Indium-111-oxine labeled leukocyte uptake in Ki-1-positive anaplastic large cell lymphoma

Abstract Indium-111-oxine labeled leukocyte (111In-WBC) scintigraphy is well known for its ability to localize in areas of active infection, but not in areas of lymphomatous involvement. We present a case of Ki-1-positive anaplastic large-cell lymphoma that was initially thought to be a case of multifocal osteomyelitis because of positive uptake on a 111In-WBC scan. The areas of abnormal uptake on the indium scan were demonstrated histopathologically to be sites of lymphomatous involvement in bone.

Materials and methods
An 11-year-old, Hispanic boy was transferred to our hospital for evaluation of right foot and lower pack pain. This patient initially presented to another hospital with a 2-month history of progressively worsening right foot pain associated with intermittent fever and 18-pound weight loss. He also noted lower back pain of 1-month duration. The patient felt the right foot pain begin after minor trauma (“kicking a rock”). Evaluation revealed leukocytosis and an elevated erythrocyte sedimentation rate (ESR). Multiple imaging studies reportedly showed findings consistent with multifocal osteomyelitis. Radiographs of the right ankle and foot showed diaphyseal, periosteal reaction in the third metatarsal bone and luency in the distal tibia. A bone scan (limited to the ankles and feet) showed hyperemia in the right ankle and foot associated with a focal area of intense uptake in the mid tarsal region. Magnetic resonance imaging (MRI) of the right foot and ankle (1 week after bone scan) showed abnormal signal intensities (low on T1-weighted images and high on T2-weighted images) in the third metatarsal, the talus, and the distal tibial metaphysis.

Results
Upon transfer to our hospital, physical examination was unremarkable except for skin pallor and a low-grade fe-
Laboratory analysis demonstrated leukocytosis of 14,000/µl with slight elevation of the granulocyte fraction, anemia (hemoglobin of 9.9 g/dl), and an elevated ESR of 130 mm/h. Radiographs of the right ankle showed a well-defined lytic lesion in the distal tibia (Fig. 1). An 111In-WBC scan (3 weeks after the bone scan) showed increased uptake in multiple regions, including distal tibia, third metatarsal, multiple vertebral bodies, left iliac crest, and posterior aspect of right iliac spine (Fig. 2). A computed tomography (CT) scan of the body was also performed and showed a mottled appearance of the posterior aspect of the right iliac crest (Fig. 3). Because of the abnormal indium scan, the diagnosis of multifocal osteomyelitis was strongly favored. The patient was started on parenteral antibiotics, but showed no clinical improvement. Eventually, biopsy of the right iliac crest and distal tibial bone was performed; it showed Ki-1-positive anaplastic large-cell lymphoma intermixed with neutrophils (Fig. 4).

Fig. 1 Lateral radiograph of the right ankle. There is a well-defined lucent lesion in the anterior aspect of the distal tibia (arrow)

Fig. 2a, b Indium-111-labeled leukocyte scan. a Lateral image of the right foot. There are areas of increased activity in the region of the distal tibia (solid arrow) and distally in the foot (open arrow). b Posterior image of the abdomen and pelvis. There is increased activity in the region of the T12, L2, L4, and L5 vertebral bodies (open arrows). There is also increased activity in the left iliac crest (black arrow) and the posterior right iliac spine (solid white arrow)

Fig. 3 Computed tomography of the pelvis. On bone window, there is a lytic region in the posterior right iliac spine (arrow)

Fig. 4 Photomicrograph of biopsy specimen of right iliac crest. There are large anaplastic lymphoma cells (arrows) intermixed with an abundance of neutrophils (curved arrows). The anaplastic cells showed strong positive reactivity for expression of Ki-1 (CD30)