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Myxoinflammatory Fibroblastic Sarcoma of Eyeball in an Infant: A Rare Presentation

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Abstract

Myxoinflammatory fibroblastic sarcoma (MIFS) is a rare soft tissue neoplasm most commonly occurring in the distal extremities of adult patients. It is a low-grade neoplasm with high rate of local recurrence but low rate of metastasis. We describe a case of MIFS of eyeball in an infant. An enucleation surgery was performed, and on the basis of histopathological and immunohistochemical evaluation, a diagnosis of MIFS was rendered. Till date more than 400 cases of MIFS have been reported with only a single case report of MIFS in an adult in iris. To the best of our knowledge, ours is the first case of MIFS in the eye in a child. Considering its rarity in children and especially in an infant (this seems to be the youngest patient in the literature), close follow-up is essential as the biology of these lesions cannot be predicted.

Keywords

myxoinflammatory fibroblastic sarcoma, eyeball, infant, soft tissue tumor, slow growing

Introduction

Myxoinflammatory fibroblastic sarcoma (MIFS) is a rare soft tissue neoplasm accounting for approximately 1% of all adult tumors.[1] It most commonly occurs in the distal extremities of middle-aged adult patients usually presenting as a slow-growing, painless mass. It is a low-grade neoplasm with a high propensity for local recurrence but low metastatic rate. Thus, elaborate clinicoradiological and pathological investigations is necessary for an accurate diagnosis. In this article, we report the most unusual case of MIFS in a child who developed the lesion in eyeball. Within the rare group of pediatric cases, more so in infants, this seems to be the youngest patient in the literature of MIFS. The unusual site further evokes an interest in this case.

Case Report

A 7-month-old infant presented with a swelling in the eyeball of 2 months duration. No systemic involvement or constitutional symptoms such as fever were noted. All laboratory investigations of basic blood counts, including erythrocyte sedimentation rate, were within normal limits. Ophthalmoscopic examination revealed presence of a tumor in the eyeball, without involvement of the optic disc. magnetic resonance imaging findings were suggestive of a retinoblastoma. Based on this, an enucleation surgery was planned and carried out. Histopathological examination showed presence of choroid and retinal layers with the orbital cavity infiltrated by a mixed cellular infiltrate composed of numerous neutrophils, few eosinophils admixed with large mononuclear cells exhibiting the morphology of histiocytic cells with round, central to peripherally placed nucleus with many showing prominent nucleolus, and abundant pale eosinophilic to foamy cytoplasm. Some of these larger cells appeared to be binucleate (Reed-Sternberg-like or virocyte-like) with many showing neutrophils within the cytoplasm (emperipolesis). No multinucleate forms were, however, identified. The intervening areas showed few spindled-shaped fibroblasts (Figures 1-4). Given these morphological features, a diagnosis of reticulohistiocytoma was offered.

The paraffin blocks were then subjected to a panel of immunohistochemistry markers and histochemical stains. On immunohistochemistry, the large cells were strongly positive for vimentin and NSE with weak staining for cytokeratin and CD68 and were negative for CD45, CD99,

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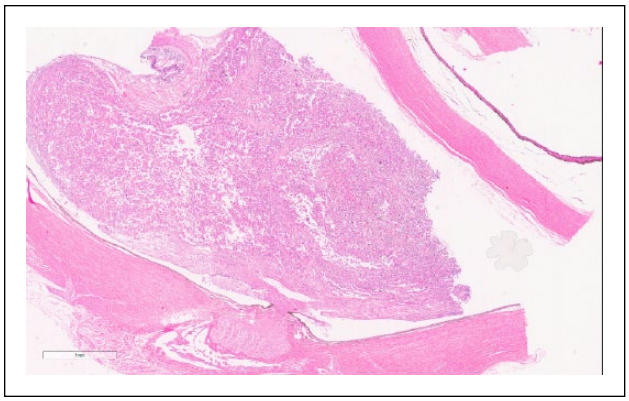

Figure 1. Scanning power view shows orbital cavity infiltrated by a mixed cellular infiltrate composed of numerous neutrophils admixed with large mononuclear cells exhibiting the morphology of histiocytic cells (hematoxylin and eosin, ×40).

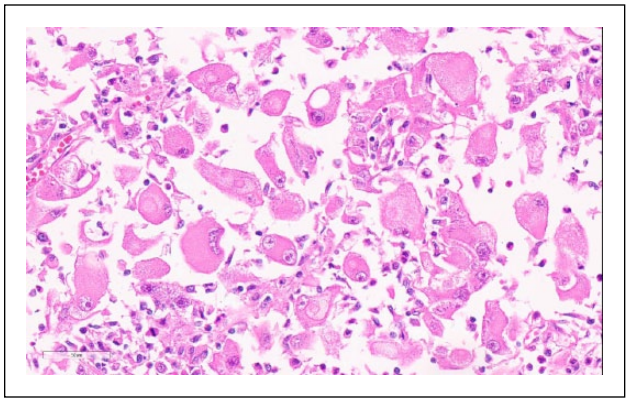

Figure 2. Hematoxylin and eosin (HE) section shows large mononuclear cells exhibiting the morphology of histiocytic cells with round, central to peripherally placed nucleus with many showing prominent nucleolus and abundant pale eosinophilic to foamy cytoplasm (virocyte-like; HE, ×400).

S-100, CD1a, GFAP, factor XIIIa, PGP, CD163, and CD34 (Figures 5-8). CD56 showed some membranous staining in many of the larger cells and suggested a very organoid pattern of arrangement. Based on the immunophenotyping of the larger cells with vimentin, variable cytokeratin, CD56, NSE, and no histiocytic markers led to a final diagnosis of MIFS. However molecular characterization was not performed.

Discussion

MIFS is a rare malignant soft tissue tumor first reported in 1998 by 3 independent investigators.[2] It predominantly arises in the distal extremities of adult patients usually between fourth and fifth decades of life. It can also rarely

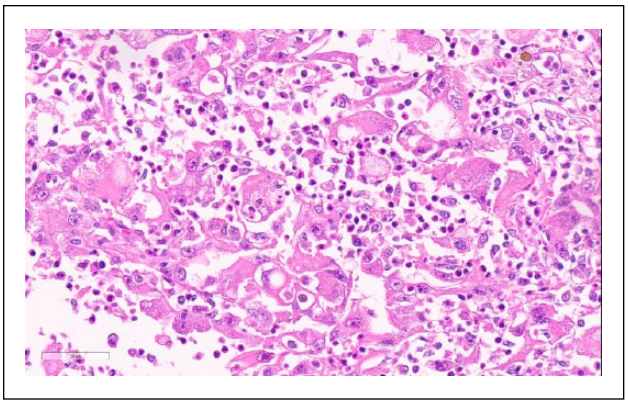

Figure 3. Histiocytoid cells showing emperipolesis (hematoxylin and eosin, ×400).

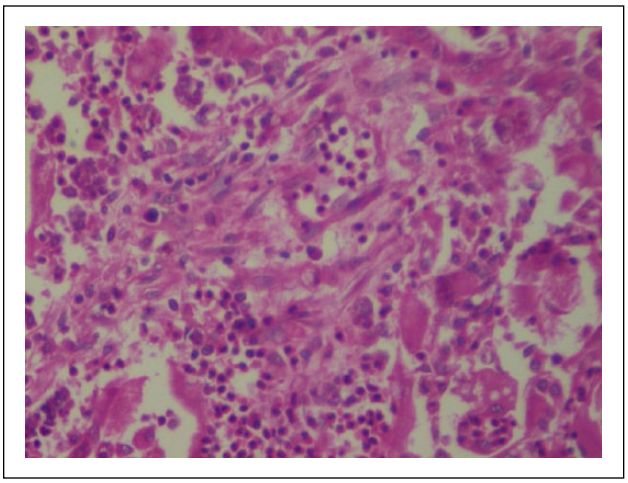

Figure 4. Few fibroblastic cells seen interspersed with large virocyte-like cells (hematoxylin and eosin, ×400).

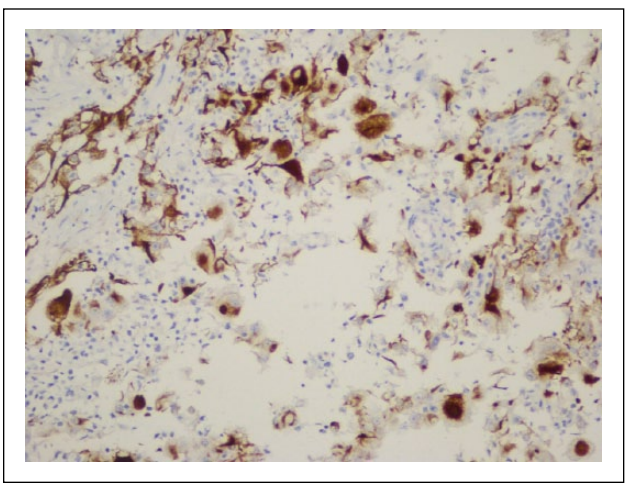

Figure 5. Large histiocytoid cells showing patchy weak staining (cytokeratin, ×400).

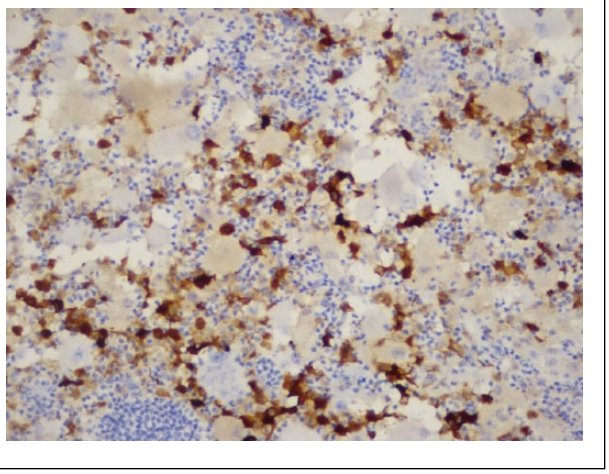

Figure 6. Negative staining for S-100 by large mononuclear cells (S-100, ×400).

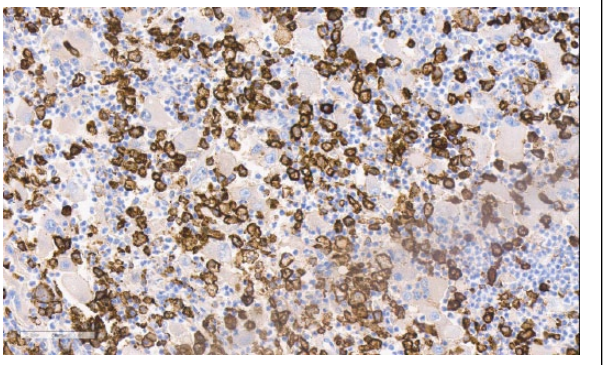

Figure 7. Large cells showing negative staining for CD163 (CD163, ×400).

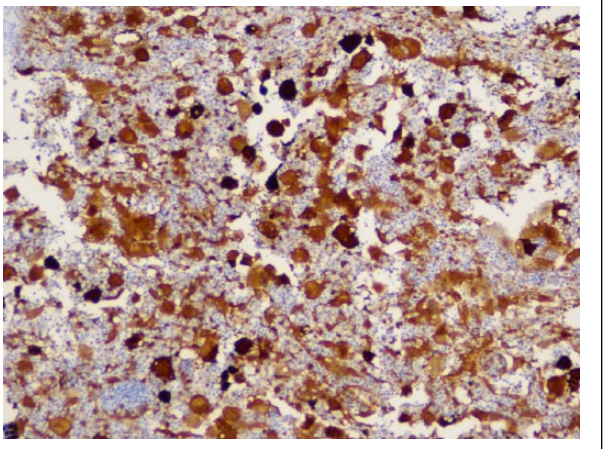

Figure 8. Positive staining of large cells by NSE (NSE, ×400).

develop in other regions such as head, face, gluteal region, and chest wall.[3,4] MIFS usually presents as a slow-growing, solitary, and painless mass. Most MIFSs behave as low-grade malignant neoplasms as they have a high propensity for local recurrence, although nodal and distant metastases are rare.[5,6] The etiopathogenesis of MIFS is unknown. Some cases have been associated with history of trauma. In view of the virocyte-like cells, an infectious etiology has also been proposed, but no microorganisms have ever been detected. The prominent inflammatory component seen in MIFS has led to the suggestion that mediators of chronic inflammation, including various cytokines, may be implicated in its development.[7,8]

Histologically, MIFS is characteristically a multinodular lesion composed of hypocellular and hypercellular areas comprising of atypical spindle to epithelioid cells, vacuolated fibroblasts mimicking lipoblasts (pseudolipoblasts), and large pleomorphic virocyte-like or Reed-Sternberg–like cells within prominent myxoid stroma containing a mixed inflammatory cell population, variable hemosiderin deposition, and fibrosis.[7-9] The mitotic activity is usually low. Role of immunohistochemistry in diagnosing MIFS is limited. However, expression for CD34 and CD68 with typical negativity for SMA and EMA may be seen.

Although the histology of MIFS appears benign, it is known to recur. Cases with atypical features like presence of complex branching and/or thick-walled arcuate vessels; small cellular areas of epithelioid or spindle cells in solid, fascicular, or whorled patterns; abnormal mitotic activity (>10 mitotic figures per 50 high-power fields and/or the presence of atypical mitoses) have been described in the literature. MIFS with at least 2 of these atypical features were noted to recur more frequently than those with only one feature or lacking these features.[5]

Genetically, MIFS has been associated with a marker/ring chromosome 3 with 3p amplicons[10] as well as with a characteristic translocation, t(1;10)(p22;q24) with rearrangements of TGFBR3 and MGEA5 on chromosomes 1p22 and 10q24.[8]

Differential diagnosis includes a wide range of conditions including both benign and malignant such as tenosynovitis, giant cell tumor of the tendon sheath, inflammatory myofibroblastic tumor, liposarcoma, epithelioid sarcoma, and myxoid malignant fibrous histiocytoma. MIFS is rather difficult to diagnose due to its heterogeneous histology and therefore all the above-mentioned conditions need to be excluded before conclusion of this diagnosis.[11] In the index case, a negative factor XIIIa in the large foam cells ruled out juvenile xanthogranuloma, and lack of S100 and CD163 excluded the possibility of a true histiocytic lesion including reticulohistiocytoma. A possibility of rhabdoid tumor was excluded in view of retained INI-1. Negative PGP stain, GFAP, and HMB-45 ruled out a ganglionic differentiation, glial origin, and melanocytic origin, respectively.

Cytomegalovirus immunostain that was performed was also negative. Histochemical stains of PAS and GMS were negative, thus also excluding fungal and parasitic etiology.

Wide resection is generally accepted as the first choice of treatment for MIFS and initial complete surgical resection is the only statistically significant clinicopathologic factor for predicting a lower rate of recurrence. At present, the efficacy of chemotherapy and radiotherapy remains unclear.[12]

Till date more than 400 cases of MIFS have been reported including a large cohort of 104 cases[5] along with descriptions of high-grade, aggressive variants.[6,13] It is usually seen in adults in the acral region. There has been a single case report of MIFS in an adult in iris with morphologic and immunohistochemical features sharing a striking resemblance with our case.[14] MIFS in children are rare with very few cases reported till date. A single pediatric series of 5 cases has been reported by Weiss et al with the youngest being a 5-year-old child and 2 of them arising in head and neck regions.[15] To the best of our knowledge, ours is the first case of MIFS in the eye in a child. Considering its rarity in children and especially in an infant (this seems to be the youngest patient in the literature), close follow-up is essential as biology of these lesions cannot be predicted.

Conclusion

MIFS is a rare low-grade soft tissue sarcoma mostly occurring in extremities. In view of its rarity in children, heterogeneous histopathologic findings, and a nonspecific immunoprofile that poses diagnostic challenges, this case broadens the demographic characteristics and highlights the salient features of MIFS and exclusion of its mimics.

Declaration of Conflicting Interests

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Ethical Approval

Not applicable, because this article does not contain any studies with human or animal subjects.

Informed Consent

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Trial Registration

Not applicable, because this article does not contain any clinical trials.

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