Case of the Month September 2026

History/Signalment:

A 6-year-old castrated male German Shepherd dog had a two-week history of a swollen, erythematous tract on the left hind limb with marked crusting. Initial treatment with amoxicillin and prednisone resulted in noticeable improvement. However, a draining tract developed in affected areas and progressed to episodes of profuse hemorrhage. The patient was sedated for punch biopsies and placement of a probe for the draining tract. Surgical excision of the draining tract was performed, with no significant findings.

Figure 1. Left hind limb.

Figure 2. Left hind limb.

Figure 3. Left hind limb, haired skin. H&E, 1x magnification.

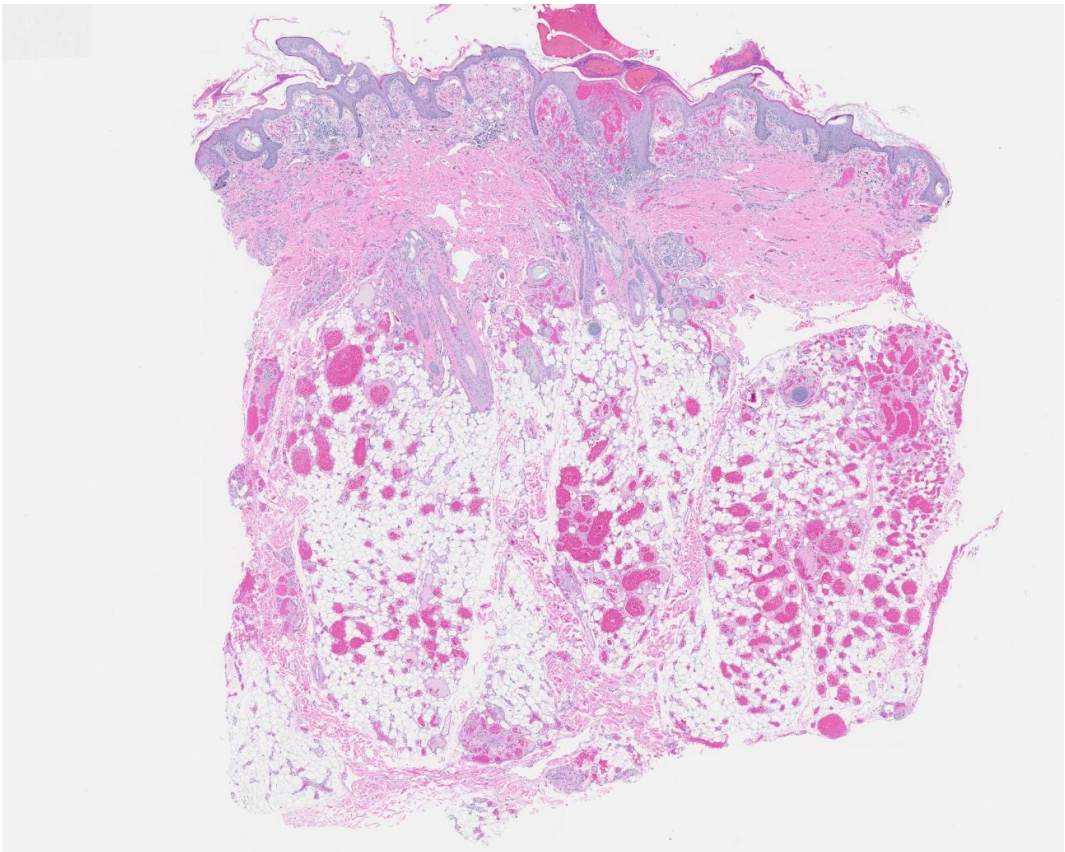


Figure 4. Left hind limb, haired skin. H&E, 1x magnification.

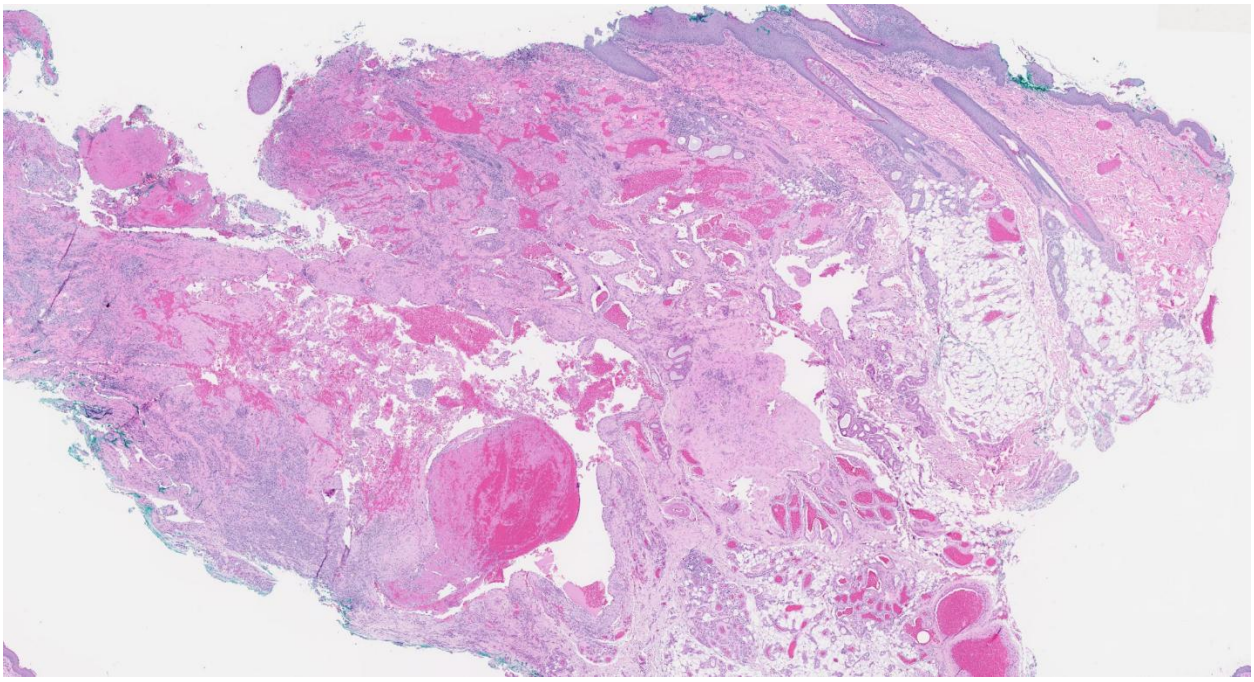


Figure 5. Left hind limb, subcutis. H&E, 6x magnification.

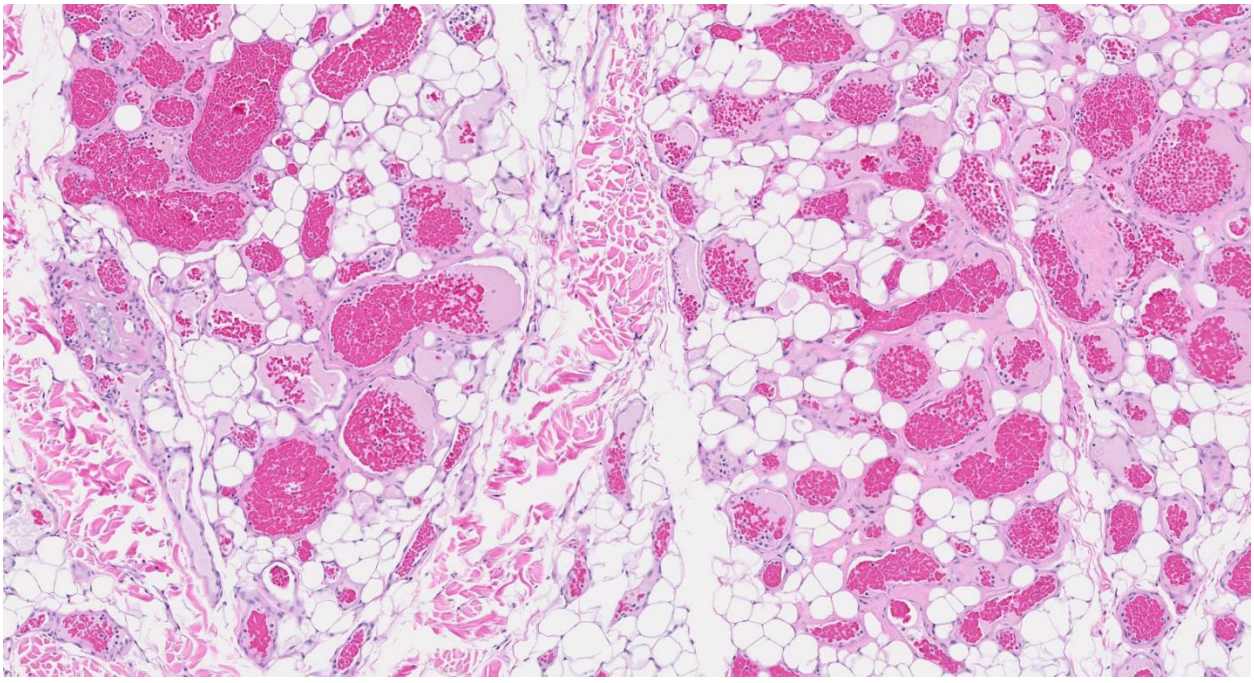


Figure 6. Left hind limb, deep dermis and subcutis. H&E, 4x magnification.

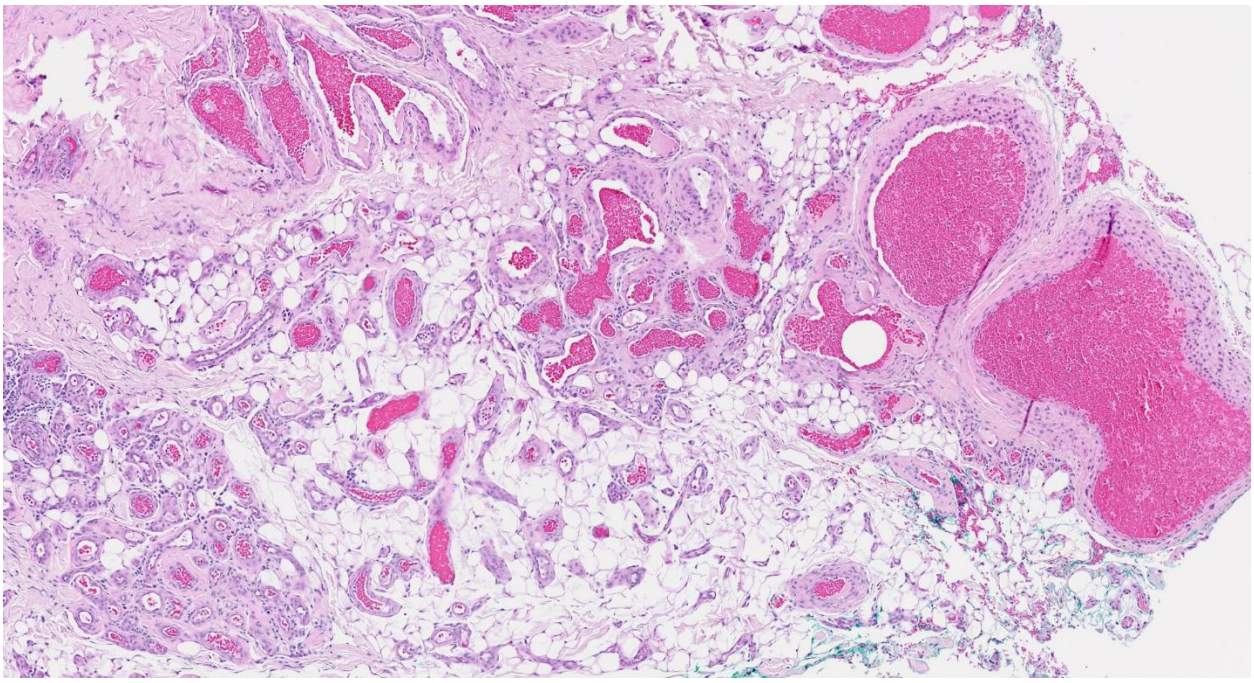
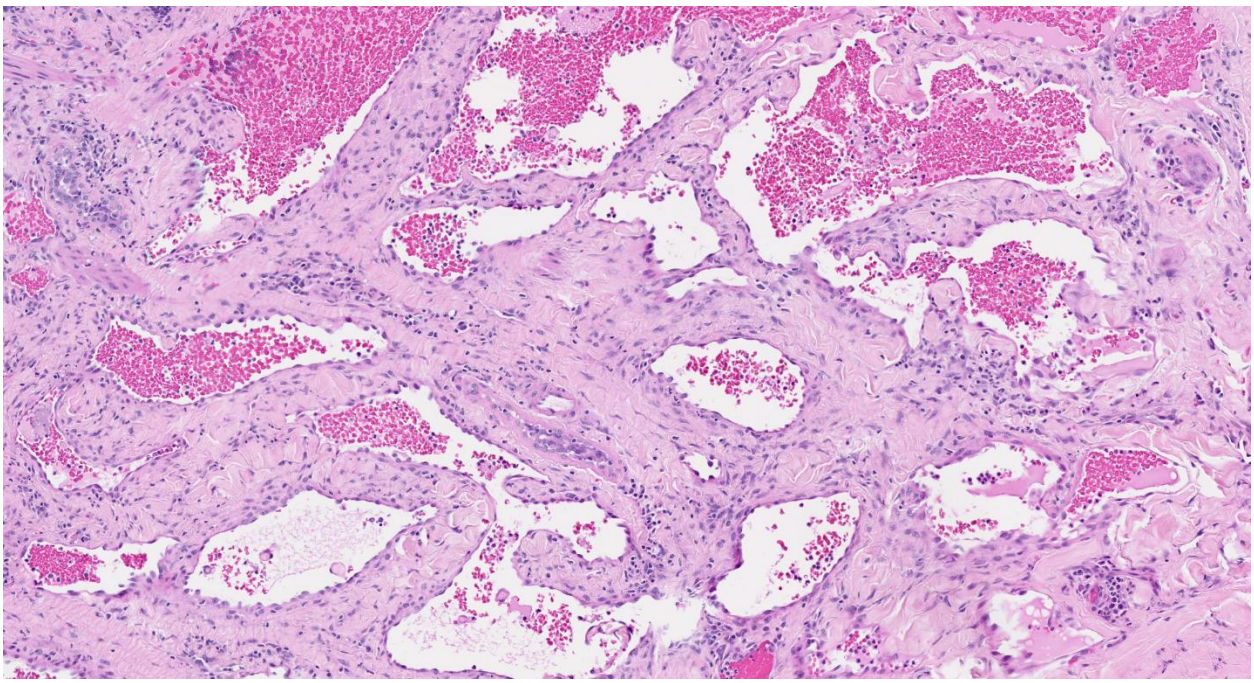


Figure 7. Left hind limb, deep dermis. H&E, 6x magnification.



Which of the following is the best diagnosis?

a) Angiolipoma
b) Well-differentiated hemangiosarcoma
c) Infiltrative hemangioma
d) Cutaneous progressive angiomatosis

Histopathologic Description:

Extending from the superficial dermis into the panniculus is a poorly demarcated, non-encapsulated, infiltrative proliferation of blood vessels with a wide variety of sizes and morphology. Within the panniculus and deep dermis are numerous medium-sized vessels, with thin walls and a moderate amount of collagenous stroma in between the blood vessels. Normal pre-existing adipocytes are intermixed with vascular proliferation, forming nodules within the subcutaneous adipose tissue separated by thin fibrous connective tissue.

In one section, the dermis and panniculus contain a large proliferation of blood vessels that form blind-ended channels and are severely dilated and filled with fibrin thrombi. The blood vessels are supported by abundant hyalinized collagen and lined by bland, flat endothelial cells, with minimal cellular atypia and no mitotic figures. Adjacent to this proliferation are numerous medium-to-large-sized blood vessels with thick walls of highly cellular smooth muscle. In the adjacent dermis, the adnexa and superficial dermis is infiltrated by lymphocytes, plasma cells, and macrophages. The epidermis is multifocally ulcerated and replaced by eosinophilic, amorphous material and cellular debris (serocellular crusts). The remaining epidermis is moderately hyperplastic. The stratum corneum is orthokeratotic in a basketweave arrangement.

Morphologic Diagnosis:

Haired skin: Cutaneous progressive angiomatosis

Comments:

Angiomatosis comprises a complex and heterogeneous group of incompletely characterized vasoproliferative disorders with biological behavior ranging from benign to aggressive. In human medicine, the term angiomatosis refers to a wide range of non-neoplastic vascular proliferations, including both vascular malformations (congenital or

developmental) and reactive vascular lesions. Reactive vascular lesions may undergo spontaneous regression, whereas vascular malformations require surgical intervention. A variety of factors have been implicated in the development of vascular proliferations in humans. The importance of vascular endothelial growth factor (VEGF) and endothelial cell expression of receptors for VEFG has been documented, and the influence of adhesion molecules and their receptors, fibroblast growth factor (FGF), and coagulation factors has also been reported. Some forms of angiomatosis have been associated with infectious etiologies, particularly bacillary angiomatosis, which is linked to infection with *Bartonella* spp.

In dogs and cats, angiomatosis is rare, and unlike in humans, spontaneous regression has not been documented. Cutaneous, mucosal, cardiac, meningeal, skeletal, digital, and multisystemic forms occur in dogs. Some lesions develop in young animals, supporting a hamartomatous origin rather than a true neoplastic process. Frequently, lesions remain unnoticed in a dense long hair coat, which could explain why some cases have been described in adult dogs. Clinical findings range from single to multiple dark red to purple macules and patches, resembling the “port-wine stains” described in humans, or may present as multiple soft papules or plaques. Papules and plaques may periodically hemorrhage due to irritation, whereas hemorrhage is less common in macules and patches.

Progressive angiomatosis is a dermal to subcutaneous variant of angiomatosis with a particularly aggressive presentation. It typically involves digits (this form being especially aggressive), lower extremities, and, less commonly, the trunk. It develops in young to middle-aged animals, although cases in older animals have been reported, with no known breed or sex predisposition. It is classified as an infiltrative, non-neoplastic, vascular proliferation with progressive behavior. Prognosis varies depending on the extent, depth, and anatomic location of tissue involvement. Lesions are poorly demarcated, rapidly expanding, infiltrative and can invade bone and cause osteolysis. Facial and multisystemic progressive angiomatosis have been described in dogs, where the condition may resemble the “blue rubber bleb nevus syndrome” in humans.

Histologically, angiomatosis is characterized by variably circumscribed nodules composed of blood-filled vascular structures embedded in preexisting or newly deposited fibrous to myxoid stroma. Adjacent nodules are often interconnected by blood-filled channels, forming an anastomosing network of vascular spaces. The endothelial lining is composed of normal mature to slightly enlarged endothelial cells with hyperchromatic nuclei. Atypia is absent and mitoses are rare. Thrombosis and intraluminal, partially occlusive papillary endothelial hyperplasia may be present. The overlying skin may be ulcerated. Histological

subtypes include cavernous, capillary, and arteriovenous angiomatosis. Cavernous angiomatosis is composed of a mixture of capillaries and cavernous blood vessels, whereas capillary angiomatosis is composed of capillaries embedded in variably abundant fibrous to edematous stroma. Arteriovenous angiomatosis is characterized by a mixture of capillaries, small arterioles and veins, with endothelial cells often accompanied by smooth muscle and fibrous tissue, creating structures that resemble arterioles and veins.

Progressive angiomatosis can have an infiltrative growth, and ruling out well-differentiated capillary hemangiosarcoma or infiltrative hemangioma may be challenging, especially in small punch biopsies. In some cases, angiolipoma may also resemble angiomatosis; however, angiolipomas are characterized by a proliferation of thin-walled vascular channels within a adipose tissue proliferation. Although progressive angiomatosis may involve subcutis, the adipose tissue is otherwise normal. Morphologic features associated with progressive angiomatosis include loosely infiltrative blood vessels lined by a monolayer of endothelial cells, absence of cellular atypia and mitotic figures, papillary endothelial hyperplasia, mixed vascular composition, and the presence of interposed normal tissue components and nerve fibers between vascular proliferations. Additionally, multilobular to multifocal growth is more suggestive of progressive angiomatosis and is often associated with interposed normal tissue. For progressive angiomatosis, clinical history may be the deciding factor in establishing the definitive diagnosis versus other forms of angiomatosis. Although complete surgical excision is curative, poor demarcation and rapid progression can make this difficult to achieve. Recurrence is frequent, and amputation is often necessary; however, metastasis does not occur. Progressive angiomatosis should remain as an important differential diagnosis in dogs with lesions that appear aggressive, particularly when bone involvement and osteolysis are present, as these cases can closely mimic malignant neoplasia.

References:

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