A Case Poster
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^{99m}Tc-MDP in Pathological Fracture

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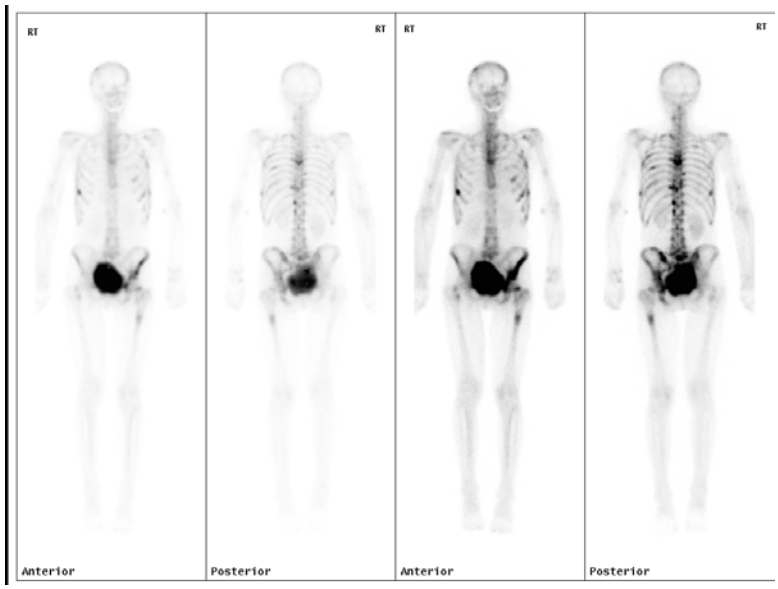
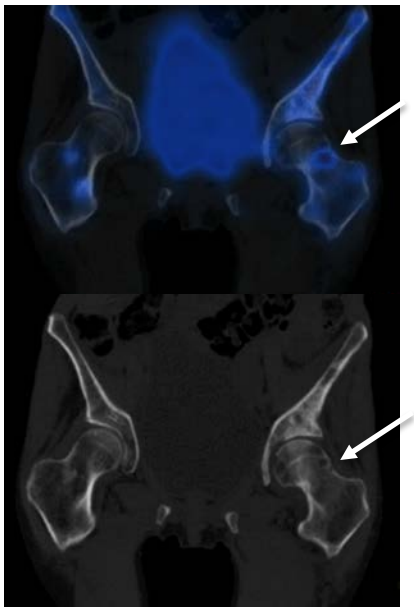
Case —Recurrent Breast Cancer

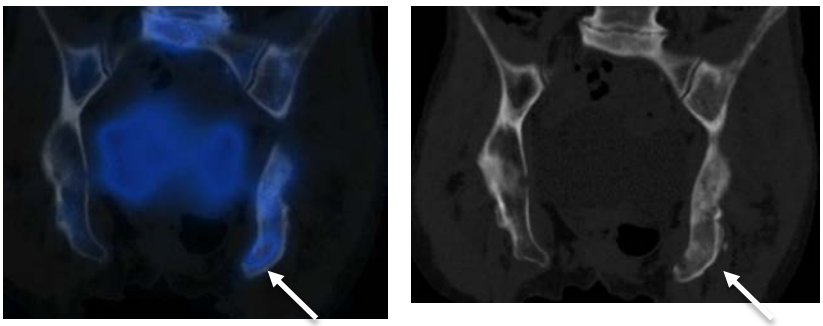
Patient had known breast cancer with previous right mastectomy. CT showed recurrence 4 months ago, and nuclear medicine scan was requested to assess metastatic involvement.



(A) Whole body planar image



(B) SPECT/CT demonstrating fracture at the left neck of femur



(C) SPECT/CT demonstrating fracture at the left inferior pubic ramus

On whole body planar imaging there was widespread bony metastatic disease, with involvement of skull, ribs, vertebral column, pelvis and proximal femur. There was additional increased uptake in the left neck of femur. The patient proceeded to SPECT/CT which revealed a lucent line running through the left neck of femur in keeping with fracture of the neck of femur. A further area of increased uptake in the left inferior pubic ramus also localized to a fracture on SPECT/CT. The patient was transferred to Acute Oncology and referred to the Orthopedic team for urgent fixation of the fracture.

^{99m}Tc-MDP in fractures

Pathological fractures can occur in patients with known metastatic skeletal disease. As there is often no history of trauma, the patient may present with pain, or may be asymptomatic.

Neck of femur fracture can cause significant morbidity due to complications caused by avascular necrosis. Hence it is important to identify a fracture early to allow surgical intervention. Hip fractures are normally diagnosed on plain radiographs, however in this case, the patient did not present in the typical fashion, and had a SPECT/CT instead to assess for skeletal metastasis. The increased uptake corresponded to a new fracture seen on plain film, and the patient went on to have a hip replacement.

While MRI is the best modality of evaluating unexplained hip pain, or an occult fracture, bone scintigraphy can be used if MRI is contraindicated or equivocal. SPECT/CT has been shown to have increased specificity compared to bone scintigraphy alone. Studies have also shown SPECT/CT can be useful in predicting avascular necrosis of femur, by comparing uptake of the fractured femoral head to that of the contralateral femoral head.

Bone metastases occur in up to 70% of patients with breast and prostate cancers. Pathological fractures are more commonly seen in breast cancer due to the lytic nature of the lesions, while less often in prostate due to them being sclerotic lesions. While most fractures show increased uptake due to osteoblastic reaction, an occult fracture can also present as an area of no uptake, known as a 'cold line'.

In evaluating bony metastases, reviewing common areas of pathological fractures (e.g. neck of femur and vertebral wedge fractures) are essential, and early detection of a pathological fracture may be able to aid in treatment decision.

CONCLUSIONS

- ^{99m}Tc-MDP is a common radionuclide used for assessing skeletal metastases
- Patients with widespread bony metastases are prone to pathological fractures which may be incidentally picked up, and can be correlated with CT or plain film
- Early detection is essential to avoid complications such as avascular necrosis, hence it is important to review common fracture sites on SPECT/CT

References:

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