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Case Report

Primary rectal adenocarcinoma with musculoskeletal metastasis as the only metastasis site: A case report with a short literature review ☆

Fatima Zahrae El Mansoury, DR[a,*], *Walid El Ouardi, DR*[b], *Zakia El Yousfi, DR*[a], *Marouan Kili, DR*[a], *Soukaina Allioui, DR*[a], *Hatim Essaber, DR*[a], *Assaad El Bakkari, DR*[a], *Hounayda Jerguigue, DR*[a], *Youssef Omor, PR*[a], *Rachida Latib, PR*[a]

[a] *Radiology Department, National Institute of Oncology, University of Medicine and pharmacy of Rabat, Rabat, Morocco*

[b] *University of Medicine and pharmacy of Rabat, Rabat, Morocco*

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ABSTRACT

Rectal carcinoma with metastasis to skeletal muscle is a rare occurrence. Since 1970, only 30 cases of skeletal muscle metastasis originating from colorectal adenocarcinomas have been documented, underscoring its exceptionally low incidence. Here, we present the case of a middle-aged man who was diagnosed with rectal adenocarcinoma 3 months ago. During examination, a subcutaneous mass was discovered in the left proximal buttock. Histological analysis of a biopsy confirmed that this mass was a metastatic lesion originating from the primary rectal adenocarcinoma.

Introduction

Colorectal cancer ranks as the third most prevalent cancer on a global scale, with over 1.8 million new cases reported in 2018 [1]. The metastasis of colorectal cancer can occur through various pathways, including lymphatic, hematogenous, and direct spread. The liver, lungs, peritoneum, lymph nodes, and bones are the most common sites for secondary cancer growth. The occurrence of metastasis in skeletalmuscles from any type of cancer is exceedingly rare, this rarity can be attributed to the unfavorable conditions for tumor growth within muscle tissue [1,2]. The management approach for such cases is not well-established, and the prognosis remains uncertain [3].

Abbreviations: SMM, skeletal muscle metastasis; MRI, magnetic resonance imaging; DWI, diffusion weighted images.

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* Corresponding author.
E-mail address: fatidoly@gmail.com (F.Z. El Mansoury).

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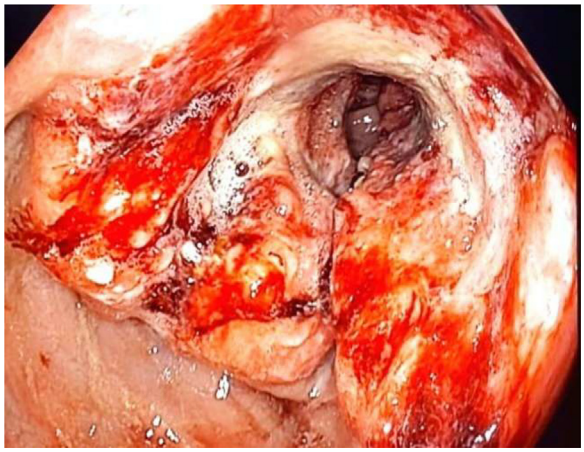

Fig. 1 – Endoscopic image showing the circumferentially nonobstructive ulcerating and bleeding tumor of the rectum.

Case report

A 57-year-old male patient visited our hospital reporting a 1-month history of rectal bleeding, accompanied by a weight loss of approximately 5 kg and a decrease in appetite. The patient had no family history of similar complaints. Upon rectal examination, a growth was observed, encircling the rectal mucosa and beginning at a distance of approximately 5 cm from the anal opening. The growth exhibited limited mobility, and no inguinal or femoral lymph nodes were palpable.

On colonoscopy, a friable, circumferentially infiltrative non-obstructive mucosal lesion was seen in the upper, middle, and and the lower rectum at 4.5 cm from anal verge (Fig. 1). Biopsy from this rectal lesion showed predominantly infiltrating neoplastic cells singly scattered in a glandular architecture. The histological appearance was of a poorly differentiated adenocarcinoma rectum.

The patient underwent a contrast-enhanced magnetic resonance imaging (MRI) of the pelvis, which revealed a circumferential nodular thickening affecting the lower, middle, and upper rectum. This thickening exhibited a low T2 signal and diffuse enhancement, resulting in the infiltration of the perilesional fat. Notably, perirectal nodes were observed in close proximity to the rectal fascia. In the lower portion, the lesion spared the sphincters (Figs. 2 and 3). No metastatic sites were identified on the thoraco-abdomino-pelvic CT scan, thus classifying the tumor as T4bN2bM0. Given the extensive nature of the tumor, surgical resection was not a viable option. Consequently, the patient received palliative radiotherapy to the pelvis at a dose of 30 Gy in 10 fractions and began palliative chemotherapy.

Two months later, the follow-up MRI exhibited a stable aspect of the tumor, and the palliative treatment was consequently maintained. A month later, the patient returned with a swelling in the left buttock, accompanied by a dull throbbing pain. Clinical examination revealed a firm, fixed swelling in the left buttock.

Biopsy from this lesion indicated predominantly infiltrating neoplastic cells dispersed singly within a glandular architecture. The histological characteristics were consistent with a poorly differentiated rectal adenocarcinoma. Subsequently, a new thoraco-abdomino-pelvic CT scan revealed that the muscle metastases were the sole secondary site (Fig. 4). Upon retrospective review, it was noted that the nodules in the left buttock region had been visible on the follow-up MRI conducted a month earlier (Fig. 5).

Discussion

Skeletal muscle metastasis (SMM) is an infrequent event in oncologic patients. So far, limited research has explored the imaging characteristics of SMM. Additionally, it is a highly diverse condition given the varying primary tumors, locations, and imaging manifestations [4]. Based on existing literature, lung cancer, gastrointestinal tumors, and renal cell carcinoma are the most common primary malignancies that metastasize to skeletal muscles [5].

Since 1970, only 30 cases of SMM originating from colorectal adenocarcinomas have been documented. In addition, the prevalence of SMM in patients with colorectal cancer is provided as 0.028% [1].

Carcinoma metastases are most frequently observed in local and regional lymph nodes followed by occurrences in the liver, lungs, and bones. Despite skeletal muscle constituting 50% of the body's mass and receiving a significant portion of cardiac output, metastases to these areas are exceptionally rare [6]. This rarity is attributed to the distinct homeostatic conditions in skeletal muscles, including constant cellular stress due to muscle contraction, high permeability to tumor cells, and specific homeostatic factors such as high lactate levels, abundant blood flow, low pH, and fluctuating oxygen levels, all of which hinder tumor cell proliferation [6,7].

Metastases to skeletal muscles tend to be predominantly situated in the axial region of the body, encompassing the paravertebral, gluteal, and psoas muscles. This is a crucial point to note, as the presence of a mass in these areas should lead healthcare providers to consider the possibility of metastatic disease, in addition to primary soft-tissue neoplasms.

The majority of skeletal muscle metastases were observed in patients with widespread or disseminated diseases. However, in 8.6% of cases, muscle metastases were the first sign of a metastatic process. This discovery is significant and underscores the importance of comprehensive examination of the skeletal musculature by radiologists during staging investigations for patients with oncologic diseases [8].

From a clinical perspective, skeletal muscle metastases originating from carcinomas often manifest as painful, palpable masses, sometimes with accompanying swelling. These metastases are frequently identified prior to the diagnosis of the primary carcinoma [6].

Imaging findings in muscle metastases are nonspecific. Radiographs can reveal a soft tissue shadow, which may exhibit calcifications in cases of gastric, pancreatic, and colorectal carcinomas [4].

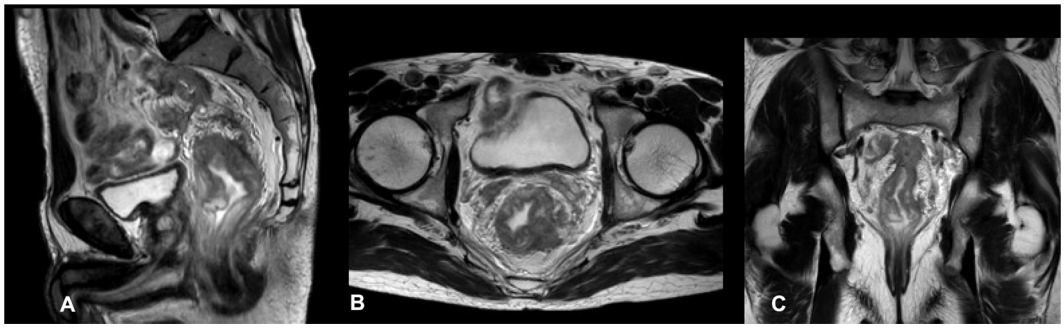

Fig. 2 – T2 sequence images in the sagittal (A), axial (B), and coronal (C) planes displaying circumferential nodular thickening involving the lower, middle, and upper rectum.

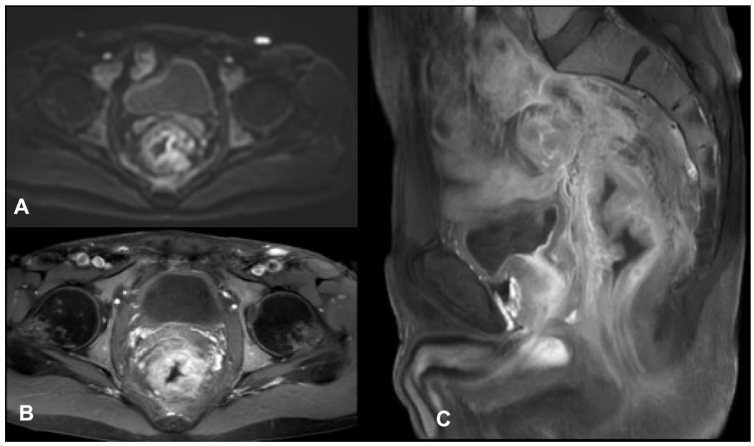

Fig. 3 – DWI sequence (A), axial (B) and sagittal (C) T1 FAT SAT postcontrast sequences demonstrate restricted diffusion and tumor enhancement.

Contrast-enhanced CT is useful for assessing the extent of the mass within the skeletal muscle. Additionally, CT helps in determining whether a tumor affects adjacent bones, fascial planes, nerves, and vessels [4,6].

MRI still the best imaging modality for evaluating soft-tissue masses because of its high tissue contrast and ability to depictfine anatomic detail. 18F-FDG PET/CT is also a useful modality for localizing metastatic sites and guiding the management [2,6].

All skeletal muscle metastasis were categorized according to the proposed classification, as follows [4,5]:

- Type 1: round or oval intramuscular metastatic lesions with homogeneous contrast enhancement.
- Type 2: abscess-like intramuscular metastatic lesion with central low attenuation and rim contrast enhancement.
- Type 3: metastatic diffuse muscle infiltration with swelling and inhomogeneous contrast enhancement.
- Type 4: SMM manifesting as multiple intramuscular calcifications.
- Type 5: SMM manifesting as intramuscular bleeding.

According to the literature, most commonly identified SMM is type 1, as in our case, followed by type 2 and type 3 [4].

The proposed classification of SMM highlights the importance of considering various differential diagnoses for each type. For example, type 1 SMM may resemble several benign lesions like muscle hemangioma, intramuscular ganglion, and myxoma. Type 2 SMM should be differentiated from inflammatory abscesses. In cases of type 3 SMM, distinguishing it from muscle sarcoma or intramuscular lymphoma is essential due to the similar diffuse muscle infiltration. For type 4 lesions, the possibility of calcifications from conditions like myositis ossificans, calcific tendinitis, angiomatosis, systemic sclerosis, and calcific myonecrosis should be considered. Additionally, intramuscular bleeding or hematoma can sometimes be mistaken for SMM, and vice versa. Therefore, when dealing with oncologic patients with an intramuscular hematoma, SMM should be included in the list of potential diagnoses, and histopathological evaluation may be required to confirm or rule out malignancy [4].

The choice of treatment is individualized based on the patient's clinical status and overall condition. It may involve various approaches, such as observation, radiation therapy, chemotherapy, or surgical excision [3,6].

Skeletal muscle metastases are often detected in the context of advanced metastatic disease, where multiple organs

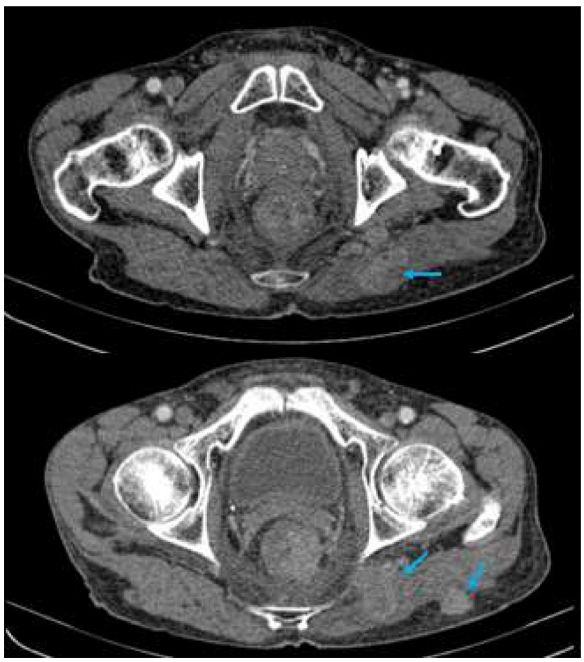

Fig. 4 – Axial postcontrast CT scan sections displaying nodular metastatic lesions in the left buttock involving the gluteus maximus and gluteus medius (blue arrows).

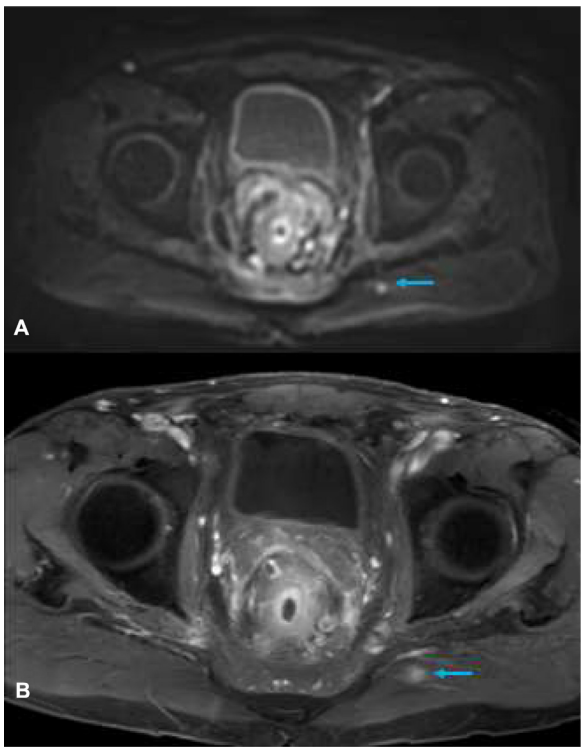

Fig. 5 – DWI sequence (A) and axial T1 FAT SAT postcontrast sequence (B) showing the left buttock metastatic nodule (blue arrow).

are affected, and symptoms are primarily attributed to this widespread involvement. In such scenarios, chemotherapy is recommended to manage the systemic aspect of the disease, guided by the diagnosis of the primary tumor. Additionally, radiation therapy may be considered for local control of symptomatic lesions [6]. In cases where a muscle metastasis is identified in a patient who has had a prolonged period without disease progression, surgical excision may be a suitable option [6].

Skeletal muscle metastasis is typically a consequence of systemic spread of cancer, indicating advanced disease and often associated with an overall poor prognosis. Overall, the prognosis is driven by the primary carcinoma [1,2,8].

Conclusion

Metastases in skeletal muscle are infrequent, and cases originating from rectal carcinoma are rarely reported in medical literature. This particular case is unusual as it entails rectal carcinoma metastasizing only to skeletal muscles, without any involvement of primary sites like the liver and lung. Different imaging techniques, including radiographs, CT scans, MRI, and PET-CT scans, have been used for diagnostic and staging purposes. Nonetheless, a conclusive diagnosis usually requires a tissue biopsy with subsequent histopathological analysis.

Patient consent

Written informed consent for the publication of this case report was obtained from the patient. He agrees to participate voluntarily in this study.

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