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Case Report

Ossifying skeletal muscle metastasis as an initial manifestation of colorectal adenocarcinoma [☆]

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ABSTRACT

Skeletal muscle metastases from colorectal cancer (CRC) are very rare. They have usually been described in patients with known CRC and as a well-defined mass. In this case report, we present a unique case of diffuse and ossifying skeletal muscle metastasis as the first manifestation of CRC. A 36-year-old man presented with progressive left thigh swelling and left hip pain of 6 months duration. He denied any gastrointestinal complaints. CT and MRI of the thigh showed diffuse muscular swelling, signal abnormalities with linear calcifications involving the muscles of the posterior and medial compartments of the left thigh and both gluteal regions. Histology confirmed the metastatic nature of a colorectal adenocarcinoma. The patient was treated with chemotherapy and showed a good evolution after 6 months of follow-up.

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Introduction

Intramuscular metastasis of colorectal cancer is a rare phenomenon that has been reported. To our knowledge, only few cases of muscular metastasis with ossification of colorectal cancer have been reported in the published literature [1]. The reported prevalence of skeletal muscle metastasis (SMM) in autopsy series of cancer patients ranges from 0.03% to 16% [2–4]. Furthermore, SMM as the first manifestation of neoplastic disease are very exceptional. They may have different

imaging patterns and are associated with poor prognosis [4]. The purpose of this article is to describe the clinical and imaging features of a rare case of SMM with an atypical clinical presentation and a puzzling imaging appearance.

Case report

A 36-year-old man with a history of treated *Helicobacter* peptic ulcer presented with progressive left thigh swelling and

Abbreviations: CRC, colorectal cancer; SMM, skeletal muscle metastasis.

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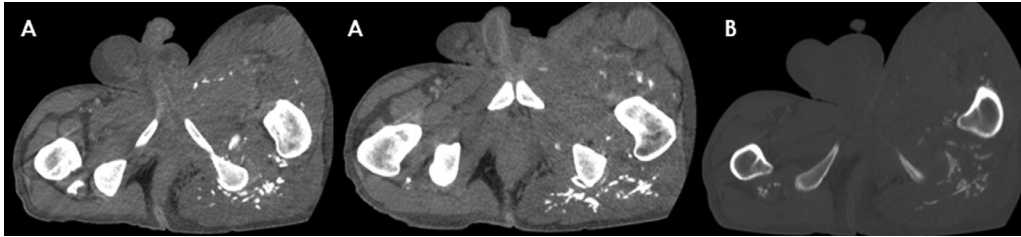


Fig. 1 – Axial images on pelvic CT scan showing diffuse left thigh and pelvic muscle enlargement and heterogeneous enhancement (A) associated to several lamellar and linear intra muscular calcifications (B).

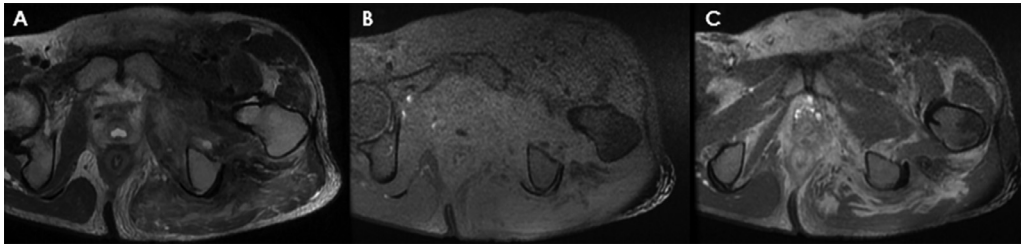


Fig. 2 – Axial images on pelvic MRI showing diffuse left thigh and pelvic muscle enlargement signal abnormalities on T2 weighted imaging (A) and heterogeneous enhancement (C) associated to several linear low signal abnormalities related to intra muscular calcifications (A and B).

left hip pain of 6 months duration. The patient denied any gastrointestinal complaints, especially transit disturbances or gastrointestinal bleeding. However, he has diffuse abdominal pain. Physical examination revealed bilateral swelling of the thighs and gluteal region. No well-demarcated mass was palpated, nor was there any skin erythema. Lymphedema was suspected. A Doppler ultrasound of the lower extremities was performed to rule out a vascular origin. A femoral CT scan and MRI were performed. The CT scan showed diffuse enlargement of the left thigh and pelvic muscles, soft tissue density enhancement with lamellar and linear intramuscular calcifications (Fig. 1). Heterogeneous enhancement was described after intravenous iodinated contrast media administration. There were no nodules or bone involvement. MRI of the thigh showed diffuse signal abnormalities on T2- and STIR-weighted images (Fig. 2) involving the muscles of the posterior and medial compartments of the left thigh, the 2 gluteus regions, and the proximal region of the medial and posterior compartments of the right thigh. There were numerous linear intramuscular calcifications as hypo-signals in all sequences. No mass, nodule, or bone involvement was described. The main diagnoses proposed were soft tissue tuberculosis, calcifying myositis and myositis ossificans progressiva. Therefore, soft tissue biopsy was initially contraindicated. By chance, a parietal rectal thickening with pelvic fat infiltration was visualized (Fig. 3). The patient presented with transit disturbances such as diarrhea and melena during his hospitalization. An entero-MRI was performed and showed segmental digestive thickening of the colon and rectum. Blood tests for tumor markers were performed and showed high levels of carcinoembryonic antigen (CEA): 10 ng/mL (0-6.5 ng/mL), human chorionic gonadotropin: 29 mUI/mL (0-2) and alpha-fetoprotein: 62.3 UI/mL (0-5.8). Colonoscopy and colon biopsy were performed, which revealed colorectal adenocarcinoma.

An ultrasound-guided muscle biopsy was then performed, which confirmed the metastatic nature of the muscle involvement of the thigh and gluteal region. The final diagnosis was SMM of colorectal adenocarcinoma with dermal involvement. An extension evaluation was performed based on a chest and abdominopelvic CT scan. No other metastatic sites were found. The patient was referred to the oncology department and a chemotherapy-based treatment protocol was initiated. The evolution was favorable with partial regression of muscular enlargement in the pelvis and thighs. Neoplastic thickening of the gastrointestinal tract was also reduced (Fig. 4). No further metastases were detected during the 6-month follow-up.

Discussion

Intramuscular metastasis of colorectal cancer is a rare phenomenon, accounting for less than 1% of metastases [1,3]. Only 18 cases have been reported in recent literature [1]. The most common site of metastasis was the femur [6]. In the majority of cases, muscle metastasis occurs during the development of known colorectal cancer. On the other hand, muscle metastases revealing colorectal neoplasia are very rare, even exceptional [1]. The possible mechanism of metastatic spread of colorectal adenocarcinoma to skeletal muscles could be via the lymphatic or hematogenous route, direct extension of the primary disease, or manipulation during surgery [1]. In our case, lymphatic or hematogenous extension are the most likely spread mechanisms.

Typically, most patients with skeletal muscle metastases present with painful masses [6]. In this case report, the patient presented with diffuse thigh swelling without a palpable or

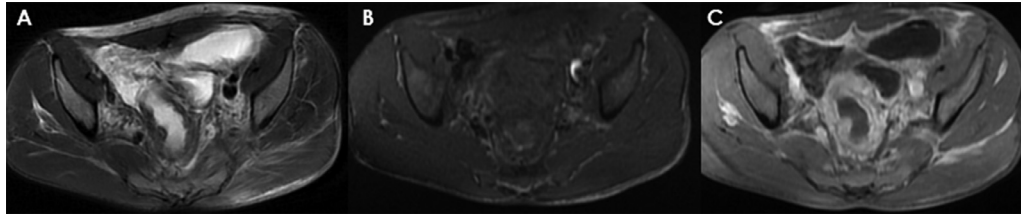


Fig. 3 – Axial images on pelvic MRI: rectal and recto sigmoid parietal thickening and signal abnormality on T2 weighted imaging (A) with heterogeneous enhancement (B, C). Pelvic fat infiltration and high signal intensity on T2 weighted ponderation with a heterogeneous enhancement (A and C).

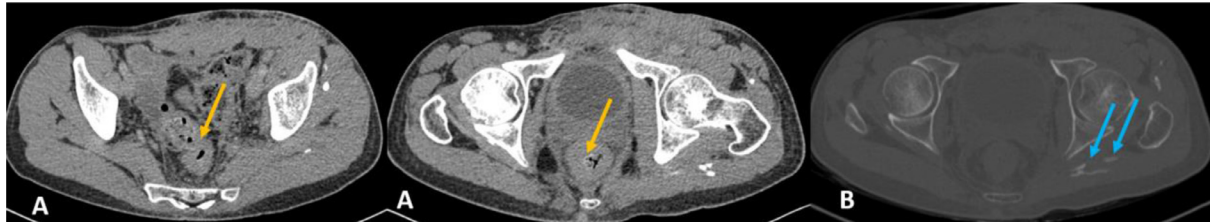


Fig. 4 – Axial pelvic CT scan showing partial regression of muscular hypertrophy of the left thigh and pelvis (A) and lamellar intramuscular calcifications (B) at 6 months follow-up.

Table 1 – Skeletal muscle metastases subtypes [2,3].

Muscle metastasis type	Imaging appearance
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	Skeletal muscle metastasis manifesting as multiple intramuscular calcifications
Type 5	Skeletal muscle metastasis manifesting as intramuscular bleeding

well-defined mass. To our knowledge, only one case of similar diffuse metastatic muscle infiltration has been reported [2].

On imaging, most skeletal muscle metastases appear as solitary or multiple well-defined masses. A CT classification has been proposed that includes 5 types (Table 1) [2,3]. Our patient had metastatic diffuse muscle infiltration with swelling, multiple intramuscular calcifications, and inhomogeneous contrast enhancement. Referring to the CT scan classification cited earlier, this appearance is a combination of both type 3 and type 4 muscle metastases. These types of metastases are less common. In the series of Meyer et al. [2], type 3 and 4 were reported in only 1.9% and 1%, respectively. Intramuscular calcifications or ossifications refer to the formation of heterotopic bone that has been reported in colon metastases, typically mucinous adenocarcinoma [6]. However, the lamellar appearance of these intramuscular calcifications is less common. They are indicative of high tumor malignancy [5]. The pathogenesis of bone metaplasia in SMM remains unknown [1,3,6]. Several mechanisms have been proposed, including the interaction of mucin-producing tumor implants, local hemorrhage, metastasis-related biochemical changes in muscle, and the differentiation of pluripotent mesenchymal cells from osteoblasts [1,3,7].

The prognosis associated with skeletal muscle metastases is generally poor [1], with a median survival from diagnosis to death of 5-12 months [1,8]. The mainstay of treatment for isolated SMM is aggressive surgical resection, with or without radiotherapy before or as an adjunct to surgery [3]. The use of systemic chemotherapy should be recommended for patients with disseminated metastases [3,8]. In our patient, resection was not performed due to widespread muscle metastasis in both thighs, pelvis, and gluteal region. Chemotherapy was started after multidisciplinary consultation.

Conclusion

The purpose of presenting this case is to highlight SMM as a rare initial presentation of metastatic colorectal cancer. Given its poor prognosis, early diagnosis is essential to improve patient outcome, even though its imaging appearance may be puzzling. Imaging, especially CT and MRI with contrast, is necessary for diagnosis, treatment selection, and follow-up. However, histologic examination is the mainstay for diagnosis confirmation.

Patient consent

The consent to publish potentially identifying information, such as details of the case, was obtained from the patient.

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