

Case Study

xSPECT* Bone Metastases in a Case of Myxoid Liposarcoma

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Case study data provided by the University of Minnesota, MN, USA

HISTORY

A 45-year-old man with history of biopsy proven myxoid liposarcoma in the left thigh, which was treated with surgery presented for follow-up. A ^{99m}Tc MDP bone scan was performed to evaluate for skeletal metastases. A bone scan was performed on the new modality, xSPECT*, 3 hours after an injection of 23.5 mCi of ^{99m}Tc MDP. Initial planar whole-body images (Figure 1) were followed by an xSPECT prototype study of the pelvis.

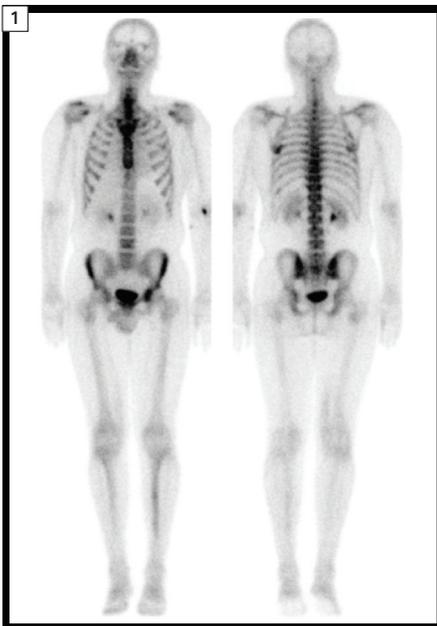
ANALYSIS

Using list mode SPECT data and CT-based zone maps, xSPECT was performed for the pelvis.

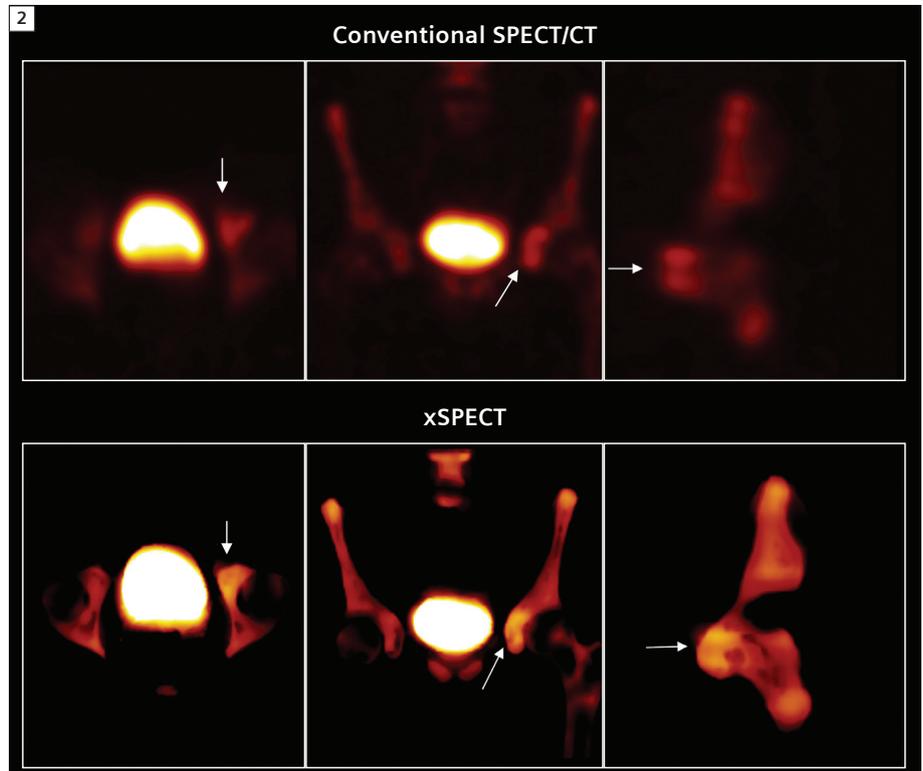
As seen on Figure 2, conventional SPECT/CT Flash 3D shows mild increase of uptake in the anterior left acetabulum, extending to the superior left pubic ramus. Preliminary xSPECT reconstructions show increased intensity of tracer uptake in the acetabular and pubic lesions, along with small hypodense areas within the anterior acetabular

lesion (arrow). The variegated uptake pattern and the lower uptake intensity of the lesion visualized on the SPECT/CT and xSPECT compared to intensely hypermetabolic tumors like osteosarcoma could reflect the myxoid pathology of the primary tumor.

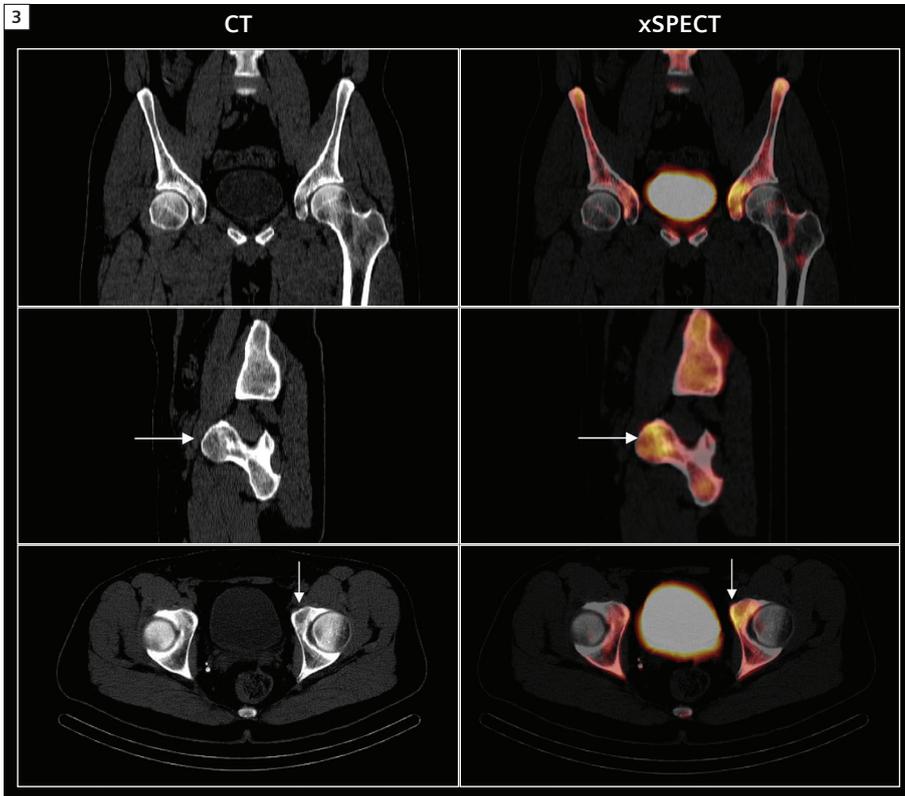
CT shows focal lytic area in the anterior acetabulum and superior pubic ramus with surrounding mild sclerosis, which corresponds to the regions of hypointensity and increased uptake of ^{99m}Tc MDP



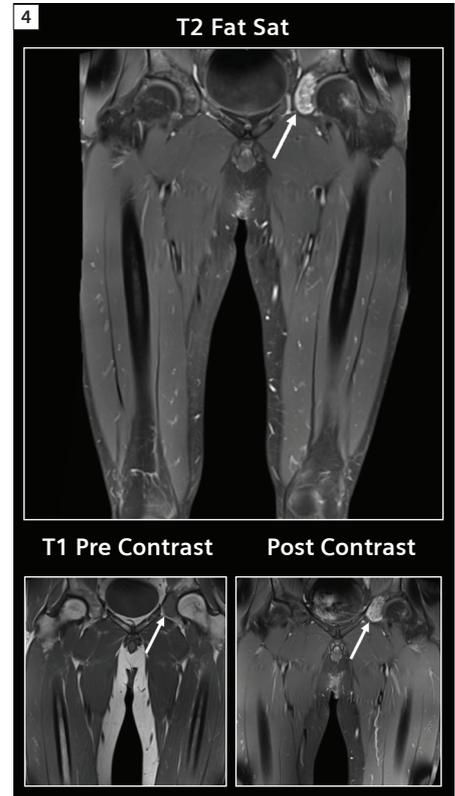
1 ^{99m}Tc MDP whole-body planar bone scan. Whole-body planar images show area of increased uptake in the left acetabulum. No other abnormal focal area of increased uptake was visualized. To further evaluate the left acetabular lesion, the SPECT/CT study was performed immediately following the planar study.



2 Conventional SPECT/CT and xSPECT of the pelvis and bilateral hip joints. SPECT was reconstructed using iterative reconstruction (Flash3D) with 4 iterations and 21 subsets. CT-based attenuation correction was also performed.



3 CT and xSPECT images highlighting the left acetabulum lesion.



4 MRI coronal images of bilateral hip joints.

respectively, in the xSPECT imaging. Scintigraphic images show variegated appearance within the bony metastases typical of myxoid liposarcoma with small focal lytic areas interspersed with zones of mild bone deposition, which correlates with CT appearance of the mass. MRI was performed with Gd contrast to evaluate the extent of bony lesion and presence of soft tissue extension or mass. The acetabular lesion is hypointense on T1 with enhancement from Gd contrast. The enhancement is patchy with small focal hypointensities within the enhancing mass. Fat-saturated T2 images show hyperintensity in the acetabular and pubic lesion, but with focal hypointensities within, which reflects the myxoid pathology of the metastatic foci of the liposarcoma. Preliminary xSPECT findings correlate well with MRI findings, but also reflect the relatively less aggressive nature of the lesion in view of the lower level of uptake compared to more aggressive tumors.

COMMENTS

Myxoid liposarcoma occurs in middle age, and is characterized by extrapulmonary metastasis, including bone metastasis. ^{99m}Tc bone scans are widely used for assessment of skeletal metastases. The frequency of bone metastases arising from myxoid liposarcoma has been reported to be 14%.¹ Bone scans have been reported to lack sufficient sensitivity for the detection of vertebral metastases arising from myxoid liposarcoma.² This is particularly true for bone scans for intramedullary lesions that have no cortical involvement. In the present case, the metastases in the anterior acetabulum and pelvis demonstrated mild increase in uptake within the lesion with variegated appearance, reflecting the combination of osteoclastic and osteoblastic activity secondary to the myxoid nature of the metastatic lesion. The new modality xSPECT can delineate the fine detail of tracer uptake within the lesion, significantly better than conventional SPECT/CT.

EXAMINATION PROTOCOL

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| Scanner | Symbia with xSPECT Technology |
| Dose | 23.5 mCi/869.5 MBq of ^{99m}Tc MDP |
| Scan Delay | 3 hours post injection |
| Parameters | 64 frames, 20 sec/frame |
| CT | 130kVp, 50 eff mAs, 3 mm slice |

References:

- Schwab et al Ann Surg Oncol 2007, 14:1507–1514
- Sakamoto et al. World Journal of Surgical Oncology 2012, 10:214

* Symbia Intevo, xSPECT, and quantitative xSPECT is not licensed according to Canadian law, is pending 510(k) clearance, and is not yet commercially available in Canada, the United States or in all countries worldwide. Due to regulatory reasons, its future availability cannot be guaranteed. Please contact your local Siemens organization for further details.