



## Isolated foot metastasis of squamous cell carcinoma of the lung: a rare location

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Squamous cell carcinoma of the lung usually presents as a local rather than a metastatic disease. We present a 55-year-old male who was referred to the orthopedics and traumatology clinic for evaluation of pain and discomfort around the left ankle 2 months after diagnosis of locally advanced non-small cell (squamous cell) lung cancer. Physical examination revealed nonspecific pain and tenderness around the ankle. T2-weighted MR images showed lesions like a bone marrow edema around the talar head and neck. Whole body dynamic bone scan revealed a metastatic lesion only in the foot. The patient died 4 months after diagnosis of the metastasis. Early diagnosis of foot metastasis may be challenging and delays in diagnosis of up to 24 months have been reported. Foot metastases are usually associated with advanced metastatic disease and survival rates are poor. Although metastatic disease of the foot is rare, it should be considered in the diagnosis of a painful foot in the elderly lung cancer patients. Palliative treatments such as pain relief medications should be chosen for patients with an expectancy of short survival whereas aggressive approaches may be applied for those with longer survival expectations.

**Key words:** Cancer; foot; lung; metastasis; squamous cell carcinoma; talus; tarsal bone.

Bone metastases are secondary deposits of a primary neoplasm from another site and are the most common malignant tumors involving the bone.<sup>[1]</sup> Metastatic disease of the skeleton occurs in at least 20 to 30% of patients with malignancy.<sup>[2]</sup> Nearly 70% of metastases occur in the axial skeleton, including the cranium, sacrum, sternum, vertebrae, pelvis and ribs.<sup>[1]</sup> Bone metastases may be seen in the appendicular skeleton but rarely distal to the knee and elbow.<sup>[3,4]</sup> Metastases to the feet are rarer than hand metastases.<sup>[2,5]</sup> The most commonly involved bones are the phalanges in the hand and the tarsal bones in the foot.<sup>[6]</sup>

Lung cancer is the most common cause of cancer-related deaths in both men and women.<sup>[7]</sup> Squamous cell carcinoma of the lung is usually a local disease rather than metastatic.<sup>[8-10]</sup> Although bone metastasis with lung cancer may be seen, extremity metastasis, especially distal extremity metastasis, is rare.<sup>[1]</sup> Symptoms of patients with metastatic carcinoma are generally non-specific, with pain being the most common.<sup>[1]</sup> Elevated serum alkaline phosphatase and hypercalcemia may be seen due to osteolytic activity of the metastatic tumor, except in prostate carcinoma.<sup>[1]</sup> Radiographically, while most metastases produce osteolytic changes, osteoblas-

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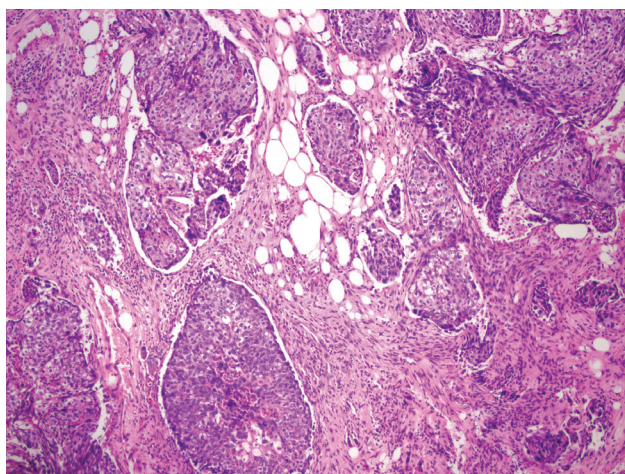
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**Fig. 1.** Mediastinoscopic biopsy specimen (H-E, x100). [Color figure can be viewed in the online issue, which is available at [www.aott.org.tr](http://www.aott.org.tr)]

tic or mixed changes can also occur.<sup>[1]</sup> Failure to recognize these lesions may lead to late diagnosis and inappropriate management. The palliative treatment of these

lesions decreases pain and improves the quality of life. Acrometastases are often initially mistaken for more benign processes, such as infection, trauma, inflammatory arthritis, osteomyelitis or gout. Persistent symptoms, unresponsiveness to conservative therapy or prior history of malignancy should prompt the physician to consider metastases when evaluating a patient.

We report a case of distal extremity metastasis presenting as extremity pain in a lung cancer patient. Talus, tarsal bone and metatarsal metastasis of squamous cell carcinoma of the lung without metastases to any other body part are rare and have not yet been reported in the English literature.

### Case report

A 55-year-old male presented to the respiratory medicine clinic with complaints of hemoptysis lasting for three weeks. He had a history of smoking (70 packs a year). Chest X-ray revealed a mass lesion at the lower lobe of the left lung. Positron emission tomography/



**Fig. 2.** (a) Anteroposterior and (b) lateral radiographs of the left foot. (c) T2-weighted sagittal MR image of the left foot. (d) T2-weighted coronal MR image of the left foot.

computed tomography (PET/CT) examination revealed high fluorodeoxyglucose (FDG) uptake in the same region and at the mediastinum. Mediastinoscopic biopsy was performed. A differentiated carcinoma metastasis was determined on the seventh station and a diagnosis of locally advanced non-small cell (squamous cell) lung cancer was made (Fig. 1). Chemotherapy was started immediately after the diagnosis.

The patient was referred to Orthopedics and Traumatology Clinic for the evaluation of pain and discomfort around the left ankle 2 months after diagnosis of squamous cell lung cancer. The patient described the pain as aching in character and it was not associated with a history of trauma or exercise. Nocturnal pain was not reported. His symptoms were activity limiting. Physical examination revealed nonspecific pain and tenderness around the ankle. There was no ecchymosis or swelling around the ankle. Direct X-ray examination of the foot did not show any sign of bony lesions during the first evaluation period (Fig. 2a, b). Non-steroidal

anti-inflammatory drugs were prescribed and rest and ice application advised. However, pain was not resolved in 2 weeks and T2-weighted magnetic resonance imaging (MRI) of the foot and ankle showed a lesion like a bone marrow edema around the tarsal bones, talar head and neck (Fig. 2c, d). No soft tissue involvement was observed. A whole body dynamic bone scan (WBDBS) was subsequently performed, revealing a metastatic lesion on the foot (Fig. 3). In the same period, a second direct X-ray showed a wide lytic lesion around the talus and tarsal bones (the cuboid and lateral cuneiform) (Fig. 4a, b). CT imaging revealed an aggressive lytic lesion in the talus, tarsal bones and first metatarsal (Fig. 4c).

An incisional biopsy was performed for the talar lesion 6 weeks following admission. Pathologic examination showed that the lesion was a distant metastasis of squamous cell cancer of the lung (Fig. 5). Ten sessions of 30 Gy palliative radiotherapy were performed at the metastasis site. The patient died 4 months after the diagnosis of metastasis.

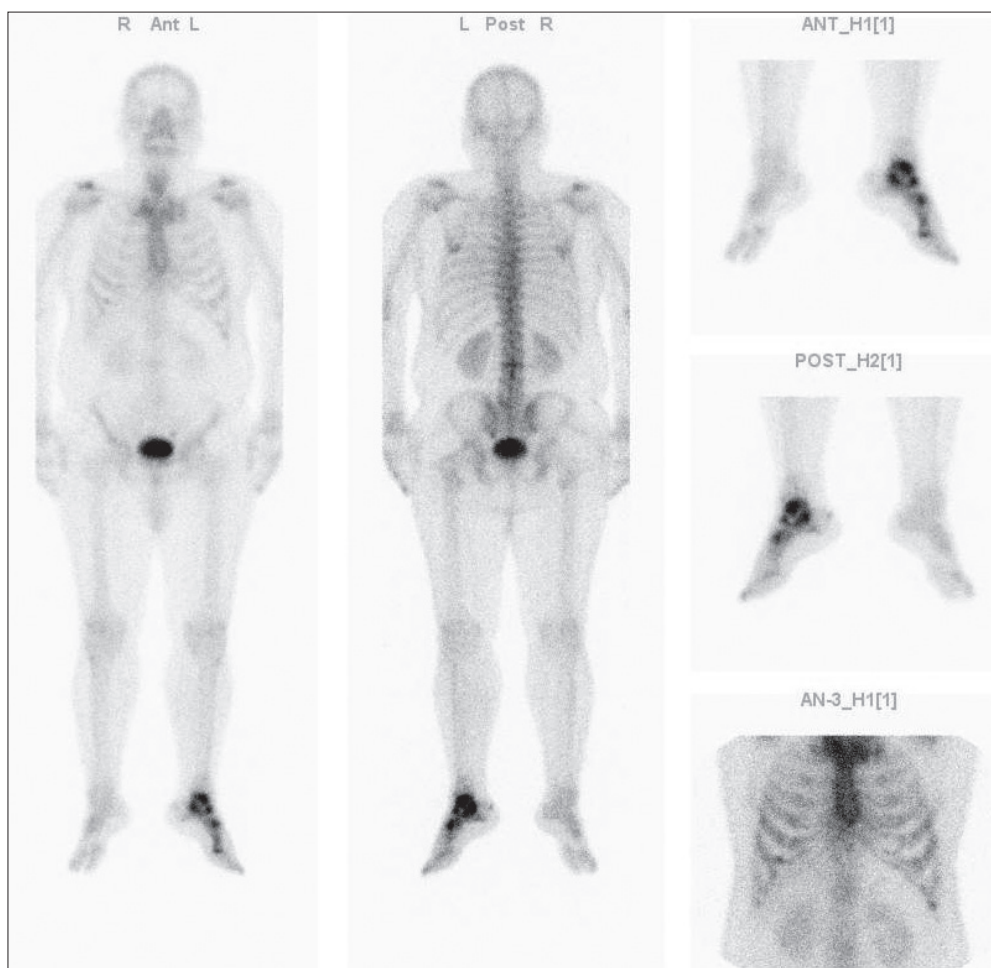
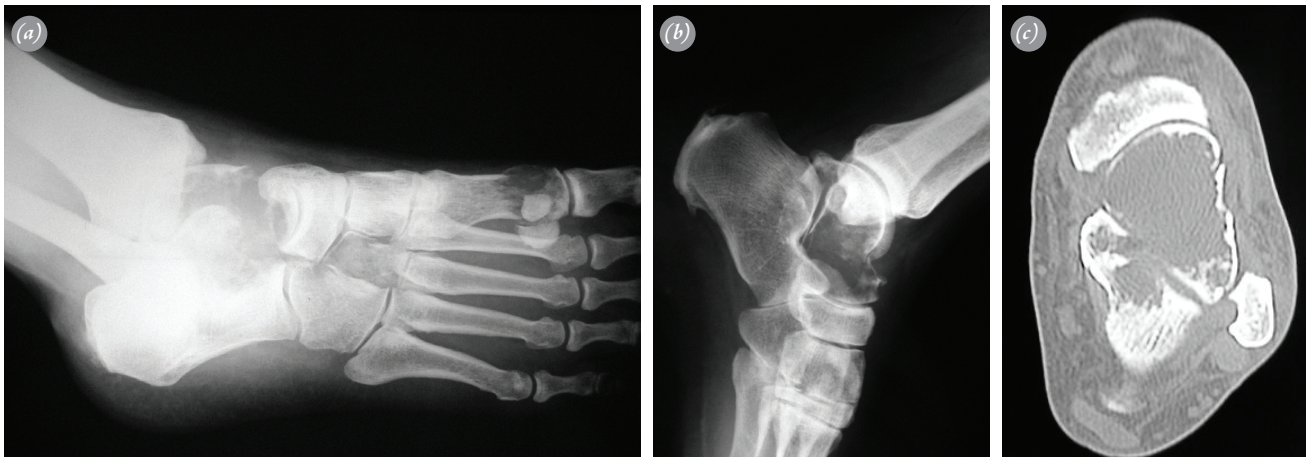


Fig. 3. Metastatic bony lesion seen on WBDBS.



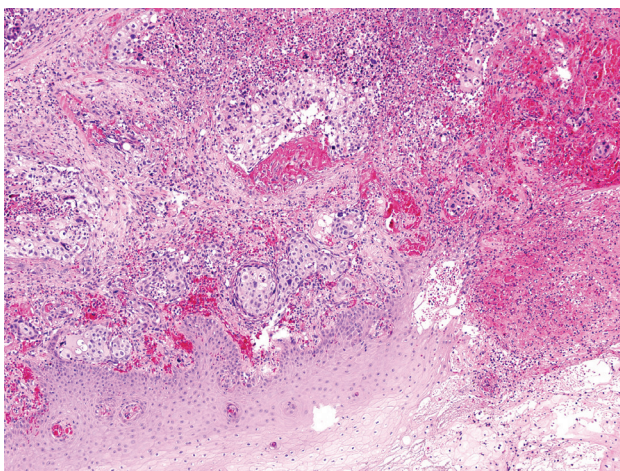


**Fig. 4.** (a) Anteroposterior and (a) lateral radiographs of the left foot 6 weeks after first administration. (c) Axial CT image of the left foot showing the lytic lesion.

## Discussion

Metastatic disease of the foot and ankle is rare with a very low reported incidence, in contrast to primary osseous lesions of the foot with an expected 3% incidence.<sup>[11]</sup> Incidence is highest in the seventh and eighth decades, with males affected twice as frequently.<sup>[12]</sup> However, acrometastases may be more common than clinically recognized.<sup>[13-15]</sup> Different factors have been thought to account for the rarity of acrometastases such as low blood flow, insufficient communication with the Batson's plexus, lower temperature gradient, cell surface properties, embolic size, and the immune system, inactive hematopoietic sites, clotting mechanisms, platelet activity and endothelial wall properties.

Affected feet may be painful, erythematous, swollen or warm, resembling an infectious process. The clinical presentation may involve pain, mass, swelling, skin



**Fig. 5.** Pathologic examination of the specimen from the left talus (H-E, x100). [Color figure can be viewed in the online issue, which is available at [www.aott.org.tr](http://www.aott.org.tr)]

lesions, pathological fractures or deformity. The clinical picture may also resemble gout, rheumatoid arthritis, Paget's disease, tenosynovitis, sprain, enchondroma, osteoid osteoma, stress fractures, and metabolic bone disorders. The majority of patients with foot metastasis present with lytic radiographic appearance. Periosteal reaction is unusual. Joint is rarely involved. Lesions may be sclerotic in prostate cancer and mixed in breast, bladder or gastrointestinal primaries.<sup>[5]</sup> However, pathologic examination may be the only way to make a definitive diagnosis in many cases.

Maheshwari et al.<sup>[16]</sup> reported the genitourinary system to be the most frequent primary site for foot bone metastasis and the calcaneus and talus to be the most common bones involved. The authors found that all patients died after a mean survival of 14.8 months after diagnosis of metastases. Acrometastases usually occur as rare preterminal events and are often part of widespread metastases.<sup>[3]</sup> Wu and Guise<sup>[17]</sup> could find only 4 (0.01%) out of 41,833 cancer patients and Hatstrup et al.<sup>[13]</sup> 10 (0.01%) of 75,000 patients of primary malignancies with metastasis to the foot or ankle. In a review of 67,000 foot tumors and lesions, Berlin found only 2 metastases (0.003%).<sup>[18]</sup> In their review, Maheshwari et al. reported a 2% incidence of foot and ankle metastasis in all skeletal metastasis, the genitourinary system to be the most common primary organ system and the lung as the most common single organ.<sup>[16]</sup> It has been reported that supradiaphragmatic lesions tend to metastasize to the hand and subdiaphragmatic neoplasms tend to metastasize to the foot.<sup>[5]</sup> In addition, 15% of acrometastases from the lungs have been reported in the foot in same report.<sup>[5]</sup> The hindfoot was found to be the most affected site of the foot and the calcaneus the most common bone in a review.<sup>[16]</sup> This situation has been linked to blood supply.

Two cases of isolated talus metastasis have been reported in the literature, resulting from breast carcinoma<sup>[19]</sup> and occult bronchial carcinoma.<sup>[20]</sup> To our knowledge, talar, tarsal bone and first metatarsal metastasis of squamous cell carcinoma of the lung without metastases to any other part of the body is a very rare condition and has not yet been reported in the English literature.

In conclusion, early diagnosis of foot metastasis may be challenging. Although metastatic disease of the foot is rare, it should be considered in the diagnosis of a painful foot in older lung cancer patients. In advanced cancer patients, attention is seldom given to the hands and feet for metastasis scan. Palliative treatments such as pain relief medications should be chosen for patients with an expectancy of short survival whereas aggressive approaches may be applied for patients with expectations of long-term survival.

**Conflicts of Interest:** No conflicts declared.

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