Case Reports in Oncology

Case Rep Oncol 2025;18:1488–1495
DOI: 10.1159/000548238
Received: July 4, 2025
Accepted: August 20, 2025
Published online: October 9, 2025

Case Report

Excellent Response and Persistent Local Control of Metastatic Extraskeletal Myxoid Chondrosarcoma Repeatedly Treated with Surgical Excision or Stereotactic Radiotherapy Alone: A Case Report

Giorgia Timon[a] Massimiliano Grassi[b] Celjeta Tominaj[c] Marianna Turazzi[c] Matteo Mascherini[d] Franco De Cian[d, e] Bruno Spina[f] Federico Zaottini[c, g] Federico Pistoia[g] Salvina Barra[a] Danila Comandini[b] Liliana Belgioia[a, c]

[a]Department of Radiotherapy, IRCCS Ospedale Policlinico San Martino, Genoa, Italy; [b]Medical Oncology Unit 1, IRCCS Ospedale Policlinico San Martino, Genoa, Italy; [c]Department of Health Sciences (DISSAL), University of Genoa, Genoa, Italy; [d]Surgical Clinical Unit 1, IRCCS Ospedale Policlinico San Martino, Genoa, Italy; [e]Department of Surgical Sciences and Integrated Diagnostic (DISC), University of Genoa, Genoa, Italy; [f]S.C. Anatomia Patologica Ospedaliera, IRCCS Ospedale Policlinico San Martino, Genoa, Italy; [g]Radiology Unit, IRCCS Ospedale Policlinico San Martino, Genoa, Italy

Keywords
Extraskeletal myxoid chondrosarcoma · Metastasis · Radiotherapy · Soft tissue sarcoma · Stereotactic ablative radiotherapy

Abstract
Introduction: Extraskeletal myxoid chondrosarcoma (EMC) is an extremely rare mesenchymal tumor, accounting for less than 3% of soft tissue sarcomas. Even though metastatic rate after radical surgery in EMC can reach 50%, prolonged survival is common even in the presence of metastatic disease. Prospective studies evaluating the role of trabectedin, antiangiogenic agents, and immunotherapy are ongoing to assess the best systemic treatment. ***Case Presentation:*** We report the case of a young Sri Lankan woman who initially underwent neoadjuvant radiotherapy and surgery for a mass of the right thigh, then experienced local relapse, managed with chemotherapy and surgery again, and finally was diagnosed with distant progression. All metastatic sites of EMC were treated with either surgical excision or stereotactic

Correspondence to:
Giorgia Timon, giorgia.timon@hsanmartino.it

Case Rep Oncol 2025;18:1488–1495
DOI: 10.1159/000548238

ablative radiotherapy alone in three different occasions, showing complete or major response. ***Conclusion:*** This individualized approach enabled prolonged systemic therapy-free intervals with minimal toxicity, so could be considered in selected patients.

Introduction

Extraskeletal myxoid chondrosarcoma (EMC) is an extremely rare sarcoma subtype, usually occurring in adults, with a median age of onset in the fifth decade and a male/female ratio of 2:1. Most EMCs arise in the deep soft tissue of the proximal extremities and limb girdles [1]. It is classified as a mesenchymal tumor of uncertain differentiation [2]. Although the risk of relapse after standard treatment is about 50%, and the metastatic rate after radical surgery ranges from 25 to 50%, prolonged survival is relatively common in EMC patients, even in advanced stages [3, 4]. In the metastatic setting, besides the standard chemotherapy currently used for soft tissue sarcoma (STS), antiangiogenic agents have recently shown promising activity [3]. We present the case of a patient affected by EMC repeatedly treated with surgery and afterward stereotactic ablative radiotherapy (SABR) on metastatic sites, achieving complete or major response and optimal local control.

Case Presentation

A 39-year-old woman from Sri Lanka was diagnosed in 2019 with undifferentiated epitheliomorphic sarcoma of the right thigh. Pathological diagnosis was confirmed in a tertiary referral center. She underwent neoadjuvant radiotherapy (RT), 60 Gy in 25 fractions from June to July 2019 in a different Radiation Oncology Department. In July 2019, a radical excision of the mass and distal right femur was performed, with immediate positioning of prosthetic implant.

One year later, in August 2020, a new swelling appeared in the right thigh: a biopsy was performed, indicating a loco-regional sarcoma relapse. Patient decided to be referred to our institute for further treatment. A CT scan also revealed a 25-mm nodule, anteriorly to the left lobe of the liver, inside falciform ligament, and a suspicious right groin lymph node. The patient started a systemic treatment, with 6 cycles of epirubicin and ifosfamide, according to international guidelines, as first-line medical treatment: 35 mg of epirubicin and 3,000 mg of ifosfamide were administered at days 1, 2, and 3 every 3 weeks for the first four cycles, and 30 mg of epirubicin and 2,600 mg of ifosfamide for the last two cycles. A clinical partial response over all three sites of disease was achieved. In May 2021, surgery was performed with complete cytoreduction. Pathological report confirmed a relapse of myxoid chondrosarcoma (ki67 10%) for abdominal and limb nodules (shown in Fig. 1); groin lymph node was negative for neoplastic disease. Pathological response was not described. After tumor board discussion, no adjuvant treatments were recommended.

The subsequent follow-up has been negative until August 2023, when a total body CT scan revealed two abdominal lesions: one 10-mm nodule located in the hypodermic right lumbar area, and a 21-mm nodule posteriorly to the right psoas muscle, in proximity of the right sacroiliac joint. Previously surgically treated sites presented no evidence of disease. Given the oligoprogression after over 2 years from surgery, a local approach was considered as first option. The patient underwent SABR to the two nodules in September 2023, for a

Case Rep Oncol 2025;18:1488–1495
DOI: 10.1159/000548238

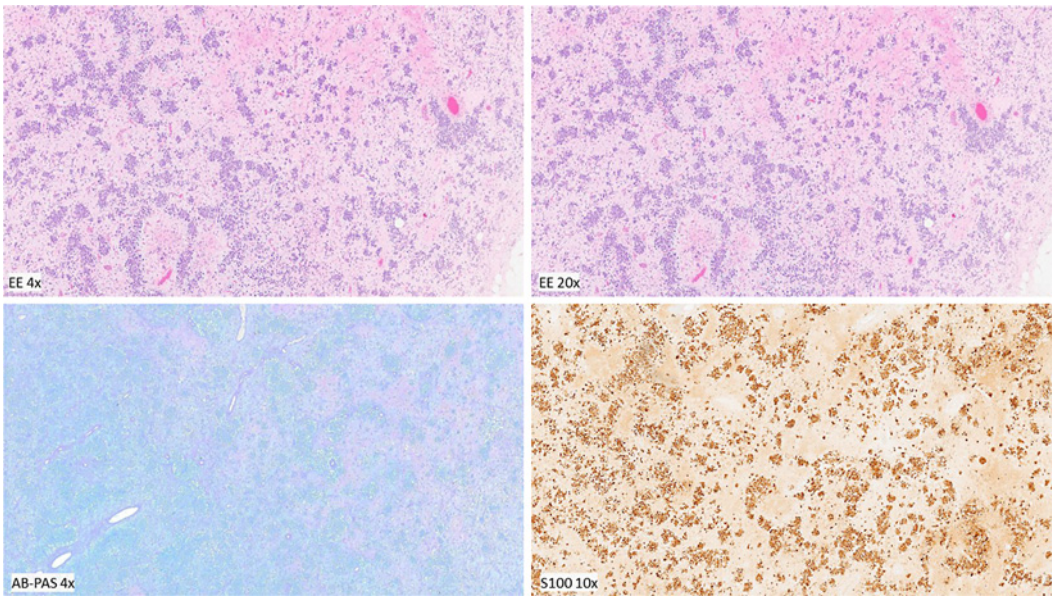

Fig. 1. Microscopic histologic examination and immunohistochemical studies of the first relapse. Neoplasm consisting of aggregates and islands of small-to-medium-sized cells with clear cytoplasm, embedded in a myxoid/fibromyxoid stroma (as confirmed by AB-PAS staining). Immunophenotypic analysis showed diffuse expression of the S100 protein molecule.

total dose of 40 Gy, delivered in 5 consecutive fractions of 8 Gy. One month later, a CT scan revealed an initial volumetric reduction of the irradiated lesions.

In May 2024, a new CT showed a complete response on irradiated sites and a new 12-mm nodule of the subcutaneous left abdominal wall. The patient underwent surgery on the new lesion in June: the histologic report suggested an extraskeletal location of myxoid chondrosarcoma (ki67 40%) (shown in Fig. 2).

The restaging was performed in October, showing three new small nodules of the abdominal wall (12, 9, and 16 mm, respectively) and two inside abdominal cavity (6 and 9 mm). Two new SABR courses were performed in December 2024 on all these new lesions, at the dose of 40–35 Gy in 5 fractions, respectively: the two nodules located in the abdominal cavity were treated at a lower dose to comply with bowel dose constraints (shown in Fig. 3).

In March 2025, a CT scan again revealed a complete response of four nodules and a major response of the largest lesion (6 mm vs. 16 mm) after SABR (shown in Fig. 3); it is possible that a further reduction will be detected in subsequent imaging. An oligoprogressive 10-mm nodule of the left abdominal wall was identified, though. A new SABR was performed, at the dose of 40 Gy in 5 consecutive daily fractions, after a careful evaluation of the previous treatment plans, to ensure no additional risk of toxicity.

During all planning CT scans and SABR courses, the patient maintained the same comfortable supine position, with both arms over her head, supported by a hard cushion. The planning CT was acquired with a slice thickness of 2 mm. Four tattoos were performed on the patient's abdominal skin, in order to reproduce the correct positioning through the whole treatment. No gating or tracking technique was adopted: breathing movement was not considered relevant due to the location of the nodules. The only possibly relevant variable was bowel movement, which could not be artificially minimized. A cone-beam CT was performed before every RT session, and SABR was delivered by a modern linac. Given the disease location, daily image guidance, and the prescription

Case Rep Oncol 2025;18:1488–1495
DOI: 10.1159/000548238

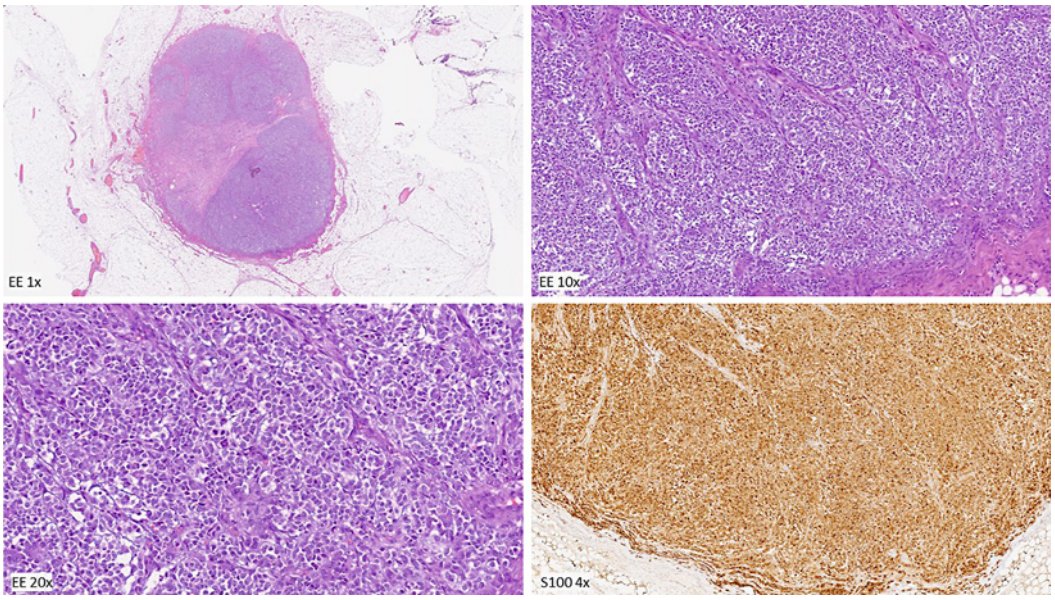

Fig. 2. Microscopic histologic examination and immunohistochemical studies of the second relapse, consistent with the previously resected disease. Neoplasm consisting of aggregates and islands of small-to-medium-sized cells with clear cytoplasm, embedded in a myxoid/fibromyxoid stroma (as confirmed by AB-PAS staining). Immunophenotypic analysis showed diffuse expression of the S100 protein molecule.

doses below the tolerance of organs at risk close to the target, no immobilizing device, such as thermoplastic mask, was deemed necessary. Table 1 shows dosimetric data of treatment plans. The small bowel was the only critical organ at risk, due to the position of abdominal lesions: to comply with dose constraints, the prescription dose for the third SABR course was lowered to 35 Gy instead of 40 Gy. All RT courses were extremely well tolerated, with no relevant side effects: only a mild transient abdominal discomfort was reported during follow-up.

Discussion

Like for other extremely rare diseases, it is challenging to build a strong evidence regarding the treatment of EMC. Patients experiencing distant progression have an unfavorable prognosis, and medical options available in this setting are limited, although survival in advanced stages is often longer than expected in other STS [3].

Limited data from older retrospective series showed poor response to anthracycline-based, dacarbazine-based, and ifosfamide-based regimens. More recent studies outlined instead of a higher sensitivity not only to anthracycline-based regimens, as for other similar diseases [5], but also to trabectedin [6] and antiangiogenic agents, such as sunitinib [7] and pazopanib [8].

After metastases are diagnosed, though, few effective therapeutic options are available [4, 9]. Despite the intrinsic radioresistance of STS and the little amount of data, encouraging results regarding radiation in patients with localized EMC have been published [10, 11]. The role of RT in metastatic setting has been mainly palliative until recently [11]. With the onset of intensity-modulated RT and SABR, the possibility of delivering a higher dose, strictly conformed and biologically more effective, has increased the interest in using RT for radioresistant tumors, such as STS [12, 13].

Case Rep Oncol 2025;18:1488–1495
DOI: 10.1159/000548238

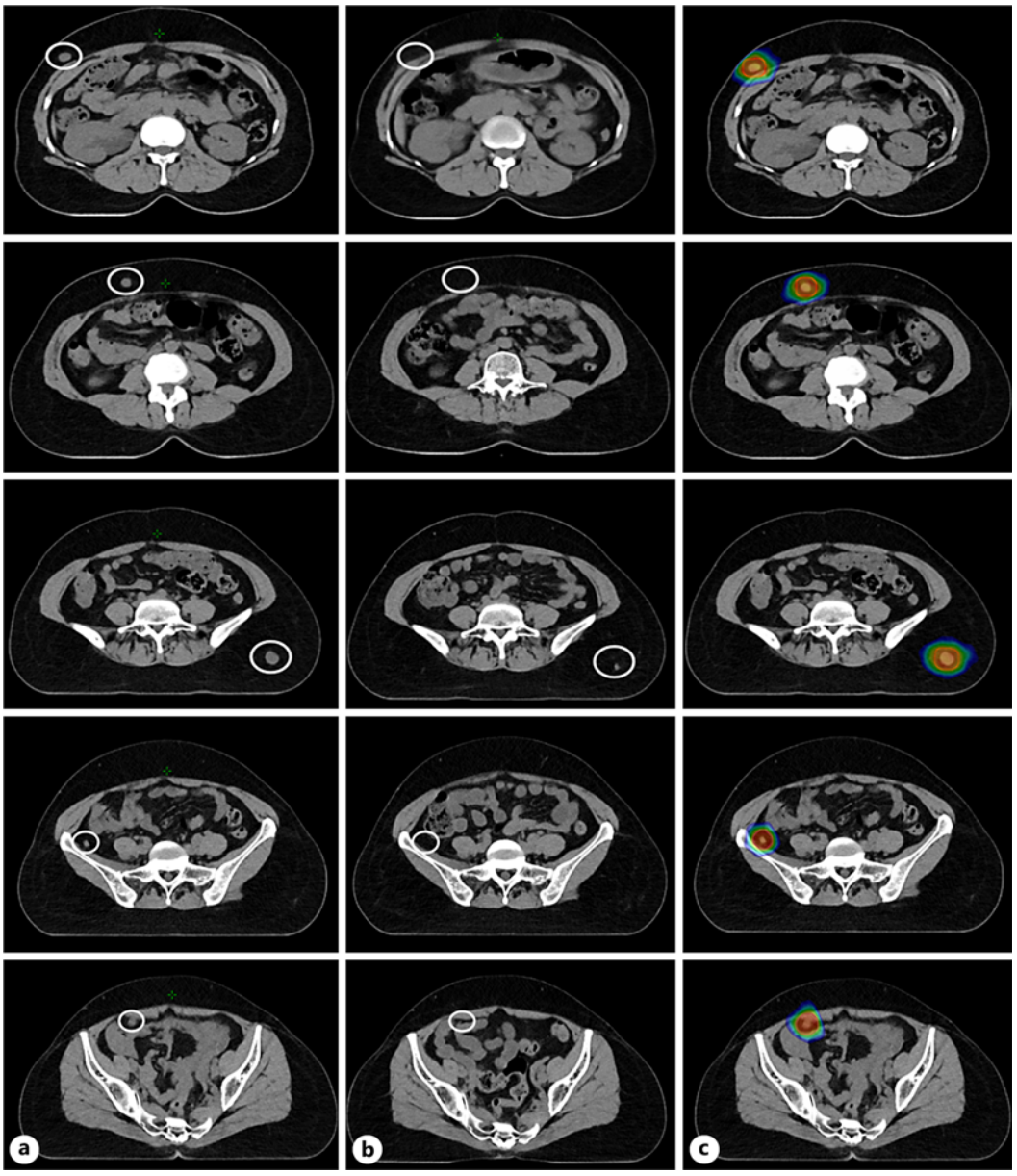

Fig. 3. Three nodules of the abdominal wall and the two nodules inside abdominal cavity before SABR (**a**), after SABR (**b**), and color-wash dose distribution (**c**): 50% isodose was selected.

Due to the rarity of the disease, limited experiences of SABR in metastatic EMC have been published. A better outcome in patients with primary EMC undergoing RT has been suggested in at least two retrospective studies, but they are not focused on SABR neither on the metastatic setting [10, 14]. To the best of our knowledge, a single experience of RT in metastatic EMC has been reported, but conventional palliative RT was employed [15]. As for other diseases, there could be a strong rationale to deliver SABR in oligometastatic EMC to delay further systemic therapies, but evidence is still lacking.

In the case we presented, all irradiated sites achieved complete or major response and to date none relapsed, showing long-term local control. Clinical decisions were shared by a multidisciplinary team, including a sarcoma-experienced radiation oncologist, medical oncologist, radiologist, surgeon, and pathologist.

Case Rep Oncol 2025;18:1488–1495
DOI: 10.1159/000548238

Table 1. Dosimetric data of the SABR courses

	Dosimetric data	Reference	1st SABR	2nd SABR	3rd SABR	4th SABR
PTV	Prescription dose (Gy)	–	40	40	35	40
PTV	D95% (%)	–	93.9	96.2	95.8	94.4
PTV	Dmean (Gy)	–	39.8	40	35	40
Spinal cord	Dmax (0.035 cm^3) (Gy)	<25.3 Gy*	NR	NR	NR	0.6
Cauda equina	Dmax (0.035 cm^3) (Gy)	<32 Gy*	20.4	3.8	3.2	NR
Large bowel	Dmax (Gy)	<38 Gy*	20.2	20.9	0.2	6.6
Large bowel	D 20 cm^3 (Gy)	<25 Gy*	11.2	10	0.1	2.5
Small bowel	Dmax (Gy)	<35 Gy*	17.4	2.2	34.7	NR
Small bowel	D 10 cm^3 (Gy)	<25 Gy*	9	1.3	17	NR
Kidney right	Dmean (Gy)	<10 Gy*	NR	1.4	0.06	NR
Kidney left	Dmean (Gy)	<10 Gy*	NR	1	0.03	0.6

PTV, planning target volume; Gy, gray; D, dose; SABR, stereotactic ablative radiotherapy; NR, not reported. *According to Bisello et al., Dose–Volume Constraints fOr oRganS At risk In Radiotherapy (CORSAIR): An "All-in-One" Multicenter–Multidisciplinary Practical Summary. Curr Oncol. 2022;29(10):7021–7050.

The patient was not considered a candidate for further systemic treatments after the initial one: this is partly due to the lack of truly effective options in this setting and also to the suboptimal compliance of the patient. It must be outlined that multiple cycles of chemotherapy could be hardly tolerated by the patients, while SABR showed in our experience a very low toxicity profile: this conservative, local approach led to a more than 4-year period free from chemotherapy and therefore potential toxicity.

The patient experienced indeed repeated oligoprogression, but remained free from local relapse in irradiated sites, showing high response rate and local control. Furthermore, no significant side effects were reported during or after SABR.

Conclusion

In our experience, SABR in oligoprogressive EMC provided an excellent local control, without any relevant toxicity, allowing to postpone more toxic systemic treatments. This personalized approach could therefore be considered in selected patients. The CARE Checklist has been completed and is provided as supplementary material (for all online suppl. material, see https://doi.org/10.1159/000548238) to ensure transparent and standardized case reporting.

Statement of Ethics

This study was performed in accordance with the Declaration of Helsinki. This human study was approved by DMT Sarcomi – IRCCS Ospedale Policlinico San Martino, approval: 01/04/2025. All adult participants provided written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for publication of the details of their medical case and any accompanying images.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Funding Sources

This study was not supported by any sponsor or funder.

Author Contributions

GT: conceptualization, data curation, investigation, methodology, validation, visualization, and writing – original draft, review, and editing. MM: investigation, supervision, validation, visualization, and writing – review and editing. MG: investigation, validation, and visualization. CT, MT, FDC, BS, FZ, FP, and SB: validation and visualization. DC: validation, supervision, and visualization. LB: supervision, validation, visualization, and writing – review and editing.

Data Availability Statement

All data generated or analyzed during this study are included in this article and its online supplementary materials. Further inquiries can be directed to the corresponding author.

References

1 Meis-Kindblom JM, Bergh P, Gunterberg B, Kindblom LG. Extraskeletal myxoid chondrosarcoma: a reappraisal of its morphologic spectrum and prognostic factors based on 117 cases. Am J Surg Pathol. 1999;23(6):636–50. https://doi.org/10.1097/00000478-199906000-00002
2 Fletcher C, Bridge JA, Hogendoorn PCW, Mertens F WHO classification of tumours of soft tissue and bone: WHO classification of tumours. vol. 5. (4th ed World Health Organization; 2013.
3 Stacchiotti S, Baldi GG, Morosi C, Gronchi A, Maestro R. Extraskeletal myxoid chondrosarcoma: state of the art and current research on biology and clinical management. Cancers. 2020;12(9):2703. https://doi.org/10.3390/cancers12092703
4 Drilon AD, Popat S, Bhuchar G, D'Adamo DR, Keohan ML, Fisher C, et al. Extraskeletal myxoid chondrosarcoma: a retrospective review from 2 referral centers emphasizing long-term outcomes with surgery and chemotherapy. Cancer. 2008;113(12):3364–71. https://doi.org/10.1002/cncr.23978
5 Foroughi A, Arefpour AM, Nikoofar A, Sanei M, Mahdavi SH, Javadinia SA. Total neoadjuvant vs. standard perioperative Cisplatin/doxorubicin chemotherapy in patients with extremities osteosarcoma: a multicenter cohort study. Asian Pac J Cancer Prev. 2023;24(7):2369–74. https://doi.org/10.31557/APJCP.2023.24.7.2369
6 Morioka H, Takahashi S, Araki N, Sugiura H, Ueda T, Takahashi M, et al. Results of sub-analysis of a phase 2 study on trabectedin treatment for extraskeletal myxoid chondrosarcoma and mesenchymal chondrosarcoma. BMC Cancer. 2016;16:479. https://doi.org/10.1186/s12885-016-2511-y
7 Stacchiotti S, Pantaleo MA, Astolfi A, Dagrada GP, Negri T, Dei Tos AP, et al. Activity of sunitinib in extraskeletal myxoid chondrosarcoma. Eur J Cancer. 2014;50(9):1657–64. https://doi.org/10.1016/j.ejca.2014.03.013
8 Stacchiotti S, Ferrari S, Redondo A, Hindi N, Palmerini E, Vaz Salgado MA, et al. Pazopanib for treatment of advanced extraskeletal myxoid chondrosarcoma: a multicentre, single-arm, phase 2 trial. Lancet Oncol. 2019;20(9):1252–62. https://doi.org/10.1016/S1470-2045(19)30319-5
9 McGrory JE, Rock MG, Nascimento AG, Oliveira AM. Extraskeletalmyxoid chondrosarcoma. Clin Orthop. 2001;382:185–90. https://doi.org/10.1097/00003086-200101000-00025
10 Kemmerer EJ, Gleeson E, Poli J, Ownbey RT, Brady LW, Bowne WB. Benefit of radiotherapy in extraskeletal myxoid chondrosarcoma: a propensity score weighted population-based analysis of the SEER database. Am J Clin Oncol. 2018;41(7):674–80. https://doi.org/10.1097/COC.0000000000000341

11 Ogura K, Fujiwara T, Beppu Y, Chuman H, Yoshida A, Kawano H, et al. Extraskeletal myxoid chondrosarcoma: a review of 23 patients treated at a single referral center with long-term follow-up. Arch Orthop Trauma Surg. 2012;132(10):1379–86. https://doi.org/10.1007/s00402-012-1557-9
12 Stergioula A, Kokkali S, Kormas T, Memos N, Pantelis E. Stereotactic radiotherapy for locally recurrent and metastatic soft tissue sarcoma. Cureus. 2025;17(5):e84886. https://doi.org/10.7759/cureus.84886
13 Spalek MJ, Teterycz P, Borkowska A, Poleszczuk J, Rutkowski P. Stereotactic radiotherapy for soft tissue and bone sarcomas: real-world evidence. Ther Adv Med Oncol. 2022;14:1–13. https://doi.org/10.1177/17588359211070646
14 Bishop AJ, Bird JE, Conley AP, Roland CL, Moon BS, Satcher RL, et al. Extraskeletal myxoid chondrosarcomas: combined modality therapy with both radiation and surgery improves local control. Am J Clin Oncol. 2019;42(10):744–8. https://doi.org/10.1097/COC.0000000000000590
15 Filannino R, Nardone A, Fucci L, Armenio A, De Luca F, Figliuolo F, et al. Impressive response and longterm survival in a patient with metastatic extraskeletal myxoid chondrosarcoma treated with radiotherapy and trabectedin: a synergistic activity. Clin Pract. 2018;15(7):953–61. https://doi.org/10.4172/clinical-practice.1000433