Subcutaneous Intravascular Pyogenic Granuloma: A Case Report and Review of the Literature

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Pyogenic granuloma (PG), also known as lobular capillary hemangioma, is a common vascular proliferation that often occurs after minor injury or infection of the skin. Typically these lesions occur in the superficial dermis; although rare, subcutaneous and intravascular lesions can occur. We present a case of PG with the unusual features of being both a deep subcutaneous and intravascular lesion localized to the forehead without antecedent trauma. We also review the literature on PG and discuss the differential diagnosis.

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Case Report

A 45-year-old man presented with a deep subcutaneous nodule on his central forehead that had been growing over the last 3 to 4 months. The lesion was asymptomatic. There was no history of trauma. Physical examination revealed a round, soft, moveable, deep dermal mass approximately 1 cm in diameter. The overlying skin was normal. No pulsation was noted on palpation. The submitting practitioner's clinical impression was a lipoma, and the lesion was excised with primary closure.

Histologic examination of the specimen revealed a multilobulated tumor composed of capillaries separated by fibrous septae and set in an edematous fibromyxoid stroma (Figure 1). The lesion was located in the deep subcutis in close approximation to the frontalis muscle. The entire lobular proliferation appeared as a mass projecting into the lumen of a dilated vessel. Cellular atypia was not observed. Immunohistochemistry staining for CD31 was performed to outline the distribution of the vessels and to demonstrate the intravascular location of the lesion (Figure 2).

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The authors report no conflict of interest.

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Comment

Pyogenic granuloma (PG), also known as lobular capillary hemangioma, is a benign vascular tumor of the skin and mucous membranes that is common in children but may occur at any age. It is a small, eruptive, usually solitary, sessile or pedunculated, vascular papule that is prone to ulceration or hemorrhage.[1,2] Any cutaneous or mucous membrane surface may be affected, with the hands, forearms, face, and gingiva being the most common.[3] The lesion typically grows rapidly over several weeks before stabilizing as an elevated erythematous friable papule measuring up to 1 to 2 cm in size. Pyogenic granulomas bleed easily after the slightest trauma and may persist indefinitely unless destroyed.[4]

There are several variants of PG that have been reported in the literature, including dermal PG,[4] oral mucosal PG,[5] and satellite PG.[6,7] Rarely, these benign proliferations may occur intravascularly[8] or subcutaneously.[9] Intravascular PG was first reported in 1979 by Cooper et al[8] who described 18 cases of a previously unrecognized entity that they termed *intravenous PGs* occupying veins of the neck and upper extremities. Since then, few cases with similar lesions have been published and all were located on the neck, arms, forearms, wrists, and hands,[10-13] except for one in the ocular adnexa[14] and one in the parotid area sampled by fine needle aspiration.[15] Our case is unique in that our patient had a subcutaneous intravascular PG localized to the central forehead.

Histologically, intravascular PG is similar to PG of other locations. Early lesions are histopathologically

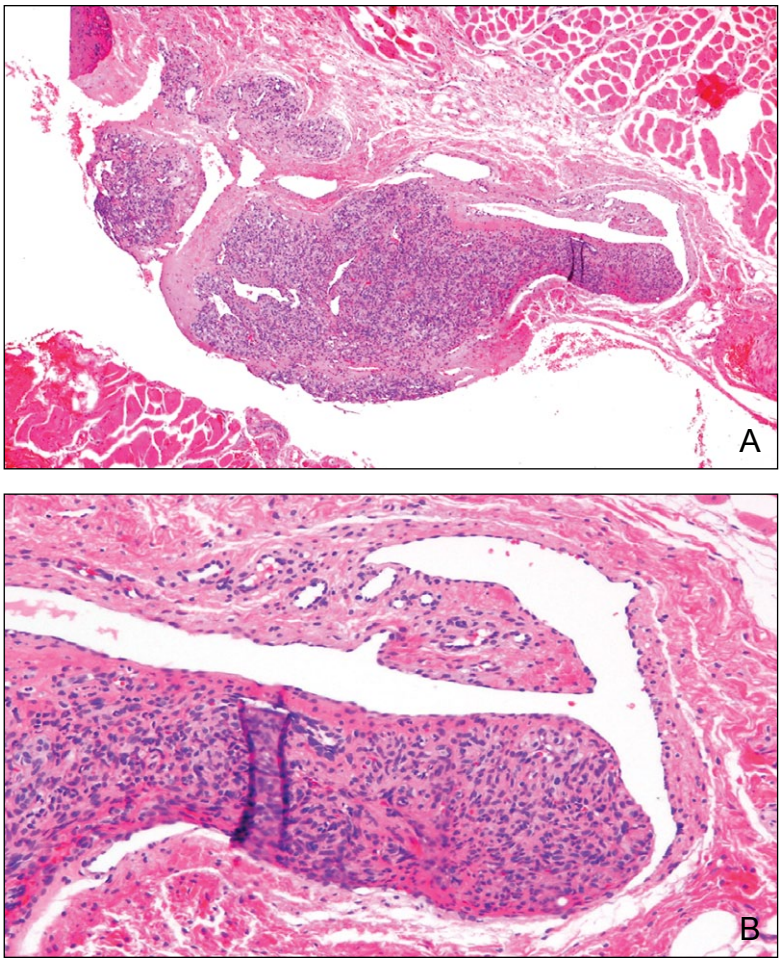

Figure 1. Multiple lobules of dilated and congested capillaries separated by fibrous septae and set in a fibromyxoid stroma (A)(H&E, original magnification ×4). The lesion is located within a vascular structure. High-power view of vascular proliferation located within a dilated vessel (B) (H&E, original magnification ×20).

identical to granulation tissue with radially disposed capillaries and venules embedded in an edematous fibromyxoid stroma containing a mixed inflammatory infiltrate. Fully developed PG is a polypoid lesion that shows a lobular pattern intersected by fibrous septae. Each lobule is composed of aggregates of capillaries and venules with plump endothelial cells, with minimal stromal edema and inflammation. In contrast to its extravascular counterparts, intravascular PG presents as an intraluminal polyp that is attached to the wall of the vein or artery by a fibrovascular stalk with a less prominent lobular pattern.[2]

Controversy exists about the pathogenesis of PG as either a hyperplastic or neoplastic process. Requena and Sangueza[2] favor a hyperplastic process that is akin to a florid expression of granulation tissue seen in response to trauma, hormonal factors, and retinoid therapy. The etiologic factors are likely multifactorial, as there are several reported cases of intravascular PG occurring without known antecedent trauma,[10,12,16] including the case reported herein.

The differential diagnosis for intravascular PG includes other intravascular fibroangiomatous proliferations such as angiosarcoma, intravascular Kaposi sarcoma, angioleiomyoma, intravascular fasciitis, intravascular papillary endothelial hyperplasia, and organized thrombus.[17] Clinically, all of these lesions can present as subcutaneous nodules; therefore, surgical excision with correct histopathologic diagnosis is necessary to differentiate these entities. Important features favoring a diagnosis of PG are its lobular architecture, lack of notable cytologic atypia, and surrounding myxoid stroma,[16] which are not seen in the other entities, specifically angiosarcoma and Kaposi sarcoma. Positive staining for human herpesvirus 8 also may be helpful in distinguishing Kaposi sarcoma from PG.[4] The histologic examination of PG can exclude entities such as angioleiomyoma and intravascular fasciitis based on the absence of smooth muscle bundles in the former and the reactive myofibroblastic proliferation in the latter. Intravascular papillary endothelial hyperplasia (Masson pseudoangiosarcoma) is characterized by small endothelial-lined papillary

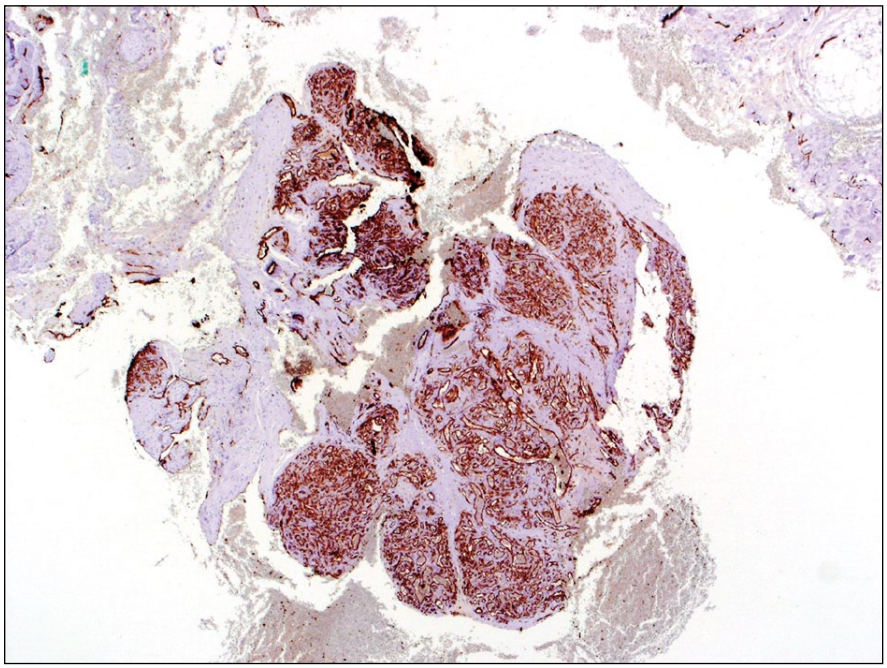

Figure 2. CD31 stain outlining the distribution of vessels as well as the intravascular location of the lesion (original magnification ×4).

structures with hyaline stalks, features that are not seen in PG.

Conclusion

Intravascular PG is an uncommon presentation of an otherwise common benign neoplasm. Its presentation as a deep subcutaneous forehead lesion is a novel location in our case, thus illustrating the variable nature of this lesion as well as highlighting the need to consider PG in the differential diagnosis when dealing with subcutaneous facial nodules.

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