



RECTUS ABDOMINIS MUSCLE METASTASIS FROM UROTHELIAL CELL CANCER – A CASE REPORT

Medicine

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ABSTRACT

Hematogenous metastasis to skeletal muscle from urothelial carcinoma is extremely rare and metastatic disease to skeletal muscle tends to be found in people with advanced-stage neoplasm.

In this paper we report a case of right rectus abdominis muscle metastasis from urothelial cell carcinoma. A left nephroureterectomy with bladder cuff excision was performed and revealed a high grade papillary urothelial carcinoma of the ureter. One year later, the abdominopelvic CT examination revealed a tumor mass in the anterior abdominal wall muscles with prevezical extension. Over the following months was observed increase in size of the metastases, although the patient was undergoing chemotherapy and radiotherapy. Surgery was performed for the resection of the mass in the anterior abdominal wall, with consecutive histopathological examination which revealed infiltrate of high grade urothelial. After 3 months were identified new metastases in the soft tissue and muscles.

KEYWORDS

muscle metastasis, urothelial cell carcinoma, CT, MRI

Abbreviations: UCC (Urothelial cell cancer), CT (computed tomography), MRI (Magnetic resonance imaging)

Introduction

Urothelial cell cancer (UCC) is the most common primary malignancy of the urinary tract, and may affect its entire length, from renal pelvis to bladder (5).

Upper urinary tract tumors include tumors of the renal pelvis and the ureters. Upper urinary tract carcinoma is a relatively common malignancy, but its exact incidence is difficult to estimate because renal pelvis carcinoma and renal cell carcinoma are usually grouped together (20).

The incidence of upper tract UCC is increasing, probably because of improved diagnostic techniques and prolonged survival, in addition to the propensity of the urothelium to develop multiple synchronous and metachronous cancers (23).

Urothelial cancers are common in the sixth and seventh decades (20), with the average age of presentation of 65 years (8), and are more prevalent in men (20), and those affecting the renal pelvis are 3 to 4 times more common than those that arise in the ureter (15).

Several risk factors have been proposed, such as tobacco use, arsenic ingestion, phenacetin abuse, and exposure to aromatic amines (20). Balkan nephropathy, which is an endemic interstitial nephropathy, is associated with 100 to 200 times increased risk of upper tract UCC (21).

Muscles constitute a rare site of metastases from distant primary lesions (3), even though they represent half of total body mass and receive a large blood flow (19). This was attributed to the contractile activity of the striated muscles, accumulation of metabolites, pH changes, inhibition of angiogenesis by lactic acid, blood pressure within the muscle tissue and local changes in temperature (19).

On the other hand studies occurring from autopsies show rates of skeletal muscle metastases fluctuating from 6% to 17,5% (16).

This controversial data suggests that skeletal muscles metastases may be more frequent but they occur at an advanced stage of a malignancy and the majority constitute microscopic metastases undetectable from the imaging modalities (3,13).

Skeletal muscles from urothelial carcinoma are very rare and up to date only few cases have been reported in the literature (3,4,12,13), since urothelial carcinoma is more likely to metastasize in the liver, lung or bones (2).

Metastases to soft tissues are relatively more common in lung, kidney and colon cancers (12).

Case presentation

We present the case of a 54-year-old patient who presented two years ago macroscopic hematuria. At that time ureterorenoscopy and left retrograde ureteropielography were performed who identified a tumor in the left pelvic ureter at approximately 3 cm from the ureteral ostium.

At that time a CT scan was performed who has identified a tumoral thickening of the pelvic ureter which associates grade III ureterohydronephrosis, and regional adenopathies.

After one month radical nephroureterectomy with left bladder cuff excision is practiced. The histopathological examination revealed high grade papillary urothelial carcinoma (G3), with muscle infiltration in the tunica.

A year later, the abdominopelvic CT examination revealed a tumor mass in the anterior abdominal wall muscles, measuring 5.4/5.2 cm, iodophilic, heterogeneous, with central necrosis, infiltrating the subcutaneous and prevezical fat with thickening of the parietal peritoneum, that impressed the anterior wall of the bladder with its thickening at this level.

At this point the patient received specific chemotherapy treatment and then radiotherapy, followed by an MRI in September 2017.

The MRI examination has identified a tumor mass of 9,5/6,1/7,8 cm in

diameter, most likely arising in the right rectus abdominis muscle, encapsulated, with septa, with multiple necrosis zones, with important contrast enhancement in the tissular areas.

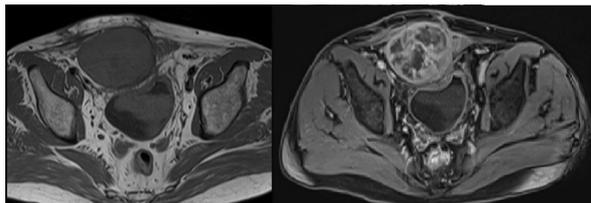


Figure 1 – MRI – T1-weighted sequences native and postcontrast: encapsulated tumor mass, with septa, with multiple necrosis zones, with important contrast enhancement in the tissular areas.

The tumor had a mass effect by moving and imprinting the anterior wall of the bladder without its infiltration; caudal it was extended to the level of pubic symphysis.

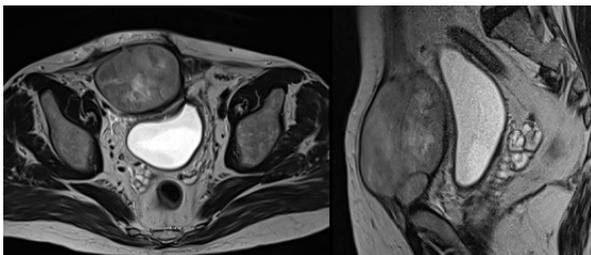


Figure 2 – MRI – T2-weighted sequences: encapsulated tumor mass, with septa, with multiple necrosis zones, with mass effect by moving and imprinting the anterior wall of the bladder without its infiltration.

According to the MRI examination, it was concluded that the tumor mass increased in size although the patient received both chemotherapy and radiation therapy. Thus it was decided to stop the radiotherapy and surgery was recommended.

In October 2017 the patient was hospitalized for surgical treatment. At this point a CT examination was performed. The CT revealed a heterogeneous tumor mass with septa and areas of necrosis included, with iodophilic walls and septa, located in the right rectus abdominis muscle, suprapubic, with dimensions of 8.3/8.4/9 cm. The tumor mass comes in direct contact with the anterior wall of the bladder, which is thickened in the lower portion of up to 0.7 cm, without revealing the demarcation limit at this level.

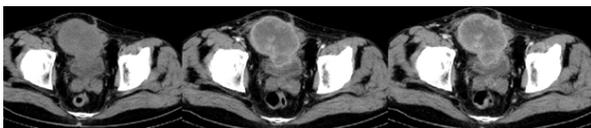


Figure 3 – CT of the abdomen and pelvis – native and postcontrast images, arterial and venous phases: heterogeneous tumor mass with septa and areas of necrosis included, with iodophilic walls and septa, located in the right rectus abdominis muscle, with the infiltration of the bladder.

At the same time, inguinal adenopathies on the right side with a maximum transverse diameter of 0.5 cm were visualized. No other metastases have been identified.

After the CT, a surgery was performed for the resection of the mass in the anterior abdominal wall, with consecutive histopathological examination. This detected infiltrate of high grade urothelial carcinoma with large areas of tumor necrosis.

After the surgery, in December 2017, the patient began to receive chemotherapy with side effects such as: vomiting, nausea, dizziness, fever, subocclusive syndrome and later, venous thrombosis in the left inferior limb, and anemia.

In January, at the re-evaluation clinical examination, subcutaneous

nodules were found in the right axilla, left scapula, epigastric area and right breast. An abdominal-pelvic ultrasound was performed that identified the presence of hypoechoic nodules of up to 5/4.4cm in pelvis, and also an axillary ultrasound which that discovered large right axillary adenopathy (of 3.7cm), and at the level of the posterior muscle of the left axilla a 2.2 cm hypoechoic nodule, which probably was a muscle metastasis.

Considering the progression below the current treatment line, the depletion of therapeutic resources as well as hematological and non-haematological toxicity, it was decided that the patient to continue a supportive treatment.

Discussion

Although skeletal muscles comprise nearly 50% of the total human body mass and are well vascularized, metastases in the musculature are rare (6,22).

Various primary malignant sites have been reported to give muscular metastases such as neoplasms from pancreas, lung, kidney, stomach, colon, and ovaries (3,13), but from urothelial carcinoma are very rare (6).

Shinagare et al. (20) found in their study that lymph nodes, lungs, liver, bones, and peritoneum were the most common sites of metastases from urothelial cancers of the upper urinary tract. Muscular and subcutaneous tissue were involved in metastatic process in 15% of the patients, and most of the patients (79%) had involvement of more than one organ.

Usually the largest muscles of the body such as the psoas, gluteals, and the erector spinae are the most common sites of the metastases (3).

The reported prevalence of skeletal muscle metastases from post-mortem studies of patients with cancer is inconstant and ranges from 0.03 to 17.5% (22).

Different factors have been proposed to act protectively against muscle that possibly acts against tumor neovascularity (1). However, Magee and Rosenthal (10) in 2002 reported that an increase in the incidence of metastasis is seen in patients sustaining a trauma.

Normal physiology of the striated muscles is impaired by trauma, causing focal hyperemia and the ability of the muscle tissue to eliminate lactic acid is reduced and thereby metastatic cells exhibit susceptibility to infiltrate into muscle tissue (7).

Based on this fact, reports have emphasized the need for questioning patients for the history of trauma (14).

Hematoma, muscle rupture and soft tissue infections that manifest with similar clinical findings should be kept in mind in the differential diagnosis (10,14).

The current case did not have a remarkable history for trauma that would facilitate muscle metastasis. Furthermore, ultrasonography, MRI and CT did not show any finding suggestive of hematoma, strain or infection. MRI is considered as the imaging modality of choice in tumor staging and perivesical invasion, with a reported accuracy of 87% (11).

In a study conducted by Surov et al. (22) on a group of 5170 patients with metastasized cancer, 61 patients had muscle metastases identified on computed tomography. Of these, only 16.4% were the muscular metastases from urological cancers. Skeletal muscle metastases were located in the iliopsoas muscle (27.5%), paravertebral muscles (25%), gluteal muscles (16.3%), lower extremity muscles (12.5%), abdominal wall muscles (10%), thoracic wall muscles (5%), and upper extremity muscles (3.8%). Most of the metastasis was diagnosed incidentally during routine staging CT examinations, while almost a quarter was symptomatic.

In another study, Saitoh et al. (17) analyzed autopsy reports of 602 cases to investigate the mode of metastasis. They identified metastases in 88% of the subjects localized in lymph nodes, lungs, peritoneum, and ipsilateral adrenal, and they were more frequent in cases of tumors of the renal pelvis than in those of tumors of the ureter. In their study no metastasis was found in muscle structures.

Most of the patients with urothelial cancers of the upper urinary tract undergo nephroureterectomy, which was performed in almost 90% of the patients in the study conducted by Shinagare (20), and also in the case of our patient.

Metastases are often seen after nephroureterectomy, indicating the possibility of occult micrometastases even before the surgery (20).

There is very limited literature describing in detail the metastatic pattern of the upper tract urothelial tumors (20).

Usually the confirmation of the metastases from urothelial carcinoma to a skeletal muscle is achieved via an ultrasound-guided biopsy (6), but in the case presented by us, anatomopathological analysis was performed after surgical resection.

In the literature, we have identified only one case of metastases in the rectus abdominis muscle caused by UCC, but that patient had the primary tumor in the bladder (12).

In another case described by Koca et al. (7) the patient presented metastasis in the iliopsoas and adductor longus muscles 3 months after the initial diagnosis of transitional cell carcinoma of the urinary bladder.

Doo et al. (3) and Katafigiotis et al. (6) described two metastases to sartorius muscle, one with renal pelvis cancer at approximately 6 year from nephroureterectomy, and the other with bladder cancer 8 months after the radical cystectomy, while Nagao et al. (13) described the case of one in the gluteus maximus.

Ekici et al. (4) described the first case of upper limb metastasis in a deltoid muscle, and Guidi et al. (5) first describe flexor digitorum superficialis and profundus metastasis from UCC, both localized to the bladder.

Sawazaki et al. (18) present a case of right gluteal muscular metastasis from a renal pelvic tumor 5 months after right nephroureterectomy and adjuvant chemotherapy, but also pulmonary metastasis and right adrenal gland recurrence; the gluteal mass was excised followed by adjuvant chemotherapy, but the patient showed a new metastasis in the right gluteal muscle, with consecutive radiotherapy for the new tumor mass.

The case is similar to ours regarding the recurrence of muscular metastasis although metastases have been excised and the patient received chemotherapy and radiation therapy.

On the other hand, Lönne and Spanidis (9) describe the case of a patient with carcinoma of the urinary bladder that had a very large, isolated metastatic tumor in the abdominal wall. After the complete excision of the metastasis no further metastatic growth was observed 1 year later, although local disease progression was found to have occurred in the bladder.

Nabi et al. (12) reported that the mean survival rate after receiving chemotherapy was 8 months (min 6–max 12), while Katafigiotis (6) reported that 7 months after the excision of the muscle metastasis the patient is still alive and with a negative imaging follow-up.

In our case, although resection of the muscular metastasis was performed continued with chemotherapy and radiotherapy, progression of the disease below the treatment was observed, with new metastasis in the soft tissue and muscles, and major side effects due to treatment, so it was decided that the patient should continue only a supportive treatment.

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