

Delineation of Femoral Marrow Infiltration in a Patient of Lymphoma Using xSPECT Bone and CT

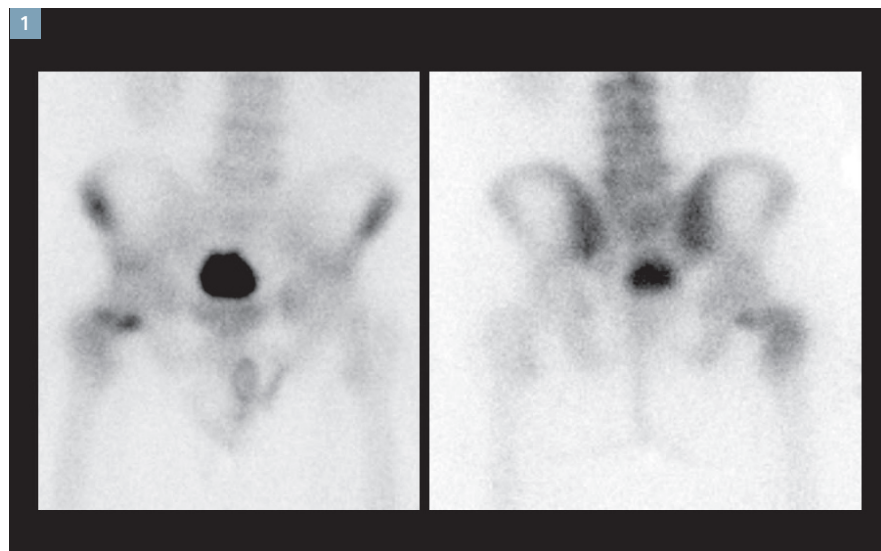
By: Partha Ghosh, MD, Molecular Imaging Business Unit, Siemens Healthcare

Data courtesy of The Johns Hopkins Hospital, Baltimore, MD, USA

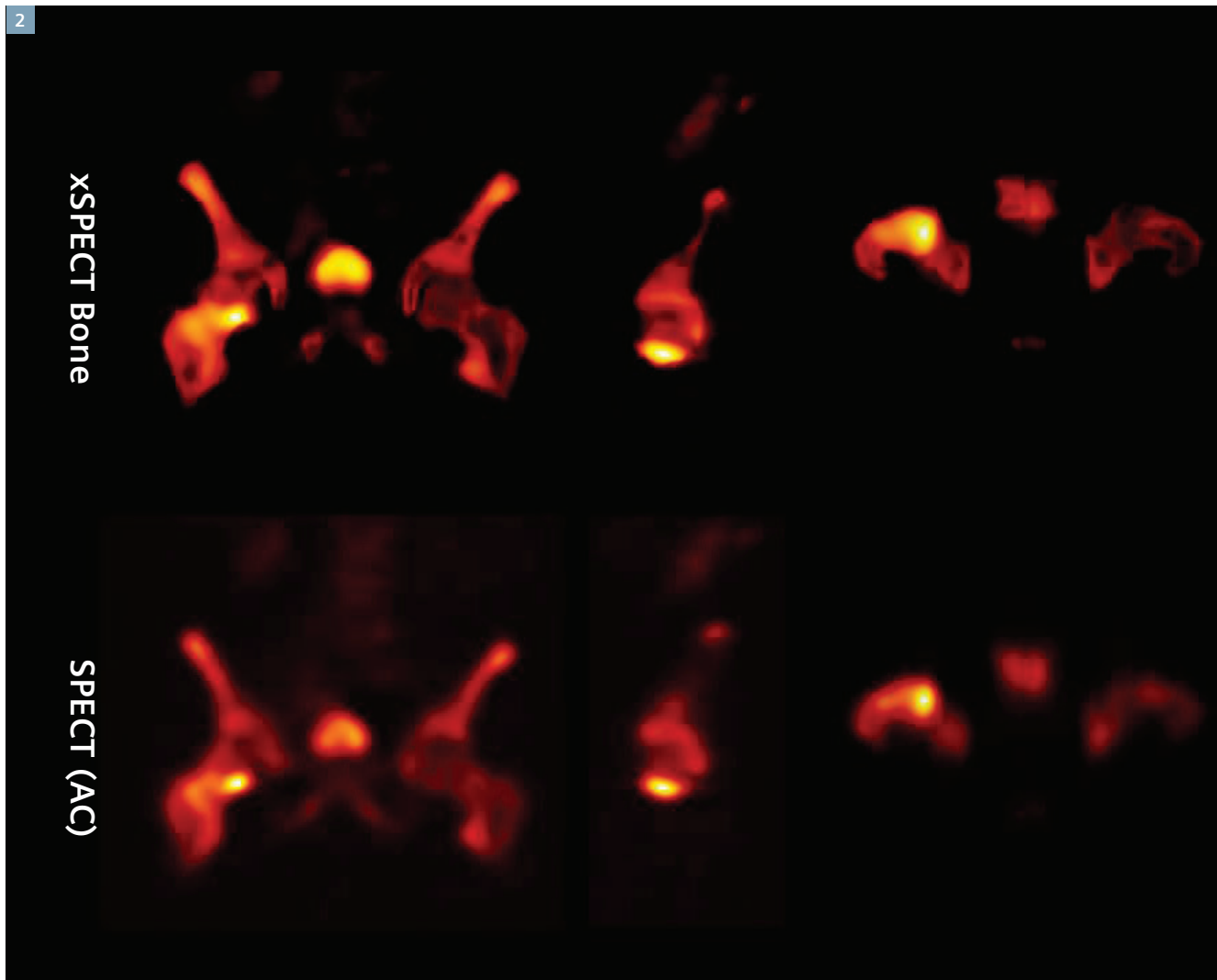
History

A 72-year-old man with a history of non-Hodgkin's lymphoma treated with chemotherapy underwent a ^{99m}Tc MDP bone scan to evaluate osseous lesions. A recently performed MRI of the pelvis showed slight hyperintensity in the right femoral neck in the fat-suppressed images, which was suspicious of marrow infiltration.

An xSPECT* study was performed three hours following IV injection of 27.4 mCi ^{99m}Tc MDP. Initial planar images were followed by xSPECT acquisition. 3D iterative reconstruction and xSPECT Bone* reconstructions were performed for comparison.



1 Anterior (*left*) and posterior (*right*) planar images of the pelvis show focal increase in uptake in the right femoral neck, especially towards the medial end.



2 Comparison of xSPECT Bone and SPECT (AC) reconstruction of the pelvis demonstrate sharp delineation of the focal hot area in the femoral neck.

Diagnosis

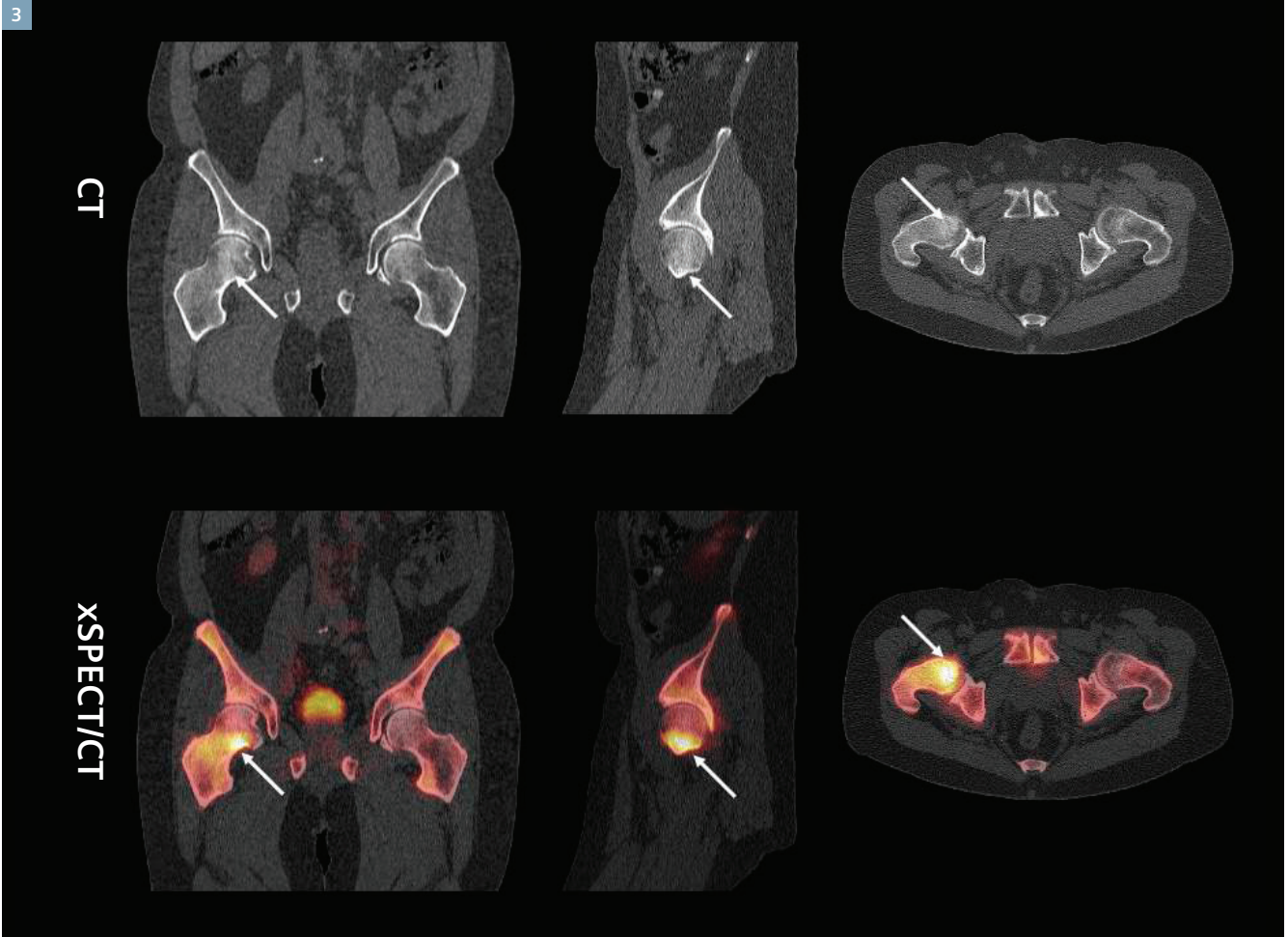
xSPECT Bone sharply defines the focal area of increased uptake in the medial margin of the neck of the femur adjacent to the femoral head. The rest of the femoral neck and the intertrochanteric crest also shows slightly increased uptake. The femoral head uptake appears normal. Compared to SPECT (AC), the xSPECT Bone images show sharper margins of the hyper-

metabolic foci in the femoral neck as well as sharper delineation of the femoral head, trochanteric regions, intertrochanteric crest and the rest of the pelvis and acetabulum.

CT shows mild sclerosis involving the femoral neck just adjacent to the femoral head, predominantly in the anterior and inferior aspect of the

neck. Fusion of CT with xSPECT Bone shows exact coregistration of the focal increase in uptake with the zone of sclerosis. The correlation of the focal area of skeletal hypermetabolism, along with the associated sclerosis seen on CT in view of the MRI findings at the same area, strongly suggest the presence of lymphomatous infiltration in the marrow of the femoral neck.

3



3 CT and fusion of CT and xSPECT Bone show mild sclerosis in the femoral neck, which corresponds to the focal area of increased uptake in the medial margin of the femoral neck.

Comments

Marrow infiltration is common in advanced lymphoma. PET/CT and MRI are both highly sensitive for detection of marrow infiltration.¹ In this clinical example, the MRI findings were suspicious of marrow involvement, but the xSPECT Bone and CT information was supportive of the final diagnosis of lymphomatous infiltration of the femoral neck marrow. The increased sclerosis seen on CT along with the skeletal hypermetabolism may be related to osteoblastic activity stimulated by the infiltrating lymphoma cells.

Value of xSPECT Bone Technology

xSPECT Bone sharply defines the extent of marrow infiltration in the femoral neck by lymphoma and correlates it with the degree and extent of sclerosis seen on CT. The well-defined boundaries of the skeletal hypermetabolism defined by xSPECT Bone provides information about the degree of involvement of the marrow of the greater trochanter and upper part of the femoral shaft beyond the heavily infiltrated region in the lower part of the femoral neck, thereby illustrating the greater extent of lymphomatous infiltration than was estimated from the CT or SPECT only.



4 Volume rendering of the fusion of CT and xSPECT Bone shows the focal increase in uptake involving the anterior and inferior part of the junction of the femoral head and the neck with most increase in the inferomedial part.

Examination Protocol

Scanner	Symbia Intevo*™
Scan dose	27.4 mCi ^{99m} Tc MDP IV injection
Scan protocol	3 hour post-injection delay
SPECT	32 frames, 30 seconds/frame
CT	130kV 31 eff mAs, 2 mm slice thickness, 16x1.25 mm collimation

* Symbia Intevo, xSPECT and xSPECT Bone are not commercially available in all countries. Due to regulatory reasons their future availability cannot be guaranteed. Please contact your local Siemens organization for further details.

The statements by Siemens customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

Reference:

1 Wu, et al., 2012, *Eur J Radiol.*, Feb; 81(2):303-11.