



## Metastasis from lung carcinoma to the finger: A case report

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Skeletal metastasis in the hand is exceedingly rare. In approximately 10% of the reported cases, it occurs as the primary manifestation of an occult malignancy. The early, correct diagnosis is warranted given the patient's poor prognosis. Conventional radiographs and MRI are helpful in diagnosis, but histology is needed for confirmation. Due to the usual wide spread malignancy, palliation is the primary goal of treatment. Disarticulation and resection of the affected ray is the most common approach. We present a case of a skeletal metastasis from a lung carcinoma in the fourth digit of the hand and performed a curettage of the metastatic tumor, followed by a stabilization of the middle phalanx with a bone cement spacer and postoperative local radiation. The postoperative pain relief was acceptable and the functional outcome was relatively good, and therefore indicates that this treatment option could be considered in the palliative care setting of acrometastasis.

**Keywords** : Acrometastasis ; metastatic tumor ; hand ; cement spacer.

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*Our patient granted permission for publication of his case.*

### INTRODUCTION

Primary tumors in the hand skeleton are rare and usually benign. In approximately 90% of the cases an enchondroma will be diagnosed (3). Metastatic tumors in the hand skeleton are even rarer. While the skeleton is one of the most common sites of cancer metastasis, only an estimated 0.1% of all osseous metastases involve the hand (6).

We present a case report of a 79-year-old male with a fracture caused by metastasis of initially unknown origin. On the basis of the histological material acquired through surgery, the diagnosis of squamous cell carcinoma of the lungs was made. Thereafter an unusual therapy was used which would save the finger.

### CASE REPORT

A 79-year-old male injured the right ring finger while putting out the garbage. In the three weeks prior to the incident there was vague pain in the concerned finger. Further anamnesis provided that

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the patient has had a femoro-popliteal bypass on the left side, a revision thereof and an aortobifemoral bypass due to peripheral and central vascular disorders. Furthermore the patient smokes and he had a hypercholesterolemia.

Physical examination revealed a severe swelling of the right ring finger at the middle phalanx. There were also abnormal dexterity and crepitations. Radiological investigation showed a fracture due to a pathological process in the middle phalanx of the right ring finger. There was irregular osteolysis and cortical destruction, see figure 1. Based on these images, the finger was immobilised using a shaft over the proximal and distal interphalangeal joints, while waiting for the analysis of the internist. Using this the patient had relatively few complaints. Analysis by the internist showed no indications for a primary tumor. Therefore the decision was made to perform a biopsy of the pathological process in the middle phalanx using a Bierse anesthetic. Perioperatively there was clear evidence



**Fig. 1.** — X-ray showing the fracture by pathological process in the middle phalanx of the right ring finger. There is irregular osteolysis and cortical destruction

of pathological tissue due to vitreous grey tissue. After removing the pathological tissue, the middle phalanx showed to be hollow and unstable to such a degree that the necessity arose to stabilise the middle phalanx, see figure 2. A spacer of bone cement was chosen with the intention of preventing an amputation in this stage of the analysis (figures 3 and 4). Pathological anatomic investigation of the removed material showed a squamous cell carcinoma and the CT-scan of the thorax that was performed hereafter revealed a primary tumour in the left superior lobe of the lung. Due to the bad cardiovascular condition of the patient a curative surgical treatment of the primary tumour was considered impossible and the patient was therefore treated using radiotherapy of the primary tumour and the finger.

Six months after surgery there was no progression of the growth of the lung carcinoma, however the patient still indicated some complaints of pain at the right ring finger. The surgical wound had healed well and there was no nerve damage and no local recurrence of cancer or ulceration. The range of motion of the distal interphalangeal joint was 60 degrees flexion and a 15 degree extension deficit (60/15/0), and for the proximal interphalangeal joint 70 degrees flexion and a 30 degree extension



**Fig. 2.** — Peroperative image showing pathological tissue, after removal of which the middle phalanx is hollow and unstable



*Fig. 3.* — Peroperative image showing the spacer of bone cement placed in the middle phalanx



*Fig. 4.* — X-ray image showing the cement spacer in situ

deficit (70/30/0). There was no rotational deviation in the finger. The strength was reduced compared to the contralateral finger, but the same as it was before the intervention. Due to the good dexterity and usability of the finger in daily life, the patient did not consider amputation as a possible therapy for the mild pain in the finger. He lived for eight months after surgery.

### DISCUSSION

The occurrence of skeletal metastases in the hand is exceedingly rare. In approximately 10% of the reported cases, this may be the primary manifestation of an occult malignancy elsewhere in the body (9). Bronchogenic carcinoma is the most common malignancy of primary origin, followed by breast, renal cell, and colon carcinoma (4). The exact pathophysiology is still unknown. A possible explanation of the relatively high prevalence of bronchogenic carcinoma metastases could be their easy access to the systemic arterial circulation, as it has been suggested that metastasis to the acral regions occurs through circulation (4,9). The rarity of an acrometastasis itself, may be explained by the limited presence of hematopoietic bone marrow in the distal extremities. Skeletal metastases

generally affect bones rich in hematopoietic bone marrow such as the pelvis and vertebral bodies (4,9). Although metastases have been reported in every bone of each hand and fingers, the third digit, the thumb, and the distal phalanges are the most involved sites (9).

The fast, correct diagnosis is challenging considering the rarity of skeletal metastases in the hand and the nonspecific symptoms and findings of the clinical examination. Particularly when there is no knowledge of any malignancy in the human body at all. In this case report, the main clinical symptoms were pain, swelling, and loss of function. Other studies describe also enlarging digit, ulceration and symptoms similar to those of infection, such as erythema and warmth (9,10). Conventional radiographs are helpful in diagnosis. In case of an skeletal metastasis the lesion can be osteolytic, sclerotic, or both lytic and sclerotic, generally depending on the primary malignancy (5,9). Cortical destruction and fractures may present as late manifestation. For early detection of acrometastasis, a three-phase bone scintigraphy (TPBS) would be more effective than plain radiographs, since more than 50% of the cancellous bone has to be replaced by malignant tissue before a metastasis is identifiable on plain radiographs (10). However, a

broad differential diagnosis can still be considered at this point, including primary bone tumors, rheumatoid arthritis, gout, and osteomyelitis (4). Magnetic resonance imaging (MRI) can be useful for further differentiation and for evaluating soft tissue extension in case of a primary bone tumor or metastasis (9). In addition, most patients with acrometastasis have already knowledge of their metastatic disease, which makes other diagnoses less plausible. When only a suspicion exists about the presence of metastatic malignancy, as in our case, a biopsy can provide definitive diagnosis (9). Consultation of an oncologist is recommended to determine the primary tumor and the extent of the disease.

In general, the prognosis after diagnosing acrometastasis is poor. Due to the wide spread malignancy in most cases, the mean life expectancy is about one half year (4,9,10). Therefore, palliation to optimize patient's quality of life is the primary goal and include appropriate tumor management, pain relief, and maximal preservation of hand function (9). Disarticulation and resection of the affected ray of the hand is the usual treatment strategy. The pain relief and functional outcome are generally acceptable (1,2,4,9). Other strategies include wide resection, curettage, chemotherapy and local radiotherapy (10). Radiotherapy could provide an added value for pain relief and remineralization of bone, when surgical resection is not warranted or possible (4). Since there is neither evidence nor expectations of prolonged life expectancy after aggressive surgical resection of the metastatic tumor due to the already wide spread malignant disease, all treatment options for pain relief and maximal preservation of hand function should be considered.

In this case report curettage of the metastatic tumor was performed, followed by stabilization of the middle phalanx with a bone cement spacer and postoperative local radiation. This strategy with intralesional curettage and segmental cement spacers has already been applied as treatment for large metastatic lesions in for instance vertebral bodies, femur, tibia and humeral shafts (7). Additionally, the case study of Shaw et al. (8) described the use of a cement spacer in the distal

phalanx of the thumb after curettage of the tumor until pathological confirmation of a metastatic process. In a second stage, an amputation was still performed, followed by postoperative radiation (8). To our current knowledge, this is the first case report describing the application of a bone cement spacer after tumor curettage as definitive surgical treatment for skeletal metastases in a digit of the hand. The simplicity of the procedure in combination with postoperative rapid recovery, relative good finger mobility, and ability to use the digit during daily activities, suggest that this treatment strategy should be considered as an alternative for primary amputation. Postoperative local radiotherapy would be recommended for further pain relief, as it is usually impossible to resect the whole metastatic tumor. In case of persistent pain and patient's dissatisfaction of the functional outcome, disarticulation and resection in a second stage is still an option.

## CONCLUSION

In conclusion we can state that such an occurrence of a skeletal metastasis in the finger is rare and that fast, correct diagnosis is challenging but warranted given the patient's poor prognosis. Due to the usual wide spread malignancy, palliation to optimize patient's quality of life is the primary goal of treatment. The use of a bone cement spacer after surgical curettage of metastatic tissue, followed by local radiation, could be considered as a permanent solution in the palliative care setting of acrometastasis for those patients who really do not want a finger amputated. The postoperative pain relief is acceptable and the functional outcome is relatively good. Further case series are necessary to provide an overview of the benefits and limitations of this surgical approach in comparison with primary amputation.

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