

## Extrarenal uptake of $^{99m}\text{Tc}$ -DTPA at the site of bone marrow biopsy

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Unexpected iliac uptake of  $^{99m}\text{Tc}$ -DTPA was noted in a 10-year old female referred for evaluation of renal function prior to receiving chemotherapy for relapsed acute lymphocytic leukemia. This scan finding corresponded to the site of a bone marrow biopsy performed five days earlier. X-ray of the area revealed no abnormality. It is assumed that the extrarenal uptake was due to increased vascularity at the site of recent bone marrow biopsy, most likely due to increased osteoblastic reaction in the cortex of the ilium. The patient proceeded with the bone marrow transplant and was well at follow-up six months later.

**Key words:** extrarenal, uptake, DTPA, bone marrow

### INTRODUCTION

Technetium-99m diethylenetriamine pentaacetic acid (DTPA) is widely used in investigation of renal disorders and for measuring the glomerular filtration rate (GFR). Extrarenal uptake of  $^{99m}\text{Tc}$ -DTPA has been described in a number of lesions including malignancies and sites of inflammation.<sup>1–6</sup> We present a case of unexpected uptake of this radiopharmaceutical at the site of bone marrow biopsy in a patient suffering from acute lymphocytic leukemia (ALL).

### CASE REPORT

A 10-year-old female was referred for evaluation of renal function prior to bone marrow transplantation for relapsed ALL. She was first diagnosed with ALL in October 1997. After two years of chemotherapy, completed in November 1999, she received further chemotherapy after a relapse in March 2000. In August 2000 she was prepared for a bone marrow transplant, which included a  $^{99m}\text{Tc}$ -DTPA study with GFR measurement to assess renal function. She had no history of renal or bone disease.

The patient received a 300 MBq bolus injection of  $^{99m}\text{Tc}$ -DTPA while in the supine position. Images were acquired on a Starcam gamma camera (Starcam 400AC/T; General Electric Medical Systems, Milwaukee, WI) equipped with a low-energy, general purpose collimator interfaced to a dedicated workstation. A 128 × 128 matrix was used with a 20% energy window centered at 140 keV. Forty one-second frames were acquired followed by 62 twenty-second frames in the posterior projection. Further images were acquired one-hour post injection in the posterior and right lateral projections.

There was normal distribution of radiotracer in the dynamic images (Fig. 1) over the first 40 seconds of the study with increased uptake of  $^{99m}\text{Tc}$ -DTPA in the superior aspect of the right side of the pelvis (Fig. 2) present in the first 5 minutes. It remained virtually unchanged for the first 20 minutes of the study and persisted (although somewhat less intense) in the 1 hour post-injection images (Fig. 3A). The increased uptake was shown to lie very superficially on the right lateral image (Fig. 3B). Skin marking located this focus to the site of the bone marrow biopsy, which was performed five days earlier. The biopsy demonstrated hypocellular bone marrow with no abnormal cells. It was assumed that the extrarenal uptake was due to increased vascularity in the cortical bone at the site of the recent biopsy. She underwent a successful bone marrow transplant and was well at six months follow-up.

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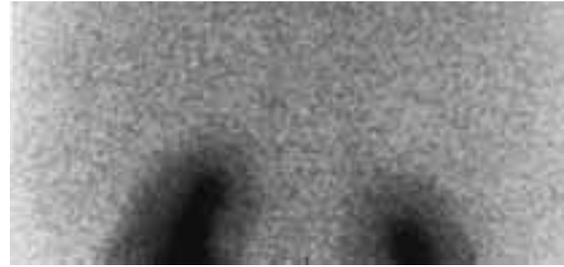
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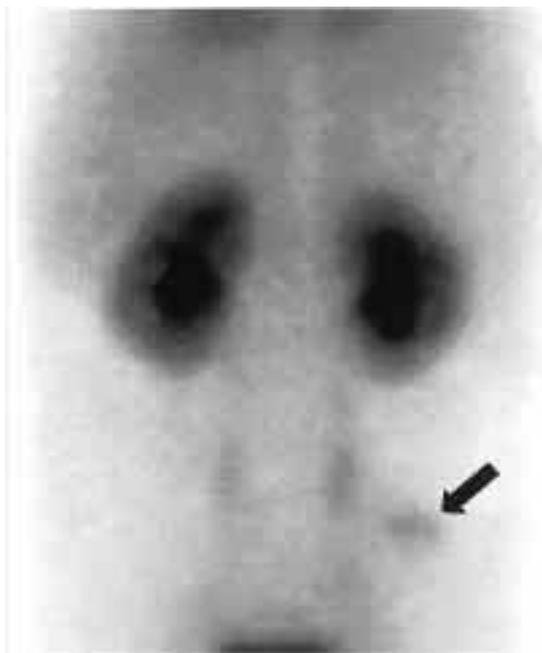
E-mail: mroman@optusnet.com.au



**Fig. 1** Posterior dynamic flow image taken between 35 and 40 seconds after injection showing normal distribution of radiotracer to abdomen and pelvis.



**A**



**B**

**Fig. 2** Increased uptake of  $^{99m}\text{Tc}$ -DTPA in the posterior iliac crest (*arrow*) at the site of recent bone marrow biopsy (*posterior view*).

**Fig. 3** Delayed images acquired one hour post injection showing persistently increased uptake in the posterior (A) and right lateral (B) projections (*arrows*).

### DISCUSSION

Uptake of  $^{99m}\text{Tc}$ -DTPA has been described in a number of lesions including bone and bone marrow. Rousseau et al.<sup>1</sup> visualized bone marrow in the thoracic and lumbar verte-

brae in the flow phase in a patient with acute renal failure and disseminated intravascular coagulation secondary to staphylococcal sepsis. The authors felt that this was related to increased bone marrow blood flow associated with augmentation of hematopoiesis. Klein et al.<sup>2</sup> de-