

Bushehr Theranostics Innovation Center

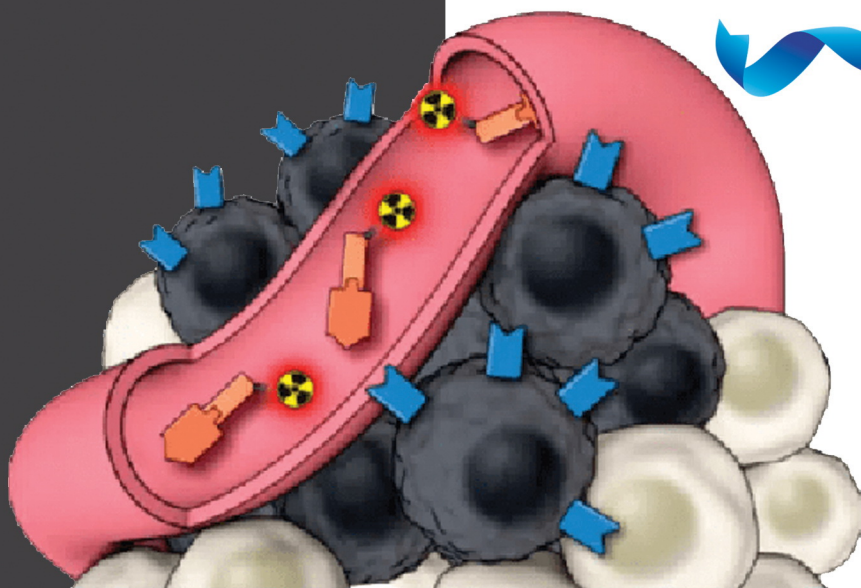


Theranostics in Prostate Cancer

Theranostics

^{68}Ga -PSMA PET/CT for Diagnostics

^{177}Lu -PSMA for Therapeutics



Concept of Theranostics in Prostate Cancer

1. Prostate cancer cells have receptors on their surface called prostate specific membrane antigen (PSMA)
2. The diagnostic test is performed by targeting these receptors using ^{68}Ga -PSMA PET/CT
3. The therapy is performed by targeting these receptors by ^{177}Lu -PSMA

What is value of Theranostics?

- Develop a very sensitive and specific diagnostic scan
- Ability to observe and monitor the efficacy of anticancer drugs against tumors in patients

Using diagnostic PET/CT exam, we can identify the degree of receptors on the tumor cells.

- Predict who will response to therapy and who will not
- Provide targeted and personalized treatments for patients

^{177}Lu -PSMA is injected intravenously and targets only tumor cells all over the body, with little effect on healthy cells so decreases treatment related toxicity

Indication for prostate cancer imaging using PSMA PET/CT (EANM/SNMMI)

■ Routine clinical use

- Initial staging of prostate cancer
- Localization of recurrent (BCR) or persistent (BCP) prostate cancer
- Localization of prostate cancer which is non-metastatic by conventional imaging (nmCRPC)
- Staging before PSMA-directed radioligand therapy

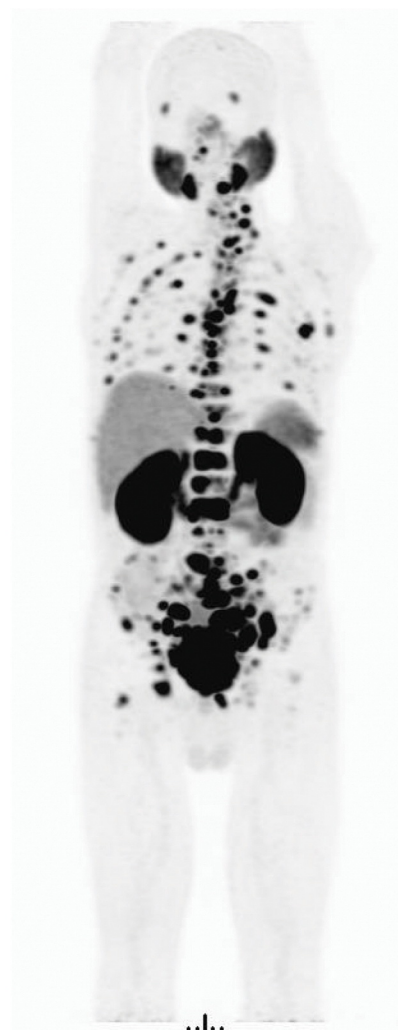
■ Potential clinical applications

- Guidance of prostate biopsy
- Imaging metastatic prostate cancer
- Monitoring of systemic treatment for metastatic prostate cancer

Case No.1: Bone Scan Vs 68Ga-PSMA (From our center)



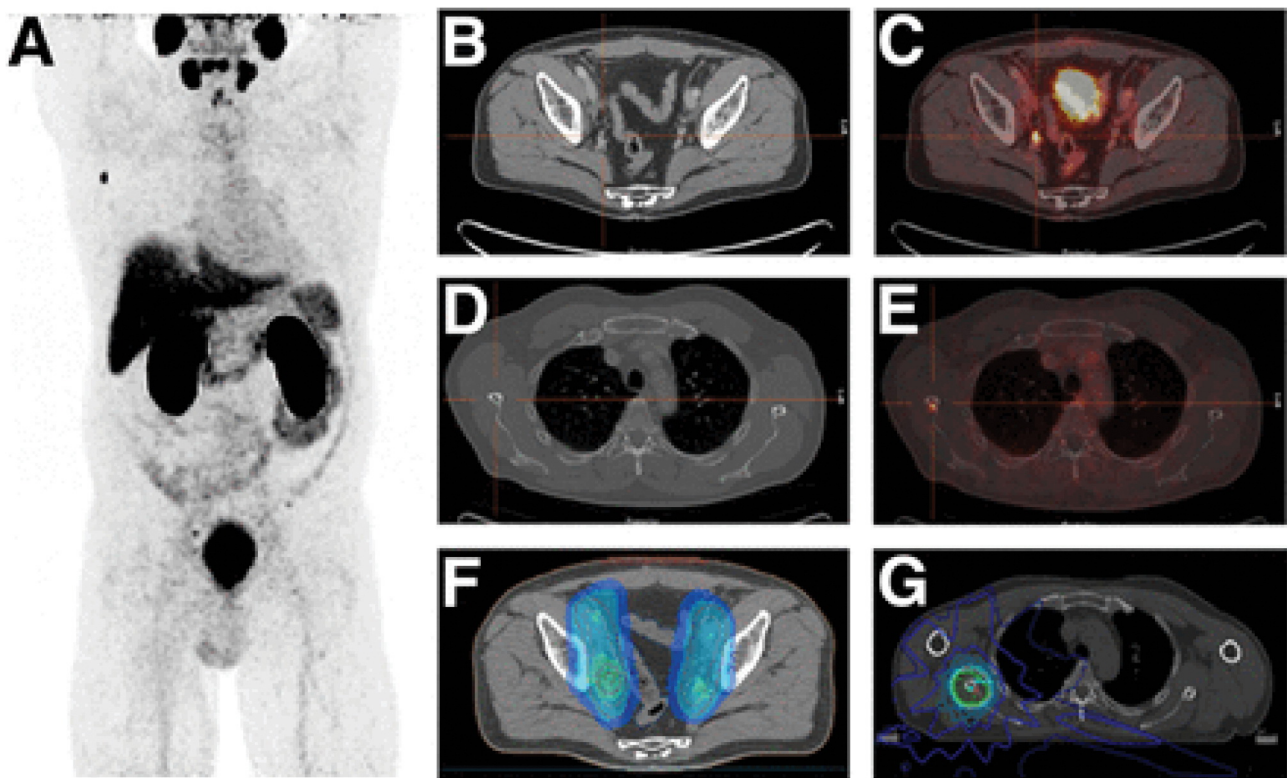
Bone Scan



68Ga-PSMA

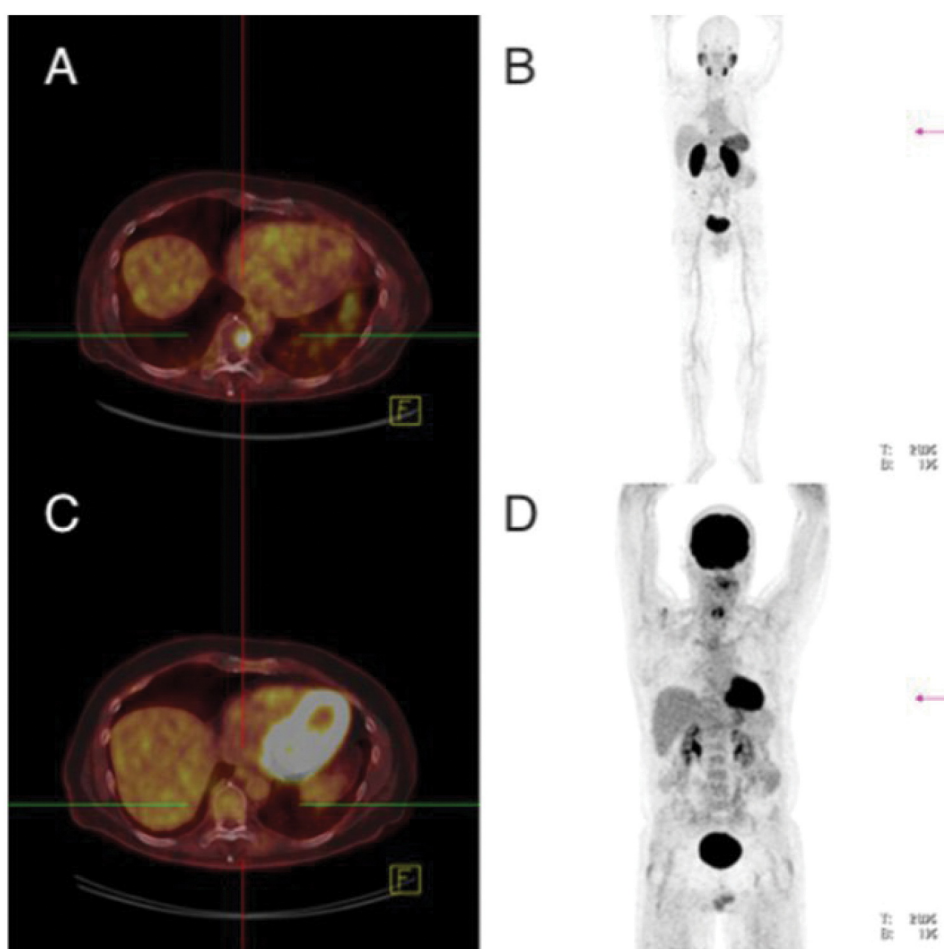
- ✓ Initial staging by routine bone scintigraphy shows few metastases
- ✓ However, 68Ga-PSMA PET shows diffuse bone metastases.

Case No.2: CT Vs 68Ga-PSMA scan



- A patient with prostate cancer underwent radiotherapy because of persistent PSA after radical prostatectomy. 68Ga-PSMA PET showed local residual disease, single lymphatic, and single bone metastases with high PSMA uptakes.
- Right iliac lymph node metastasis which was not characterized on CT (B), showed PSMA uptake on PET/CT (C).
- Single bone metastasis in lateral border of right scapula which was not correlated on CT (D), showed PSMA uptake on PET/CT (E).
- The patient was planned for radiotherapy (F & G) (DOI: 10.2967/jnumed.118.220855)

Case No.3: FDG PET/CT Vs 68Ga-PSMA scan

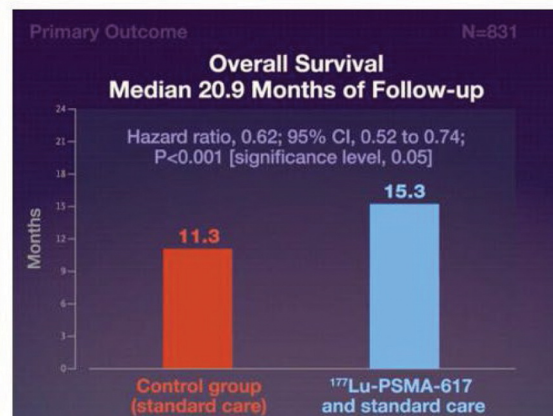
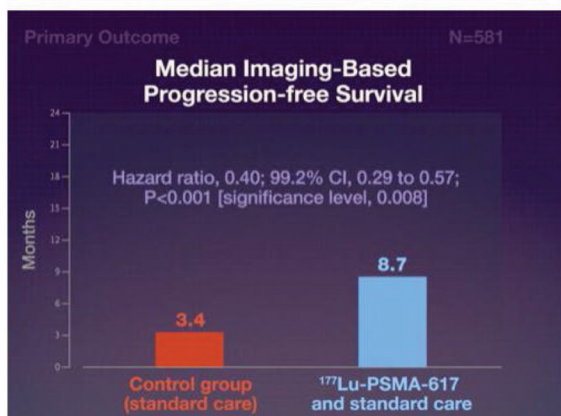
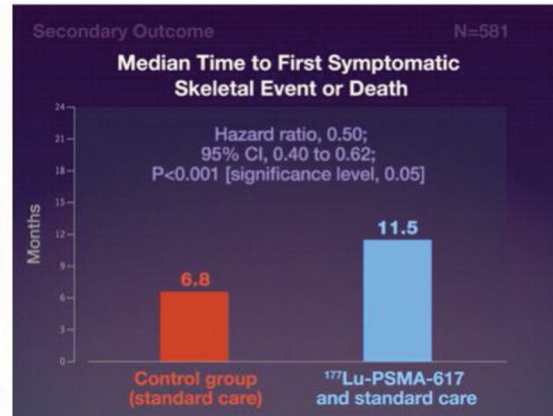
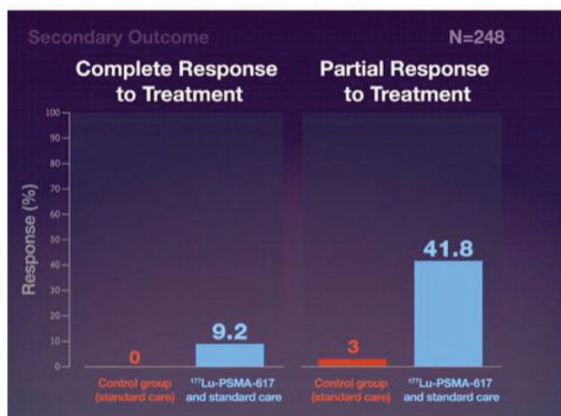
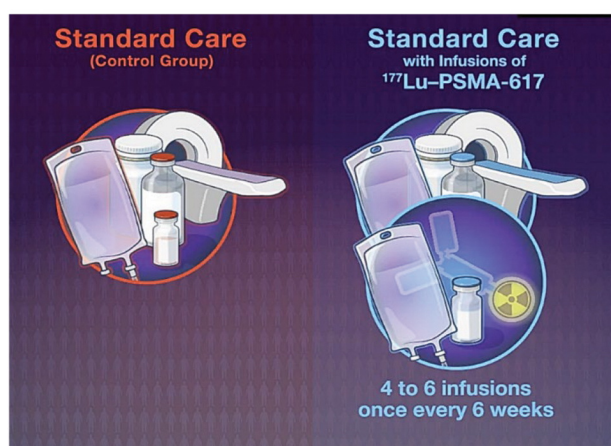
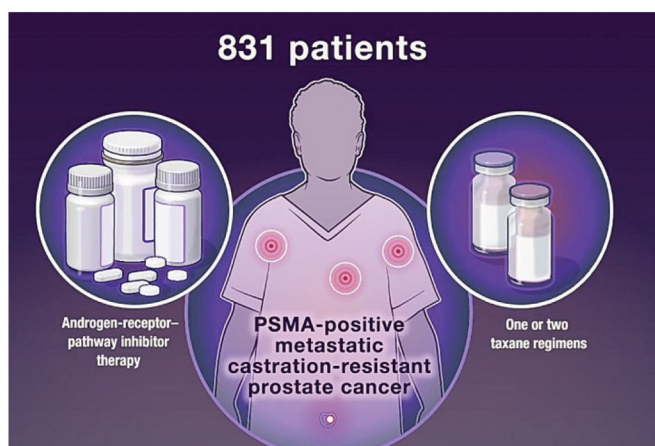


- 68Ga-PSMA-PET/CT (A, B), 18FDG-PET/CT (C, D). Osseous metastasis thoracic vertebral body 9 with increased PSMA expression without increased glucose utilization (doi: 10.3390/cancers13225688).

TheraP trial ^{177}Lu -PSMA Vs Cabazitaxel (Vision Trial)

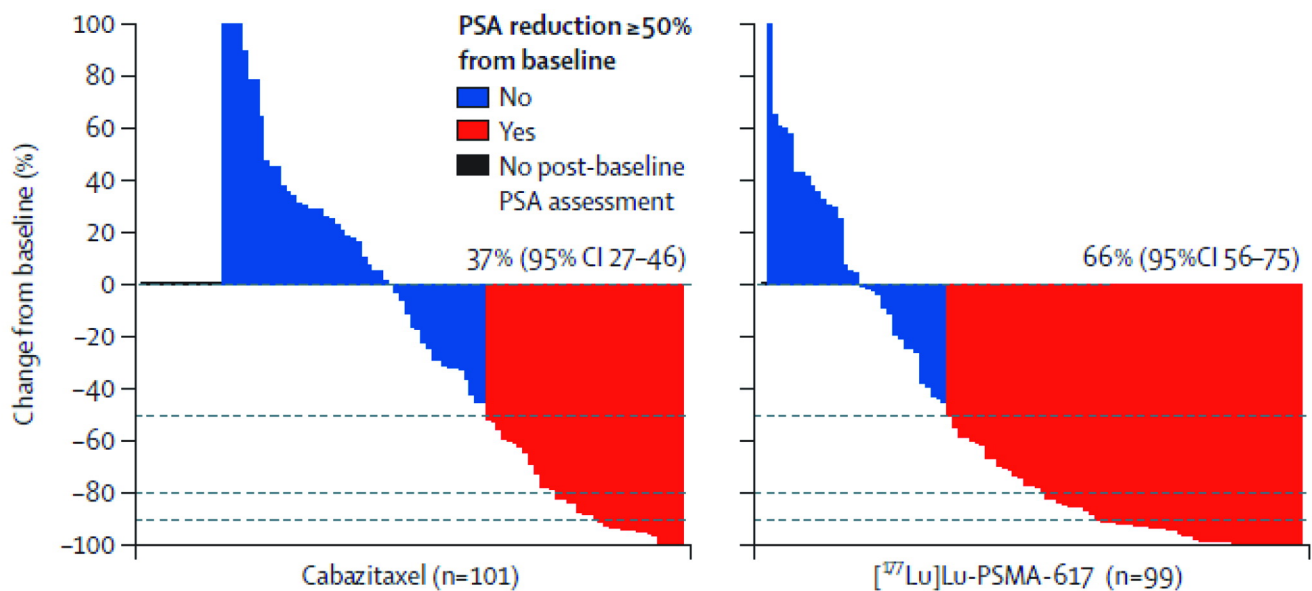


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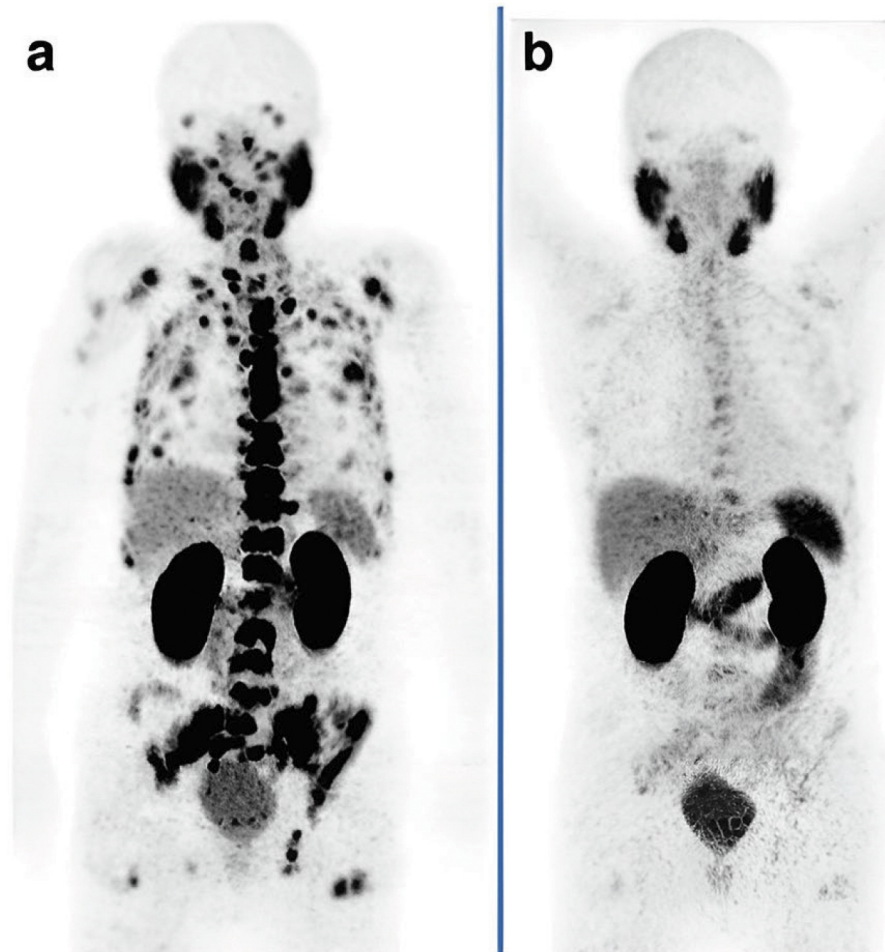
177Lu-PSMA-617 versus cabazitaxel in patients with mCRPC (TheraP)

THE LANCET



- PSA responses were more frequent among men in the ¹⁷⁷Lu-PSMA-617 group than in the cabazitaxel group (65 vs 37 PSA responses; 66% vs 37% by intention to treat; difference 29%).
- Grade 3–4 adverse events occurred in 33% of men in the ¹⁷⁷Lu-PSMA-617 group versus 53% of men in the cabazitaxel group.
- No deaths were attributed to ¹⁷⁷Lu-PSMA-617.

^{177}Lu -PSMA treatment



- The ^{68}Ga -PSMA PET/CT scan showed diffuse bone and bone marrow involvement in a patient with mCRPC (a). Follow-up ^{68}Ga -PSMA PET/CT scan done 8 weeks after 2 cycles of ^{177}Lu -PSMA showed a significant response (b) (PSA level decreased from 261 to 9 ng/ml and ALP also reduced from 659 to 81 (U/L)) (DOI: 10.7759/cureus.29369)



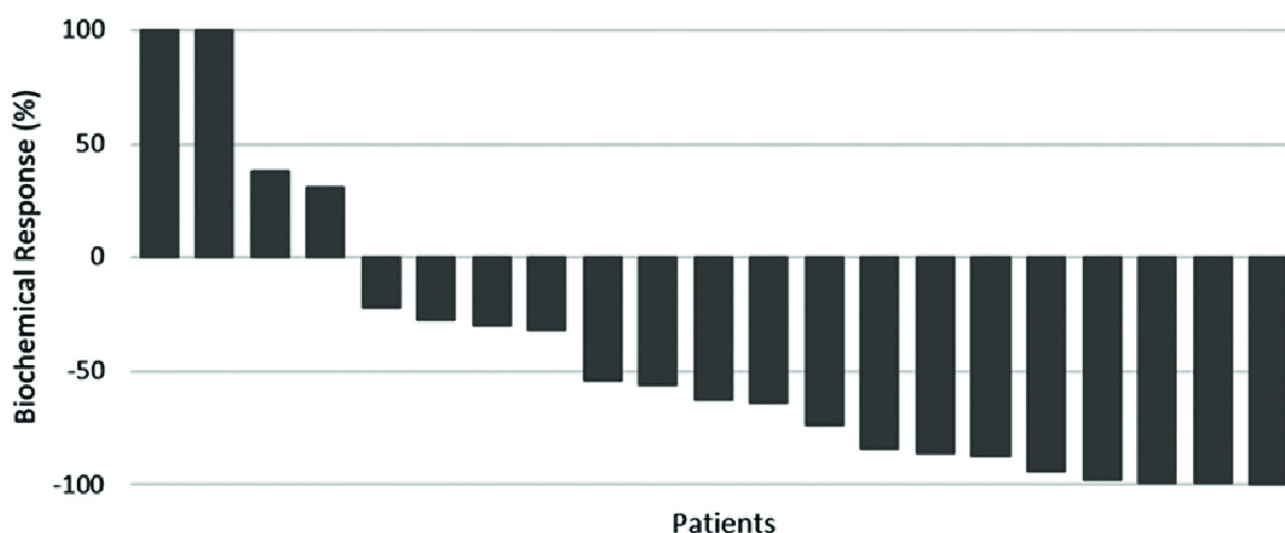
Bushehr researchers studied PSMA Theranostics for several years to better precisely diagnose and treat prostate cancer

Start: December 2016

Number of treated patients >200

Number of cycles >1000

doi: 10.4103/wjnm.WJNM_20_19



our experince with PSMA-therapy

- ❁ About 80% of patients with mCRPC show a good response to PSMA-Therapy
- ❁ Patients with a positive response (any PSA-decline) have a longer OS
- ❁ PSMA therapy has low toxicity profile
- ❁ Patients with a positive response to the first cycles have benefit from further cycles in the case of recurrence

مرکز جامع پیش بالینی ، تصویر برداری مولکولی و درمان های نوین



■ اسپکت سی تی (SPECT/CT)

■ تراکم سنجی استخوان (BMD)

■ درمان های جدید سرطان (پروستات ، غدد عصبی ، کودکان و ...)

■ پت سی تی (PET/CT)

■ اسپکت (SPECT)

■ ید درمانی (بستری و سرپایی)

بوشهر - خیابان طالقانی - پشت بیمارستان شهدای خلیج فارس

تلفن: ۰۷۷ ۳۳۴۴۵۹۹۰ فاکس: ۰۷۷ ۳۳۴۴۵۹۹۱ همراه: ۰۹۱۷۷۷۹۲۴۰۳

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