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Case Report

Extraskeletal Myxoid Chondrosarcoma in a 19-Year-Old Female: A Case Report Highlighting Diagnostic Challenges and Aggressive Clinical Course

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Abstract: Extraskeletal Myxoid Chondrosarcoma (EMC) is a rare soft tissue sarcoma, traditionally characterized by an indolent clinical course and occurrence in the fifth or sixth decades of life. Presentation in adolescents is exceptionally rare and often poses significant diagnostic challenges due to its benign-mimicking radiological appearance. A 19-year-old female presented with a painless subcutaneous nodule in the right scapular region. Initial ultrasound (US) misinterpreted the lesion as a sebaceous cyst due to the hypoechoic nature of the myxoid matrix, leading to a one-year diagnostic delay. Following rapid growth and subsequent biopsy, the patient underwent a wide R0 surgical resection. Histopathological analysis revealed high-grade features, including a mitotic index >20/10 HPF and 20% necrosis, within a 20.0 cm surgical specimen. Despite complete resection, the patient developed widespread pulmonary and lymph node metastases within months. Due to the characteristic chemoresistance of EMC, palliative care was initiated, and the patient passed away five months after the definitive diagnosis. This case challenges the traditional "indolent" classification of EMC. The high mitotic activity and extensive necrosis in this young patient represent a high-grade outlier compared to classic cohorts. The diagnostic delay highlights the need to include rare sarcomas in the differential diagnosis of subcutaneous nodules, regardless of age or benign initial imaging. EMC in young patients can exhibit a highly aggressive phenotype with rapid systemic progression. Early diagnostic suspicion and a multidisciplinary approach are crucial for managing this unpredictable and potentially fatal neoplasm.

Keywords: Extraskeletal Myxoid Chondrosarcoma; Sarcoma; Diagnostic Errors; Adolescent; Case Report.

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1. Introduction

Extraskeletal Myxoid Chondrosarcoma (EMC) is a rare malignant mesenchymal neoplasm, first identified by Stout and Verner in 1953 and further elucidated by Enzinger and Shiraki in 1972 [1]. Despite its nomenclature, EMC is currently classified by the World Health Organization (WHO) as a tumor of uncertain differentiation, accounting for less than 1% of all soft tissue sarcomas. Clinically, EMC often follows a more protracted course with a relatively more favorable prognosis compared to conventional skeletal chondrosarcomas [1]. The disease shows a distinct male predilection (M:F ratio 2:1) and primarily affects adults in their fifth and sixth decades, remaining exceptionally rare in pediatric and adolescent populations [2-4].

The neoplasm typically arises within the deep soft tissues of the proximal lower extremities, particularly the thigh. However, atypical primary sites, including the retroperitoneum, head and neck, bone, and pleura, have been reported [4]. Patients usually present with a deep-seated, enlarging mass; while often asymptomatic, it may manifest with pain, tenderness, or restricted joint mobility, occasionally mimicking a hematoma [3]. Although radiological imaging is essential to delineate tumor boundaries and involvement of adjacent structures, imaging findings are often non-specific and insufficient for a definitive diagnosis [5].

Genetically, EMC is characterized by the hallmark t(9;22) translocation, or less frequently, the t(9;17) variant. While the t(9;22) translocation may occur as an isolated anomaly, most cases exhibit complex chromosomal alterations, such as trisomies of 7, 8, 12, 19, or 1q25-qter [1]. Histologically, the tumor displays a characteristic multinodular architecture, where fibrous septa partition the lesion into lobules. These lobules contain atypical cells with eosinophilic cytoplasm and high nucleus-to-cytoplasm ratios, arranged in cords or clusters within an abundant myxoid stroma. While hyaline cartilage is rare, necrosis, hemorrhage, and rhabdoid differentiation may be observed [3,4]. Immunohistochemically, S-100 and CD117 are expressed in 20–30% of cases, with occasional positivity for synaptophysin and NSE; notably, INI1 expression is frequently lost in cases exhibiting rhabdoid features [3].

Herein, we report a rare case of dorsal EMC in a 19-year-old female, initially misdiagnosed as a sebaceous cyst. The atypical epidemiology and clinical presentation led to a diagnostic delay and an unfavorable clinical outcome, highlighting the challenges in managing this rare entity in young patients.

2. Case Report

A 19-year-old mixed-race female from upstate São Paulo, Brazil, presented with a painless subcutaneous nodule in the right scapular region first noticed in 2015. The subsequent clinical course, characterized by diagnostic challenges and rapid progression, is summarized in Table 1. Despite the clinical progression over 12 months, the patient only underwent her first imaging study in 2016. This one-year interval between the initial perception of the nodule and medical imaging stems from documented barriers to accessing the public health system and long waiting lists in her regional health district. In 2016, an ultrasound (US) was performed at an external service, which reported a lesion with features suggestive of a sebaceous cyst. No further imaging or biopsies were conducted at that time, and the patient was managed based on this initial radiological impression.

Table 1: Timeline of clinical events, diagnostic workup, and interventions.

Date	Clinical Event / Symptoms	Diagnostic Hypothesis	Intervention / Finding
2015	Onset of painless, slow-growing dorsal nodule.	Benign nodule	Clinical observation (patient-related delay).
Feb/2016	Persistent growth; first medical consult.	Sebaceous Cyst	Ultrasound (US) performed at a primary care unit.
Late/2016	Accelerated growth, pain, and violaceous color after local trauma.	Infected Lipoma	Onset of regional edema (Right Upper Limb).
Mar/2017	Surgical referral in a rural facility.	Infected Lipoma	Initial resection; rapid local recurrence observed.
May/2017	Second surgery at a secondary facility.	Malignant Neoplasm	Histopathology: Small-cell neoplasm; fragmented margins.
Jul/2017	Admission to Tertiary Center (HCFMB-UNESP).	EMC (Confirmed)	Wide margin resection + Skin autograft (R0).
Aug/2017	Postoperative staging.	Localized disease	Chest/Abdominal CT: No distant metastasis.

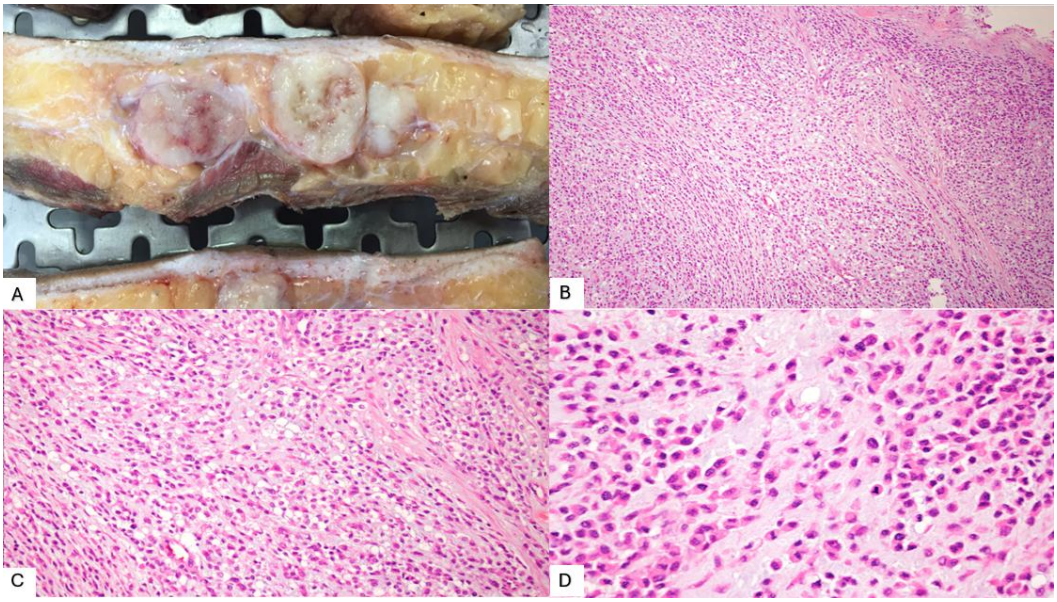
Sep/2017	New painful axillary nodule; donor site hypertrophy.	Early Recurrence	Clinical follow-up.
Oct/2017	Cough, hemoptysis, and 3kg weight loss.	Systemic Progression	CT: Multiple pulmonary nodules and lymphadenopathy.
Nov/17	Return to Oncology (HCFMB).	Terminal Stage	Palliative care for intense pain (VAS 8/10).

EMC. Extraskeletal Myxoide Condrosarcoma. CT. Computed Tomography. VAS. Visual Analogue Scale. It is a validated, standardized instrument used to measure the intensity of pain reported by the patient. It typically consists of a 10 cm horizontal line Where 0 represents 'no pain' and 10 represents 'the worst pain imaginable'.

By February 2017, the patient reported pain and edema in the right upper limb. Following local trauma, the lesion exhibited rapid growth and purplish discoloration. Based on the previous US and the clinical appearance of an "infected lipoma," several unsuccessful outpatient procedures were attempted. Due to the lack of clinical resolution, a local resection was performed in March 2017 in her city of residence. However, the lesion recurred immediately. In May 2017, an incisional biopsy performed at a different facility yielded an initial diagnosis of "Small Cell Malignant Neoplasm." Following this result, the patient was referred to the Hospital das Clínicas da Faculdade de Medicina de Botucatu (HC-FMB-UNESP). In July 2017, she underwent a definitive surgical resection of the lesion with skin grafting.

The surgical specimen was received by the Pathology department/section of HC-FMB-UNESP in July 2017. Macroscopic examination (Figure 1A) revealed a lesion covered by a skin flap, measuring 20.0 cm in length, with the flap measuring 13.0 cm. Upon sectioning, a heterogeneous multinodular pattern was observed, represented by three whitish, circumscribed, confluent nodules with defined borders, containing areas of necrosis, and collectively measuring 7.5 cm in their greatest diameter. These nodules exhibited clear infiltration into the deep dermis, adipose tissue, and skeletal muscle.

Figure 1: Macroscopic and microscopic features of Extraskeletal Myxoid Chondrosarcoma. A. Surgical specimen revealing a well-circumscribed, whitish nodular lesion with a glistening, gelatinous appearance embedded within the adipose tissue. B and C. Low-to-intermediate magnification (H&E, 100x and 200x) demonstrating a highly cellular neoplasm characterized by a multinodular architecture, defined by prominent fibrous septa and an abundant myxoid stroma. D. High-power magnification (H&E, 400x) highlighting pleomorphic neoplastic cells with eosinophilic cytoplasm and an increased nuclear-to-cytoplasmic ratio; the nuclei exhibit irregular chromatin and hyperchromasia, with identifiable mitotic figures throughout the field.



Microscopically, the neoplasm was observed to be organized in a predominantly solid pattern (Figure 1 B and 1C) of pleomorphic cells with high mitotic activity (> 20 mitotic figures / 10 high-power fields) (Figure 1D), fibrous septa, and thin-walled vessels. Necrosis was present, corresponding to 20% of the tumor volume. Also noted were areas with alternating cellularity and stroma that was either hyalinized or myxoid, containing atypical cells with a high nucleus-to-cytoplasm ratio and scant eosinophilic cytoplasm (Figure 1D and Figure 2).

Figure 2: Histopathological findings of Extraskeletal Myxoid Chondrosarcoma (Hematoxylin & Eosin). A. Low-power magnification (40x) showing a prominent multinodular growth pattern with cellular lobules partitioned by thin fibrous septa and focal infiltration into the adjacent adipose tissue. B. Intermediate magnification (200x) illustrating the tumor-host interface with direct invasion of the adipose panniculus and geographic necrosis. C. Detailed view of coagulative tumor necrosis at 200x magnification, reflecting an aggressive biological behavior. D. High-power magnification (400x) revealing neoplastic cells with abundant eosinophilic cytoplasm, marked nuclear pleomorphism, increased nuclear-to-cytoplasmic ratio, and coarse chromatin, alongside the presence of typical and atypical mitotic figures.

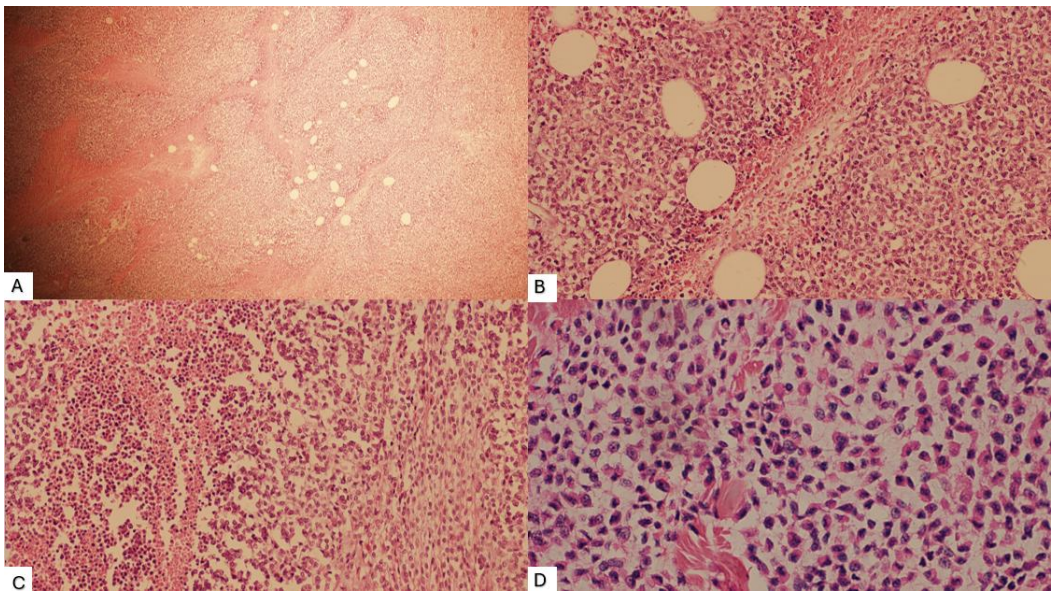
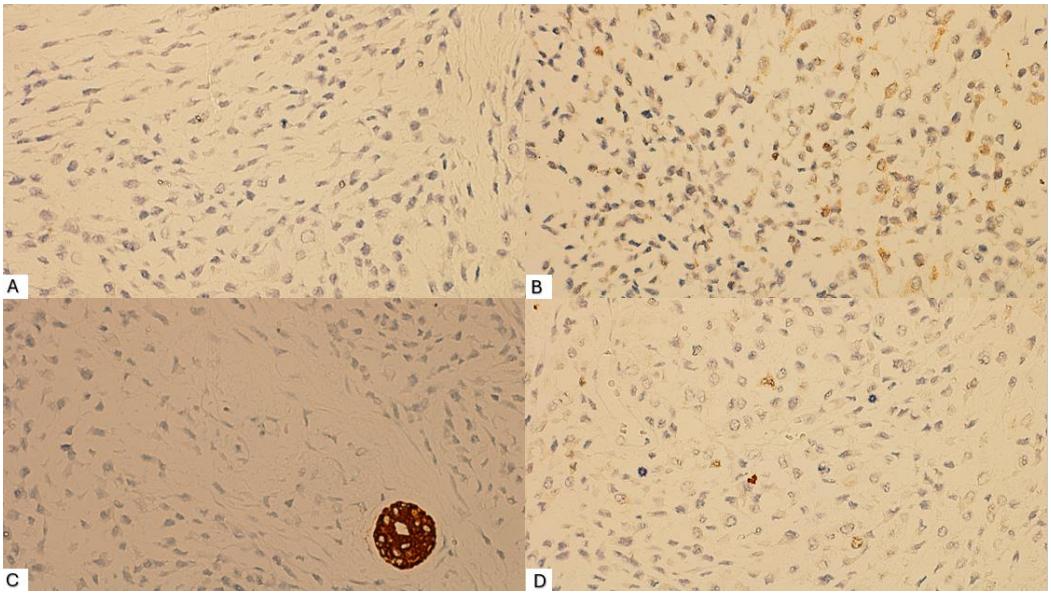


Figure 3 illustrates the focal immunoreactivity for S-100 protein and diffuse cytoplasmic expression of Neuron-Specific Enolase (NSE) (Figure 3B). The neoplastic cells were negative for Synaptophysin (Figure 3A) and Pan-Cytokeratin (AE1/AE3) (Figure 3C), with the latter showing a preserved internal control. This immunoprofile, although non-specific when isolated, supports the diagnosis of Extraskeletal Myxoid Chondrosarcoma when correlated with the characteristic multinodular myxoid morphology (Figure 3A to 3D).

In August 2017, following the R0 resection, no adjuvant chemotherapy or radiotherapy was performed. The patient was placed on a clinical follow-up protocol with the oncology and plastic surgery teams at HC-FMB-UNESP. In October 2017, the patient returned reporting a three-week history of dry cough with occasional hemoptysis, retrosternal pain, and progressive dyspnea. She also presented with intense pain at the surgical site and a 3 kg weight loss associated with nausea and emesis. Given the evidence of systemic metastasis, the oncology team indicated palliative care. The patient developed oxygen dependency due to severe dyspnea. Laboratory tests during this period showed a hemoglobin nadir of 9.2 g/dL and an elevated C-reactive protein (CRP) peak of 30.50 mg/dL.

Figure 3: Figure 3 displays an immunohistochemical profile at 400x magnification. A. Negative expression of Synaptophysin. B. Diffuse positivity for Neuron-Specific Enolase (NSE). C. Negative staining for Pan-Cytokeratin AE1/AE3 with a valid positive internal control. D. Focal reactivity for S-100 protein. The results highlight a neuroendocrine marker (NSE) positivity alongside epithelial marker (AE1/AE3) negativity.



Due to her clinical condition and personal preferences, the patient requested hospital discharge to continue palliative follow-up at a medical center closer to her residence. Home oxygen therapy was arranged by the family. The patient passed away shortly thereafter due to disease progression.

3. Discussion

Extraskeletal Myxoid Chondrosarcoma (EMC) is a rare type of malignant soft tissue tumor with well-defined phenotypic and genetic characteristics, traditionally considered a low-grade sarcoma [6]. This type of neoplasm preferentially affects the lower limbs, especially the proximal regions and the shoulder and pelvic girdles. It can be located subcutaneously or in deeper soft tissues. Tumor size varies between 1.1 cm and 25 cm, with an average of around 7 cm [7]. In the reported case, we observed divergences from the most common epidemiological patterns of EMC, such as sex, age group, and tumor location, though the lesion size falls within the average described in the literature.

The initial diagnostic challenge in this case, misinterpreting the lesion as a sebaceous cyst via ultrasound, highlights a significant clinical pitfall. The myxoid matrix of EMC, due to its high-water content, often appears anechoic or hypoechoic on ultrasound, mimicking benign cystic lesions. Combined with the patient's young age and the commonality of the dorsal location, this led to a diagnostic bias where more frequent epidemiological hypotheses were prioritized, resulting in a one-year delay until proper imaging was obtained.

EMC exhibits unique clinical behavior, often described as having an indolent course [8], though with a high rate of local recurrence and the potential for late metastases. Even in the presence of dissemination, some patients may experience prolonged survival, which contributes to EMC's high long-term mortality rate. These characteristics distinguish EMC from low-grade sarcomas. For these reasons, histological classification alone is insufficient to predict prognosis, with clinical characteristics being the main determinants of disease progression [6]. In our patient, the rapid clinical decline strongly challenges the 'indolent' label. Recent studies with long-term follow-up [11] demonstrate that recurrence rates exceed 45%, suggesting that EMC should be managed as a high-grade threat when aggressive features are present.

The histogenesis of EMC is not yet fully elucidated. Histologically, a multinodular pattern is observed, composed of primitive chondroblastic cells immersed in an abundant myxoid matrix [9]. Genetic and molecular studies have revealed that EMC constitutes a distinct entity, frequently associated with the t(9;22) translocation, involving the EWSR1 (22q12) and NR4A3 (9q22) (also known as CHN, TEC, or NOR1) genes, a common finding in most cases [1]. While this translocation is a hallmark of EMC, other translocations, such as t(9;17) (q22;q11), have also been observed.

A significant limitation of this report is the absence of molecular or cytogenetic confirmation (such as FISH or RT-PCR) to identify these characteristic fusions, as these tests were unavailable in our non-specialized center. However, the diagnosis was firmly established based on morphology and a consistent immunohistochemical profile. Given the aggressive course, we hypothesize a potential involvement of high-risk variants, such as the TAF15 fusion [12].

Macroscopically, the tumor presents as a well-circumscribed, gelatinous, multilobulated mass with a grayish-yellow coloration [1]. Microscopically, EMC typically consists of small, acidophilic cells resembling chondroblasts, arranged in clusters or cords suspended within a rich mucinous matrix [4]. In our patient, while these classic features were present, the histological analysis was notable for an alarming high-grade profile. Although immunohistochemical markers such as synaptophysin, vimentin, and S-100 protein were identified, these findings often have limited prognostic impact compared to the high cellularity and mitotic activity observed [7].

The clinical course in our 19-year-old patient starkly contrasts with the traditionally indolent description of EMC. While this neoplasm typically affects adults in their fifth or sixth decades, its occurrence in patients under 20 is exceedingly rare, representing less than 6% of cases in large series, such as those by Paioli et al. [12] and Drilon et al. [11]. In this young demographic, the diagnostic challenge is amplified, as demonstrated by the initial misinterpretation of a 'sebaceous cyst', a bias driven by the statistical rarity of sarcomas in adolescents.

The most effective therapeutic approach is wide surgical resection of the tumor, which remains effective even in cases of local recurrence or prior incomplete excision [9]. In this case, despite achieving an R0 resection in July 2017, the biological behavior of the tumor prevailed. The decision to withhold adjuvant chemotherapy and radiotherapy at that time was based on the characteristic chemo- and radioresistance of EMC [8]. Adjuvant therapy is typically reserved for dedifferentiated variants or compromised margins, neither of which were identified in the initial surgical specimen. The management of rare sarcomas like EMC remains a significant clinical challenge due to the lack of standardized adjuvant protocols, a gap highlighted in recent literature [13]. While therapeutic decisions for such rare entities ideally benefit from multidisciplinary tumor board reviews, the management followed the established surgical gold standard for localized disease. However, the rapid systemic recurrence observed even after an R0 resection underscores the unpredictable nature of this high-grade phenotype.

Our case is a high-grade outlier when compared to classic histopathological descriptions. While landmark studies, such as Meis-Kindblom et al. [6], report a typical mitotic index of 2–5 mitoses/10 HPF for EMC, our patient presented with an alarming >20 mitoses/10 HPF and 20% necrosis.

As shown in Table 2, this aggressive profile explains the devastatingly rapid progression to systemic metastasis and mortality observed, directly challenging the prevailing notion of EMC as a slow-growing neoplasm. By contextualizing these features, it becomes evident that high mitotic activity in young patients may signal a distinct, highly aggressive clinical phenotype that warrants more intensive initial management than the standard 'watchful waiting' often applied to R0 resections in this disease.

Table 2: Comparative analysis of clinical and histopathological features in EMC: Literature vs. Current Case.

Feature	Classic Literature (Indolent) [6]*	Pediatric/Adolescent Cases [11, 12, 14]**	Current Case (19y Female)
Typical Age	5th – 6th decades	Rare (<6% of cases) [11, 12]	19 years old
Mitotic Index	2–5 mitoses / 10 HPF [6]	Variable (often low)	>20 mitoses / 10 HPF
Tumor Necrosis	Minimal or absent	Rare in early stages	20% (Extensive)
Growth Pattern	Slow, "Indolent"	Slow to moderate	Rapid / Highly Aggressive
Outcome	Long-term survival	Limited response to CT [14]	Fatal (6 months post-op)

*References: Meis-Kindblom et al. [6]. *References: Drilon et al. [11]; Paioli et al. [12]; Stacchiotti et al. [14]. Nota: CT = Chemotherapy.

4. Conclusion

In conclusion, this case of Extraskeletal Myxoid Chondrosarcoma (EMC) in a 19-year-old patient highlights the critical importance of including rare sarcomas in the differential diagnosis of subcutaneous lesions, even in young populations and common anatomical sites. The significant diagnostic delay, initially driven by benign radiological interpretations, allowed for tumor progression that likely compromised the clinical outcome.

Furthermore, the presence of high-grade histological features, specifically a mitotic index exceeding 20/10 HPF and extensive necrosis, starkly contrasts with the traditionally indolent description of this neoplasm. This case underscores that EMC can exhibit highly aggressive biological behavior, leading to rapid systemic metastasis and mortality. Therefore, clinicians and pathologists must remain vigilant: high mitotic activity, especially in young patients, should be recognized as a high-risk phenotype that warrants intensive surveillance and a multidisciplinary therapeutic approach from the outset.

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Conflicts of Interest: All other authors declare no conflicts of interest.

References

1. Oliveira AM, Sebo TJ, McGrory JE, Gaffey TA, Rock MG, Nascimento AG. Extraskeletal myxoid chondrosarcoma: a clinicopathologic, immunohistochemical, and ploidy analysis of 23 cases. Mod Pathol. 2000;13(8):900-8. doi: 10.1038/modpathol.3880161.
2. Gama JM, et al. Extraskeletal myxoid chondrosarcoma metastasis to a Meckel's diverticulum adenocarcinoma. Rev Esp Patol. 2024. [Epub ahead of print].
3. WHO Classification of Tumours Editorial Board. Soft tissue and bone tumours. 5th ed. Lyon (France): International Agency for Research on Cancer; 2020. (WHO classification of tumours series, vol. 3).
4. Fisher C, et al. Diagnostic Pathology: Soft Tissue Tumors. Salt Lake City: Amirsys; 2011.
5. Goldblum JR, Folpe AL, Weiss SW. Enzinger and Weiss's Soft Tissue Tumors. 6th ed. Philadelphia: Elsevier; 2014.
6. 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. doi: 10.1097/00000478-199906000-00001.
7. Carnio N, Ribeiro HM, Guimarães WM, PM Filho. Condrossarcoma mixóide extraesquelético: fratura patológica secundária à neoplasia? Rev Patol Tocantins. 2023;10(1):[página se houver].
8. Zaki M, Laszewski P, Robinette N, et al. Unresectable Extraskeletal Myxoid Chondrosarcoma of the Neck: Early Tumor Response to Chemoradiotherapy. Cureus. 2015;7(12):e432. doi: 10.7759/cureus.432.
9. Kawaguchi S, et al. Extraskeletal myxoid chondrosarcoma: a multi-institutional study of 42 cases in Japan. Cancer. 2003;97(5):1285-92. doi: 10.1002/cncr.11162.
10. Dornelas BC, et al. Volumoso condrossarcoma mixoide extraesquelético abdominal: relato de caso. J Bras Patol Med Lab. 2019;55:[página].

11. Drilon AD, Popat S, Bhuchar G, 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. doi: 10.1002/cncr.23974.
12. Paioli A, Stacchiotti S, Campanacci D, et al. Extraskeletal Myxoid Chondrosarcoma with Molecularly Confirmed Diagnosis: A Multicenter Retrospective Study Within the Italian Sarcoma Group. Ann Surg Oncol. 2021;28(2):1142-1150. doi: 10.1245/s10434-020-08737-7.
13. Gilbert A, et al. Chondrosarcoma Resistance to Radiation Therapy: Origins and Potential Therapeutic Solutions. Cancers (Basel). 2023;15(7):1962. doi: 10.3390/cancers15071962.
14. Stacchiotti S, et al. Anthracycline-based chemotherapy in advanced extraskeletal myxoid chondrosarcoma: a retrospective study from the World Sarcoma Network. Ann Oncol. 2019;30(Suppl 5):v695-v696.