Prosthesis-Related Abscess on In-111 Leukocyte SPECT/CT Imaging

Farbod Nasserri • Peeyush Bhargava

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A 77-year-old male with a history of right knee joint replacement 4 years ago presented with swelling and pain following a fall. He soon developed fever with an elevated WBC count, ESR and CRP levels. Blood cultures were negative. Whole body images were acquired in anterior and posterior projections after the intravenous administration of 543 μ Ci of In-111-labeled autologous WBCs (a,b). They showed a large area of abnormal accumulation of labeled WBCs in the right thigh. CT and fused SPECT/CT images in the coronal plane (c,d) localized the uptake to the antero-lateral aspect of the right femoral prosthesis, extending into the knee. Transaxial CT and fused SPECT/CT images (e,f) localized the uptake to an abnormal density with an air-fluid level (e) characteristic of an abscess (Fig. 1). The patient underwent drainage, irrigation and debridement.

In-111-Labeled leukocyte scintigraphy is the imaging modality of choice for evaluation of patients with suspected joint replacement infections [1]. As compared to CT and

MRI, scintigraphy is not limited by orthopedic hardware, and in combination with bone marrow scans (using Tc-99 m sulfur colloid), provides excellent sensitivity and specificity for the diagnosis of prosthesis infection [2, 3]. Limitations of In-111 labeled leukocyte scintigraphy include low image quality and poor anatomical resolution [4]. Fusion of SPECT images with a separately acquired CT has been shown to facilitate interpretation and alter patient management [5, 6].

SPECT/CT is gaining popularity as a hybrid imaging modality where the functional (scintigraphic) and anatomic (low dose CT) information is acquired together to generate coregistered images. SPECT/CT imaging has been shown to improve the sensitivity and specificity of labeled leukocyte imaging by providing the precise localization and extent of abnormalities [7, 8]. This case highlights the importance of SPECT/CT hybrid imaging in In-111 leukocyte scintigraphy.

F. Nasserri • P. Bhargava
Department of Radiology, Baylor College of Medicine,
Houston, TX 77030, USA

P. Bhargava (✉)
4059 Glen Cove Dr.,
Houston, TX 77021, USA
e-mail: peeyush_bhargava@yahoo.com

Fig. 1 Whole body images were acquired in anterior and posterior projections after the intravenous administration of 543 μCi of In-111-labeled autologous WBCs (**a**, **b**). They show a large area of abnormal accumulation of labeled WBCs in the right thigh. CT and fused SPECT/

CT images in the coronal plane (**c**, **d**) localize the uptake to the antero-lateral aspect of the right femoral prosthesis, extending into the knee. Transaxial CT and fused SPECT/CT images (**e**, **f**) localize the uptake to an abnormal density with an air-fluid level (**e**) characteristic of an abscess

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