

# Humeral Metastasis of Renal Clear Cell Carcinoma, a Case Report and Review of the Literature

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## Abstract

**Introduction:** Adult bone tumors may be primary or secondary. Their diagnosis is often based on the results of imaging tests but can also be completed by biopsy. **Case Presentation:** We report the observation of a clinical case of fortuitous discovery in the orthopaedic-traumatology department of the national hospital Amirou Boubacar Diallo of Niamey, pathological fracture of the right humeral shaft secondary to metastasis of clear-cell adenocarcinoma of renal origin, a 57-year-old man, a refrigeration engineer by profession, from Niger living in the Middle East. This patient has no known pathological history. He consulted us for pain in his right arm that was more severe at night. All imaging and pathology examinations carried out both in Niger and in the Middle East confirmed the diagnosis of humeral metastasis of clear-cell renal cell carcinoma. Surgical management consisted of tumor resection and Kuntscher-type centromedullary alignment nailing of the fracture site. The loss of bone substance in the fracture is filled with acrylic cement. The treatment was completed by chemotherapy. **Conclusion:** Bone tumours are most often secondary in location. However, the diagnosis must be sought in the presence of any clinical sign.

## Keywords

Humeral Metastasis, Renal Adenocarcinoma, Centromedullary Nailing

## 1. Introduction

Bone metastases, or secondary malignancies, correspond to the localization and

development in bone tissue of cells that have migrated by hematogenous or lymphatic route from a primary malignancy.

These are the most common malignant bone tumours in adults, accounting for 60% of all cases. They occur most frequently in the second half of life, and it is estimated that around two-thirds of patients with cancer are likely to develop bone metastases [1]. In particular, bone metastases can result from the proliferation of breast, prostate, lung, kidney or thyroid cancer.

In the kidney, clear-cell carcinoma or adenocarcinoma, which is a tumor developed from glandular cells or, more precisely, gland covering cells, is the most common type of adult kidney cancer, accounting for around 85% [2].

We present a case report of an incidental finding of a clear-cell adenocarcinoma metastasis of renal origin located on the right humeral shaft. This case study is supported by a review of the literature.

## 2. Clinical Case Presentation

His was the case of a 57-year-old, right-handed, married man, refrigeration technician by profession, Nigerian living in the Middle East, with no known pathological history, who consulted the Orthopedics-Traumatology Department of the National Hospital Amirou Boubacar Diallo for right-arm pain, more severe at night, and relative functional impotence of the limb, which had been evolving for 3 months in a context of apyrexia and conservation of general condition.

The Clinical examination revealed a swelling at the junction of the middle third of the arm, painful to palpation, with a firm consistency and no vasculo-nervous disorders. Standard radiography of the right arm revealed a pathological diaphyseal fracture of the humerus with a pure osteolytic image and no soft tissue invasion (**Figure 1**).

Chest X-ray was normal. Biological examination revealed a predominantly granulocytic hyperleukocytosis ( $12,200 \text{ GB/mm}^3$ ), while C-Reactive Protein, Hbs antigen and alpha-feto-protein were normal. Renal-vesico-prostatic ultrasonography revealed a  $72 \times 56 \times 60 \text{ mm}$  polar inferior heterogeneous renal tissue-occupying process with indistinct contours and suspicious vascularization on Doppler at the right kidney dependencies (**Figure 2**).

The tumor was resected. The 10 cm long surgical specimen was sent for anatomopathological examination **Figure 3(a)**.

We performed a Kuntscher-type centromedullary alignment nailing of the right humerus fracture site **Figure 3(b)** filling the bone loss with acrylic cement. The upper limb was immobilized with a palmar antebrachial cast.

Anatomopathological examination of the specimen showed that the histological appearance was that of a malignant tumour: metastasis of clear-cell adenocarcinoma of renal origin (**Figure 4**).

The final diagnosis was humeral metastasis of clear cell renal cell carcinoma.

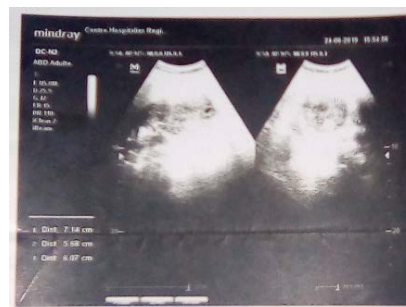
The world health organization TNM classification system (2009) allowed us to classify the tumor as stage T1aN0M1. The Karnofsky performance index for the patient was 90%.



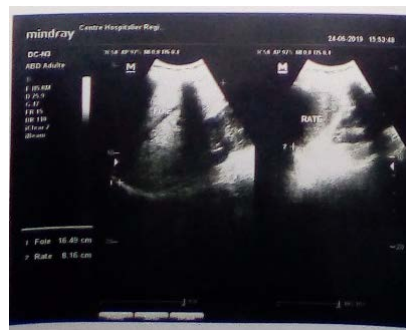
**Figure 1.** X-ray of the right arm, front (a) and side (b).



(a)



(b)



(c)

**Figure 2.** Renal vesico prostatic ultrasound.



(a)

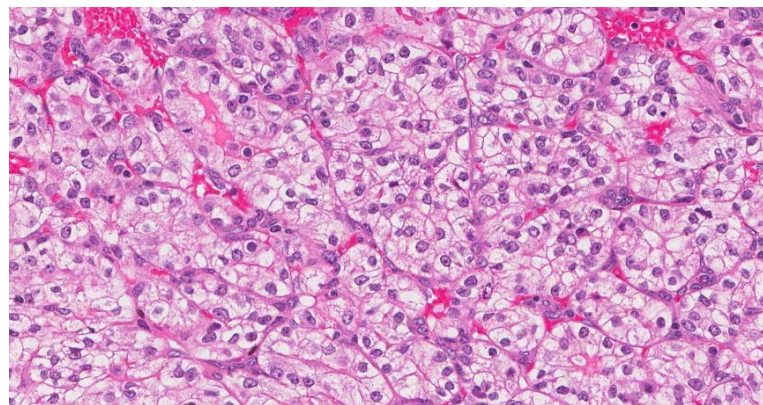


(b)



(c)

**Figure 3.** Surgical specimen (a), post-operative radiograph (b), clinical image (c) 6 months post-operatively.



**Figure 4.** Renal clear cell adenocarcinoma.

The proposed chemotherapy was refused by the patient, who wished to return to the Middle East where he was carrying out his professional activities.

After 6 months post-operatively, the local evolution was marked by wound healing **Figure 3(c)**, a good general condition with a pain-free right arm, and a resumption of daily and professional activities after traveling to the Middle Eastern country where he was working.

At the 12-month follow-up in the Middle East, the patient presented with severe epistaxis and abdominal pain, requiring hospitalization in the Middle East. He had undergone several additional tests, including a renal biopsy, which was also carried out in the Middle East, confirming the diagnosis of renal cell carcinoma (medical report of his hospitalization in the Middle East).

These examinations confirm the diagnosis of humeral metastasis of clear-cell renal cell carcinoma initially made in the Orthopedics-Traumatology Department of the Amirou Boubacar Diallo National Hospital in Niamey-Niger.

At the last follow-up of 32 months, the patient was in the country where he was being followed at the national cancer center and had undergone 9 courses of chemotherapy (protocol: Cisplat-SFU). After these courses of chemotherapy, the patient was doing well.

### 3. Discussion

Renal cell carcinoma accounts for 90% of all malignant renal tumours. It comprises four main histological types: clear cell carcinoma (75%), tubulo-papillary carcinoma (10% - 15%), chromophore carcinoma (<5%), Bellini or collecting-tube carcinoma (1%) [3].

Clear cell renal carcinoma was also known as Grawitz's renal tumor, after its first description by this author in 1883. Clear cell renal cell carcinoma is a tumour with a difficult-to-predict course; it can grow locally for a long time without causing symptoms, and often the first clinical symptoms are caused by metastases [4].

After the femur, the humerus is the second most affected site among long bones for renal cell carcinoma (RCC) metastases.

Casadei and *et al.* [5] reported 56 patients with bone metastases of renal cell carcinoma of the humerus who underwent surgical reconstruction. The distribution of lesions was as follows: 35 lesions were located on the proximal third of the humerus, 12 on the humeral diaphysis, 9 on the distal third of the humerus. Of these, 6 diaphyseal lesions were stabilized using centromedullary nailing, and 5 using a screw-plate with cement filling of the bone loss. The mean age of the series was 63 years. Good oncological and functional results were obtained.

In the study by Simon and *et al.* [6] of surgical treatment of metastatic renal cell carcinoma in 65 cases operated on for metastatic renal cancer, 55 patients (41 men and 14 women) were included. The mean age was 60 years (41 to 84 years). In this series, eight patients underwent 2 operations and 1 underwent three operations for three metastatic locations. In 23% of cases, metastases were present at the time of diagnosis of the primary tumor; in 17% of cases, the metastasis was incidental. Pathological fractures were present in half the cases (33 cases) and the other half without pathological fractures. The most frequent site was the femur (40 cases). The second most common site was the humerus (15 cases), followed by other sites (10 cases). Surgery was centromedullary nailing for the femur and humerus. Functional outcome was good or fair in 78% of cases.

Moura and *et al.* [7] reported on a series of 82 patients with pathological tumoral fracture of the humeral shaft: 86 humeral fixations with static centromedullary nail not reamed by the anterograde or retrograde approaches. In this series, the most common primary tumors were breast carcinoma (30.49%), multiple myeloma (24.39%), lung adenocarcinoma (8.54%) and renal cell carcinoma (6.10%). All patients reported an improvement in arm pain, and the mean Musculoskeletal Tumor Society (MSTS) score rose from 26% in the preoperative period to 72.6% when assessed in patients still alive 3 months after surgery.

For the latter two authors [6] [7], centromedullary nailing was the most commonly used osteosynthesis technique, accounting for 27 cases/65 (41.54%) and 86 cases/86 (100%) of humeral nailing in Simon and Moura respectively.

This technique is effective for pathological fractures of the humeral diaphysis, ensuring stable fixation of the arm and thus enabling functionality and quality of life, as was the case in our observation.

The diagnosis of a secondary humeral location of renal adenocarcinoma was fortuitous.

Swelling and pain in the arm were the telltale signs. The osteolysis observed on the X-ray was an important element that led us to suspect the tumoral nature of this pathology, which the biopsy confirmed. This justifies the need to request an X-ray in the event of any bone pain that is even slightly persistent.

#### **4. Conclusion**

Bone metastases are most often the proliferation of a primary malignancy. In this case study, we report an unusual humeral osteolytic involvement arising from a renal cell carcinoma. The finding was fortuitous.

#### **Conflicts of Interest**

The authors declare no conflict of interest.

#### **Authors' Contributions**

The authors' participation was collegial in both drafting and revising the manuscript. All authors have read and approved the final version of the manuscript.

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