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Other vascular tumors

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Angiosarcoma

ABSTRACT

Vascular tumors are rare in children and adults. Classification of these tumors has been difficult, especially in the pediatric population, due to the rarity of these lesions, the unusual morphologic appearance, their diverse clinical behavior, and no independent stratification for pediatric tumors. In 2013, The World Health Organization updated the classification of soft tissue vascular tumors. Pediatric tumors were not independently stratified and the terminology was mostly left unchanged, but the intermediate category of tumors was divided into locally aggressive and rarely metastasizing. These tumors are treated with multimodality therapy and therefore need the guidance of an interdisciplinary team for best care.

Introduction

Vascular tumors are rare in children and adults. Classification of these tumors has been difficult, especially in the pediatric population, due to the rarity of these lesions, the unusual morphologic appearance, their diverse clinical behavior, and no independent stratification for pediatric tumors. In 2013, The World Health Organization updated the classification of soft tissue vascular tumors. Pediatric tumors were not independently stratified and the terminology was mostly left unchanged, but the intermediate category of tumors was divided into locally aggressive and rarely metastasizing (Table).

Benign tumors

Spindle cell hemangioma

Spindle cell hemangiomas (SCH), initially called spindle cell hemangioendotheliomas, often occur as superficial (skin and subcutis), painful lesions involving distal extremities in children and adults.[1,2] The tumors appear as red–brown or bluish lesions that can begin as a single nodule but develop into multifocal painful lesions over years. The lesions can be seen in Maffucci Syndrome and capillary/lymphatico/venous malformations (Klippel–Trenaunay syndrome), generalized lymphatic anomalies (GLA), lymphedema, and an organized thrombus. These tumors are well circumscribed, occasionally contain phleboliths, and consist of cavernous blood spaces alternating with areas of nodular spindle cell proliferation. A significant percentage of SCH are completely intravascular. The vein containing the tumor is abnormal as are blood vessels apart from the tumor mass. Surgical removal is usually curative though there is a risk of recurrence.

Epithelioid hemangiomas

Epithelioid hemangiomas (EH) are benign lesions that usually occur in the skin and subcutis but can occur in other areas such as the bone. They should not be confused with epithelioid hemangioendothelioma or epithelioid angiosarcoma. EH may be a reactive process and are associated with local trauma and may also develop in pregnancy. Patients present with local swelling and pain at the involved site. In the bone, they present as well-defined lytic lesions that involve the metaphysis and diaphysis of long bones.[3] They can have a mixed lytic and sclerotic pattern of bone destruction. On pathologic evaluation they have small caliber capillaries with eosinophilic, vacuolated cytoplasm and large oval, grooved, lobulated nuclei. The endothelial cells are plump and they are mature, well-formed vessels surrounded by multiple epithelioid endothelial cells within abundant cytoplasm. They lack cellular atypia and mitotic activity.[4] Treatment consists of curettage, sclerotherapy, resection, or, rarely, radiation.

Pyogenic granuloma

Pyogenic granuloma, known as "lobular capillary hemangioma," is a benign reactive lesion that predominantly affects

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Table
The 2013 WHO Classification of vascular tumors.

Vascular tumors
Benign
Hemangiomas
Epithelioid hemangioma
Angiomatosis
Lymphangioma
Intermediate (locally aggressive)
Kaposiform hemangioendothelioma
Intermediate (rarely metastasizing)
Retiform hemangioendothelioma
Papillary intralymphatic angioendothelioma
Composite hemangioendothelioma
Kaposi sarcoma
Malignant
Epithelioid hemangioendothelioma
Angiosarcoma of soft tissue

children and young adults.[5–7] The pathophysiology of the development of pyogenic granuloma is unknown. These lesions can arise spontaneously in sites of trauma or within capillary malformations. Pyogenic granulomas have also been associated with medications, including oral contraceptives and retinoids. Most occur as solitary growths, but multiple (grouped) or rarely disseminated lesions have been described. These lesions appear as a small or large, smooth or lobulated vascular nodule that can grow rapidly sometimes over weeks to months and have a tendency to bleed profusely. Histologically, these lesions are composed of capillaries and venules with plump endothelial cells separated into lobules by fibromyxoid stroma. Some untreated lesions eventually atrophy, become fibromatous, and slowly regress. Treatment often consists of full-thickness excision, curettage, or laser photocoagulation but reoccurrence is common.

Angiofibromas

Angiofibromas are rare benign neoplasms in the pediatric population and are the typical cutaneous lesions of tuberous sclerosis found as red papules on the face. Excision and topical treatments have been used, such as sirolimus.[8] Specifically challenging are juvenile nasopharyngeal angiofibromas (JNA), which account for 0.5% of all head and neck tumors.[9] Histologically, JNA are benign vascular tumors but they can be locally destructive, spreading from the nasal cavity to the nasopharynx, paranasal sinuses, and orbit skull base with intracranial extension. Some articles have suggested a hormonal influence on JNA with present emphasis on the molecular mechanisms involved. Surgical excision is the treatment of choice, but this can be challenging because of the extent of the lesion. JNA have also been treated with radiation therapy, chemotherapy, and alpha interferon therapy. Recently, sirolimus has been used to control tumor growth (verbal communication).

Intermediate: Locally aggressive

Kaposiform hemangioendothelioma/tufted angioma

Kaposiform hemangioendothelioma (KHE) and tufted angioma (TA) are rare vascular tumors that typically occur during infancy or early childhood but have been reported in adults. Both tumors are thought to be a spectrum of the same disease as both can be locally aggressive and cause Kasabach–Merritt phenomenon, a serious life-threatening coagulopathy characterized by profound

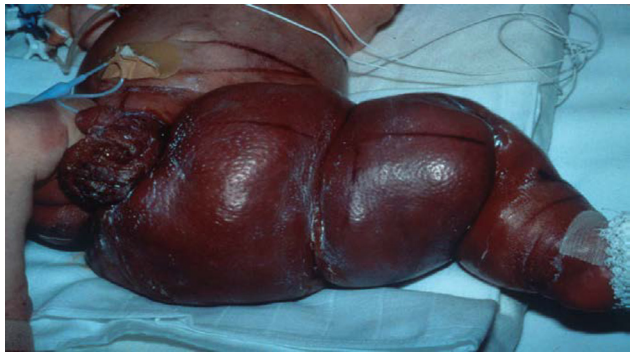

Fig. 1. A Kaposiform hemangioendothelioma with Kasabach–Merritt phenomenon. (Color version of figure is available online.)

thrombocytopenia and hypofibrinogenemia (Figure 1). They will be discussed further as one entity, KHE.

The exact incidence of KHE is unknown but estimated to be 0.07/100,000 children per year based on a recently published retrospective review.[10–12] The lesions affect both sexes equally, with most developing in the neonatal period, half presenting at birth, but others presenting during childhood and in adults.[13] KHE is characterized by sheets of spindle cells with an infiltrative pattern in the dermis, subcutaneous fat, and muscle. There are often areas of fibrosis with dilated thin-walled vessels infiltrated around the areas of spindle cells (Figure 2). Mixed with these areas are nests of rounded epithelioid cells of vascular origin and aggregates of capillaries with round or irregularly shaped lumens containing platelet-rich fibrin thrombi. There is usually the presence of abnormal lymphatic spaces either within or at the periphery of the lesion. The rate of mitosis is variable but usually low. Tufted angioma is characterized by multiple, discrete lobules of tightly packed capillaries (tufts) scattered in the dermis and sometimes in the subcutis, so-called “cannonball” pattern.[14] Mitoses are rare.

The pathogenesis is poorly understood. There is some evidence that KHE may be derived from lymphatic endothelium as the spindle cell expresses the vascular markers CD31 and CD34, the vascular endothelial growth factor receptor-3 (VEGFR3), a receptor required for lymphangiogenesis, and the lymphatic markers

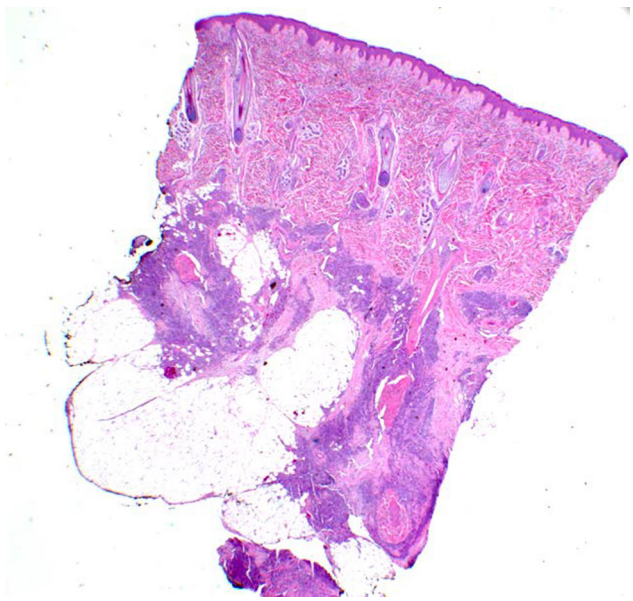

Fig. 2. Infiltrating spindle cell lesion infiltrating multiple planes of tissue (KHE). (Color version of figure is available online.)