

## IMAGING GAMUT

# Scintigraphic bone imaging of Paget's disease with $^{18}\text{F}$ -NaF PET-CT

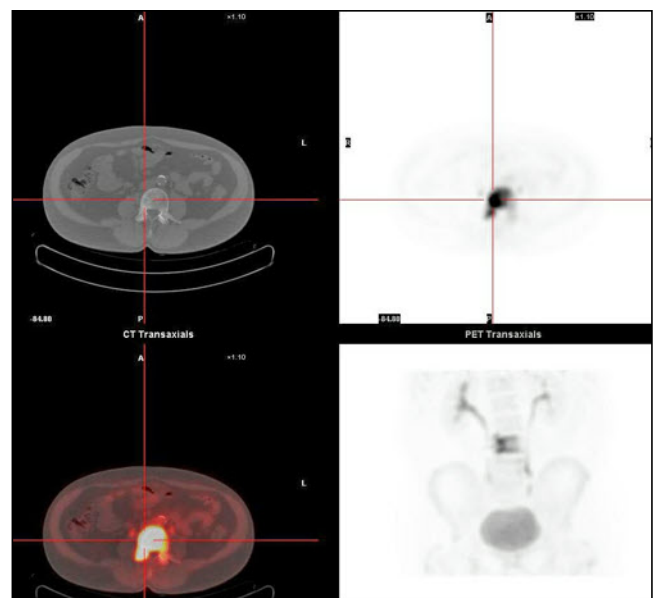
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**Key words:** *Paget's disease,  $^{18}\text{F}$ -NaF, PET-CT*

**Background** A 68-year-old male complaining of chronic low back pain radiating to the left lower limb, had an MRI, which showed an incidental finding of T1/T2 hypointense L3 vertebra sclerotic lesion. The MRI results were suspicious of several pathologies including chronic infection, bone metastasis and haematological malignancy. The patient was referred in September 2012 to the nuclear medicine department for a  $^{18}\text{F}$ -NaF PET-CT scan.

**Procedure**  $^{18}\text{F}$ -NaF (400 MBq) was administered intravenously and a low-dose CT scan without contrast was performed after 60 minutes of initial uptake phase followed by PET imaging from the vertex to the toes in arms-up position. The PET, CT and fused images were reconstructed in transaxial, coronal and sagittal projections.

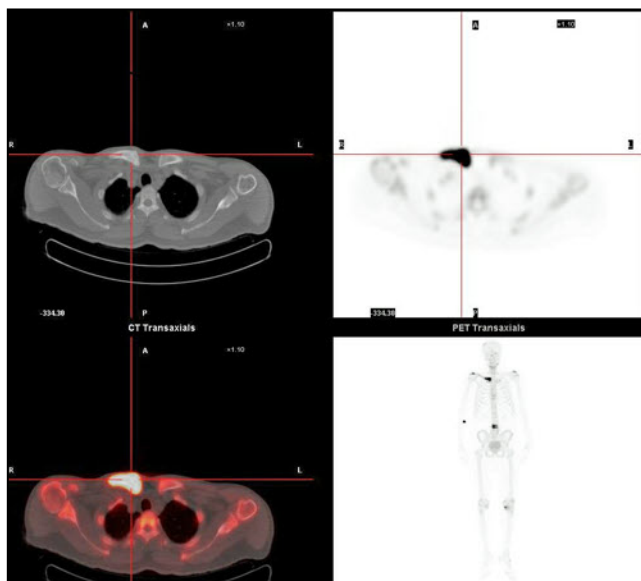


**Figure 1** *Transaxial CT (top left), fused PET-CT (bottom left), and PET images (top right) and coronal PET (bottom right) images showing the lesion in the L3 vertebral body*

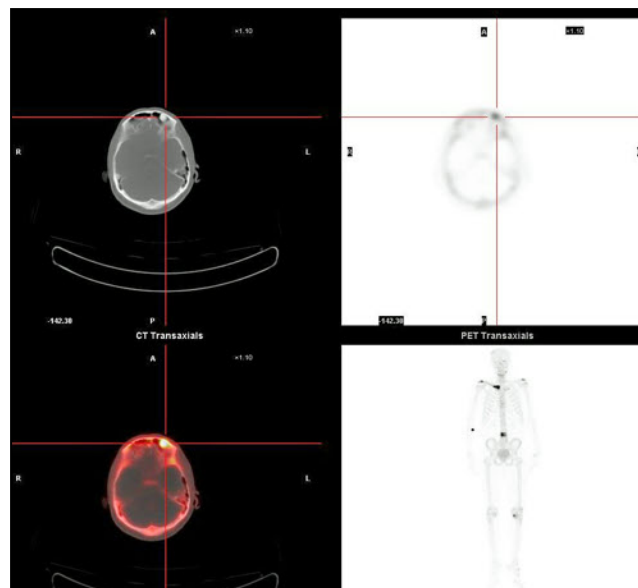
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**Findings** The images showed multiple skeletal lesions involving: the L3 vertebral body extending unilaterally to the right posterior element (Figure 1), proximal third of the right clavicle, which appeared expansile and sclerotic on CT images (Figure 2) with two additoanl



**Figure 2** Transaxial CT (top left), fused PET-CT (bottom left), and PET images (top right) and whole-body PET (bottom right) images showing the scapular lesion



**Figure 3** Transaxial CT (top left), fused PET-CT (bottom left), and PET images (top right) and whole-body PET (bottom right) images showing the left frontal sinus lesion

foci of mild increased radiotracer uptake seen involving the right parietal bone and the left frontal sinus; the left frontal sinus lesion appeared sclerotic and expansile on the CT (Figure 3). These scintigraphic features favoured the diagnosis of polyostotic Paget's disease. The patient's plain chest x-ray was requested and core bone biopsy of L3 vertebra performed for confirmation of the diagnosis. The results of the bone core biopsy revealed early Paget's disease.

**Conclusion** Polyostotic Paget's disease may mimic metastatic skeletal disease. However, the presence of characteristic features seen on the  $^{18}\text{F}$ -NaF whole-body bone scan, helped establish the correct diagnosis.

**Comments** Paget's disease affects 3-4% of the population aged over 40 years living in cold climates. It is an idiopathic disorder characterized by excessive and abnormal remodeling of the bone [1]. The disease has three pathological phases: lytic phase, mixed phase and blastic phase. Frequent sites of involvement include the spine, pelvis and proximal long bones [2]. Although radiography

in some cases can be sufficient for diagnosis of Paget's disease, functional bone scintigraphy is essential to differentiate it from other pathologies with similar presentation such as malignancy [1, 3]. The conventional  $^{99\text{m}}\text{Tc}$ -MDP bone scan is more sensitive than plain radiography for the diagnosis of Paget's disease due to the characteristic findings and distribution pattern that helps distinguish it from other pathologies [4]. The characteristic patterns of Paget's disease include homogeneous pronounced uptake in the vertebra (Mickey mouse sign) and increased radiotracer uptake typically abutting one joint and extending into the diaphysis. The conventional bone scan is often helpful in establishing the diagnosis of Paget's disease because of the characteristic distribution pattern and the appearances of the lesions, which guide in making a correct diagnosis. Bone scintigraphy with  $^{18}\text{F}$ -NaF PET-CT potentially appears to be more sensitive than the conventional bone scan due to its ability to depict subtle changes in bone metabolisms, but the relative diagnostic sensitivity of the two techniques in Paget's disease needs to be established and confirmed.

## References

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