CASE REPORT


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# Acrometastasis as a first sign of lung cancer

## Akrometastaza kao prvi znak karcinoma pluća

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**Abstract**

**Introduction.** Bone metastases occurring distally to the elbow or knee joint are called acrometastases. Acrometastases make up only 0.1% of all bone metastases, but only 0.007% to 0.3% occur in the bones of the foot or hand. In 10% of patients, bone metastases occur as the first sign of a previously undiagnosed primary tumor. **Case report.** A 64-year-old male reported to the hospital due to painful swelling and redness of the fifth finger of the dominant hand. Osteolysis of the proximal phalanx of the fifth finger was diagnosed radiographically. A working diagnosis of osteomyelitis and phlegmon of the proximal phalanx was made. After incisional drainage, a tumor mass was observed intraoperatively. Amputation of the finger was performed at the level of the metacarpophalangeal joint. Pathohistological analysis revealed squamous cell carcinoma metastasis. After a computed tomography scan and bronchoscopy with biopsy, a diagnosis of squamous cell carcinoma of the bronchus was made. The patient was given chemotherapy. During the application of the second cycle, there was a fatal outcome. **Conclusion.** Pathohistological verification and determination of the location of the primary tumor are important when acrometastasis is found because starting novel immunotherapy and targeted therapy in a timely manner could change the median survival of these patients.

**Key words:**
**amputation, surgical; carcinoma, squamous cell; diagnosis; drug therapy; finger phalanges; lung neoplasms; neoplasm metastasis; treatment outcome.**

**Apstrakt**

**Uvod.** Metastaze u kostima koje se javljaju distalno od zgloba lakta ili kolena nazivaju se akrometastaze. Akrometastaze čine samo 0,1% svih metastaza kostiju, ali samo 0,007% do 0,3% njih javlja se u kostima stopala ili šake. Kod 10% bolesnika, metastaze kostiju javljaju se kao prvi znak prethodno nedijagnostikovanog primarnog tumora. **Prikaz bolesnika.** Muškarac star 64 godina javio se u bolnicu zbog bolnog oticanja i crvenila petog prsta dominantne šake. Radiografski je dijagnostikovana osteoliza proksimalne falange petog prsta šake. Postavljena je radna dijagnoza osteomijelitisa i flegmone proksimalne falange. Nakon izvršene incizione drenaže, intraoperativno je primećena tumorska masa. Izvršena je amputacija prsta na nivou metakarpofalangealnog zgloba. Patohistološkom analizom utvrđena je metastaza skvamocelularnog karcinoma. Posle kompjuterizovane tomografije pluća i bronhoskopije sa biopsijom, postavljena je dijagnoza skvamocelularnog karcinoma bronha. Bolesnik je započeo primanje hemioterapije. Tokom primene drugog ciklusa, došlo je do fatalnog ishoda. **Zaključak.** Kada se akrometastaza dijagnostikuje, potrebno je izvršiti patohistološku potvrdu i utvrditi lokalizaciju primarnog tumora, jer pravovremeno započinjanje inovativne imunoterapije i ciljane terapije može promeniti medijanu preživaljvanja tih bolesnika.

**Ključne reči:**
**amputacija; karcinom, planocelularni; dijagnoza; lečenje lekovima; prsti, falange; pluća, neoplazme; neoplazme, metastaze; lečenje, ishod.**

### Introduction

Metastases in bones are common in oncological patients [1]. If they occur distally to the elbow or knee joint, they are called acrometastases [2]. Acrometastases account for only 0.1% of all bone metastases, but only 0.007 to 0.3% occur in the bones of the feet or hands [3, 4]. Bone metastases are most often detected during the treatment of the primary tumor, in certain cases synchronously with the detection of the primary tumor. In 10% of patients, they appear as the first sign of a previously undiagnosed primary tumor [5]. When the primary tumor is detected by the appearance of

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acrometastasis as the first sign, the prognosis is poor, and the median survival of these patients is about six months after diagnosis. The most common primary tumor locations that develop acrometastases are lung cancer, the gastrointestinal tract, and the genitourinary system [6].

## Case report

A 64-year-old male presented to the emergency department with complaints of pain, swelling, and redness in the area of the fifth finger of the dominant hand, which started seven days earlier (Figure 1). He was previously examined by a vascular surgeon who, through ultrasonographic examination, diagnosed a hypoechoic homogeneous formation in the area of the proximal interphalangeal joint of the fifth finger. The circulatory status of the hand was normal. Upon admission to the emergency department, a blood laboratory analysis was performed, showing a slight increase in acute phase reactants and moderate anemia. The relevant laboratory results obtained at the time of admission are shown in Table 1. An X-ray of the hand was taken, which showed osteolysis of the proximal phalanx, proximal interphalangeal joint, and part of the proximal edge of the middle phalanx of the fifth finger (Figure 2). A working diagnosis of osteomyelitis of the proximal phalanx of the fifth finger with consecutive finger phlegmon was made. Incisional drainage was indicated, which was performed under total intravenous anesthesia. Intraoperatively, a tumor mass of hyalinized appearance, irregular shape, and soft consistency was observed, filling the subcutaneous tissue at the site of the proximal phalanx (Figure 3). Given the complete destruction of the proximal phalanx, proximal interphalangeal joint, and part of the middle phalanx, amputation of the finger at the level of the metacarpophalangeal joint was performed (Figure 4).

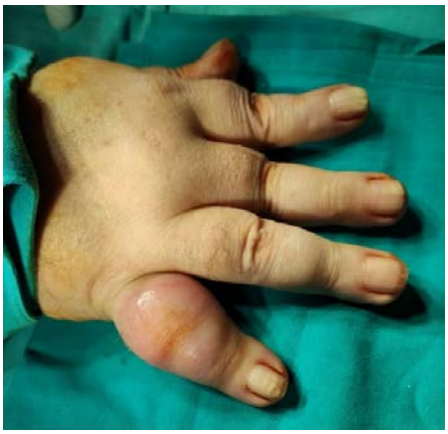

**Fig. 1 – Preoperative appearance of the hand.**

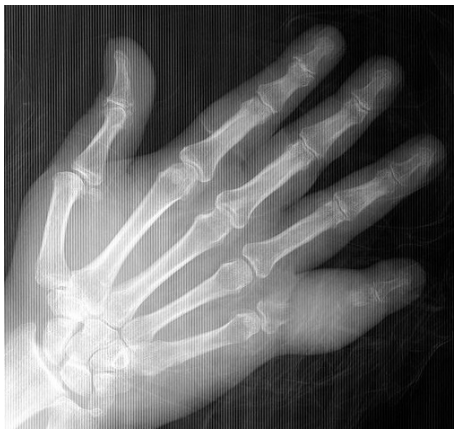

**Fig. 2 – Preoperative X-ray of the hand.**

**Table 1**

**Laboratory results obtained at the time of admission**

| Parameter | Value | Reference range |
|---|---|---|
| WBC, $\times 10^9$/L | 13.5 | 4.00–10.00 |
| CRP, mg/L | 60.2 | < 5.0 |
| [1]Fibrinogen, g/L | 4.10 | 1.86–4.86 |
| RBC, $\times 10^{12}$/L | 3.2 | 4.20–6.00 |
| Hb, g/L | 90 | 130–170 |
| HCT, L/L | 0.351 | 0.400–0.540 |

**WBC – white blood cells; CRP – C-reactive protein; RBC – red blood cells; Hb – hemoglobin; HCT – hematocrit.**

**[1] Using Clauss fibrinogen assay as a measure of function.**

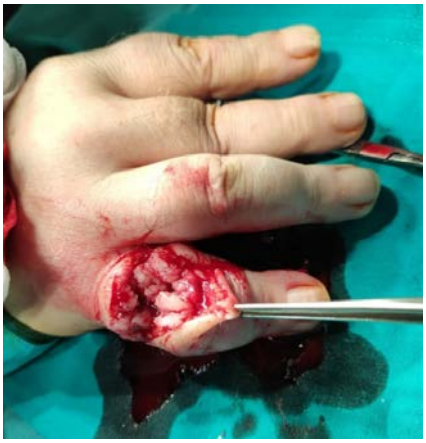

**Fig. 3 – Intraoperative finding of the tumor mass.**

**Fig. 4 – Postoperative appearance of the hand.**

The postoperative course was uneventful with primary wound healing. Pathohistological verification diagnosed *carcinoma planocellulare keratodes infiltrativum cutis et texti adiposi et ossis* (HG1) (Figures 5 and 6). Immunohistochemical testing registered 5% of PD-L1 positive tumor cells. After a computed tomography scan of the chest, a tumor change in the upper lobe of the right lung infiltrating the principal bronchus was diagnosed (Figures 7–9). Bronchoscopy was performed to biopsy the tumor change, and after pathohistological analysis of the biopsy, a diagnosis of squamous cell carcinoma of the bronchus was made. Skeletal scintigraphy did not detect other secondary bone deposits. The patient was started on chemotherapy with gemcitabine and cisplatin 20 days after the primary intervention on the hand. During the second cycle of treatment, two months after the diagnosis, the patient died due to massive hemoptysis.

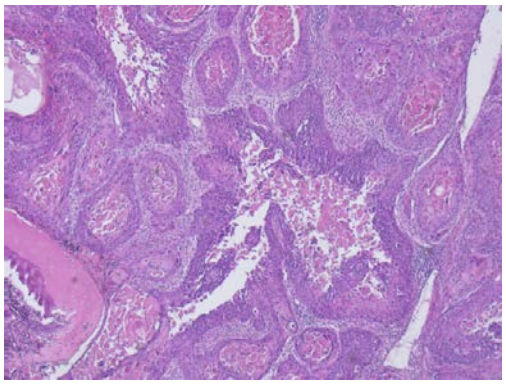

**Fig. 5 – Metastasis in the soft tissue of the finger, hematoxylin and eosin staining (×5).**

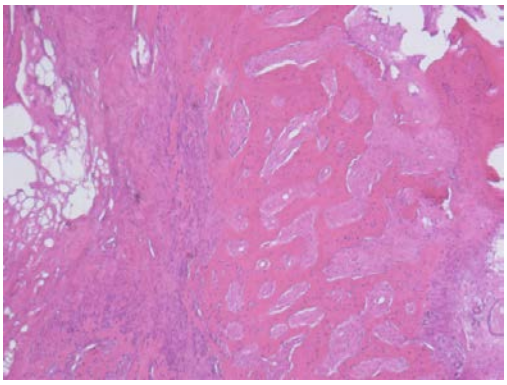

**Fig. 6 – Bone metastasis, hematoxylin and eosin staining (×5).**

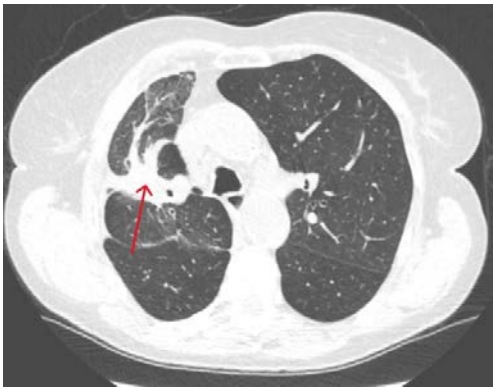

**Fig. 7 – Transversal plane of the chest, computed tomography scan: the arrow indicates a tumor lesion in the upper right lobe.**

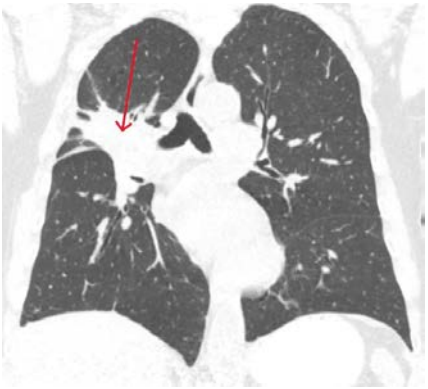

**Fig. 8 – Coronal plane of the chest, computed tomography scan: the arrow indicates a tumor lesion in the upper right lobe with infiltration and compression of the main bronchus.**

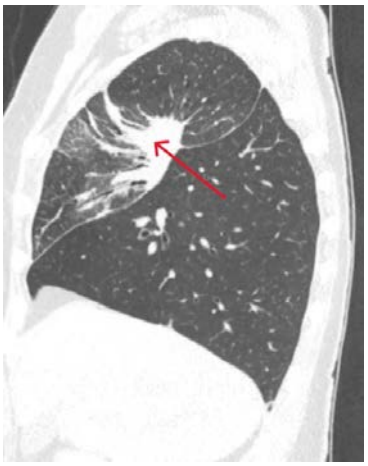

**Fig. 9 – Sagittal plane of the chest, computed tomography scan: the arrow indicates a tumor lesion in the upper right lobe with infiltration and compression of the main bronchus.**

## Discussion

Bone metastases are characterized by tropism for bone marrow, which is primarily found in the vertebral bodies. The bones of the hand have a small content of bone marrow, making them a rare site for tumor metastasis. There are several theories about the pathways of metastasis, but the most accepted theory for the development of acrometastases is hematogenous dissemination. Among the mentioned primary tumor localizations that can develop acrometastases, lung tumors are the most common source. This is explained by the facilitated transport of metastatic tumor cells bypassing hepatic and pulmonary circulation [7]. Several authors have proposed the theory that acrometastases more frequently occur in the dominant hand, which was also the case in the presented patient. These theories have been explained by the increased blood flow to the dominant hand due to more intensive use compared to the non-dominant hand. More frequent use of the dominant hand causes repetitive microtrauma of soft tissue, which becomes less resistant to tumor emboli that are easily retained in the skeletal musculature and continue their growth. At the same time, such microtraumas induce the production of prostaglandins, which, as chemotactic factors, promote the migration and adherence of tumor cells [8, 9]. The clinical presentation of acrometastases most often occurs in the form of a painful, erythematous swelling that reduces the range of motion of adjacent joints. Differential diagnosis must consider the appearance of primary skin and soft tissue tumors, soft tissue infections, tenosynovitis, osteomyelitis, pyogenic granuloma, gout, inclusion cyst, and ganglion cyst [10]. Despite the lack of a treatment protocol for acrometastases, most authors agree that amputating the affected finger is the method of choice [7]. In the presented patient, ablative surgery resulted in the eradication of the developed severe phlegmon of the finger without affecting the already impaired function of the hand as a consequence of osteolytic destruction of the proximal phalanx and proximal interphalangeal joint.

## Conclusion

Even though acrometastases are traditionally considered a rare entity, we believe they will be diagnosed more frequently in the future due to improved diagnostic and treatment protocols for oncology patients. In cases of suspected acrometastases, it is necessary to conduct adequate pathohistological and immunohistochemical detection analyses after surgical treatment. Additional radiological methods can determine the site of the primary tumor. The development of innovative immunotherapy and targeted therapy may enable longer survival and better disease control.

## Conflict of interest

The authors declare no conflict of interest.

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