



PSMA-PET/CT in Prostate Cancer

-by Dr. Nusrat Shaikh

Prostate-specific membrane antigen (PSMA) is a membrane glycoprotein that is expressed at 100–1000-fold higher levels in prostate cancer as compared to healthy prostate tissue.

PSMA can be attached to radiopharmaceuticals like Ga, which can then be used like FDG in a PET/CT scanner. PSMA attaches itself to tissues that express PSMA and helps therefore in the diagnosis and treatment of prostate cancer.

Indications of PSMA-PET/CT in prostate cancer

1. Biochemical recurrence (If the PSA level rises to greater than 0.2 ng/mL after radical prostatectomy or greater than 2 ng/mL over the nadir value) in low PSA setting (0.2- 10 ng/ml) to guide salvage therapy.
2. Primary staging in high risk cases - Gleason's score > 7, PSA > 20, stage T2c-3a.
3. Staging before and during PSMA directed radionuclide therapy (Lutetium therapy). Low PSMA expression in target lesions is a contraindication for radioligand therapy
4. Monitoring of systemic treatment in metastatic prostate cancer.
5. Castration-resistant prostate cancer: In CRPC, precise disease localization is less important than mapping disease extent. Differentiation of metastatic CRPC from non-metastatic or local CRPC from distant disease is important because it may determine further treatment options and prognosis.
6. Intraprostatic localization: Targeting biopsies in previously negative biopsy in high suspicion of prostate cancer.

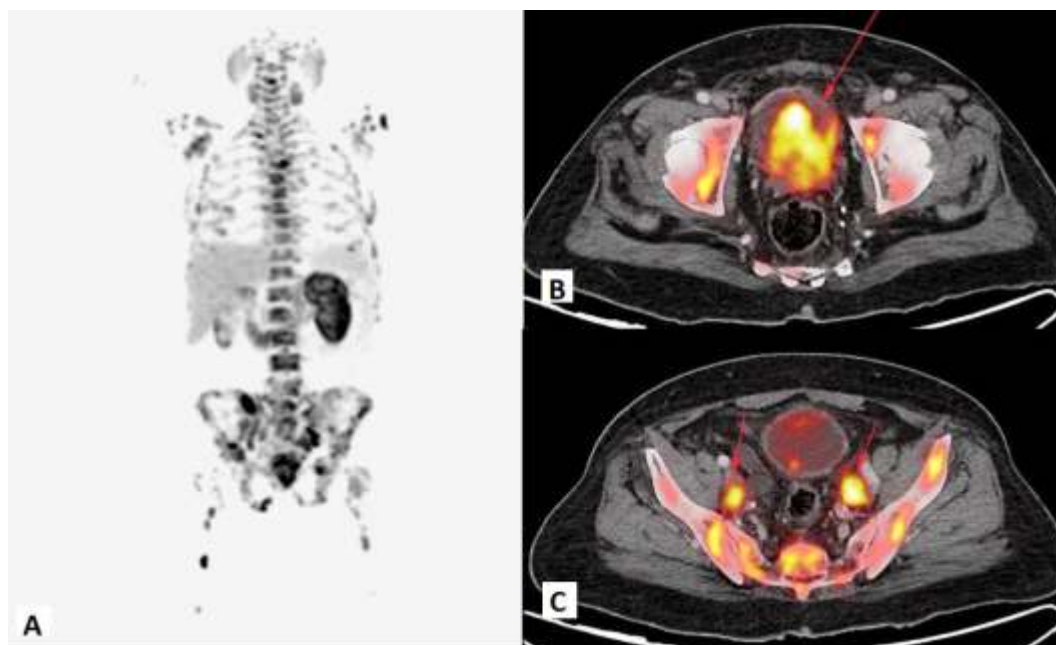
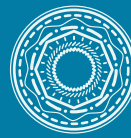


Fig. 1 (A-C): 69-years old man, recently diagnosed to have Ca prostate with serum PSA > 1000ng/ml. MIP (A) image shows multiple PSMA expressing bone metastases. Axial fused PET/CT image (B) shows a PSMA expressing mass in the prostate (arrow). Axial fused PET/CT image (C) shows PSMA expressing multiple iliac lymph node metastases (arrows).



At a glance:

- ◆ PSMA can be attached to a radiopharmaceutical for use in a PET/CT scanner
- ◆ PSMA attaches to prostate cancer cells and highlights their presence
- ◆ PSMA-PET/CT is useful in prostate cancer from diagnosis to monitoring of treatment

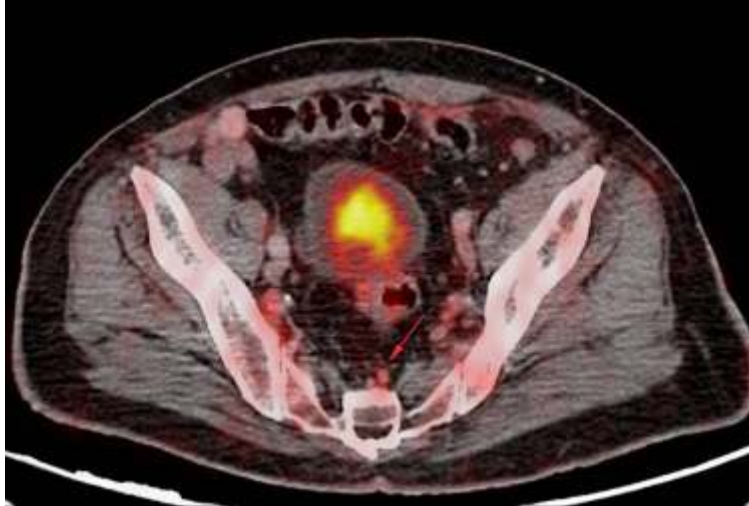
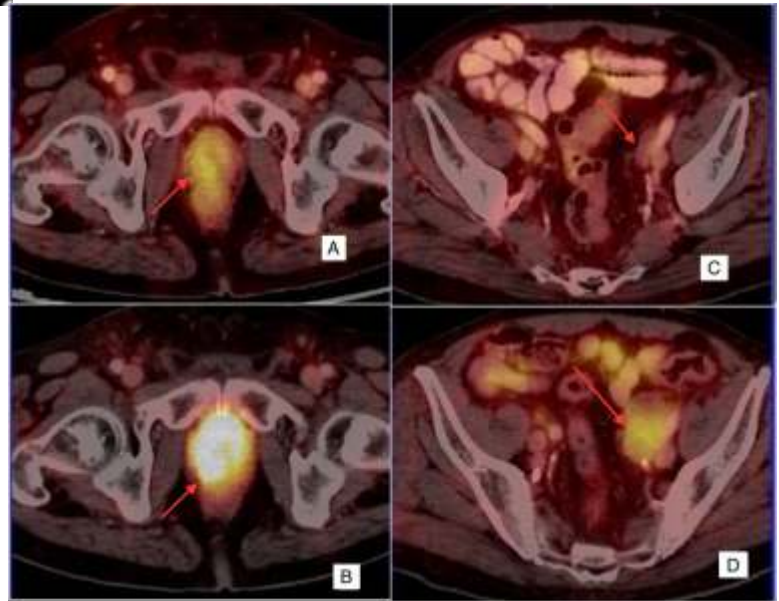


Fig. 2: 60-years old man post radical prostatectomy for Ca prostate, presented with biochemical recurrence with a rise in serum PSA from 0.5 to 1.75 in 9 months. Axial fused PET/CT image shows a PSMA expressing subcentimeter sized presacral lymph node (arrow), which is consistent with metastasis.

Fig. 3 (A-D). 72-years old man known to have metastatic prostate cancer, post anti-androgen therapy. Axial fused PET/CT images show the pre-treatment scans with uptake in the prostatic mass (arrow C) and an enlarged left external iliac node (arrow in D). Following therapy, both lesions show good partial response (A, B).



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