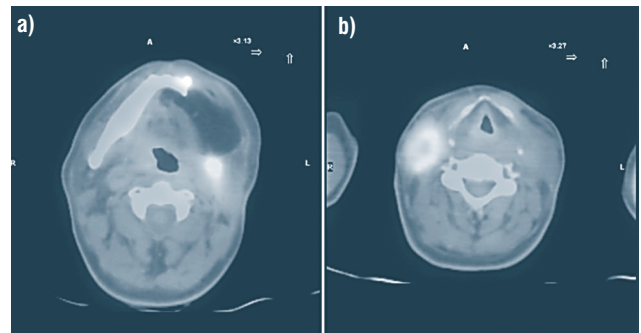


## Pitfall of $^{18}\text{F}$ -FDG-PET imaging in oncology: Herpes zoster with axillary lymphadenopathy

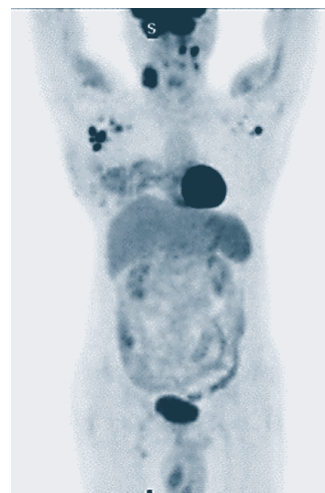
**To the Editor:** It is important to recognise the possibility of an inflammatory process such as herpes zoster being  $^{18}\text{F}$ -FDG avid and occurring on the PET scan of an oncology patient undergoing evaluation. Herpes zoster is postulated to occur when the cell-mediated immunity falls below a critical level, allowing dormant virus to replicate and infect the host. Thus it is known to occur frequently in immuno-compromised groups such as cancer patients receiving chemotherapy and radiation.  $^{18}\text{F}$ -fluorodeoxyglucose-positron emission tomography ( $^{18}\text{F}$ -FDG-PET) is widely used in cancer patients undergoing treatment, to determine the presence of residual, recurrent or metastatic disease. Inflammatory cells have high metabolic activity and can display avid  $^{18}\text{F}$ -FDG uptake.

As an example we describe the case of a 50 years old male with carcinoma of the base of the tongue, referred to our department for a  $^{18}\text{F}$ -FDG-PET scan in order to evaluate him for possible recurrent disease. His cancer was diagnosed two years ago, following which he received loco-regional radiotherapy. A year ago he had surgical removal of the mass and left hemi-mandibulectomy with flap reconstruction. Three months after surgery magnetic resonance imaging (MRI), showed post-operative changes with no evidence of recurrence. Five months later, in January 2008, another MRI scan revealed enhanced thickness in relation to the posterior flap margin and was reported as suspicious for recurrence. He was then referred for the  $^{18}\text{F}$ -FDG-PET scan which was performed one hour after intravenous injection of 370 MBq of  $^{18}\text{F}$ -FDG with a PET-CT camera, (Discovery STE16, GE). First a scout view (120 kVp, 10 mA) was obtained to localise the field of view from eye to thigh. A helical computerised tomography (CT) scan was acquired at 140 kVp, with 150 mA, before the PET study of the same region. Images were acquired in 3D mode, 2 min/bed position for 6 bed positions. CT data were used for attenuation correction and images were reconstructed using a 3D Vue point reconstruction algorithm (Xeleris, GE). Images were interpreted visually. Abnormal  $^{18}\text{F}$ -FDG accumulation was noted at the posterior aspect of the flap on the left side of the face and in a large right level III cervical lymph node (Figs. 1, 2). The maximum intensity projection image also revealed abnormal  $^{18}\text{F}$ -FDG accumulation in the right lower thoracic region and bilateral axillary regions (Fig. 2). In the transaxial fused PET-CT images this uptake was localised to the skin (Fig. 3). Corresponding CT revealed prominence of subcutaneous tissue, increased septations with reticular pattern and a Hounsfield unit corresponding to fat.  $^{18}\text{F}$ -FDG uptake was noted in multiple enlarged level I and level II lymph nodes in the right axilla (Fig. 4) and also in few enlarged nodes in the left axilla. The patient was clinically re-examined and vesicular eruptions in the T4 dermatomal distribution in the right chest wall anteriorly and posteriorly, were

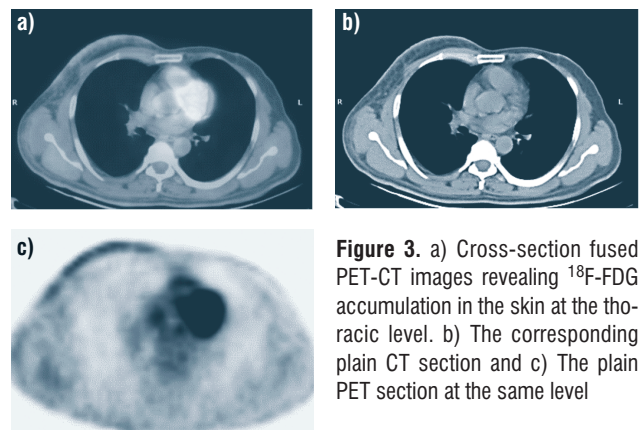
found. He said that these vesicles had erupted two days ago without associated pain (Fig. 5). Herpes zoster was diagnosed, antiviral treatment started and the patient was referred back to the oncologists who confirmed the recurrence with a biopsy



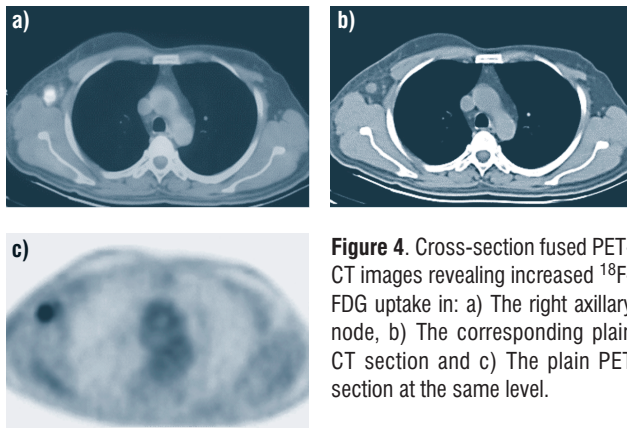
**Figure 1.** a) Cross-section fused PET-CT images showing  $^{18}\text{F}$ -FDG accumulation at the posterior aspect of the flap margin (arrow). b) Cross-section fused PET-CT images showing  $^{18}\text{F}$ -FDG accumulation in a large level III right cervical node (arrow).



**Figure 2.** Maximum intensity projection image revealed  $^{18}\text{F}$ -FDG accumulation in the right lower thoracic region (arrow) and in bilateral axillary regions (arrow-heads). Abnormal accumulation in the left side of the face and right neck is also seen (details in Fig. 1).



**Figure 3.** a) Cross-section fused PET-CT images revealing  $^{18}\text{F}$ -FDG accumulation in the skin at the thoracic level. b) The corresponding plain CT section and c) The plain PET section at the same level



**Figure 4.** Cross-section fused PET-CT images revealing increased  $^{18}\text{F}$ -FDG uptake in: a) The right axillary node, b) The corresponding plain CT section and c) The plain PET section at the same level.

from the thickening at the posterior flap.

Herpes zoster results when the varicella zoster virus reactivates in a single sensory ganglia. It results in painful blistering rash in corresponding cutaneous area of innervation. dermatomes, T3 to L3 are most frequently involved in herpes zoster [1]. The duration of the disease is usually between 7 and 10 days, but it may take as long as 2 to 4 weeks before the skin returns to normal. In our patient the right T4 dermatome was affected. The draining axillary lymph nodes were enlarged as a result of the underlying infection and resulted in abnormal increased  $^{18}\text{F}$ -FDG accumulation. Because there was no associated pain, the patient had not brought the erythematous maculopapular rash to our notice.

$^{18}\text{F}$ -FDG uptake in benign conditions can be a major problem for viable disease evaluation on PET scans of oncology patients [2]. Several causes of benign pitfalls have been reported including active infectious diseases of bacterial or fungal aetiology [2-4]. Viral infection with  $^{18}\text{F}$ -FDG uptake has been reported in the brain [5], in lymphoma patients (two cases) where the cutaneous uptake of  $^{18}\text{F}$ -FDG was misinterpreted as recurrent lymphoma [6, 7] and in a case of colon cancer mimicking sub-cutaneous metastases [8]. The possible mechanism of uptake of  $^{18}\text{F}$ -FDG is in the inflammatory cells which have increased metabolic activity [9].

*Acknowledgement:* We acknowledge the scientific contribution of our colleagues Namita Singh MD, Manoj Gupta MBBS, Madhur Srivastava MBBS and Romana Seher DMRIT.

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**Figure 5.** Photo of the patient showing the vesicular eruption anteriorly along the T4 dermatome.

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