

Sclerosing Rhabdomyosarcoma: Case Report and Review of Literature

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Case Report

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Abstract: Sclerosing rhabdomyosarcoma (SRMS) is a very rare subtype of rhabdomyosarcoma (RMS) and can lead to diagnostic difficulties especially if one is not advised of this variant. This entity was first described in 2000 by Mentzel and Katenkamp. Morphologically, it is characterized by an abundant hyalinized stroma that may erroneously lead to the diagnosis of extraskeletal chondrosarcoma, sometimes this stroma simulates a primary osteoid or vascular tumor. Thus, it can lead to confusion with osteosarcoma or angiosarcoma. We report here a case of SRMS mimicking a sclerosing epithelioid fibrosarcoma appearing in calves in a 55-year-old man. The tumor cells were arranged in nests, cords with sometimes a pseudovascular features. Immunostaining showed that the tumor was positive for Desmin, SMA and MyoD1, focally positive for myogenin and negative for CK, P63, EMA, S-100, H-caldesmon, CD34, CD31. Based on morphological discovery and immunostaining, he was diagnosed as an SRMS. This is the first case of SRMS to show a strong and diffuse α -SMA highlighting the risk of misdiagnosis as leiomyosarcoma.

Keywords: Sclerosing rhabdomyosarcoma, leiomyosarcoma, chondrosarcoma, sclerosing epithelioid fibrosarcoma

INTRODUCTION

Background

Currently, WHO subdivides RMS into three groups: embryonic (ERMS), alveolar (ARMS) and pleomorphic (PRMS) [1]. In 2000, Mentzel and Katenkamp [2] described a new variant of RMS characterized by a very abundant hyaline stroma and pseudovascular features, which called it "sclerosing pseudovascular rhabdomyosarcoma" and then abbreviated to "sclerosing rhabdomyosarcoma" (SRM) [3].

Histologically, SRMS can be placed in microalveoles, lobules, and nests in a hyalinized, abundant eosinophilic, sometimes basophilic matrix that closely simulates primitive osteoid or chondroid material [4]. Thus, he is easily misdiagnosed, if one is not aware of this entity. Sclerosing rhabdomyosarcoma presents a broad histologic differential diagnosis, including angiosarcoma, extraskeletal osteosarcoma, chondrosarcoma, sclerosing epithelioid fibrosarcoma, and carcinomas. We report here a case of SRMS of the calf and discuss the differential diagnosis.

CASE PRESENTATION

A 55-year-old male presented with a painless swelling in the right calf region. The patient reported the swelling was approximately 8 cm in size 6 months ago, and increased rapidly in size recently. Physical examination was remarkable for a 15-cm subcutaneous mass which felt firm and adhered to the adjacent tissue. Ultrasonography revealed a low echo mass measuring 15.3×4.1 mm in the subcutaneous tissue of the right calf

area, the mass was relatively well circumscribed. Then the tumor was excised and was sent for pathological examination.

Grossly, the resected tumor measured 15.5×5×3 cm, and was relatively well circumscribed, the cut surface showed consistently firm and grey-white in colour (Figure-1). Microscopically, the tumor had a characteristic constellation of moderately cellular features and consisted mainly of small round or ovoid cells with reduced cytoplasm, coarse nuclear chromatin, and visible nucleoli at high magnification. In places, the tumor cells had intracytoplasmic vacuoles reminding chondrocytes. Tumor cells were organized into nests, cords, performing pseudovascular spaces, microalveoli (Figure-2). The mitotic rate of the tumor cells was high (4 mitoses / CHM). On the periphery, the tumor infiltrated the surrounding skeletal muscle tissue. The stroma consisted of an abundant collagenous or basophilic matrix resembling a primitive cartilaginous tissue.

The result of immunohistochemistry (IHC) showed that the tumor was strongly positive for Desmin, α -SMA and MyoD1, focally positive for Myogenin and was negative for CK, P63, EMA, S-100,

CD34, CD31, H-caldesmon. Ki67 was expressed in 50% of all tumor cells (Figures 3-7). According to the morphological and immunohistochemical findings, the tumor was diagnosed as a SRMS.



Fig-1: Gross pathology of the mass: relatively well circumscribed, consistently firm and grey-white in colour

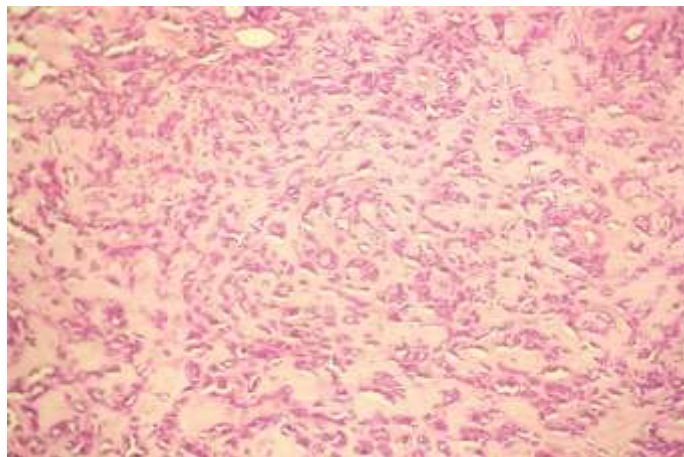


Fig-2: HE: The tumor cells were arranged in a diverse pattern, including nests, cords, pseudovascular, adenoid, microalveoli and even single-file arrays

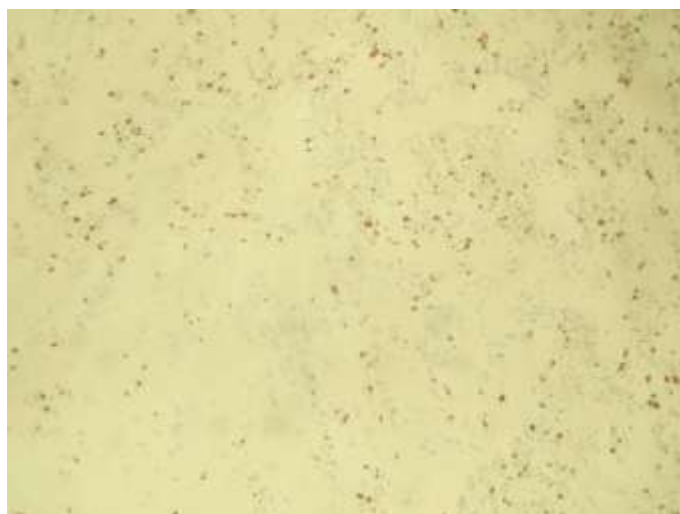


Fig-3: IHC: Ki67 was expressed in 50% of tumor cells

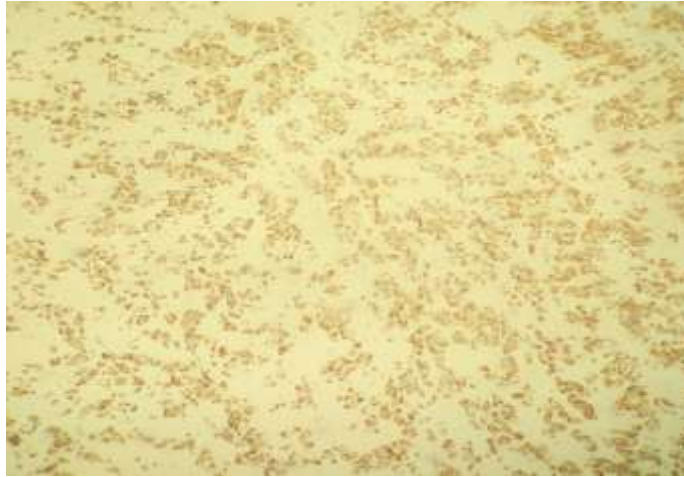


Fig-4: IHC: The tumor cells are strongly positive for Desmin



Fig-5: IHC: The tumor cells were strongly positive for SMA



Fig-6: IHC: The tumor was focally positive for Myogenin

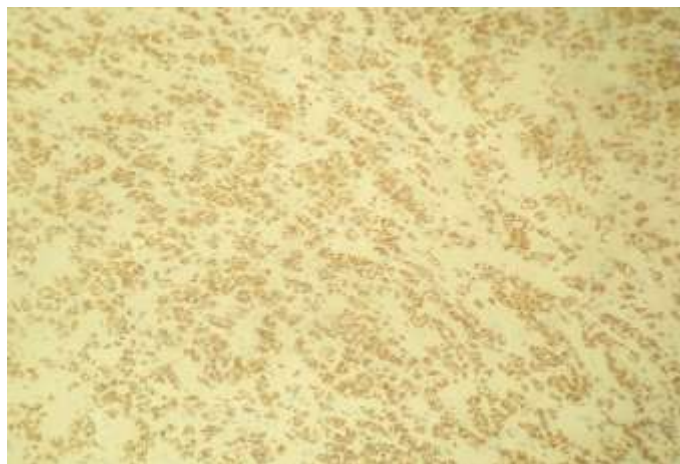


Fig-7: IHC: The tumor was strongly positive for MyoD1

DISCUSSION

SRMS is an exceptional variant of RMS first described in 2000 by Mentzel and Katenkamp [2]. They described three cases of RMS with a stroma rich in collagen, hyalinized and sclerosant. The cells were organized into nests, alveoli and sometimes they made pseudovascular cavities hence the name sclerosing pseudovascular rhabdomyosarcoma. In 2002, Folpe et al. also described four cases of a matrix-rich, hyalinizing variant of RMS. They called it sclerosing rhabdomyosarcoma [3]. Indeed, many authors wonder is this is a new variant of RMS or the subtype of ERMS or ARMS. Although SRMS shares some characteristics with ERMS and ARMS, the 11p15.5 abnormality frequently observed in ERMS [5, 6] is missing, and FOXO1-PAX3 or -PAX7 fusion transcripts associated with ARMS are also missing [7]. According to Julie et al., Of the 39 cases reported, the SRMS can occur at a very large age, ranging from 0.3 to 79 years with an average age of 27 years. The most frequently affected sites are the extremities (19/40) and the head and neck (16/40) [8]

Histologically, SRMS usually consisted of small round, ovoid or polygonal cells with a reduced cytoplasm, coarse nuclear chromatin and visible nucleoli only at high magnification, sometimes it's inconspicuous. The mitotic rate is very high. The tumor cells were arranged in a diverse pattern, including nests, cords, pseudovascular, microalveoli. Regarding the grading, this entity is immediately ranked high grade sarcoma, so we don't need to use the FNLCG grading system.

Immunohistochemically, SRMS is usually strongly positive for Vimentin, Desmin and MyoD1, and weakly, focally positive for Myogenin suggesting its skeletal muscle differentiation, but negative for CK, S-100, CD34, and CD31 [2, 3, 9, 10]. Some cases can also show positive expression of CD99, SMA and CD56 [3, 11, 12]. In contrast, Myoglobin was usually not expressed in SRMS, indicating the primitive status of the tumor cell [13]. Our immunohistochemical

results are generally similar to those reported previously, except the strong positivity for SMA, the tumor cells were strongly positive for Desmin and MyoD1, focally positive for Myogenin.

The differential diagnosis of SRMS includes osteosarcoma, angiosarcoma, extra-skeletal myxoid chondrosarcoma, mesenchymal chondrosarcoma, parachordoma, sclerosing epithelioid fibrosarcoma and metastatic carcinoma. It is essential that pathologists are familiar with sclerosing rhabdomyosarcoma to correct the diagnosis. The typical osteosarcoma is characterized by the presence of matrix calcifications and osteoclasts. Extra-skeletal myxoid chondrosarcoma is typically multi-lobed with incomplete fibrous septa. Tumor cells of mesenchymal chondrosarcoma express SOX9 [14]. The sclerosing epithelioid fibrosarcoma is composed of epithelioid cells arranged in nests and cords and deposited in a highly hyalinized collagen matrix, the tumor cells are strongly positive for MUC4 and EMA. Concerning angiosarcoma, it does not have a hyalinizing matrix characteristic of SRMS and the use of vascular markers such as CD34, CD31 and ERG allows eliminate this diagnosis [15, 16]. The parachordoma is typically lobulated and contains vacuolated cell nests deposited in a myxoid matrix, resembling physaliphorous chordoma cells. It usually expresses the S-100 protein, CK and Brachyury. In addition, the positive expression of Desmin and MyoD1, negative expression of CK, can eliminate metastatic carcinoma.

In our case, the tumor cells strongly expressed the SMA and Desmine with focal Myogenin which may be interpreted as negative if we are not aware of this entity, then we must include the MyoD1 and the H-caldesmon in the panel to rule out a leiomyosarcoma. So, the differential diagnosis may also include the latter.

CONCLUSION

Because of the rarity, SRMS is misdiagnosed easily, especially if one unfamiliar with this entity. It shows a variable histological pattern. The tumor cells

can be arranged into nests, cords, pseudovascular, and in microalveoli. To avoid the misdiagnosis, careful attention must be paid to its special histological features.

Competing interests

The authors declare that they have no competing interests.

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