

Opinion Paper

## Super Scan in <sup>68</sup>Ga-PSMA Ligand PET/CT in Prostate Cancer-Diagnostic Criteria and Its Significance

Manas Kumar Sahoo<sup>1\*</sup> and Sonam Shah<sup>2</sup>

<sup>1</sup>Department of Nuclear Medicine & PET-CT, Medanta-The Medicity, Gurugram, Haryana, India

<sup>2</sup>Department of Radiology, Medanta-The Medicity, Gurugram, Haryana, India

### Abstract

Superscan in <sup>68</sup>Ga-PSMA ligand PET/CT is not very commonly encountered in prostate cancer patients. We present a 70-year-old patient with an elevated PSA serum level of 638 ng/mL after chemotherapy for prostate cancer. <sup>68</sup>Ga-PSMA ligand in PET/CT revealed a PSMA over expression of diffuse sclerotic lesions extended to axial and appendicular skeleton. Physiological sites of PSMA over expression such as salivary glands and kidneys were suppressed. This pattern of <sup>68</sup>Ga-PSMA PET/CT joined the commonly defined "super-(bone-) scan". This pattern of appearance in <sup>68</sup>Ga-PSMA ligand PET/CT in prostate cancer patients paves way towards targeted therapy like <sup>177</sup>Lu-PSMA-617.

**Keywords:** <sup>68</sup>Ga-PSMA; PET/CT; Prostate cancer; Superscan

### Opinion

Superscan in Bone Scintigraphy (BS) is defined as increased radiotracer uptake in the axial and appendicular skeleton with negligible soft tissue and renal radiotracer uptake [1]. Superscan pattern is also seen in Paget's disease, renal osteodystrophy and non prostatic cancers by such as colon, breast, lung, leukemia, lymphoma, Waldenström's macroglobulinemia [2].

**\*Corresponding author:** Manas Kumar Sahoo, Department of Nuclear Medicine & PET-CT, Medanta-The Medicity, Gurugram, Haryana, India, Tel: +91 9013590865; E-mail: drmkshahoo@gmail.com

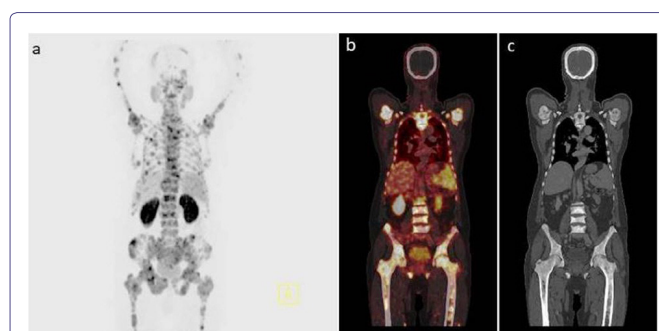
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<sup>68</sup>Ga-PSMA ligand Positron Emission Tomography (PET/CT) has become an established imaging modality in prostate cancer management [3]. Though unusual, but superscan pattern in <sup>68</sup>Ga-PSMA ligand PET/CT has been reported in few cases [4,5].

We observed superscan pattern in a 70-year-old patient with an elevated PSA serum level at 638 ng/mL of a prostate cancer after chemotherapy (Figure 1). Who was referred for <sup>68</sup>Ga-PSMA ligand PET/CT for evaluation, which revealed PSMA expressing sclerotic lesions involving almost all the entire skeleton.



**Figure 1:** A) Maximum Intensity Projection (MIP) PET image showing increased PSMA expression in the whole skeleton; B) Fused PET/CT image shows increased PSMA expression in multifocal lesions of the appendicular and axial skeleton lesions involving almost all bones of the body with extensive axial as well as appendicular bone involvement; C) Corresponding CT image showing sclerotic lesions involving extensive skeletal sites confirming the metastatic nature of the lesions.

Superscan findings open a new way towards targeted therapy with <sup>177</sup>Lu-PSMA-617 for disease control in advanced cases of castration resistant prostate cancers who have progressed after conventional treatments [6,7]. Significant clinical results have so far been achieved with the subsequent use of radiolabeled PSMA ligands in the treatment of CRPC [8].

Superscan in <sup>68</sup>Ga-PSMA ligand PET/CT can be defined as increased PSMA expression corresponding with sclerotic/lytic lesions in the CT involving almost the entire skeleton. The background physiological PSMA expression in the salivary glands, gastrointestinal tract should be suppressed. Renal uptake of the radiotracer remains variable and should not be a strict criterion for diagnosis of superscan.

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