

## Detection of lymph node metastasis from osteosarcoma with <sup>99m</sup>Tc-MDP scintigraphy. Case report

Daniela Ilić<sup>1</sup>, Georgi Zafirovski<sup>2</sup>, Nina Simova<sup>1</sup>, Nikola Zisovski<sup>3</sup>,  
Sofijanka Glamocanin<sup>3</sup>, Vesna Janevska<sup>4</sup>, Cvetka Tolevska<sup>5</sup>,  
Olivija Vaskova<sup>1</sup>, Milan Samardziski<sup>2</sup>

<sup>1</sup>Institute of Pathophysiology and Nuclear Medicine, <sup>2</sup>Clinic for Orthopedic Surgery,

<sup>3</sup>Clinic for Pediatrics, <sup>4</sup>Institute of Pathology,

<sup>5</sup>Institute of Radiotherapy and Oncology, Medical Faculty Skopje, Macedonia

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*Osteosarcoma usually spreads via the blood stream, developing pulmonary and skeletal metastasis. Rarely, the disease spreads via the lymphatics. We are reporting a case when radionuclide bone imaging detects lymph node metastasis from osteosarcoma.*

*Key words: bone neoplasms - radionuclide imaging; osteosarcoma; lymphatic metastasis; technetium Tc 99 m medronate*

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### Introduction

Osteosarcoma, as other malignant bone tumors demonstrates active bone turnover and therefore reveals intense uptake on bone scintigraphy.<sup>1</sup> Bone-seeking radiopharmaceuticals occasionally demonstrate intense uptake in soft tissue metastasis from osteosarcoma (lung, brain, renal, lymph nodes).<sup>2-4</sup> This tumor spreads usually via the blood stream with development of pulmonary and skeletal metastasis.

### Case report

The patient, male at the age of 14, first presented two years before this report. He had been complaining of painful, livid swelling in his left calf for 4 months until he was referred to us. He was seen by pediatric oncologist after radiography, bone scintigraphy, fine needle aspiration and open biopsy had been performed. Histology finding confirmed osteosarcoma of the left tibia.

Plain radiography of the left leg demonstrated a poorly-defined lesion located centrally in the left proximal metaphysis of the tibia, extending into the shaft. The lesion revealed a permeable pattern of destruction with proliferation, extensive sunburst spiculation, mineralization of the tumor, lumps, clouds and segments of ossified matrix. The

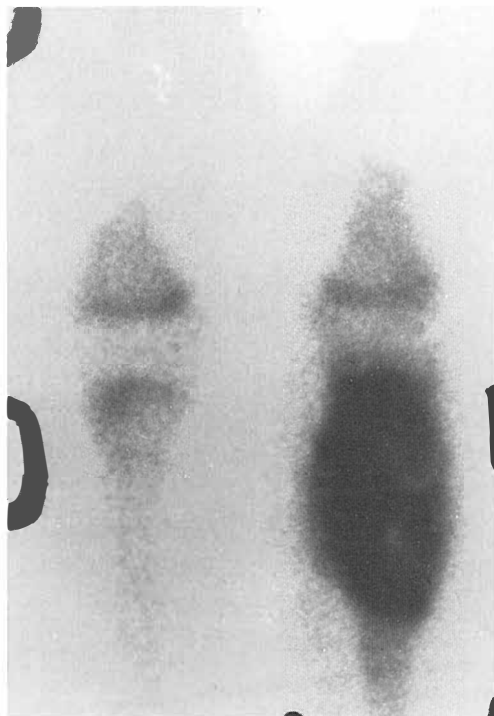
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Correspondence to: Daniela Ilić, MD, MSc, Institute of Pathophysiology and Nuclear Medicine, Vodnjanska 17, 91000 Skopje, Republic of Macedonia; Phone/Fax: +389 91 112831.



**Figure 1.** Plain radiography of the left tibia (in the period of the initial diagnosis).

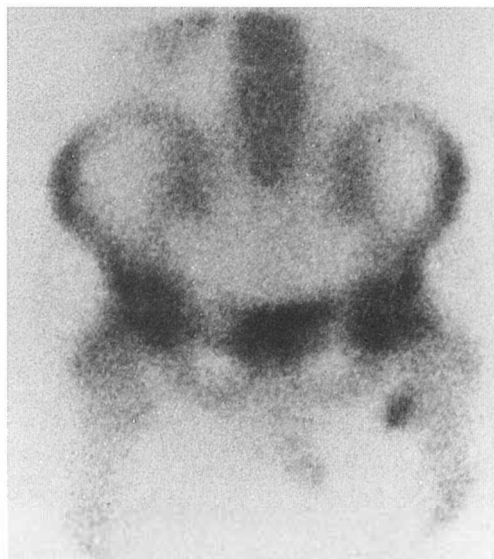


**Figure 2.** 99mTc-MDP bone scan of the primary tumor.

radiographic finding with these features strongly suggested high grade osteosarcoma (Figure 1).

Bone scintigram with 99mTc-MDP revealed inhomogenously increased uptake of bone radiotracer in the upper third of the left tibia with extension into the soft tissue adjacent to the bone (Figure 2).

After the confirmation of osteosarcoma, chemotherapy with T6 protocol for solid tumors was commenced because the parents refused surgery. T6 induction and maintenance chemotherapy for solid tumors was used for 14 months after the initial diagnosis. Before the completion of chemotherapy (exactly one year after histologic confirmation of osteosarcoma) above-knee amputation was done. Three months after the surgery, enlarged lymph node in the left groin was noticed. CT scan of the left groin demonstrat-



**Figure 4.** 99mTc-MDP bone scan after chemotherapy and surgery.



Figure 3. CT of the pelvis (region of the left groin).

ed the mass (lymph node) with punctate calcification (Figure 3). <sup>99m</sup>Tc-MDP bone scan did not show any focal hot spots throughout the skeleton, except an area of increased radiopharmaceutical activity located closely to the trochanter minor of the left femur, corresponding to the enlarged lymph node (Figure 4). The lymph node was removed and microscopic section (hematoxylin and eosin,  $\times 400$ ) revealed a metastatic deposition of osteosarcomatous tissue. There was a mesenchymal, osteoblastic stroma in which a deposition of osteoid and calcified osseous trabeculae (arrow) were found (Figure 5).

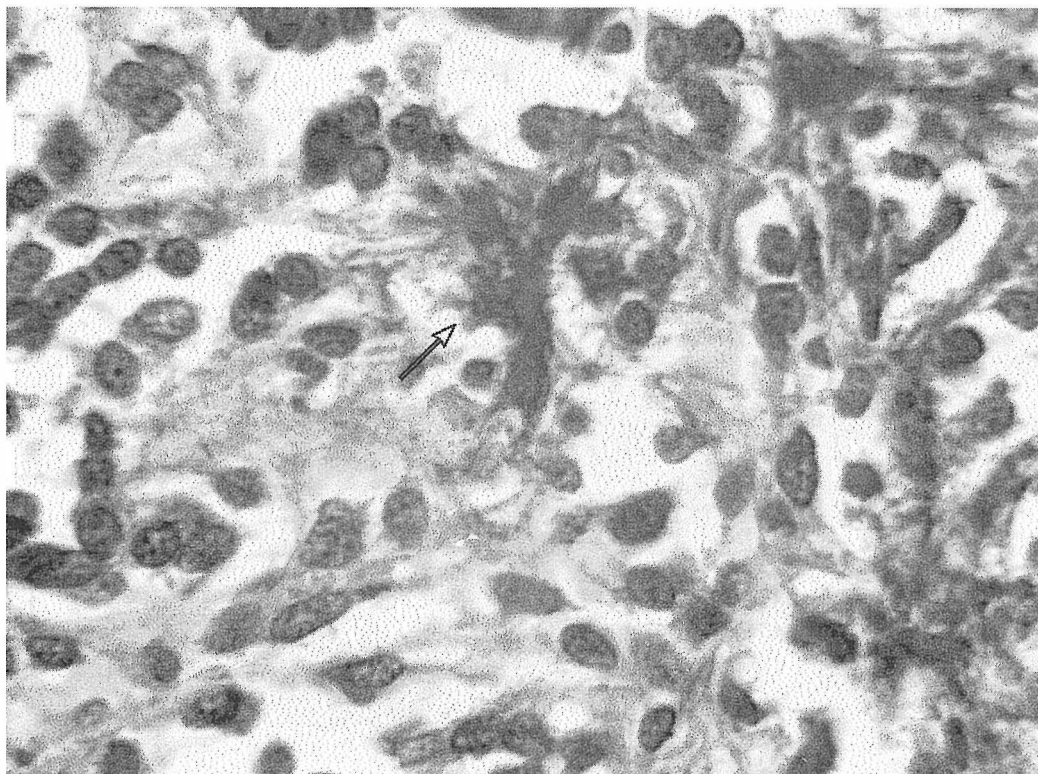
After the removal of the lymph node external beam radiotherapy of 50 Gy in the region of the left groin was applied. Recently after the termination of the radiotherapy, chest X-ray revealed pulmonary metastases. The child was in very bad condition and as he did

not respond to radiotherapy at all, orthopedic surgeon, radiotherapist and pediatrician oncologist decided not to apply any other treatment. One month later (20 months after the onset of the disease) the patient died.

## Discussion

The value of bone radionuclide imaging in the management of osteosarcoma is well established. Bone scan is quite useful in the delineation of the extent of the primary lesion, as well as in the follow up studies.<sup>5-7</sup> Local recurrence or skeletal metastasis are detected before they are radiographically apparent.

Osteosarcomatous lesions that spread via the lymphatics are very uncommon. Literature review revealed 2.7-11.4% of lymphatic



**Figure 5.** Microscopic section of the removed lymph node.

metastases in patients with osteosarcoma.<sup>7</sup> Its presence is a bad prognostic sign of the disease as none of these patients survived 5 years.<sup>8</sup>

Lymph node metastasis accumulate bone-seeking radiopharmaceutical avidly so 99mTc-MDP bone scan could be used in the assessment of any spreading (hematogenous or lymphatic) of osteosarcoma.

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