



## BICEPS FEMORIS MUSCLE METASTASIS FROM RCC - AN UNUSUAL SITE OF DISEASE

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### ABSTRACT

Renal cell carcinoma (RCC) is the seventh most frequently diagnosed cancer, is known for its predilection to metastasize to any organ, most commonly the lungs, lymph nodes, bone, and liver.

While metastasis to the skeletal muscles is considered unusual, RCC is among the more common primary tumors to metastasise to this type of tissue. We present the case of a 67-year-old patient with no significant personal history was presenting for palpable tumor mass in the right thigh which was increasing in size for the past one and a half years. The MRI examination of the region showed a tumor mass at the biceps femoris muscle. It was first consider a primary neoplasia, considering that the patient had no medical history of any kind. CT scan of the thorax, abdomen and pelvis, native and with contrast to assess possible metastasis, and it concluded that the patient had a malignant featured tumor on the left kidney. A biopsy was performed from the muscular lesion witch established the diagnosis of renal cell carcinoma metastasis.

**KEYWORDS :** biceps femoris muscle, MRI, Renal cell carcinoma

### INTRODUCTION

Renal cell carcinoma (RCC) is the seventh most frequently diagnosed cancer (27), and is the most prevalent renal neoplasm, constituting 80–85 % of primary kidney cancers, the global incidence of renal cancer (including renal pelvis and ureters) being estimated to be 338000 cases in 2012 (8), and its incidence varies from one region to another (7).

RCC is known for its predilection to metastasize to any organ, most commonly the lungs (27), lymph nodes, bone, and liver (7,5,16). The metastatic potential of this cancer is widespread and unpredictable (9). Distant metastases appear in approximately 20-30% of the patients who have primary RCC at the time of diagnosis, with 30-50% developing metachronous metastasis post nephrectomy (5,17,1).

While metastasis to the skeletal muscles is considered unusual (4), RCC is among the more common primary tumors to metastasise to this type of tissue (12).

In a study which included more than 200 patients with metastatic tumors, Surov et al (24) found that 2.3% of those with RCC had skeletal muscle metastases.

The location of skeletal muscle metastases can vary widely (11). Furthermore, they may be painless and can sometimes occur long after the primary surgical treatment; therefore, discovering these metastases can be challenging (11).

In order to reduce the chance of overlooking muscle metastases, the possibility of their presence should be considered in patients with a history of RCC (22), even long after the primary tumor has been resected (21).

### CASE PRESENTATION

We present the case of a 67-year-old patient with no significant personal history was presenting for palpable tumor mass in the right thigh which was increasing in size for the past one and a half years.

Upon admission, at the physical examination, the tumor was palpable without the patient experiencing pain or discomfort.

Consecutive, a thigh ultrasound examination was performed which revealed a hypoechoic tumor lesion on the postero-medial region, with approximately dimensions of 8/4cm, with irregular margins and high internal vascularization at Doppler examination.

For an accurate assessment of both structural characteristics and

locoregional extension, it was decided to perform a MRI examination. The MRI was performed on a Siemens Concerto, native and with intravenous contrast. The examination protocol included T1 weighted sequences, T2 weighted sequences, fat suppression sequence, and T1 postcontrast sequences. MRI examinations were performed in all three planes (axial, coronal and sagittal).

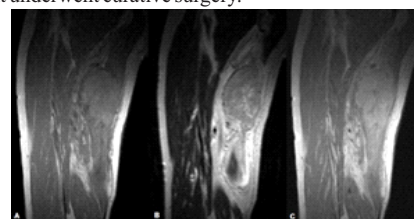
At the MR images was identified a large tumor mass with dimensions of 8/4.6/8.5cm, developed in the biceps femoris muscle, with mostly well-defined contour, except for the inferior part of the tumor, where the contour was irregular (Figure 1).

On T2-weighted images (Figure 1, Figure 2) it was observed moderate hypersignal intensity, as well as in fat-suppression sequence. The tumor mass had intermediary signal intensity to the normal muscle in T1-weighted images, and moderate heterogeneous contrast enhancement on T1-weighted postcontrast images (Figure 2).

The lesion had mass effect on semitendinosus, semimembranosus, and adductor magnus muscles, and it was in contact with the femoral artery, the sciatic nerve, with perforating artery and vein, without their infiltration; withal it was observed that the tumor presented surrounding edema of the soft tissue, more pronounced in the lower region, where the contour was not so well defined (Figure 3).

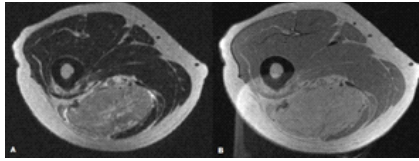
A primary muscular malignant tumor was suspected and the patient has undergone a biopsy. Until the histopathological result would be received, the patient has been subjected to CT scan of the thorax, abdomen and pelvis, native and with contrast to assess possible metastasis.

The conclusion of the CT examination was that the left kidney presented a tumor mass with malignant features, without any other metastases. The pathological result was muscular RCC metastasis, and the patient underwent curative surgery.

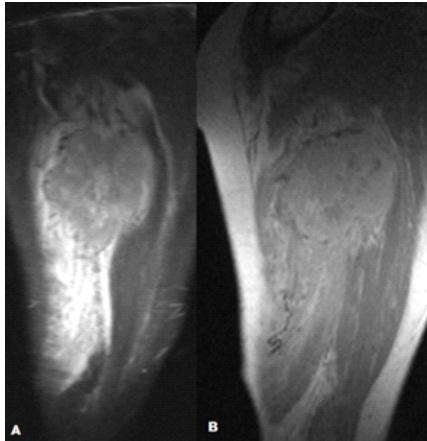


**Figure 1:** sagittal plane MRI: A. T1 weighted sequence, B. T2 weighted sequence, and C. T1 weighted sequence postcontrast – tumor

mass in the biceps femoris muscle mostly well-defined contour, except for the inferior part of the tumor, where the contour is irregular



**Figure 2:** axial plane MRI: A. T2 weighted sequence, and B. T1 weighted sequence postcontrast – tumor mass in the biceps femoris muscle with moderate hypersignal intensity on T2 weighted sequence and moderate enhancement in T1 weighted sequence postcontrast



**Figure 3:** coronal plane MRI: A. fat suppression sequence, and B. T1 weighted sequence postcontrast – surrounding edema of the soft tissue, more pronounced in the lower region, where the contour was not so well defined

## DISCUSSION

Renal cell carcinoma (RCC) is known for unusual sites of metastatic disease with virtually any organ being involved either through hematogenous or lymphatic spread (7,17,13).

Although skeletal muscle represents approximately 50% of total body mass and receives a large portion of total cardiac output, hematogenous metastatic disease to skeletal muscle is extremely rare (18,3,20).

Skeletal muscle metastases from renal cell carcinoma are extremely rare: only 16 cases have been described say Schatteman et al (23).

But, in another study (19) there were found 27 cases of renal cell carcinoma with skeletal muscle involvement, with the most common sites involved being the thigh (30%), upper arm (18%), and shoulder (15%). Five cases had multiple skeletal muscle metastases.

Autopsy studies demonstrated that the incidence of skeletal muscle metastases in patients who died from cancer is less than 1% (2).

The correct diagnosis of metastatic renal cell carcinoma to skeletal muscle is difficult in comparison with soft-tissue metastasis diagnosis (18). Metastatic disease to skeletal muscle tends to be found in people with advanced-stage neoplasms (20).

In the study conducted by Schatteman et al (23) only in 5 cases from the 16 analyzed, the muscle mass was the initial manifestation of the renal tumor. In the other 11 patients, the muscle masses were metachronous (10 months-16 years). They also described a case of skeletal muscle metastasis from a clear cell renal carcinoma, two years after nephrectomy. Their first clinical tentative diagnosis was soft tissue tumor, showing the mimicking capacity of renal cell carcinoma, as in our case.

In our patient, the lesion has well-defined margins in the most part and large dimensions, which are consistent with the results published by Haygood et al (11). They found in the studied cases a range from 0.2 cm to 11.3 cm in the patient that were symptomatic. It should be noted that the patient in this case did not show any symptom, presenting himself to the doctor just because the thigh region had been deformed. However, the tumor showed surrounding edematous changes.

Muscle edema surrounding the intramuscular metastasis was seen in just one patient in the study of Pretorius (20), and it was identified as an area of peripheral hypoattenuation surrounding the enhancing mass.

Muscle edema has been described as a common feature of both benign and malignant intramuscular lesions evaluated with MR imaging (10,25), hence, is a nonspecific change.

On MRI images, the tumor behaved differently from literature cases. Chen et al (4) describe a metastasis from RCC as having high signal intensity on both T1- and T2-weighted sequences. The same aspect is also identified by Sakamoto et al (22), these two cases being different only through the contrast enhancement of the tumor. Pompo et al (19) stated that muscle metastases from carcinoma are typically hypointense to slightly hyperintense relative to skeletal muscle on T1-weighted images and isointense to hyperintense on T2-weighted images.

In our case, the lesion had moderate heterogeneous contrast enhancement, being from this point of view similar to that described by Sakamoto (22).

MRI with gadolinium enhancement is useful in evaluating the vascularity of the tumor, differentiating areas of necrosis according to (14,26), and planning operative treatment (15).

Picchio et al (18) reported a case of a 58-year-old man with skeletal muscle metastasis from a clear-type renal cell carcinoma 5 years after total nephrectomy. The tumor was located in the proximal left thigh at the level of the great adductor muscle.

In their paper, Manzelli et al (15) described the case of a 73-year old female with late skeletal muscle metastases from a clear-type renal cell carcinoma 8 years after total nephrectomy. The metastases were located in the right femoral quadriceps, in the sartorius muscle and adductor magnus muscle. A complete surgical resection with a wide margin was performed for all lesions, and the final pathological report deposited for metastatic renal carcinoma clear-type cells.

Camnasio et al (3) presented the case of a 63-year-old male with a history of metastatic renal cell carcinoma (RCC) previously treated with left radical nephrectomy and immunotherapy in which the oncologic follow up had been negative for 4 years, but with the development of a metastasis in the left psoas muscle.

Pompo (19) describes the case of a 73 year old male patient who presented a tumor mass located in the biceps femoris muscle, 21 years after renal cell carcinoma treated with a right nephrectomy. Age, location, and lack of pain in that patient were suspicious for soft tissue sarcoma, like in our case.

As can be seen, most cases in the literature show metastasis in patients with known RCC, and only one at the biceps femoris muscle. The case presented by us is a muscular metastasis without a history of renal neoplasia or any other kind of cancer.

MRI findings alone are insufficient to differentiate metastatic lesions from soft tissue sarcomas (6). Biopsy is needed to make a definitive diagnosis. Plain radiography has little use in differentiating metastases from soft tissue sarcoma (12).

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