“Superscan” on F18-fluorodeoxyglucose Positron Emission Tomography — Computed Tomography [18-F] FDG PET-CT

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Abstract
“Superscan” features have been described in 18F FDG PET-CT (F18 fluorodeoxyglucose Positron Emission Tomography-Computed Tomography) scan; characterized by significantly increased uptake in one or more organ systems resulting in absent or decreased uptake in the organs which normally show physiological uptake. The importance of the awareness has evolved over the years in order to avoid false interpretation of scan findings as well as in determination of a high tumour burden. We present images of three patients who underwent 18F FDG PET-CT scan showing findings consistent with FDG PET-CT superscan.

Keywords: Superscan, F18-fluorodeoxyglucose Positron Emission Tomography-Computed Tomography, Hepatic, Hypermetabolic.

A 68-year-old female with hoarseness of voice, weight loss and neck swelling, diagnosed with diffuse large B-cell lymphoma was seen in the medical centre. Baseline PET-CT scan showed hepatic superscan (Figure-1). A 12-year-old female with waxing waning fever and bilateral neck swelling was diagnosed with Hodgkin’s lymphoma. Baseline PET-CT scan showed superscan (Figure-2). A 45-year-old female with known breast cancer; developed osseous metastases. PET-CT scan showed hepatic and skeletal superscan (Figure-3). All

Figure-1: Coronal PET image shows hypermetabolic left cervical and mediastinal lymphadenopathy along with significant uptake in the liver (arrow). Reduced FDG uptake in the brain, myocardium, kidneys, urinary bladder, depicting a Hepatic Superscan.

Figure-2: Coronal PET image shows hypermetabolic cervical, supraclavicular (arrow) and axillary lymphadenopathy. Reduced FDG uptake in the brain, myocardium, kidneys, urinary bladder, depicting a Superscan.

Figure-3: Coronal (a) Sagittal (b) PET-CT scan showed hepatic and skeletal superscan; hypermetabolic lymphadenopathy along with extensive hepatic and osseous metastases.
three cases show variations of FDG superscan with reduced FDG uptake in the brain, myocardium, kidneys, urinary bladder and soft tissue structures known as sink phenomenon.

The term "superscan" is well described on skeletal scintigraphy showing a characteristic pattern of increased skeletal radiotracer uptake with near-absent renal and soft tissue uptake.\(^1\) On 18-F FDG PET-CT scan, superscan is characterized by markedly high uptake in one or more organs or organ systems with absent or diminished FDG uptake in organs that normally show physiological FDG uptake.\(^2\) Most of the reported FDG superscans have metastatic disease implying a heavy tumour burden represented by hypercellularity and hypermetabolism.\(^3\) A negative correlation has been seen between the tumour glycolytic volume and brain uptake. Superscan findings may reverse with effective treatment of disease.

Superscan has been described as metabolic skeletal superscan, hepatic superscan or both. A hepatic superscan is described by high hepatic FDG uptake with strikingly reduced or absent metabolic activity in the brain, mediastinum and the renal cortex.\(^4\)-\(^6\)

The knowledge of different patterns of superscan is necessary to avoid false negative interpretation and unnecessary neurological imaging or assessment.

References