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Tissue Diagnosis of Hemangioma

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Hemangiomas are a benign form of vascular tumor that result from proliferation of blood vessels. They often present in infancy and gradually involute during the first decade of life. Investigation into the exact cause of hemangiomas is ongoing and is likely related to levels of glucose transporter isoform 1 (GLUT1) and placenta-associated vascular antigen observed in the endothelial cells of hemangiomas undergoing proliferation and involution. This unique developmental course is attributed to an imbalance of growth factors that begins with an initial overexpression of fibroblast growth factor (FGF) and vascular endothelial growth factor (VEGF) during the proliferative phase with progression to increased levels of tissue metalloproteinase during involution.

Young children are the most common group to develop hemangiomas, but there are many reports of hemangiomas developing later in life. The most common regions affected include the face and scalp; but hemangiomas may occur anywhere blood vessels are present and have been observed in deeper tissues such as the larynx, muscles, liver, and brain. Hemangiomas present at birth are referred to as congenital hemangiomas and those that present later in infancy are known as infantile hemangiomas.

Hemangiomas may be further classified as capillary or cavernous on the basis of histology. Capillary hemangiomas are commonly found in the skin and subcutaneous tissues. These are found more frequently in young children and often regress. Microscopic examination reveals small closely packed vessels that resemble

capillaries. Samples of the proliferative phase may show signs of immature cells and disorganized blood vessels. This is in contrast to cavernous hemangiomas which are found more frequently in adolescents and adults within deeper structures. These lesions are much less likely to regress over time. Histologic examination reveals large cavities filled with blood (Figure 1).

Capillary hemangiomas may be expected to involute over the first few years of life and may be monitored over time. Imaging with contrast MRI is indicated if the boundaries of the hemangioma are unclear or if there is concern for adjacent tissue involvement. Furthermore biopsy should be reserved for cases where there are signs of malignancy such as ulceration and fixation. Lesions that fail to involute may be managed medically with propranolol or glucocorticoids. Surgery may be indicated in cases where involvement of deeper structures such as the orbit, larynges, or gastrointestinal tract are involved. It may also be pursued for cosmesis in cases of cutaneous lesions that do not involute.

Pathologic specimens of hemangiomas show an increased number of vascular structures containing red blood cells or transudate with a preserved monolayer of normal-appearing endothelial cells. Capillary hemangiomas have densely packed spindle cells with minimal blood or transudate present. Hemosiderin is often observed secondary to rupture of vessels. Cavernous hemangioma samples show large diameter dilated vessels with thinned walls (Figure 2).

The pathology differential diagnosis for hemangioma should include arteriovenous malformation, angiosarcoma, vasculitides, and Kaposi sarcoma.

Suggested Reading

Semkova K, Kazandjieva J, Tsankov NK. What's new in infantile hemangiomas: current insights and future perspectives. *Skinmed.* 2013;11L341-9.

Marqueling AL, Oza V, Frieden IJ, Puttgen KB. Propranolol and infantile hemanigoms four years later: a systematic review. Pediatr Dermatol. 2013;30:182-91.

Prasetyono TO, Djoenaedi I. Efficacy of intralesional steroid injection in head and neck hemangioma: a systematic review. Ann Plast Surg. 2011;66:98-106.

Figure Captions:

Figure 1: A well-circumscribed vascular mass removed in its entirety shown at 20X magnification. Vascular structures are readily recognized throughout with occasional cystic dilations.

Figure 2: High magnification showing dilated tortuous vascular spaces with flattened endothelial lining. Red blood cells and transudate may be seen within these spaces and cystic dilations may be appreciated.