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Case Report

Unusual Presentation of Solitary Metastasis to the Right Metacarpal Bone in Renal Cell Carcinoma

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ABSTRACT

Background: Renal cell carcinoma (RCC) is a highly aggressive cancer with a notable propensity for metastasis. The most frequently affected sites include the lungs, bones, liver, adrenal glands, lymph nodes, and brain. It is estimated that around one-third of patients with advanced RCC develop bone metastases. Acral metastases are rare, accounting for only 0.1% of all metastatic bone involvement.

Case Description: A 62-year-old male presented with complaints of bleeding micturition for 1 week. Computed Tomography-Chest plus Abdomen plus Pelvis showed a lesion in lower pole parenchyma of left kidney. Patient underwent Left Radical Nephrectomy. Post operative HPR revealed Clear cell carcinoma grade 3, with Lymphovascular invasion. Patient was started with Tablet Sorafenib 200mg 2BD from June 2022 till November 2022.

Patient defaulted treatment for 1.5 years then presented with complaint of swelling and pain over Right thumb. X-Ray Hand revealed completely destroyed 1st metacarpal and proximal phalanx suggestive of? Metastasis. Biopsy from lesion confirmed Atypical Renal Cell Carcinoma. Patient was treated with Injection Zoledronic Acid monthly and Tablet Sorafenib. Palliative RT was given to the right thumb for pain management.

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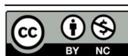

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Conclusion: Swelling of the thumb in a 62-year-old male is often misdiagnosed as benign inflammatory process, leading to delay in treatment.

Solitary metastasis from Clear Cell RCC to metacarpal bone of thumb is rare hence we highlight the necessity of considering metastatic disease in such presentations.

KEYWORDS

• Renal cell carcinoma • Acral metastasis • Bone metastasis

INTRODUCTION

Renal cell carcinoma (RCC) is an aggressive malignancy which accounts for almost 2-3% of the cancers in adults.[1] As per GLOBOCAN 2022 Data, Renal Cell Carcinoma accounts for about 4.4% of all cancers worldwide. In India, it constitutes about 1.3% of Total cancer burden with a higher disease propensity in Males than females, representing 1.6% and 0.9% respectively.[2] About 25%-30% of patients with RCC have metastasis at presentation or detected after tumour diagnosis[3,4] and 30% of patients with metastatic RCC have bone metastasis.[5] The usual sites of metastasis are the lung, bone, liver, lymph node, adrenal gland and brain.[6,7] In RCC, the most commonly involved bones are the axial bones including pelvis, ribs, and spine. Rarely, long bones or the small bones of the limbs are sites for bony metastases.[8,9] Acrometastasis is an unusual site of metastasis and constitutes 0.1% of all metastases.[10] Of patients with metastases, about 1 to 3% have solitary lesions.[11] To the best of our knowledge, there are only few cases reported with acral metastasis within which combined involvement of both metacarpal and proximal phalanx metastases being rarely reported in the literature hence, we report this rare case of the metastasis of clear cell renal carcinoma to the metacarpal and proximal phalanx of thumb.

CASE REPORT

A 62 year old male from Periphery (Ranji), Jabalpur (District) of Madhya Pradesh, India, presented with complaints of bleeding micturition for 1 week. Computed Tomography-Chest plus Abdomen plus Pelvis showed mass lesion in lower pole parenchyma of left kidney. Patient underwent Left Radical Nephrectomy with Post operative HPR revealed Clear cell carcinoma grade 3, with Lymphovascular invasion. Patient was started with TKI (Tablet Sorafenib 200mg 2BD) since June 2022 till November 2022.

Due to unknown reasons after defaulting treatment for a period of 1.5 years, patient presented with complaint of swelling and pain over Right thumb (Figure 1 & 2)

X-ray Hand revealed completely destroyed 1st metacarpal and proximal phalanx Suggestive of? Metastasis (Figure 3). Incisional Biopsy from the Right thumb lesion suggested in favour of Atypical Renal Cell Carcinoma (Figure 4). As per NCCN guidelines, patient was treated with Injection Zoledronic Acid monthly and Tablet Sorafenib and was given Palliative RT to right thumb for pain management.

Metastatic work up with CECT - Chest, Abdomen, and Pelvis revealed no additional metastatic deposits.

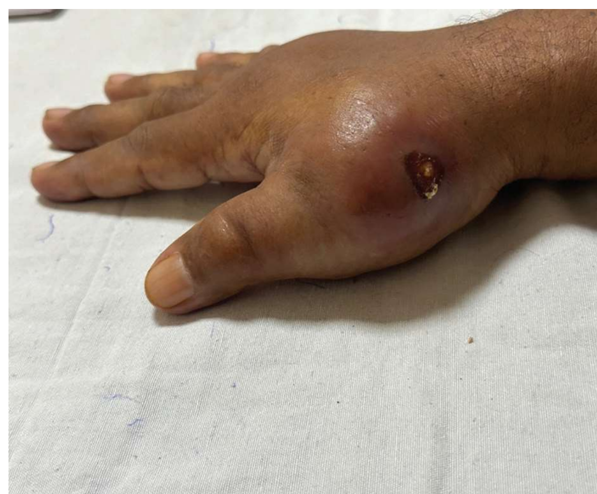

Figure 1: Right hand swelling of the patient - Lateral view

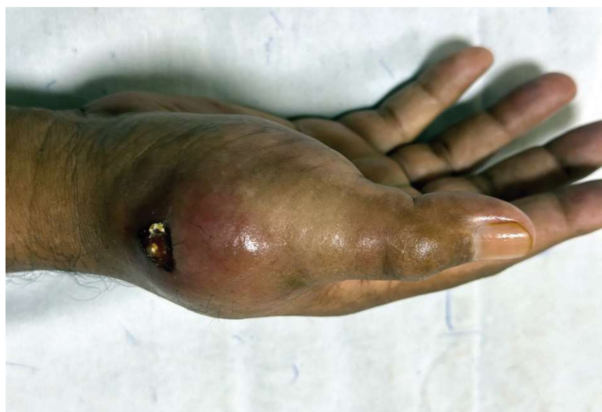

Figure 2: Right hand swelling of the patient Anteroposterior view

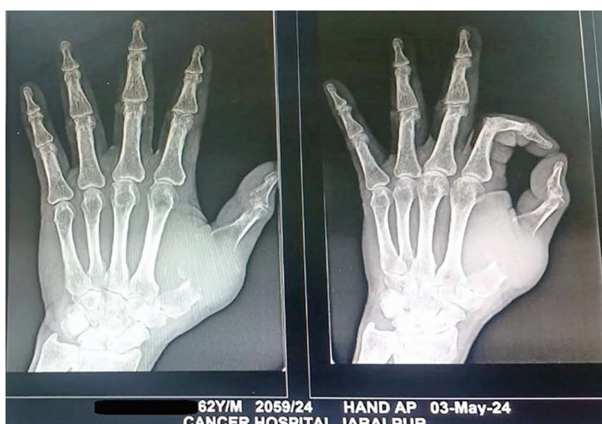

Figure 3: X-ray radiograph of the patient of Right Hand – Anteroposterior View

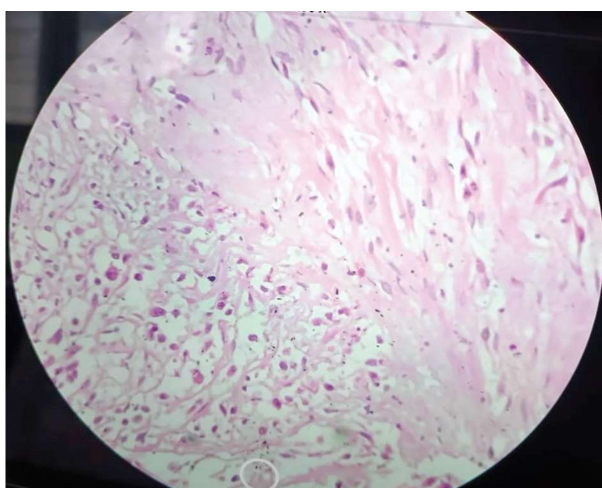

Figure 4: Metastatic renal cell carcinoma; Haematoxylin-Eosin staining (x40 Magnification)

DISCUSSION

RCC possesses the ability to metastasize to various regions of the body, and the likelihood of such occurrences remains uncertain[7]. It is anticipated that renal cell carcinoma (RCC) may metastasize several years after the primary diagnosis; nonetheless, most instances are characterized by metastasis occurring at a solitary site[12]. RCC is commonly known to metastasize to the lungs, bone, and brain, but RCC can metastasize to some atypical sites as well, such as skeletal muscle[13], scalp[14] and uvula[15], as described in the literature. Bone metastasis in RCC is primarily osteolytic, resulting in considerable morbidity and a range of skeletal-related complications. Such complications encompass pathological fractures, bone pain, hypercalcemia, and nerve compression[16]. These incidents have a detrimental impact on the patient's quality of life and overall performance[6]. The most common skeletal problem is bone pain[9].

Bone metastasis may frequently occur in conjunction with metastases in additional sites throughout the body[17]. The present report outlines the metastasis of clear cell renal cell carcinoma to the right thumb. The rare occurrence of acrometastasis to the hand was initially described by British surgeon Handley in 1906. Acrometastasis, defined as the spread of cancer to the extremities, is relatively infrequent. In fact, metastasis to the hands represents approximately 0.1% of all instances of metastatic bone disease.[10]

The extensive review of existing literature by Flynn et al. in 2008[18] revealed 257 documented instances of acrometastases, of which 31 cases (12%) were linked to primary kidney carcinoma. The study meticulously examined various parameters, including patient demographics such as age and sex, the site of the primary cancer, the locations of metastasis within the hand and other appendages, the treatments provided, and the survival duration of the patients. The results demonstrated that men (155 cases) were almost twice as likely to suffer from acrometastasis compared to women (84 cases), with a median age of 58 years (spanning from 18 months to 91 years). The predominant primary malignancies identified were lung carcinoma (44%), kidney carcinoma (12%), and breast carcinoma. Cancers affecting the rest of the population included those of the colon (6%), stomach, liver, prostate, and rectum[19,20].

The literature review indicates a higher incidence of metastatic lesions in the right hand, with 102 cases of osseous lesions reported in this hand compared to 84 in the left hand. This finding aligns with the hypothesis

that metastatic lesions are more prevalent in the dominant hand, as the majority of the population is right-handed. Nonetheless, there were 23 documented cases (10%) where both hands were affected. The third finger was identified as the digit most commonly impacted by osseous metastases, with 68 cases recorded. The thumb followed with 53 cases, while the fourth finger had 37 cases, the second finger had 35 cases, and the fifth finger had 25 cases. The distal phalanx was the most affected area, with 74 secondary lesions noted. Other significant sites included the metacarpal bones (56 cases), proximal phalanges (26 cases), and middle phalanges (16 cases), which are consistent with findings in the existing literature.[20-22] According to the cases reviewed, amputation emerged as the predominant treatment approach, accounting for 50 cases. The subsequent treatments included radiation therapy in 30 cases, excision in 15 cases, and systemic therapy in 10 cases. Documentation concerning patient survival was insufficient in the existing literature. However, it was noted that the median survival for patients in these cases was 6 months. This result aligns with the conclusions drawn by Farzan *et al.,* who indicated that patients with hand metastases had an average survival period of merely 6 months.[23] The extensive review of existing literature has validated that a diagnosis of hand metastasis signifies a poor prognosis, thereby reinforcing the importance of accurately diagnosing acrometastases.

Patients exhibiting hand metastasis frequently report symptoms such as pain, redness or discoloration, tenderness, warmth, swelling, erythema, and functional impairment. These manifestations can lead to misdiagnoses, including infections, gout, osteomyelitis, tenosynovitis, and rheumatoid arthritis, potentially resulting in delays in appropriate treatment.[24,25]

The mechanisms involved in acrometastasis are not thoroughly comprehended. The deposition of metastatic tumor cells in the hand remains unclear, with previous hypotheses indicating that increased blood flow or trauma may be influential. Healey and colleagues found that most patients with acrometastasis had lesions located in their dominant hand. This finding was interpreted as being linked to the dominant hand's greater blood circulation and its increased risk of injury compared to the non-dominant hand.[26] This hypothesis aligned with Joll's notion of trauma-induced acrometastasis, considering that he had earlier noted how persistent trauma could compromise the integrity of nearby tissues, thus enabling tumor emboli to lodge and proliferate within the skeletal system.[27] Recent studies have proposed that chemotactic factors, specifically prostaglandins, which are released after a traumatic experience, may be instrumental in promoting cell migration and their adherence to bone material. The liberation of these prostaglandins, in conjunction with local chemotactic signals, is believed to stimulate cellular movement.[24] This theoretical framework continues to uphold the perspective that acrometastasis may be associated with an antecedent physical injury. Furthermore, it is significant to mention that the patient examined in this case was also affected in their dominant hand.

Acrometastasis is commonly linked to extensive disease dissemination, which contributes to a poor prognosis for patients diagnosed with this condition. Patients typically present with advanced disease stages, with a median survival of approximately six months. Consequently, aggressive treatment approaches are seldom considered. The primary aim of treatment in these cases is to manage pain, with palliative amputation being an option in certain scenarios. For localized renal cell carcinoma, surgical intervention is the recommended treatment modality. Radiation therapy may offer palliative relief for bone pain, while systemic chemotherapy has not proven beneficial for metastatic renal cell carcinoma. Surgical options are regarded as the most effective therapeutic approach for bone metastases in renal cell carcinoma, primarily serving a palliative role. For metastatic diseases, treatment strategies include immune checkpoint inhibitors and tyrosine kinase inhibitors.[28] This case report serves to enhance the understanding of the atypical presentations of renal cell carcinoma, drawing attention to the essential aspects of thorough history taking, rigorous clinical examination, and the need for relevant diagnostic investigations that support effective diagnosis and treatment. It also highlights the necessity of a multidisciplinary team approach in the management of metastatic renal cell carcinoma in patients with solitary bone metastases. Timely recognition and intervention for these metastases can result in

a marked improvement in the quality of life for patients.

CONCLUSION

This report aims to stress the essential role of accurate diagnosis in cases of acrometastases. The detection of malignant lesions in the hands carries profound prognostic consequences and poses a substantial threat to the patient's autonomy. Timely identification and appropriate management of these metastases can lead to a significant enhancement in the quality of life for affected individuals.

ABBREVIATIONS

RCC: Renal cell carcinoma

HPR: Histopathological report

NCCN: National comprehensive cancer Network

CECT: Contrast enhanced computed tomography

BD: Bis Die - Twice Daily

RT: Radiation Therapy

TKI: Tyrosine Kinase Inhibitor

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