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Pathology

LUNG CANCER PRESENTING AS ACROMETASTASIS TO METACARPAL BONE: A RARE PRESENTATION

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ABSTRACT Metastatic lesions to the hand are rare and account for only 0.1% of all osseous metastases according to the literature. Lung is the most common site for hand acrometastasis followed by breast and renal cancer. They are generally diagnosed in patients with a well-known tumour history, but in 10% of the reported cases, they represented the first sign of an occult malignancy. The present case illustrates a rare and exceptional situation of acrometastasis of third metacarpal bone as the first manifestation of lung adenocarcinoma.

KEYWORDS : Acrometastasis, lung cancer, metacarpal.

INTRODUCTION

Acrometastases are metastases located distal to the elbow and knee. They are uncommon in general, but more frequent in lower extremities.The primary metastases in the hand are extremely rare and include 0.1% of all bone metastases.[1] Metastases in the hand preferentially reach the phalanges and then the metacarpals and carpals. They are most frequently produced by carcinomas of the lung, breast and kidney from which the metastasis of lung cancer are present in about half of the cases.[2]

Usually an acrometastasis is a sign of very advanced disease with presence of previous multiple metastases elsewhere. Very few cases have been described as metacarpal metastases in the absence of other previous metastases. The hand as the first location of metastasis, is a peculiarity of the present case.

CASE PRESENTATION

A 60 year old female presented with a painful swelling on the dorsum of left hand with a history of trivial trauma**.** On clinical examination, the hand was warm, red and tender. Flexion and extension movements of the fingers were painful. There was no neurovascular deficit. No epitrochlear or axillary lymph nodes were palpable. It was primarily considered as inflammatory pathology and treated with analgesics and antibiotics for 10 days. The patient didn't show any improvement and she then consulted orthopaedic department and was advised plain radiographs of her left hand which showed a lytic lesion of third metacarpal with destruction of its distal part. Radiologically it was suspected as Enchondroma.(Figure 1). The patient was managed conservatively but she didn't improve symptomatically. MRI hand was advised which revealed a large lobulated heterogenous altered signal intensity, predominantly solid mass lesion with internal cystic components in 3rd metacarpal bone. Cystic components of lesion show fluid-fluid levels. Erosive changes were seen in adjacent proximal ends of 2nd and 4th metacarpal bones with bone marrow edema and suggestion of infiltration in medial aspect of proximal end of 2nd metacarpal bone. The lesion measured approx. 80x33x29mm. The lesion was abutting and stretching extensor tendon at the dorsal aspect, ventrally the lesion was seen abutting flexor tendons.(Figure 2) Core needle biopsy was taken and it came out to be inconclusive. Case was discussed in institutional tumour board and excisional biopsy was planned which was reported as metastatic carcinoma.

As the patient presented with severe pain which was persistent and a large rapidly progressive swelling on hand, the orthopaedic surgeon performed radical surgery and the patient underwent wrist disarticulation. The specimen was submitted for histopathological examination. Histopathology revealed bone and soft tissue infiltrated by tumour cells arranged in papillary and glandular pattern, having vesicular nuclear chromatin. The morphology was consistent with metastatic papillary adenocarcinoma. On IHC study, the tumour cells were positive for CK7, TTF-1, vimentin and negative for CK20, CDX2 and PAX8.(Figure 3)

Detailed history revealed that patient was a chronic regular smoker and experienced a significant weight loss. HRCT thorax was done, revealing a 10x12x12mm size soft tissue density nodule in upper lobe of left lung.(Figure 4)

In view of presence of soft tissue mass lesion in lung and TTF-1 positivity on IHC of excised mass, the case was finally diagnosed as Papillary adenocarcinoma lung with hand acrometastasis.

A total-body scintigraphy and FDG-PET scan were negative for other secondary locations. The patient was referred to oncology department where she is at present being treated with chemotherapy,with good response.

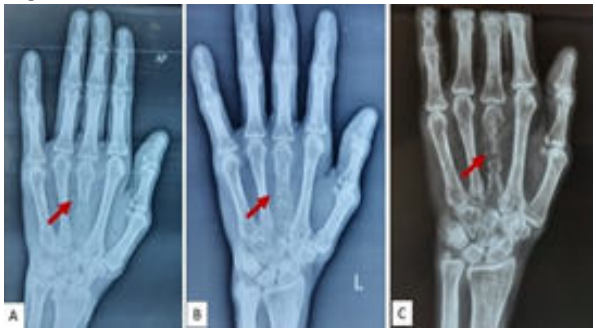

Fig 1 (A,B,C) – Sequential X-rays of left hand showing expansile , lytic lesion involving 3rd metacarpal with associated bony destruction and soft tissue swelling. There is increasing level of destruction is seen in sequential X –rays s/o aggressive process.

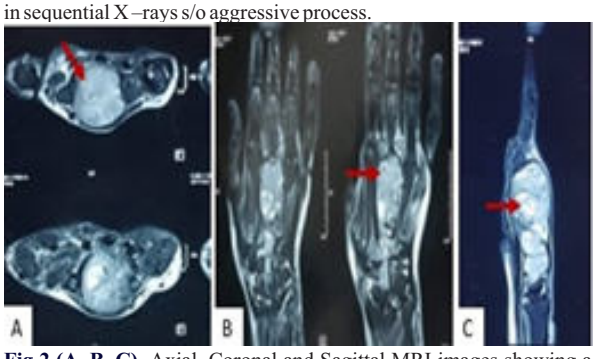

Fig 2 (A, B, C)- Axial, Coronal and Sagittal MRI images showing a lobulated heterogenous signal intensity lesion involving 3rd metacarpal bone. Lesion also shows internal cystic component with fluid-fluid levels.

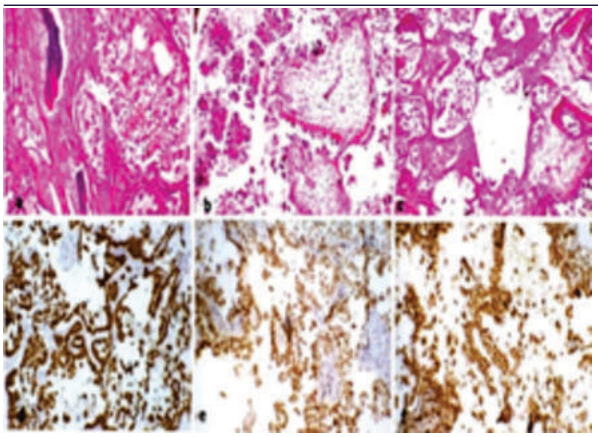

Figure 3 (a,b,c) Show bone and soft tissue infiltrated by tumor cells arranged in papillary configurations having vesicular nuclear chromatin with prominent nucleolus and eosinophilic cytoplasm. **(d,e,f)-** Tumor cells show positivity for CK 7, TTF-1 and Vimentin respectively.

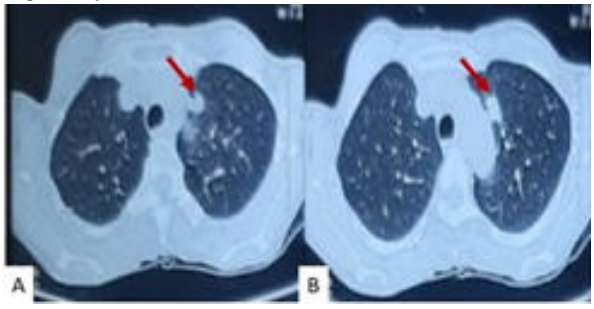

Fig 4 (A, B) – HRCT image of chest showing a well defined round lesion in left lung (adjacent to arch of aorta), showing spiculated margins.

DISCUSSION

Bone metastases are common findings in the natural history of cancer patients, but acrometastases are very rare.[3] Upper limb is considered to be the least affected part of the skeleton with approximately 10-15% of bone metastasis occurring in this region.[4]

Osseous secondary lesions generally affect bones rich in red marrow such as vertebral bodies, small bones of extremities are very poor in red marrow; this could be an explanation of acrometastases being so rare.[3] The metacarpal lesion described in our case was initially considered as primary bone disease because of its unusual location for a metastasis. One of the reasons for the delayed diagnosis was probably the rarity of this site for neoplasms.

Hand metastasis was first described in 1906 by Handley in a case of breast cancer, presenting with multiple metastases to metacarpal bones.[5] Primary lung tumours comprise about 50% of all cancers that metastasize to the hands.[6] The mechanism responsible for the deposition of the metastatic tumour cells within hand is unclear but an increase in the blood flow or trauma has been suggested. Overall the most common location of metastasis is the third finger.[7]

Hand metastases of lung cancer are mainly in the male patients with smoking history. Therefore it suggests that acrometastasis may be related to smoking. Interestingly acrometastases are two times more common in dominant hand, this may be due to more blood supply and possibly being more vulnerable to trauma than the non-dominant hand.[7]Our patient was also a chronic smoker and affected hand was her dominant hand.

The patient with hand metastasis usually presents with pain, swelling and redness. In such type of presentation, the diagnosis is often delayed especially when primary is not suspected. It may be confused with other pathologies such as infection, primary bone and skin tumours.[8] The metacarpal lesion described in our case was initially considered as primary bone disease because of its unusual location for a metastasis, which is rare in metacarpal bone.

With clinical and radiological examinations, it is mandatory to obtain a tissue diagnosis by histopathologic examination and application of Immunohistochemistry. As in our case, TTF-1 marker played a key role in confirmation of the diagnosis. Vimentin expression in Non-small cell carcinoma is associated with occurrence of metastasis[9] which was also seen in our case.

When metastases to hand are identified, it is probable that other metastases are disseminated in skeleton because metastases in hand bone indicate very advanced primary tumor. We evaluated that the metacarpal lesion was the only metastatic site because there was no other abnormal uptake in FDG-PET scan at that time.

The most common sites of bone metastasis from lung cancer are the ribs and thoracic spine. However metacarpal bone metastasis in lung cancer is extremely rare.

Once diagnosed, multidisciplinary medicosurgical approach is essential to improve patient's function and pain as much as possible. The most preferred treatment for acral lesions is radical surgery. Amputation or disarticulation is the most common approach, since it allows a wide margin resection and pain control.[1] Our patient underwent radical surgery in the form of wrist disarticulation and is now being treated by chemotherapy.

CONCLUSION

Acrometastasis in hand is rare. It must be considered in any rapidly progressive lesion that does not respond to the usual treatment. The clinical presentation may mimic the inflammatory or benign lesion of bone with consequent misdiagnosis. Dealing with a chronic acral lesion, careful complete evaluation is needed, since that may be the first manifestation of an occult primary tumor. Biopsy should be performed from the lesion located even at uncommon site. Diagnosing metacarpal bone lesion as hand acrometastasis and finding a primary as lung is difficult as in our case and is a rare condition. It is important to know that bone metastasis in distal parts of extremities may occur in patients without extensive metastases.

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