Preoperative 18F-fluciclovine PET/CT findings may be predictive of postoperative prostate-specific antigen (PSA) in patients with high-risk prostate cancer.

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Introduction

Preoperative imaging is crucial in the appropriate staging and treatment of patients with high risk prostate cancer.

Objective

We set out to evaluate factors associated with postoperative PSA following 18F-fluciclovine PET/CT guided robotic radical prostatectomy and extended pelvic lymph node dissection (RP+EPLND).

Methods

Forty-three patients with high-risk prostate cancer underwent fluciclovine PET before robotic RP+EPLND. Abnormal uptake of fluciclovine in the prostate and extraprostate sites (lymph nodes or bone) was noted. PET findings were reviewed with the surgeon preoperatively. Histopathologic assessment was completed following surgery. PSA was assessed 68.7 ± 29.2 days after surgery. Undetectable PSA was considered optimal. Univariate analysis was performed to determine clinical, imaging and histologic factors associated with optimal postoperative PSA. Statistical significance was set as $p<0.05$.

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Results

Table: Factors associated with optimal post-operative PSA after robotic RP+EPLND.

	Undetectable PSA (n=18)	PSA >0.01 (n=25)	p-value
Pre-operative PSA(ng/ml) mean±SD	19.13±17.50	33.35±37.79	0.04
Gleason score			
7	9	7	0.14
9	9	18	
Grade group			
2	5	3	
3	4	4	0.30
5	9	18	
Resection margins			
Negative	11	9	0.10
Positive	7	16	
Pathology			
N_0	16	2	<0.01
$N_1(\pm M_1)$	9	16	
PET			
Localized disease	15	15	0.10
Extraprostate metastasis	3	10	
PET			
Localized disease or regional LN metastasis	18	20	0.04
Non-regional LN metastasis	0	5	

- Optimal postoperative PSA was present in 18/43 patients
- Preoperative PSA and localized prostatic disease on histology were associated with optimal postoperative PSA
- Detection of non-regional lymph nodes metastasis (M1a) on PET was significantly associated with sub-optimal postoperative PSA

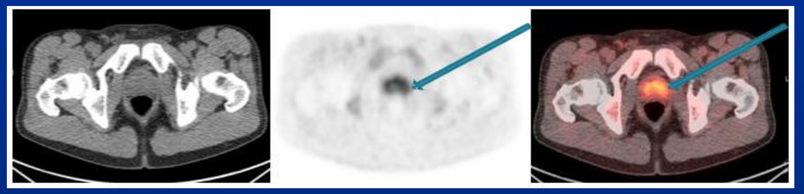

Fig 1: 55 y/o M with prostate cancer, Gleason 4+5, PSA 10.78 ng/ml. Fluciclovine PET showed uptake in the prostate only (see arrow) verified by histology. PSA 95 days after surgery was undetectable.

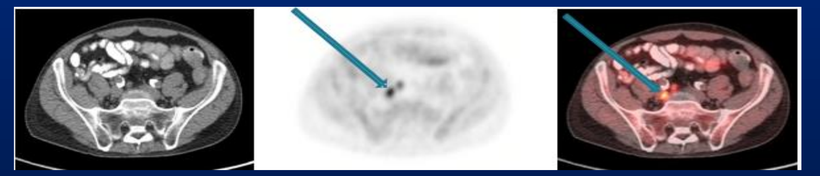

Fig 2: 51 y/o M with prostate cancer, Gleason 4+5, PSA 115.85 ng/ml. Fluciclovine PET showed uptake in the presacral lymph node (see arrow) verified by histology. PSA 51 days after surgery was 3.34 ng/ml.

Conclusion

Findings of non-regional lymph nodes metastasis on preoperative fluciclovine PET is predictive of sub-optimal postoperative PSA after RP+EPLND. Fluciclovine PET may be a useful guide to select patients that will not benefit from curative surgery but require systemic therapy.