Brown to violaceous firm plaque below left breast

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ABSTRACT

Atypical vascular lesions (AVLs) are a group of proliferating vessels in the mammary glands. They most commonly appear in female patients following radiation therapy for breast cancer, but can also occur spontaneously. The exact mechanism behind the development of AVLs outside the radiation field is not well understood. Histopathology is characterized by irregular dilated thin-walled vascular spaces with branching and anastomosing pattern in superficial and deep dermis. The vascular channels were lined by single endothelial cell layer with no mitotic figures or necrosis. We are presenting a case of AVL in a breast Ca patient, developed post radiation therapy

KEY WORDS: Atypical vascular lesion, Angiosarcoma

CLINICAL FINDINGS

A 69-year-old woman with history of bilateral breast cancer presented with a skin lesion under the left breast (Fig. 1). Patient is known to have bilateral breast cancer (cT2 N1 M0, invasive ductal carcinoma, ER/PR-positive, HER2-negative) for which she underwent neoadjuvant chemotherapy, surgery, and radiotherapy. After completing the treatment and achieving remission, she presented with a brown to violaceous firm plaque four years later.

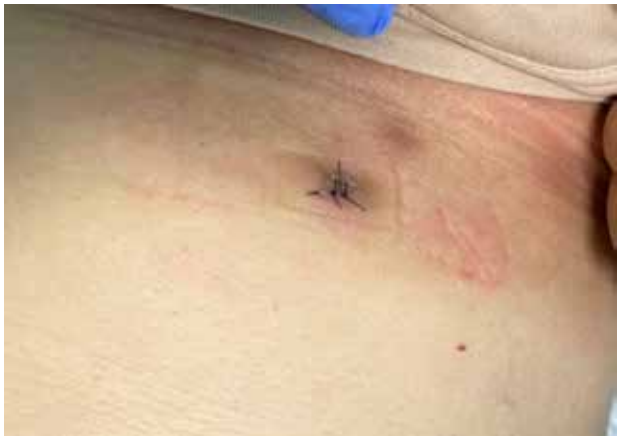

Fig. 1 Clinical image of brown to violaceous firm plaque below left breast

What is your clinical differential diagnosis?

- Atypical vascular lesion
- Angiosarcoma
- Hobnail hemangioma
- Kaposi sarcoma

PATHOLOGICAL FINDINGS

A complete surgical excision was done and microscopy revealed vascular proliferation dissecting the collagen in the upper dermis. It consisted of irregular dilated thin-walled vascular spaces with branching and anastomosing pattern in superficial and deep dermis. The vascular channels were lined by single endothelial cell layer with no mitotic figures or necrosis (Fig. 2, 3).

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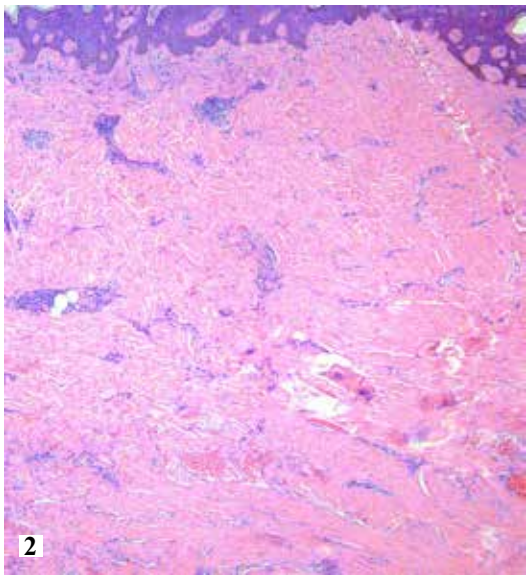

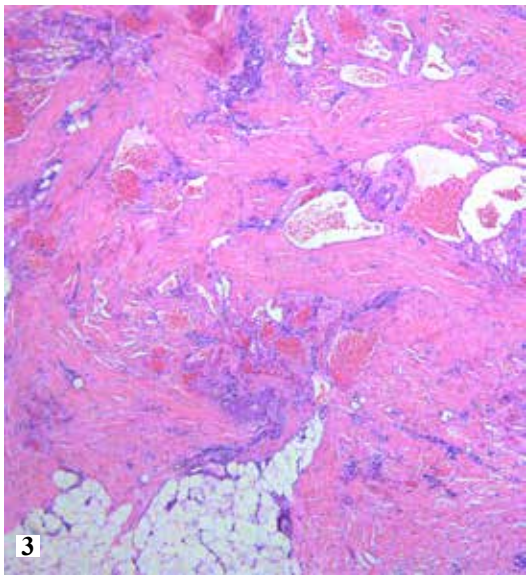

Fig. 2 & 3 A, B, Microscopy exhibited vascular proliferation dissecting the collagen in the upper dermis and consisting of irregular dilated thin-walled dermal vascular spaces with branching and anastomosing pattern. The vascular channels were lined by single endothelial cell layer with no mitotic figures or necrosis (hematoxylin–eosin 2, ×40, 3, ×100)

DIAGNOSIS

Atypical vascular lesion

COMMENT

Atypical vascular lesions (AVLs) were first described by Fineberg and Rosen in 1994 as a group of proliferating vessels in the mammary glands. They most commonly appear in female patients following radiation therapy for breast cancer,[1] but can also occur spontaneously.[2] They are thought to develop due to lymphatic obstruction, leading to the dilation of superficial vascular channels, proliferating anastomosing vessels with adjacent lymphocytic infiltration.[3]

Clinically, AVLs present as small, erythematous, or violaceous macules, papules, or plaques that can mimic benign conditions such as hemangiomas or more concerning entities like angiosarcomas.[2] On dermoscopy, AVLs may display a characteristic pattern of tan network in the center, surrounded by erythematous to violaceous background at the edges, without a clearly defined vascular structure in the periphery.[4] However, the clinical appearance and dermoscopic features are not always definitive, necessitating further histopathological examination to further differentiate AVLs from other entities.[1] It's important to note that not all AVLs are associated with prior radiation exposure; some can develop in areas unexposed to radiation, complicating their diagnosis and management.[2] The exact mechanism behind the development of AVLs outside the radiation field is not well understood. It is also unclear whether such occurrences might be associated with a faster progression or an increased risk of evolving into angiosarcoma.[5]

Atypical vascular lesions can be classified into two main types based on their etiology: lymphatic and vascular.[6] Lymphatic AVL typically arise from lymphatic endothelial cells and often appear as translucent vesicles or cysts. They are usually empty and formed from ectatic vessels. On the other hand, vascular AVL are similar to capillary hemangioma and are formed by irregular small vessels lined by hobnailed endothelial cells filled with red blood cells.[6]

The onset of AVLs varies significantly, with the

latency period typically spanning from several months to many years after radiation therapy, usually between 2-6 years.[1,2,8,9,10] This variation highlights the unpredictable AVL nature. Therefore, closely monitoring patients who have undergone radiation therapy is advisable.

The histopathological features of AVLs pose a significant diagnostic challenge due to their potential overlap with angiosarcoma. Typically, AVLs present as relatively circumscribed, symmetric, wedge-shaped lesions in the dermis, with the base oriented toward the dermal-epidermal junction. While these vessels are usually confined to the superficial dermis,[11] A range of benign entities which must be differentiated from angiosarcoma also exists. This review discusses first, breast lesions of apparent vascular origin, then benign and histologically bland perilobular, cavernous and capillary haemangiomas. Subsequently, more diagnostically challenging, atypical haemangiomas, papillary endothelial hyperplasia, angiomatosis and angiolymphoid hyperplasia with eosinophilia (epithelioid haemangioma they may also extend into the deeper reticular dermis and, in rare cases, involve the underlying subcutaneous tissue.[1,12] The vessels in AVLs typically display varying degrees of dilation and thin walls, lined by a single layer of cytologically bland endothelial cells.[1,8,11] A range of benign entities which must be differentiated from angiosarcoma also exists. This review discusses first, breast lesions of apparent vascular origin, then benign and histologically bland perilobular, cavernous and capillary haemangiomas. Subsequently, more diagnostically challenging, atypical haemangiomas, papillary endothelial hyperplasia, angiomatosis and angiolymphoid hyperplasia with eosinophilia (epithelioid haemangioma,[12,13] The endothelial cell nuclei may protrude in a hobnail fashion and show hyperchromasia.[14] Occasionally, focal multilayering of the endothelium is observed.[15] The vessels themselves are often irregular and ectatic, with vascular anastomoses sometimes present.[1] The lumina of the vessels in AVLs typically lack erythrocytes, and a chronic inflammatory cell infiltrate, predominantly composed of lymphocytes, is often present in the surrounding tissue. This infiltrate can be notable for the formation of germinal centers.[1,14] Distinguishing features in AVLs as compared to angiosarcoma are relative circumscription and projections of stroma into the lumen. On the other hand, papillary endothelial hyperplasia, infiltration into subcutis, mitotic figures, prominent nucleoli, significant cytological atypia and blood lakes are absent in atypical vascular lesion and present in angiosarcoma.[11] A range of benign entities which must be differentiated from angiosarcoma also exists. This review discusses first, breast lesions of apparent vascular origin, then benign and histologically bland perilobular, cavernous and capillary haemangiomas. Subsequently, more diagnostically challenging, atypical haemangiomas, papillary endothelial hyperplasia, angiomatosis and angiolymphoid hyperplasia with eosinophilia (epithelioid haemangioma

The endothelial cells in both lymphatic and vascular types of AVLs are positive for CD31 and may variably express CD34. The lymphatic type is characterized by D2-40 positivity, whereas the vascular type is D2-40 negative.[1,3,6,16,17] Furthermore, the lymphatic type lacks circumferential pericytes, shown by smooth muscle actin immunostaining, whereas the vessels in the vascular type are surrounded by pericytes.[1,3]

As for the treatment of AVLs, topical 0.05% betamethasone dipropionate has been shown to

provide symptomatic relief and reduce erythema within two days. However, surgical excision, whether staged or not, remains the primary treatment for AVL,[9] which aims at obtaining negative margins. When the lesion is large and not amenable to surgery, close clinical monitoring may be a suitable alternative.[5] Regardless of treatment, patients should be closely monitored for new or progressing lesions.[13,17] The uncertainty surrounding progression to malignant angiosarcoma in extensive AVL cases underscores the importance of ongoing surveillance.[1,17] In a clinical analysis of 42 cases, one patient with AVL experienced a recurrence at the original site, three others developed new lesions, and one patient presented with multiple small papules on the chest wall that progressed from AVL to angiosarcoma.[7]

In conclusion, AVLs are benign lesions that frequently arise after radiation therapy for breast cancer. Their similarity to angiosarcoma poses significant diagnostic challenges making histopathological analysis essential for accurate differentiation. The natural history and potential for malignant transformation remain uncertain, underscoring the necessity of long-term follow-up. Treatment typically involves surgical excision with negative margins, followed by close monitoring to ensure optimal outcomes. However, more studies on non-surgical management outcomes are required to better understand the behaviour of AVLs and its potential link to radiation-associated angiosarcoma.[13]

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