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## Acrometastasis due to lung adenocarcinoma

The authors declare no financial disclosure

### Abstract

We are presenting a case of acrometastasis in a male patient with lung adenocarcinoma. Acrometastases accumulate for 0.1% of all metastatic bone lesions and can be the first manifestation of cancer in approximately 10% of cases. The main clinical manifestations are tenderness, intermittent pain, functional impairment, erythema, heat and swelling of the affected part. Lung cancer is the main primary malignancy which causes acrometastases. Although the lesions can be recognized in x-rays or CT scans, the gold standard for the diagnosis is MRI scan in which the full extension of the tumor can be evaluated. The diagnosis is usually confirmed by fine-needle biopsy of the affected bone. In the presence of acrometastases, prognosis is very poor and palliative treatment is usually recommended. This case shows that patients at risk for lung cancer should be screened intensively when they develop persistent digital symptoms.

**Key words:** lung adenocarcinoma, acrometastasis, metastatic bone lesions

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### Introduction

Despite the awareness of tobacco smoking and its consequences, lung cancer remains the most frequently diagnosed cancer globally [1]. The most common sites of metastasis are the nervous system, bones, liver, respiratory system and adrenal glands [2]. Acrometastases are very rare but may occur during or after the diagnosis of lung cancer. As new treatment options are available and life expectancy is prolonged, it is essential to recognize bone metastases as soon as possible. This could lead to better quality of life due to pain relief and to avoid skeletal related events such as pathological fractures [3]. We are presenting a case of acrometastasis which occurred as the first manifestation of lung cancer in a male patient presented in the emergency department.

### Case Presentation

A 72-year-old ex-smoker male patient with a smoking history of 50 pack-years presented in our department complaining about chest pain and a swallowing and painful right first toe. The patient reported that pain and swallow of the first toe occurred approximately one month before admission, while the onset of chest pain was approximately 15 days ago and was described as persistent and worsening with movements. Clinical examination revealed a palpable and painless mass (2 × 2.5 cm) on the right hemithorax which was attached to the chest wall, and a swallowed and painful right fist toe (Fig. 1). Vital signs as well as the rest of the clinical examination were normal. Laboratory tests showed elevated white blood cell count (11.000 K/ $\mu$ L) and CRP (36 U/L), and uric acid levels within normal limits (4 mg/

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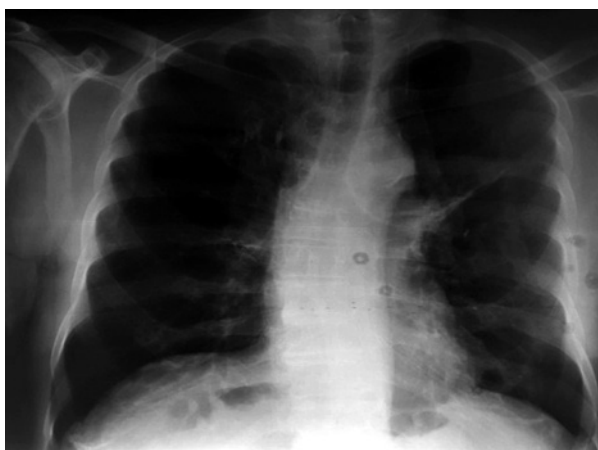
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**Figure 1.** A swollen, painful distal phalanx of the first right toe



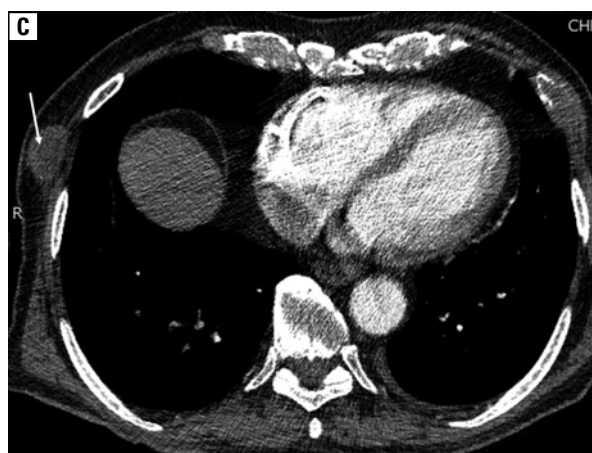
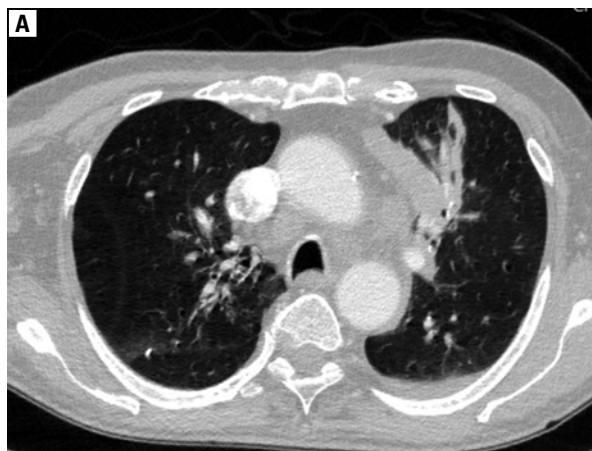
**Figure 2.** Chest X-Ray revealing linear opacities in the left upper field

dL). Chest X-Ray revealed linear opacities in the left upper field (Fig. 2). The patient was admitted to our department for further evaluation.

A Chest CT scan was performed, and showed a mass (3.5 × 3 cm) in the anterior segment of the left upper lobe and a subcutaneous mass of the right hemithorax (Fig. 3). Fiberoptic bronchoscopy did not reveal any abnormalities.

Simultaneously, an X-ray of the right foot was performed and revealed a lytic lesion in the distal phalanx of the first metatarsal (Fig. 4). Computed tomography of lower limbs showed a complete destruction of the distal phalanx of the right first toe (Fig. 5). Bone scintigraphy was performed, showing increased uptake of the radioactive drug at the distal phalanx of the first toe, the spinal cord, several ribs, and the right humerus (Fig. 6).

A biopsy of the phalanx revealed acrometastasis of the distal phalanx of the right first toe due to lung adenocarcinoma. Immunohistochemistry of this tissue sample revealed cancer cells which were

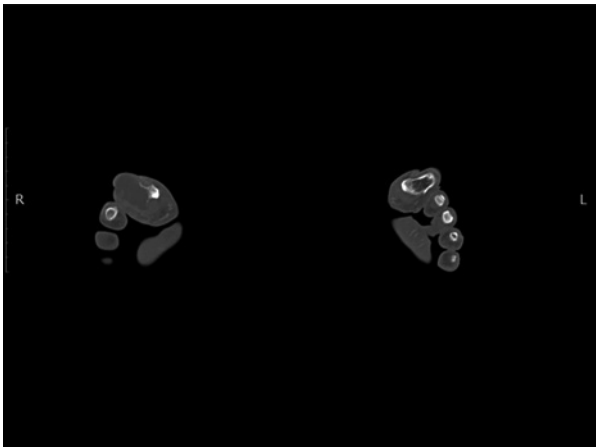


**Figure 3. A, B** — CT of the chest showing a mass of 3.5 × 3 cm in the anterior segment of the left upper lobe which was causing atelectasis of the surrounding lung parenchyma. **C** — subcutaneous mass 2 × 2.5 cm on the right hemithorax (white arrow)

positive for thyroid transcription factor-1 (TTF-1), CK7 and CK5/6, which confirmed the lung origin of the lesion while they were negative for ALK or EGFR gene mutations. The subcutaneous mass was excised as a whole (dimensions 4.8 × 3.2 × 1.5 cm) and sent for pathologic examination. The immunohistochemistry of the tissue of the subcutaneous mass



**Figure 4.** A lytic lesion in the distal phalanx of the first metatarsal

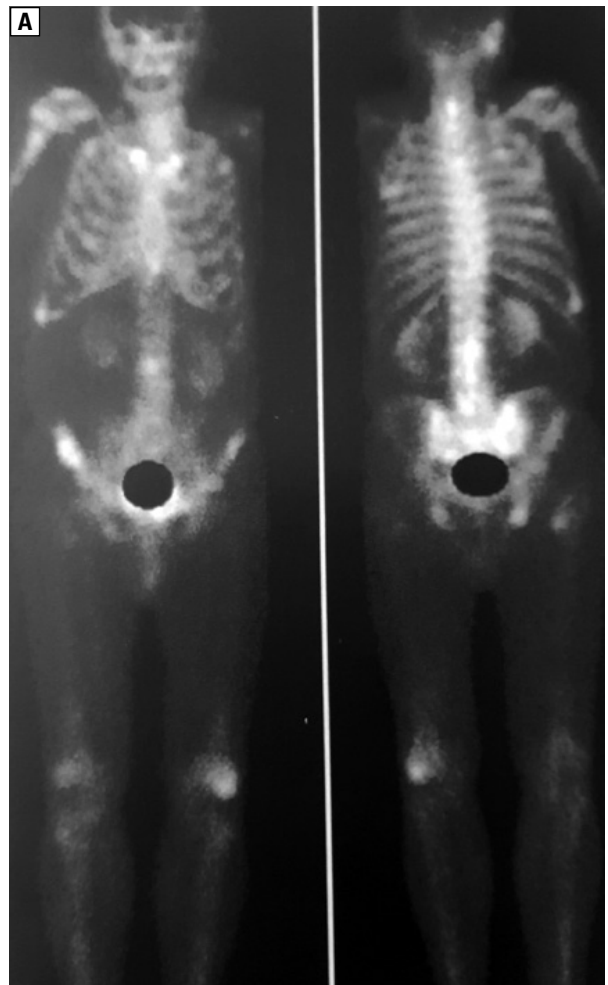
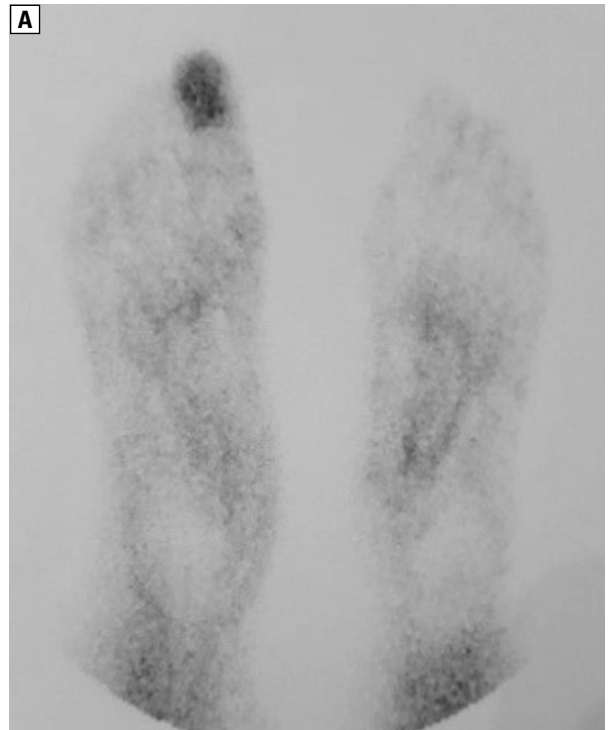


**Figure 5.** CT of the right lower limb showing complete destruction of the distal phalanx of the first right toe

was positive for CK7, pCEA and MUC-1 and negative for CK20, CDX-2, TTF-1, CK34βE12, WT-1, RCC, and MUC5AC. This kind of immunohistochemistry, although not specific was also compatible with lung adenocarcinoma. According to the above the diagnosis is adenocarcinoma of the lung T2N2M1b, stage IVA. The patient was then referred to the oncology department for initiation of chemotherapy with carboplatin and gemcitabine. Microbiologic cultures of the biopsy material were negative.

### Discussion

Acrometastases, are metastases located distal to the elbow or knee [4]. They are rare presentations of an end stage disease, accumulating for 0.1% of all metastatic bone lesions [5]. They are usually diagnosed in a patient with a history of already known malignancy, however, in approximately 10% of cases, they occur as the first manifestation of cancer [6].



**Figure 6. A, B** — bone scintigraphy revealing increasing uptake of the radioactive drug at the distal phalanx of the first toe, the spinal cord, some ribs as well as the right humerus

In the case of our patient the symptoms of acrometastasis were the first sign of lung cancer. The patient was complaining about pain and erythema of the right first toe for at least one month before admission and approximately two weeks before the onset of the chest pain. It was one of the main symptoms that brought him to the emergency department since he was mostly complaining about the pain on histoe rather than the chest pain, which was one of reasons that made us investigate it thoroughly. Even though bronchoscopy was normal, diagnosis was confirmed from the acrometastasis.

In the presence of acrometastasis, the affected part may appear with tenderness, intermittent pain, functional impairment, erythema, heat and swelling. Differential diagnosis includes infections, cyst, gouty arthritis, ganglia, osteomyelitis, tuberculous dactylitis, pyogenic granuloma and primary skin tumors. The most common primary malignancy which causes acrometastases is lung cancer (32.9%), followed by renal cell (20%), breast (12.9%) and colon (10%) cancer [7].

In X-Rays the lesion is usually lytic, however, it depends on the primary tumour's origin. CT is rarely useful and thus, the gold standard for the diagnosis is the MRI scan in which the full extension of the tumor can be evaluated [8].

Although the pathophysiologic mechanism leading to acrometastasis has not been fully understood, it is believed that tumor cells dissemination to the digits occurs through circulation. This could explain the high prevalence of acrometastases in the cases of lung cancer, because the tumour cells have direct access to the systemic circulation through left atrium and ventricle [9]. The diagnosis is confirmed by biopsy of the affected bone. Since acrometastases are rare, there is not enough evidence of the appropriate treatment. When they are diagnosed, the prognosis is very poor, (mean survival less than six months), and palliative treatment is usually recommended [10].

Amputation and chemotherapy have been used, but recent literature suggests that local radiation therapy could provide pain relieve and some function to the affected digit [11, 12].

Our case shows the importance of screening patients at risk for lung cancer when they develop persistent digital symptoms.

### Conflict of interest

The authors declare no conflict of interest

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