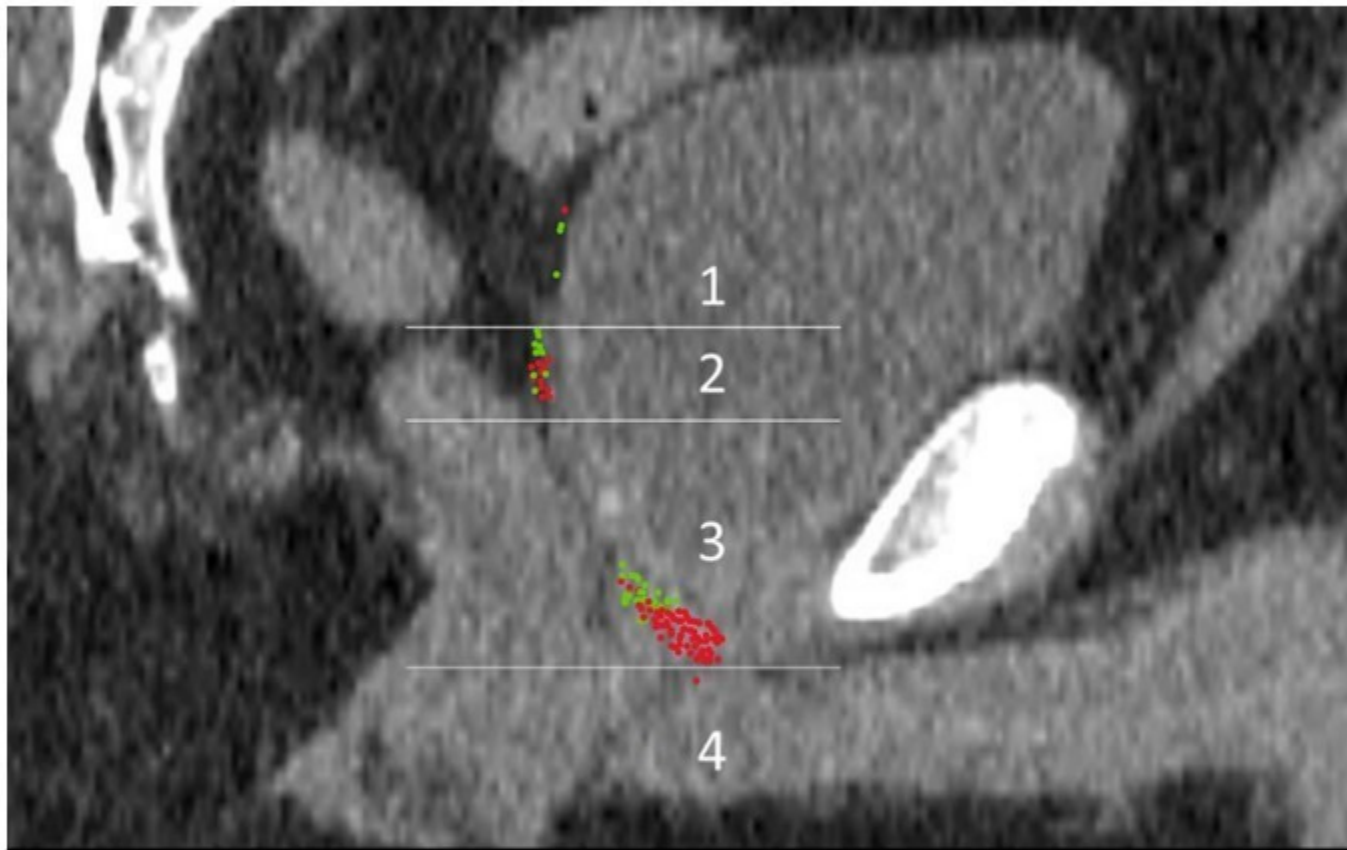
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Introduction & Objectives: Prostate specific membrane antigen (PSMA) PET/CT scans have shown high sensitivity and specificity at very low PSA levels for prostate cancer recurrence after prostatectomy. Therefore, PSMA PET/CT can help to better understand the pattern of local recurrence (LR), which might subsequently improve target volume definitions of prostate bed salvage radiotherapy. This study aimed to describe the pattern of LR detected on PSMA PET/CT.

Materials & Methods: Patients with suspected LR after prostatectomy on PSMA PET/CT were retrospectively identified at 6 centres between June 2017 – June 2022. Three PSMA tracers were used (⁶⁸Ga]PSMA-11, [¹⁸F]DCFPyL and [¹⁸F]PSMA-1007). All PSMA scans were anonymized and centrally reviewed by an expert nuclear medicine physician, and graded according to the 5-point scale of the E-PSMA guidelines v1.0 for PSMA PET/CT. To classify the location of LR, the prostate bed was divided into four regions (Figure 1).

Results: We identified 86 PSMA PET/CT scans, of which 49 were [¹⁸F]PSMA-1007 labelled, 20 [⁶⁸Ga]PSMA-11 and 17 [¹⁸F]DCFPyL labelled. In total, 97 PSMA-positive lesions in the prostate bed were observed and multifocal LR was reported in 19 PSMA PET/CT scans (19.6%) (maximum of 3 lesions per scan). Central review qualified 71 (73.2%) lesions as malignant, 9 (9.3%) as equivocal and 17 (17.5%) as benign. The most common site of LR was peri-anastomotic with 45 recurrences (63.4%) within 2 cm cranial of the penile bulb. (Figure 1) Remarkably, 10 (14.1%) LRs were located 5 mm cranial of the penile bulb, a region which is currently not covered by any contouring guideline. Only 11 (15.5%) lesions were located retro-vesical, within 1 cm cranial of the pubic bone.

Figure 1 – Pattern of 97 prostate bed lesions diagnosed on PSMA PET/CT scan. Red represents local recurrences qualified as malignant, green represents benign or equivocal PSMA positive lesions.



Region boundaries	Lesions n (%)	Observed as malignant n (%)
1 > 1 cm above the top of the pubic bone	4 (4.1%)	1 (1.4%)
2 ≤ 1 cm above the top of the pubic bone	20 (20.6%)	11 (15.5%)
3 Caudal of the top of the pubic bone Cranial of the top of the penile bulb	72 (74.2%)	45 (63.4%)
4 Caudal of the top of the penile bulb	1 (1.0%)	1 (1.4%)
Total	97	71

Conclusions: Our results describe the pattern of local recurrence after radical prostatectomy based on PSMA PET/CT. These results may contribute to the development of a new, PSMA PET/CT based, target volume definition for prostate bed salvage radiotherapy.