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Predictive factors of 18F-fluorocholine PET/CT diagnostic effectiveness in patients with biochemical recurrence of prostate cancer

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Introduction & Objectives: Current EAU guidelines suggest Choline-PET/CT as an imaging modality for the evaluation of patients with prostate cancer (PCa) who have developed biochemical recurrence (BCR) after radical prostatectomy (RP) or primary radiation therapy (RT).
Our purpose was to investigate the influence of different prognostic factors on 18F-fluorocholine PET/CT (PET/CT) detection rate in patients with BCR.

Materials & Methods: 45 PCa patients with BCR (data collected between 11.2016 and 12.2017) were retrospectively analysed. 32 patients had previously undergone RP, whereas 13 were primary treated with RT.
PET/CT results were correlated with histopathology, subsequent MRI and CT scans, PET/CT and PSA follow-up. Mean follow-up period was 19 months (range 13–26). Mean PSA before PET/CT was 6.44 ±9.09 ng/ml (0.26–54.69). Mean PSA doubling time (PSADT) and PSA velocity (PSAV) were of 5.08±3.77 ng/ml/month (0.76–34.3) and 0.65±1.37 months (0.01–6.57), respectively.

Results: In our series PET/CT detected suspicious lesions in 53.3% of patients (24/45). Positive PET/CT results correlated with the PSA kinetics and Gleason score (Table 1).

Parameter	PET/CT-positive	PET/CT-negative
PSA		
<2	26.7% (4/15)	73.3% (11/15)
2–5	57.2% (8/14)	42.8% (6/14)
>5	75.0% (12/16)	25% (4/16)
PSADT		
>6	38.5% (5/13)	61.5% (8/13)
<6	59.4% (19/32)	40.6% (13/32)
PSAV		
<0.2	38.1% (8/21)	61.9% (13/21)
≥0.2	66.7% (16/24)	33.3% (8/24)

Gleason score		
<7	43.8% (7/16)	56.2% (9/16)
≥7	58.6% (17/29)	41.4% (12/29)

Optimal thresholds for prediction of a positive PET/CT were identified by ROC analysis (Table 2).

	Optimal threshold	AUC	Sensitivity %	Specificity %	P value
PSA	2.6	0.70	75	71.4	0.014
PSADT	4.2	0.61	58.3	62	>0.05
PSAV	0.23	0.63	66.7	66.7	>0.05

Clinical results of PET/CT after follow up ≥ 1 year are shown in Table 3. Diagnostic accuracy, sensitivity and specificity were 64.4%, 61.1% and 77.8%, respectively.

	Relapse +	Relapse –
PET/CT-positive	91.7% (22/24)	8.3% (2/24)
PET/CT-negative	66.7% (14/21)	33.3% (7/21)

Conclusions: In our series PSA kinetics did not demonstrate higher predictive value of a positive PET/CT when compared to PSA level. Our data, like other publications, showed that 18F-fluorocholine PET/CT has low diagnostic accuracy in patients with BCR with PSA < 2 ng/ml. Nevertheless, it could be useful in clinical practice, when PSMA PET/CT is not available.