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## Intramuscular metastases in the course of rectal adenocarcinoma

**Keywords:** colorectal cancer, intramuscular metastases, skeletal muscle metastases, primary rectal adenocarcinoma

Colorectal cancer (CRC) is the third most commonly diagnosed neoplasm worldwide and is the second most common cause of death related to cancer [1]. The most frequent metastatic sites of CRC are the liver, lungs, peritoneum, and lymph nodes. Brain, bones, and other sites are less common [2]. Intramuscular metastases are very rare, with an estimated incidence of 0.028% [3].

A 63-year-old female patient was diagnosed with rectal adenocarcinoma *G2 intestini crassi*. She underwent neoadjuvant radiotherapy to the rectal area, mesorectum, and regional lymph nodes, with a margin of 25 gray (Gy; 5 Gy in 5 fractions) and transanal total mesorectal excision (TaTME) with colostomy. After TaTME, the patient received six courses of adjuvant chemotherapy in the 5-fluorouracil and calcium folinate (LF1) regimen. The patient remained in remission after completion of chemotherapy.

A control positron emission tomography-computed tomography (PET-CT) scan six months later indicated disease progression — intramuscular metastases were observed in the mesorectum on the right side, adjacent to the pelvic floor muscles, and in the left thigh area between the adductor magnus, semitendinosus and semi-membranosus muscles. An additional metastatic lesion was detected in the left buttock above the anus (Fig. 1A, B). A subsequent computed tomography (CT) scan revealed a ring-shaped contrast-enhanced lesion closely adjacent to the sigmoid colon, uterus, and small intestine loop, as well as the presence of foci in the left mesorectum, closely adjacent to the levator ani muscle,

rectum and vagina, bilateral enlargement of the inguinal lymph nodes and the lymph node at the left iliac vessels (Fig. 1C). The patient did not report pain or symptoms caused by the constriction of the surrounding tissues by the metastatic masses. Due to the surgical inaccessibility of the metastatic sites, the patient's performance status, and lack of indicators, it was decided against the surgical removal of the masses. The patient was qualified for the treatment regime for colon cancer according to the scheme — folinic acid, fluorouracil, and irinotecan (FOLFIRI) plus cetuximab. Treatment tolerance was good, and disease stabilization was observed with a tendency to lesion regression. However, after four months, a follow-up CT scan showed disease progression (Fig. 1D). It was decided to change treatment, and the folinic acid, fluorouracil, and oxaliplatin (FOLFOX) regimen was implemented.

Intramuscular metastases in the course of colorectal cancer are extremely rare. Fewer than 60 cases were reported worldwide, and only 12 in Europe [3–5]. In most cases, the occurrence of intramuscular metastases indicated worse clinical outcomes. Most affected patients are women in the 6<sup>th</sup> and 7<sup>th</sup> decade of life. The vast majority of described cases presented a singular intramuscular lesion in the thigh or gluteus area. The time of finding the lesions and their appearance varied. The most commonly reported symptoms included pain and enlargement of the affected muscle area. To our knowledge, this is the first case of intramuscular metastases of *adenocarcinoma crassi* in Poland.

Received: 17.09.2024

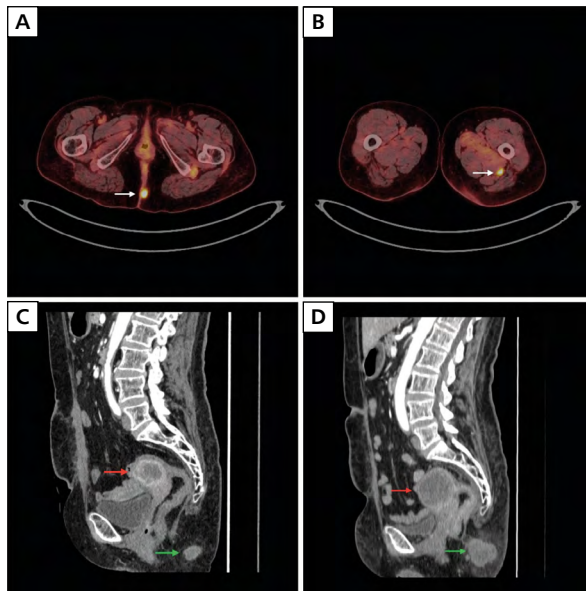
Accepted: 18.09.2024

Early publication date: 26.11.2024

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Oncol Clin Pract, DOI: 10.5603/ocp.102637, Copyright © 2024 Via Medica, ISSN 2450–1654, e-ISSN 2450–6478



**Figure 1.** A. Positron emission tomography-computed tomography scan (axial plane) demonstrating intramuscular metastasis to the left thigh area (white arrow); B. Positron emission tomography-computed tomography scan (axial plane) demonstrating intramuscular metastasis to the left buttock (white arrow); C. Computed tomography scan (sagittal plane) demonstrating a ring-shaped contrast-enhanced lesion, adjacent to the sigmoid colon, uterus and small intestine loop (red arrow) and an intramuscular metastasis to the left buttock (green arrow); D. Computed tomography scan (sagittal plane) demonstrating a progressed ring-shaped contrast-enhanced lesion, adjacent to the sigmoid colon, uterus and small intestine loop (red arrow) and an intramuscular metastasis to the left buttock (green arrow)

## Article Information and Declarations

### Ethics statement

Ethic statement not required due to no intervention.

### Author contributions

A.R.: conceptualization, writing — original draft preparation, writing — review and editing, supervision,

visualization; K.J.: conceptualization, writing — original draft preparation, writing — review and editing, visualization; J.O.: conceptualization, writing — original draft preparation, writing — review and editing, supervision; M.J.: conceptualization, writing — original draft preparation, writing — review and editing, visualization; K.S.: conceptualization, writing — original draft preparation, writing — review and editing, supervision, visualization. All authors have read and agreed to the published version of the manuscript.

### Acknowledgments

None.

### Funding

None.

### Conflict of interest

The authors declare no conflict of interest.

### Supplementary

None.

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