

## Angiomatoid Fibrous Histiocytoma : A Case Report

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### —Abstract—

Angiomatoid fibrous histiocytoma is a rare soft tissue tumor that generally affects children and young adults. We report a case of angiomatoid fibrous histiocytoma in an 11-year-old boy who complained of a back mass for 3 years. Surgical excision was performed. The excised specimen showed a  $4.0 \times 3.6 \times 3.0$  cm, well circumscribed, grayish white tumor, with multicystic changes. Histological examination showed proliferation of spindle or round shaped tumor cells. There was a dense fibrous pseudocapsule with prominent chronic inflammatory cell infiltrates.

**Key Words:** Angiomatoid fibrous histiocytoma, Soft tissue, Immunohistochemistry, Ultrastructure

### Introduction

Angiomatoid fibrous histiocytoma is a very uncommon soft tissue neoplasm. Enzinger first described it as angiomatoid malignant fibrous histiocytoma in 1979.<sup>1)</sup> It is predominantly a tumor of children and young adults, with a mean age of 20 years. The extremities are the most common sites, followed by the trunk and head and neck.<sup>2)</sup> The tumor is characterized by a fibrous pseudocapsule, fibrohistiocytic proliferation of

round or spindled cells, angiomatoid changes, and pericapsular lymphoplasmacytic infiltrates.<sup>3)</sup> Three substantial series have been published in the English literature.<sup>3-5)</sup> Four cases have been reported in the Korean literature.<sup>6-9)</sup>

We report a case of angiomatoid fibrous histiocytoma that occurred on the back of an 11 year-old boy, and review the medical literature.

### Case Report

An 11-year-old boy presented with a back mass present for 3 years. The mass was slowly increasing in size. On physical examination, a firm nodule was present at the right mid back. The overlying skin of the mass was brown with hypertrichosis. No fever was present. On laboratory examination, the hemoglobin was 10.2 g/dl and the hematocrit was 31.3%. On MR imaging, there was a well-circumscribed mass in the back

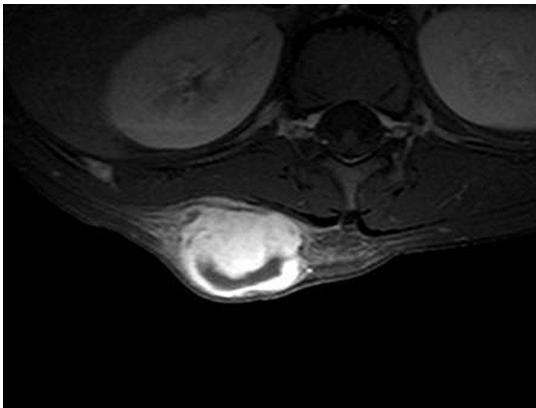


Fig. 1. MR imaging. The tumor shows contrast enhancement on T1-weighted fat suppression contrast enhancement image.

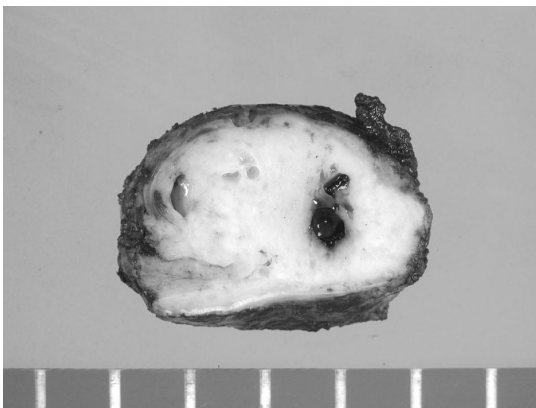


Fig. 2. Gross finding. The tumor is well circumscribed, grayish white mass with multicystic changes.

with intermediate signal intensity on T1-weighted images and mixed intermediate and high signal intensity on T2-weighted images. The tumor showed contrast enhancement on the T1-weighted fat suppression contrast enhanced images (Fig. 1). A lipoma was suspected clinically. A mass excision was performed. The mass measured  $4.0 \times 3.6 \times 3.0$  cm in size (Fig. 2). The mass was well circumscribed and surrounded by a fibrous pseudocapsule. On section, the cut surface was grayish white and showed variable-sized, cystic spaces filled with amber-colored serous fluid and blood clots. The histological examination showed a proliferation of spindle or round shaped tumor cells arranged in nodules (Fig. 3). The tumor cells had vesicular nuclei. Some of the tumor cells showed nuclear pleomorphism. The stroma was fibrous or myxoid. The mitotic figures were 3/10 high power fields. Occasionally blood-filled,

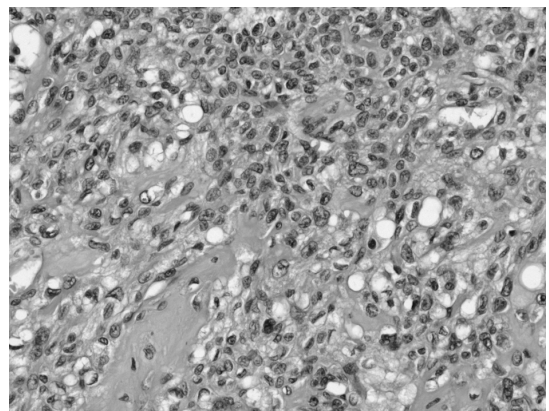


Fig. 3. Microscopic finding. The proliferation of spindle or round shaped tumor cells is seen (Hematoxylin-eosin stain,  $\times 200$ ).

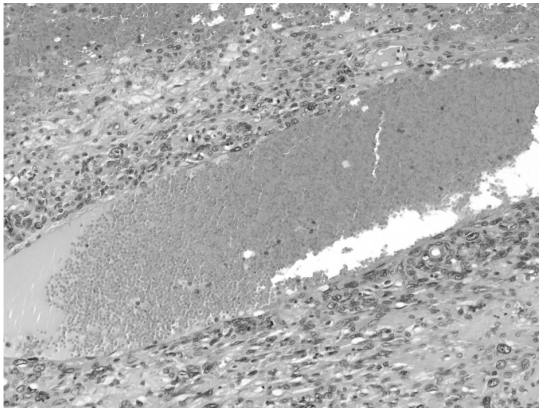


Fig. 4. Microscopic finding. The blood-filled cystic spaces without endothelial lining are noted (Hematoxylin-eosin stain,  $\times 100$ ).

cystic spaces were found (Fig. 4). There was a dense fibrous pseudocapsule with prominent lymphoplasmacytic cell infiltrates and lymphoid follicles (Fig. 5). On the immunohistochemical stain, the tumor cells showed focal positivity for CD68, lysozyme, smooth muscle actin, desmin, CD99, and epithelial membrane antigen (Fig. 6). The tumor cells were negative for

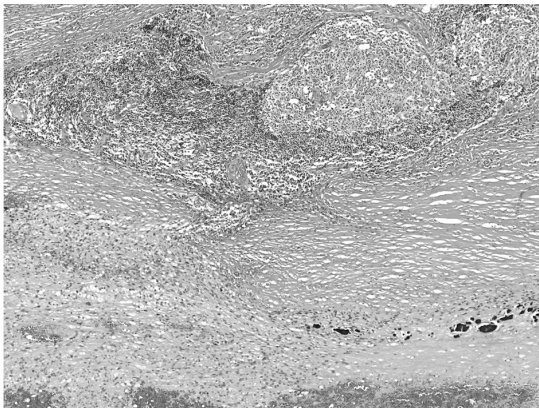


Fig. 5. Microscopic finding. The fibrous pseudocapsule with chronic inflammatory cells infiltrate is present (Hematoxylin-eosin stain,  $\times 40$ ).

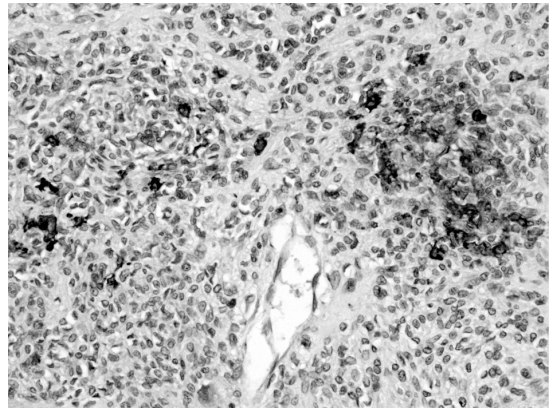


Fig. 6. Microscopic finding. The tumor cells are positive for smooth muscle actin (Immunohistochemical stain,  $\times 200$ ).

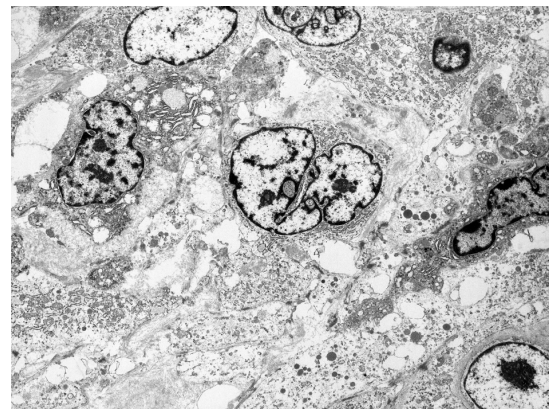


Fig. 7. Ultrastructural finding. Many endoplasmic reticulum and phagolysosomes are present in the cytoplasm ( $\times 2,000$ ).

S-100 protein, HMB-45, cytokeratin (AE1/AE3), and CD34. On electron microscopic examination, the tumor cells showed many endoplasmic reticulum and phagolysosomes (Fig. 7). A pathological diagnosis of angiomatoid fibrous histiocytoma was made. The patient has remained free from recurrence over a period of 6 months.

## Discussion

Angiomatoid fibrous histiocytomas account for approximately 0.3% of all soft tissue tumors.<sup>2)</sup> Enzinger<sup>1)</sup> originally regarded angiomatoid (malignant) fibrous histiocytomas as a variant of malignant fibrous histiocytomas. In the study reported by Costa and Weiss<sup>4)</sup> on 108 cases of angiomatoid (malignant) fibrous histiocytomas, local recurrences were detected in only 12% of patients. Five patients developed metastases. Fanburg-Smith and Miettinen<sup>3)</sup> noted only a 1% frequency of metastases in their clinical follow-up of 86 patients with angiomatoid (malignant) fibrous histiocytomas. For these reasons, the World Health Organization has reclassified angiomatoid fibrous histiocytoma as an intermediate malignancy (rarely metastasizing) in the category of tumors with uncertain differentiation.<sup>2)</sup> Clinically, angiomatoid fibrous histiocytomas are slow-growing tumors in the deep dermis and subcutis and often are mistaken for a hematoma. The occasional associated systemic signs of fever, anemia and weight loss suggest cytokine production by the tumor. In our case, the patient had anemia (10.2 g/dl). The MRI findings of angiomatoid fibrous histiocytoma may reveal multicystic components with fluid-fluid levels, indicating hemorrhage.<sup>10)</sup>

Grossly, the median size for an angiomatoid fibrous histiocytoma is 2.0 cm; they range from 0.7 to 12.0 cm. The tumor has a firm consistency and is circumscribed, with a

tan-gray appearance. On the cut surface, it is often multinodular with blood-filled cystic spaces and a red brown appearance, denoting hemosiderin, occasionally simulating a hematoma or cystic hemorrhage within a lymph node. Microscopically, angiomatoid fibrous histiocytoma is characterized by a multinodular proliferation of eosinophilic, histiocytoid or myoid cells, pseudoangiomatoid spaces, a thick fibrous pseudocapsule, and a pericapsular lymphoplasmacytic infiltrate. The pseudoangiomatoid spaces are not lined by endothelium. Based on the gross and microscopic findings, the present case was consistent with an angiomatoid fibrous histiocytoma.

On immunohistochemical studies, the angiomatoid fibrous histiocytoma is positive for desmin in 50% of cases, often also with scattered desmin positive cells within the lymphoid proliferation.<sup>2)</sup> Approximately 40% of cases show EMA positivity and in many cases stain for CD68. Half of the cases may be positive for the nonspecific marker for CD99. The tumor cells are uniformly negative for other reticulum cell tumor markers such as, S-100 protein, HMB-45, cytokeratins, CD34, and vascular markers (CD31, factor VIII-related antigen). Ultrastructurally, the tumor cells have the features of fibroblastic, myofibroblastic, histiocytic cells and undifferentiated cells.<sup>11, 12)</sup> Currently, the direction of differentiation of the angiomatoid fibrous histiocytoma is considered inclusive, but based on the light microscopic appearance and the increasing

evidence of desmin expression by the tumor cells, it is likely to be classified as a myofibroblastic tumor.<sup>11)</sup> The present case showed focal positivity for CD68, desmin, lysozyme, CD99, and epithelial membrane antigen. On the electron microscopic study, the tumor cells showed many endoplasmic reticulum and phagolysosomes. These immunohistochemical and ultrastructural findings suggest that this tumor had features of fibroblastic or histiocytic cell differentiation. The results of cytogenetic studies, on angiomatoid fibrous histiocytomas are characterized by t(12;22) (FUS-ATF1), t(11;22) (EWS-ATF1), and t(11;22) (EWS-CREB1).<sup>13-15)</sup>

The differential diagnosis of an angiomatoid fibrous histiocytoma includes aneurysmal fibrous histiocytoma (dermatofibroma with aneurysmal change), metastatic tumor in the lymph nodes, vascular neoplasms, malignant fibrous histiocytoma, and rhabdomyosarcoma.<sup>11, 16)</sup> Aneurysmal fibrous histiocytomas show the characteristic infiltration of spindle cells among pre-existing collagen bundles, a storiform growth pattern, and a more polymorphous cell population, with multinucleated giant cells, siderophages, and foamy macrophages. The dense capsule and the surrounding lymphoid infiltrate seen in angiomatoid fibrous histiocytomas may be mistaken for a metastatic tumor in the lymph nodes. Angiomatoid fibrous histiocytomas do not have the structures found in normal lymph nodes, such as a subcapsular sinus or afferent

lymphatics. The angiomatoid features of angiomatoid fibrous histiocytomas may simulate vascular neoplasms, such as epithelioid hemangioma or angiosarcoma. The presence of the characteristic fibrous capsule and chronic inflammatory cell infiltrate and the absence of true vascular lumen formation favor the diagnosis of an angiomatoid fibrous histiocytoma. The immunohistochemical staining can aid in the exclusion of vascular neoplasms. The expression of CD31, CD34 or factor VIII-related antigens is not found in the angiomatoid fibrous histiocytoma. Angiomatoid fibrous histiocytomas lack the pleomorphism and anaplasia of malignant fibrous histiocytomas and they usually occur in young rather than in older individuals. Because 50% of angiomatoid fibrous histiocytomas express desmin, and some have a primary round cell appearance, angiomatoid fibrous histiocytomas may be mistaken for rhabdomyosarcomas. Angiomatoid fibrous histiocytomas reveal cytologically bland, fibroblastic or histiocytic cells, unlike the clearly malignant round cells, strap cells, and eosinophilic giant cells of rhabdomyosarcoma. Rhabdomyosarcomas are typically large and deeply seated.

Angiomatoid fibrous histiocytomas have an indolent course with about 15% of cases developing local recurrence and 1~2% distant metastases.<sup>11)</sup> While the local recurrence rate might be higher with infiltrated margins, the location on the head and neck, and the deep intramuscular location, there are no known

clinical, morphological, or genetic factors that have been associated with metastasis. In our case, the patient showed no evidence of recurrence at the 6-month follow-up. Wide excision is the treatment of choice for primary tumors and careful follow-up is recommended in all cases.

## 요 약

혈관종성섬유조직구종은 드문 연조직 종양으로 소아와 청소년기에 주로 발생한다. 호발 부위는 팔다리, 몸통, 머리와 목 등이다. 저자들은 등에 발생한 혈관종성섬유조직구종 1예를 경험하였기에 문헌 고찰과 함께 보고한다. 11세 남자가 등의 덩이를 주소로 내원하였다. 자기공명영상에서 등의 피하조직에 경계가 좋은 덩이가 관찰되었다. 덩이에 대한 절제가 시행되었다. 절제된 덩이는  $4.0 \times 3.6 \times 3.0$  cm 크기의 회백색을 띠었고, 장액과 혈액덩이로 차 있는 낭성공간이 보였다. 조직학적으로 종괴는 섬유성 거짓피막으로 둘러 싸여 있었고 여기에 만성염증세포 침윤이 동반되어 있었다. 종양세포는 방추형 혹은 난원형이고 결절성 증식을 하고 있었고, 혈액으로 차여진 혈관성 공간이 관찰되었다.

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