

# INNER SPACES Edited by Dr. Bhavin Jankharia

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# Different Types of Commonly Used PET/CT Scans

-Dr. Pooja Bharti



Fig. 1 (A-D): Ca prostate with raised serum PSA level of 343.91 mg/dL. Ga-68 PSMA PET/CT. Whole body coronal PET (A) and axial fusion PET/CT (C) images show the primary prostate lesion (arrow) with significant PSMA uptake. The axial fusion PET/CT image (B) shows a metastatic right external iliac lymph node with PSMA uptake (arrow). The sagittal fusion PET/CT image (D) shows diffuse PSMA avid osteosclerosis suggestive of skeletal involvement by the disease.

PET/CT imaging has become an integral part of cancer diagnosis and treatment and there are many different types of PET/CT scans available in the market. Below mentioned are some of the common types with indications:

## F-18 FDG PET/CT:

This is the most common PET/CT using FDG, which is actively taken up by metabolically active cells. Major indications are:

- Establish baseline staging before commencing treatment, response to therapy and suspected recurrence, relapse or residual disease in oncology
- Find an etiology in patients with unexplained fever and weight loss.
- Diagnosing and characterizing dementias.

- 68-Ga PSMA PET/CT:
- This uses 68-Gallium prostate-specific membrane antigen (PSMA) to evaluate patients with prostate cancer. Major indications are:
- Diagnose and stage prostate cancer.
- Evaluate patients with surgery and/or radiation/chemotherapy and with suspected persistent/ recurrent disease based on rising serum prostate specific antigen levels.

### Ga-68 DOTA PET/CT:

It is used for imaging of neuroendocrine tumors (NETs), as it attaches to high density of SST (somatostatin) receptors on NET cells. Its major indications are:



#### At a glance:

- For many years, FDG has been the mainstay of PET/CT.
- In the last few years, other molecules have added to the power of PET/CT in diagnosing and staging diseases.
- These include PSMA, DOTA and FAPI at this stage.



- Localize primary tumours and detect metastatic disease (staging) and detect residual, recurrent or progressive disease in follow-up cases (restaging)
- Assess response to therapy.

#### Ga-68 FAPI PET/CT:

This is based on the molecular targeting of fibroblast activation protein which is expressed in the stroma of epithelial tumors. Major indications are:

 Diagnosing and staging tumors such as gastrointestinal signal cell cancers, hepatobiliary cancers and ovarian cancers with peritoneal spread. Fig. 2 (A-C). Paranganglioma (neuroendocrine tumor – NET) with raised serum chromogranin A level of – 996.80 ng/ml. Ga-68 DOTA PET/CT. Whole body coronal (A) and axial PET/CT fusion (B) images show large a intensely somatostatin receptor expressing mass (arrow) in the left para-aortic region. Axial contrast enhanced CT scan image (C) shows significant enhancement (arrow).



Fig. 3 (A-D): Carcinoma cecum post-surgery and chemotherapy. Ga-68 FAPI PET/CT. Whole body coronal (A) and axal fusion PET/CT (B) images show a focal residual/recurrent lesion at the ileocecal junction (arrow) with FAPI expression also at the surgical scar site (arrow), both of which show partial regression after 6 cycles of chemotherapy and 4 cycles of targeted therapy (arrows in C and D).

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