

MedPeer Publisher

Abbreviated Key Title: MedPeer

ISSN : 3066-2737

homepage: <https://www.medpeerpublishers.com>

SKELETAL MUSCLE METASTASIS TO THE LEFT RECTUS ABDOMINIS MUSCLE FROM COLONIC ADENOCARCINOMA: A CASE REPORT WITH SEQUENTIAL CT AND ULTRASOUND CORRELATION

DOI: 10.70780/medpeer.000QGVU

AUTHOR AND AFFILIATION

Samia Amar¹, Boutaina Essaher¹, Manal Oufroukhi¹, Youssef Omor², Rachida Latib², Hatim Essaber²

¹Department of radiology, Faculty of medicine and pharmacy, Mohammed V University, Rabat, Morocco

²Department of radiology, National Institute of Oncology, Rabat, Morocco

Corresponding author: Samia Amar, samiaamar23@gmail.com

ABSTRACT

Skeletal muscle metastasis from colorectal adenocarcinoma is an exceptionally rare manifestation of metastatic disease. We report the case of a 60-year-old woman with a history of moderately differentiated colonic adenocarcinoma who developed a new lesion within the left rectus abdominis muscle during oncological follow-up. The lesion was absent on a computed tomography (CT) examination performed 9 months earlier and became apparent on a subsequent contrast-enhanced CT examination, during which the patient's overall disease had also progressed. Targeted ultrasonography subsequently demonstrated a well-defined, oval, predominantly hypoechoic intramuscular lesion, confirming its localization in the left rectus abdominis muscle. In the context of the known colorectal malignancy, interval disease progression, and new appearance of an enhancing intramuscular lesion, the findings were considered highly suggestive of skeletal muscle metastasis. No biopsy was performed, and the lesion was considered a radiologically presumed skeletal muscle metastasis based on the clinical and context. This case highlights the importance of comparing current and prior CT examinations and demonstrates the complementary role of ultrasound in confirming the intramuscular origin of an unusual metastatic lesion.

KEYWORDS

Skeletal muscle metastasis, Colorectal cancer, Rectus abdominis, Intramuscular metastasis

MAIN ARTICLE

INTRODUCTION

Colorectal cancer most commonly metastasizes to the liver, lungs, peritoneum, and distant lymph nodes, whereas skeletal muscle represents an unusual site of metastatic involvement. Skeletal muscle metastasis from colorectal adenocarcinoma is extremely rare, with an estimated incidence of approximately 0.028% in patients with colorectal cancer. A systematic review by Kulkarni et al. identified only a limited number of reported cases, emphasizing the rarity of this metastatic pattern and the paucity of available data [1].

Skeletal muscle is considered relatively resistant to metastatic colonization despite its large mass and abundant blood supply. The mechanisms underlying this relative resistance remain incompletely understood and are likely multifactorial. Proposed explanations include the physical effects of constant muscle contraction and mobility, local metabolic conditions such as lactic acid production and variations in oxygen tension, and characteristics of the muscle microenvironment that may hinder tumor-cell implantation and proliferation. More recently, local immune activity and myokine-mediated effects have also been proposed as potential contributors [1,2].

When skeletal muscle metastases occur, their imaging appearance is variable and nonspecific, potentially overlapping with soft-tissue sarcoma, abscess, hematoma, or other intramuscular lesions. In a study specifically evaluating skeletal muscle metastases of the trunk and pelvis, the most common ultrasound findings were hypoechoic echogenicity, well-defined margins, and round-to-oval or lobulated morphology, with intralesional vascularity demonstrated in 64.8% of lesions, although peripheral vascularity may also be observed. On contrast-enhanced CT, the most frequent patterns were abscess-like lesions with rim enhancement or round-to-oval lesions with homogeneous enhancement [3].

We report an unusual case of a newly developed metastasis within the left rectus abdominis muscle in a patient with colonic adenocarcinoma, with particular emphasis on its interval appearance on CT examinations performed 9 months apart and its subsequent characterization by targeted ultrasonography.

CASE PRESENTATION

A 60-year-old woman with a history of moderately differentiated colonic adenocarcinoma undergoing first-line systemic therapy was followed with serial imaging. A contrast-enhanced CT examination performed 9 months before the current evaluation showed no focal abnormality within the left rectus abdominis muscle, with preserved muscular architecture (Figure 1A).

During the subsequent 9-month interval, there was progression of the patient's known metastatic disease. Follow-up contrast-enhanced CT demonstrated a newly developed focal lesion within the left rectus abdominis muscle. The lesion was centered within the muscular compartment, with no evidence of direct extension from an adjacent intra-abdominal structure (Figure 1B).

Targeted high-frequency ultrasonography of the anterior abdominal wall was subsequently performed for further characterization. Ultrasound demonstrated a well-defined, oval, predominantly hypoechoic lesion centered within the left rectus abdominis muscle. The lesion was clearly distinguishable from the surrounding subcutaneous tissues and remained entirely intramuscular (Figure 2A). Color Doppler examination demonstrated peripheral vascularity around the lesion (Figure 2B).

No biopsy was performed. In the context of the patient's known colorectal adenocarcinoma and progressive metastatic disease, the lesion was considered a radiologically presumed skeletal muscle metastasis.

DISCUSSION

Skeletal muscle metastasis from colorectal adenocarcinoma is a rare manifestation of metastatic disease. In their systematic review, Kulkarni et al. identified only 30 reported cases of skeletal muscle metastases from colorectal adenocarcinoma in the published literature and cited an estimated frequency of approximately 0.028% among patients with colorectal cancer [1]. However, this figure should be interpreted cautiously, as it is derived from limited published data rather than from a contemporary population-based cohort. The true frequency may be underestimated, as skeletal muscle metastases may remain asymptomatic or be overlooked on routine imaging. Skeletal muscle metastases generally occur in the setting of disseminated disease and are associated with poor prognosis [1,2].

The relative resistance of skeletal muscle to metastatic colonization remains incompletely understood. Several mechanisms have been proposed, although none has been established as an independent protective factor. Continuous muscle contraction and mobility have been suggested to interfere with tumor-cell implantation and growth, while local metabolic conditions, including lactic acid production, variations in oxygen tension, and changes in pH, may create an unfavorable environment for tumor proliferation. Additional hypotheses involve characteristics of the extracellular matrix, local immune activity, and muscle-derived signaling molecules such as myokines. These mechanisms are likely multifactorial and may act in combination rather than independently [1,2].

The imaging appearance of skeletal muscle metastases has been described in increasing detail. Cha et al. evaluated 71 pathologically confirmed skeletal muscle metastases involving the trunk and pelvis. On ultrasound, 98.6% of lesions were hypoechoic and 85.9% had well-defined margins, with round-to-oval and lobulated morphologies being the most frequent. Intralesional vascularity was demonstrated in 64.8% of lesions. Peripheral vascularity was also illustrated in some cases in their series. On contrast-enhanced CT, 40% of lesions appeared as round-to-oval masses with homogeneous enhancement, whereas 53.3% demonstrated an abscess-like appearance characterized by central low attenuation and peripheral enhancement. CT was also the most frequent modality through which skeletal muscle metastases were initially detected [3].

In the present case, the lesion demonstrated several of these previously described features. On contrast-enhanced CT, it appeared as a newly developed enhancing intramuscular lesion within the left rectus abdominis muscle. Targeted ultrasound demonstrated a well-defined, oval, predominantly hypoechoic lesion with peripheral vascularity. These imaging findings were highly suggestive of metastatic disease [3]. The combination of the imaging appearance with the patient's known colorectal adenocarcinoma and progressive systemic disease therefore substantially increased the likelihood of metastatic involvement.

A particularly notable feature of this case is the demonstration of interval development on two CT examinations performed 9 months apart. The left rectus abdominis muscle was normal on the initial examination, with preserved muscular architecture and no focal lesion, whereas a new intramuscular mass was evident on follow-up imaging. This temporal evolution provides an important diagnostic clue in the oncological setting and strengthens the interpretation of the lesion as a metastatic deposit. It also highlights the value of comparison with prior examinations when evaluating subtle abnormalities within skeletal muscle. More broadly, this case underscores the need for systematic assessment of the abdominal wall and

other parietal structures during oncological imaging. Although the primary focus of surveillance imaging is often directed toward visceral organs and lymph nodes, abnormalities involving the abdominal wall or skeletal muscles may be subtle and easily overlooked, particularly when they are small or newly developing. Careful review of the parietal structures on current and prior examinations may therefore facilitate earlier recognition of uncommon metastatic sites. This observation is consistent with the findings of Cha et al., who reported that some skeletal muscle metastases were retrospectively identifiable on previous CT examinations despite not having been noted initially [3].

The rectus abdominis represents an uncommon site of skeletal muscle metastasis from colorectal adenocarcinoma. More broadly, distant soft-tissue metastases can involve a variety of anatomical sites, with the thigh musculature being the most frequent reported skeletal muscle location in the series of Damron and Heiner, although the overall distribution was heterogeneous [4]. Nevertheless, abdominal wall and rectus abdominis involvement have been reported. Manafi-Farid et al. described a rare case of colorectal cancer with progressive intramuscular and subcutaneous metastatic spread involving the abdominal wall, including the rectus abdominis region [5]. Other reports have described colorectal cancer metastases involving skeletal muscles at various anatomical sites, including the extremities, demonstrating the heterogeneous distribution of this uncommon metastatic manifestation [6,7].

The differential diagnosis of a newly developed intramuscular mass in a patient with colorectal cancer remains broad and includes metastatic disease, primary soft-tissue neoplasm, hematoma, abscess, and other inflammatory lesions. Imaging findings alone are not pathognomonic. In the present case, however, several elements favored metastatic disease: the lesion was absent on the preceding CT examination, appeared during a period of documented oncological progression, demonstrated contrast enhancement, was entirely centered within the skeletal muscle, and had concordant sonographic findings. The absence of direct extension from an adjacent intra-abdominal structure further supported a hematogenous metastatic origin rather than direct tumor invasion.

An additional consideration in this case is the absence of histopathological confirmation. Although biopsy may be appropriate when imaging findings are indeterminate, when alternative diagnoses remain plausible, or when tissue characterization would alter management, it was not performed in the present case. The lesion was therefore considered a radiologically presumed skeletal muscle metastasis rather than a pathologically confirmed metastasis. This interpretation was based on the concordance between the patient's known

metastatic disease and the multimodality imaging findings. Biopsy was not pursued because confirmation of the lesion was not considered likely to alter the therapeutic strategy.

CONCLUSION

Skeletal muscle metastasis from colorectal adenocarcinoma is an uncommon manifestation that may present as a newly developed intramuscular lesion during oncological surveillance. This case highlights the importance of systematic assessment of the parietal structures, including the abdominal wall musculature, in addition to the usual evaluation of visceral and nodal disease. Careful comparison with prior CT examinations can demonstrate interval development and provide an important diagnostic clue, particularly when a new lesion appears in the setting of progressive malignancy.

Targeted ultrasound provides a complementary tool for further characterization, allowing precise confirmation of intramuscular localization and assessment of lesion morphology and vascularity. In this case, the lesion was well-defined, oval, predominantly hypoechoic, and demonstrated peripheral vascularity. Although histological confirmation was not obtained, the concordant clinical and multimodality imaging findings strongly supported a radiological diagnosis of skeletal muscle metastasis.

FIGURES:

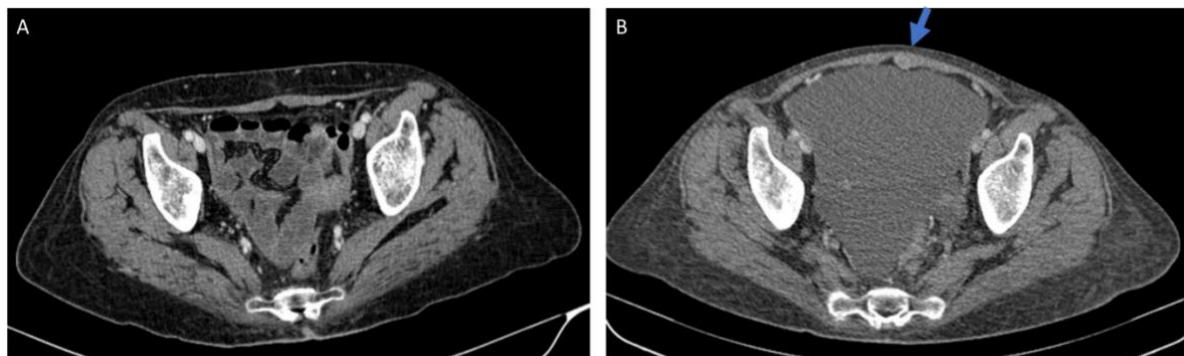


Figure 1. Interval development of a left rectus abdominis lesion on contrast-enhanced CT. (A) Axial contrast-enhanced CT image obtained 9 months before the current evaluation shows preserved architecture of the left rectus abdominis muscle without a focal lesion. **(B)** Axial contrast-enhanced CT image obtained 9 months later demonstrates a newly developed enhancing lesion within the left rectus abdominis muscle (arrow).

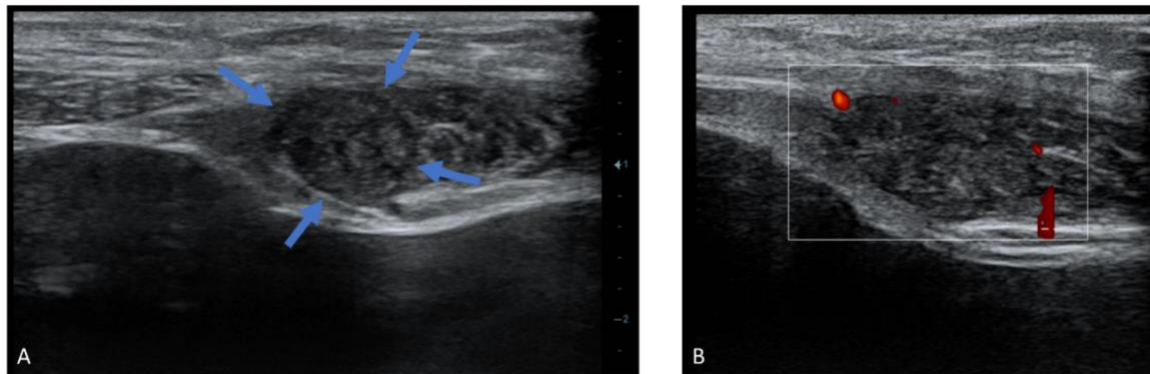


Figure 2. Targeted ultrasonography of the left rectus abdominis lesion. (A) Transverse high-frequency ultrasound demonstrates a well-defined, oval, predominantly hypoechoic lesion (arrows) centered within the left rectus abdominis muscle. (B) Color Doppler ultrasound demonstrates peripheral vascularity surrounding the lesion.

ACKNOWLEDGEMENTS

The authors have no acknowledgements to declare and report no conflicts of interest.

REFERENCES

1. Kulkarni N, Khalil A, Bodapati S. Skeletal muscle metastasis from colorectal adenocarcinoma: a literature review. *World J Gastrointest Surg.* 2022;14(7):696-705. doi:10.4240/wjgs.v14.i7.696. <https://doi.org/10.4240/wjgs.v14.i7.696>
2. Mihailescu-Marin MM, Chindris MD. Skeletal muscle metastases from colorectal adenocarcinoma: a rare case report with literature review. *Reports.* 2026;9(2):146. doi:10.3390/reports9020146. <https://doi.org/10.3390/reports9020146>
3. Cha SY, Kim HS, Lee JH, Yoon YC. Skeletal muscle metastases of the trunk and pelvis: focus on ultrasound, CT findings, and clinical manifestations. *Br J Radiol.* 2022;95(1139):20220513. doi:10.1259/bjr.20220513. <https://doi.org/10.1259/bjr.20220513>
4. Damron TA, Heiner J. Distant soft tissue metastases: a series of 30 new patients and 91 cases from the literature. *Ann Surg Oncol.* 2000;7(7):526-534. doi:10.1007/s10434-000-0526-7. <https://doi.org/10.1007/s10434-000-0526-7>
5. Manafi-Farid R, Ayati N, Eftekhari M, Fallahi B, Masoumi F. A rare presentation of colorectal cancer with unusual progressive intramuscular and subcutaneous metastatic spread. *Asia Ocean J Nucl Med Biol.* 2019;7(1):89-94. doi:10.22038/AOJNMB.2018.11934.
6. Choi PW, Kim CN, Kim HS, et al. Skeletal muscle metastasis from colorectal cancer: report of a case. *J Korean Soc Coloproctol.* 2008;24(6):492-496. doi:10.3393/jksc.2008.24.6.492. <https://doi.org/10.3393/jksc.2008.24.6.492>

7. Mesti T, Rink S, Pocivavsek K, Ocvirk J. Isolated metastases in the elbow as the first presentation of metastatic colorectal cancer: a case report and overview of literature. J Clin Case Rep. 2015;5(10):1000621. doi:10.4172/2165-7920.1000621.
<https://doi.org/10.4172/2165-7920.1000621>