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Case report

Papillary endothelial hyperplasia arising in the irradiated breast: A diagnostic dilemma

Laila Khazai[a], Alec Chau[b], Susan Hoover[c], Marilin Rosa[a,*]

[a] Department of Anatomic Pathology, H. Lee Moffitt Cancer Center and Research Institute, United States
[b] Department of Radiology, H. Lee Moffitt Cancer Center and Research Institute, United States
[c] Breast Surgical Oncology, Comprehensive Breast Program, H. Lee Moffitt Cancer Center and Research Institute, United States

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ABSTRACT

Papillary endothelial hyperplasia (PEH) is a benign proliferative lesion that may occur in any site of the body, but most commonly affects the skin and subcutaneous tissues. In the breast, PEH has been documented but is rare. PEH is notorious for being misdiagnosed as angiosarcoma due to its complex growth pattern, papillary processes and interlacing vascular channels. The occurrence of PEH years after breast irradiation constitutes a pathological and clinical diagnostic challenge because angiosarcoma is far more common in this setting. The most important features that differentiate papillary endothelial hyperplasia from angiosarcoma are its presentation as a round nodule without infiltrative borders, its localization inside a vessel or in association with thrombus, and the lack of significant cytologic atypia or areas of solid growth, even in the presence of a complex architecture. Clinical history and site of involvement (cutaneous versus parenchymal) are usually of help to establish a correct diagnosis. Herein, we describe two cases of PEH presenting in patients with history of breast carcinoma and breast radiation therapy. The clinical and morphological features as well as the differential diagnoses are discussed. To our knowledge, no other cases of PEH of the breast occurring in the post-radiation setting have been described in the literature.

1. Introduction

Papillary endothelial hyperplasia was first described by Pierre Masson in 1923, presenting as a non-reducible hemorrhoid in a 68-year old man [1]. He noted that even though the lesion pathologically appeared similar to a thrombosed hemangioma, it was different from an ordinary thrombus because it began not as a clot but as an endothelial proliferation. It was also different from a hemangioma because the process remained within the vessel lumen. He named it "vegetant intravascular hemangioendothelioma", and described it as a neoplasm that displays degenerative changes including thrombosis and necrosis secondary to outgrowing its blood supply [1,2]. Since then, PEH has been designated by a variety of different names including Masson's tumor, Masson's pseudo-angiosarcoma, intravascular angiomatosis, and intravascular endothelial proliferation, among others. In 1976, Clearkin and Enzinger coined the term intravascular papillary endothelial hyperplasia, which is a closer descriptive term to the true nature of the lesion [3].

PEH is currently accepted as an exuberant organization and recanalization of a thrombus, thus not a true neoplasm [4,5]. It is suggested by some that thrombus-induced hypoxia might initiate the thrombus organization process that results in vascular proliferation [6]. The presence of proliferating endothelial cells forming papillary structures often leads to the suspicion of a malignant process, particularly a low-grade angiosarcoma. Since angiosarcoma is the most common malignant vascular tumor of the breast, with an incidence of 0.05% of all primary breast malignancies [3,5,7], it is only natural that it be considered in the differential diagnosis, especially in patients with history of radiation therapy where angiosarcoma is always the most feared complication. The differentiation from angiosarcoma is crucial due to the aggressive behavior and treatment that can ensue after a diagnosis of angiosarcoma, not to mention its metastatic potential. Herein, we will describe the morphologic features of papillary endothelial hyperplasia, especially those that are helpful in distinguishing this lesion from an angiosarcoma.

* Corresponding author at: Department of Anatomic Pathology, H. Lee Moffitt Cancer Center, 12902 Magnolia Drive, Tampa, FL 33612, United States.
E-mail address: marilin.rosa@moffitt.org (M. Rosa).

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2. Clinical summary and pathologic findings

2.1. Case #1

A 57 year-old female with history of left breast, stage III invasive ductal carcinoma diagnosed 9 years prior, who underwent modified radical mastectomy with implant-based reconstruction followed by adjuvant systemic chemotherapy and radiation to the chest wall and axilla, presented complaining of a palpable mass in ipsilateral breast, first noted several months prior to presentation. On physical examination, the skin overlying the palpable mass was unremarkable. A soft, rubbery nodule was palpated 3 cm cephalad to the middle portion of the transverse mastectomy scar. No other remarkable physical findings were noted in the reconstructed breast or regional lymph node basins. Mammogram was negative. Ultrasound showed an oval, elongated solid mass with well-defined borders measuring 3.3 × 1.1 cm (Fig. 1). Ultrasound-guided core biopsy was subsequently performed and pathologically diagnosed as "atypical vascular proliferation". The vascular proliferation was characterized by minimal cytologic atypia and was accompanied by fragments of fibrin. These findings were concerning for an under-sampled angiosarcoma in light of the morphologic features and the history of radiation therapy to the chest wall.

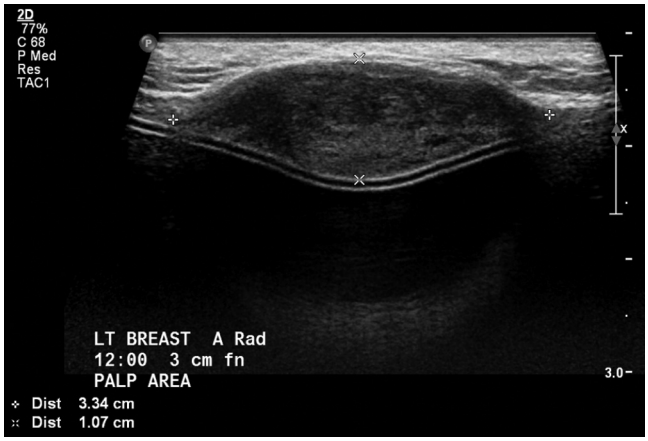

Fig. 1. Ultrasound demonstrating an oval solid mass with circumscribed margins, directly overlying the saline breast implant. There was no detectable internal vascularity on power Doppler imaging.

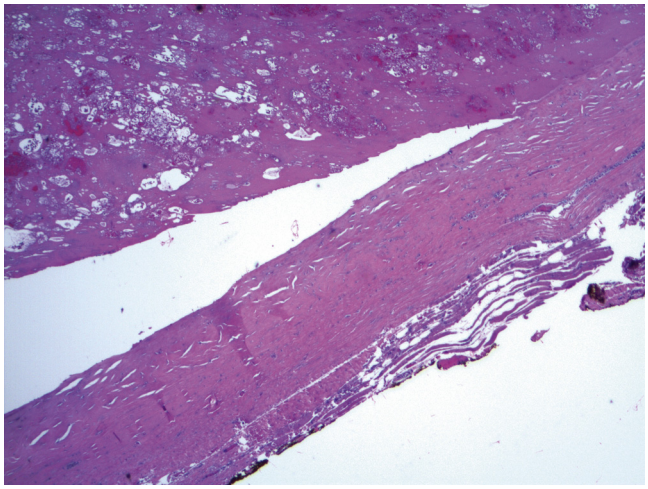

Fig. 2. Microscopic view of the lesion reveals a well-circumscribed nodule surrounded by a fibrotic rim. Evaluation at low magnification is important because circumscription of the lesion is key for the diagnosis (H&E, original magnification 2.5×).

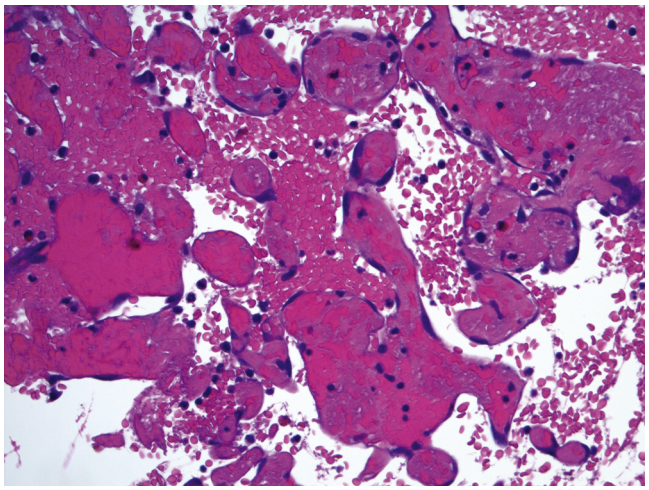

Fig. 3. Papillary structures composed of multiple papillae lined by a single layer of endothelial cells. The papillae contain congested fibrin cores and some appear to float in the lumen. No cytologic atypia is noted in this field (H&E, original magnification 20×).

After multidisciplinary discussion of the patient's case, the consensus opinion was to proceed with wide local excision of the lesion for a definitive diagnosis. Gross examination showed a fairly circumscribed, spongy hemorrhagic lesion measuring 2.5 × 2.2 cm, completely excised. Skin was not present. Histologic examination showed a circumscribed lesion predominantly composed of what appeared to be organized blood clot, with a biopsy cavity in the center surrounded by a fibrotic rim (Fig. 2). There were a few foci of viable small vascular spaces predominantly at the edges of the lesion. The vascular spaces displayed papillae with eosinophilic collagenized cores lined by a single layer of endothelial cells with focal cytologic atypia and few mitotic figures (Figs. 3 and 4). Areas of necrosis were also focally seen. Elastin stain showed patchy remnants of the vessel elastic layer in the surrounding fibrotic rim, consistent with a dilated vessel (Fig. 5). Overall, findings were consistent with papillary endothelial hyperplasia, arising in an ectatic vessel in the reconstructed breast. The patient had an uneventful postoperative recovery; however presented with widespread metastatic breast carcinoma 5 months later.

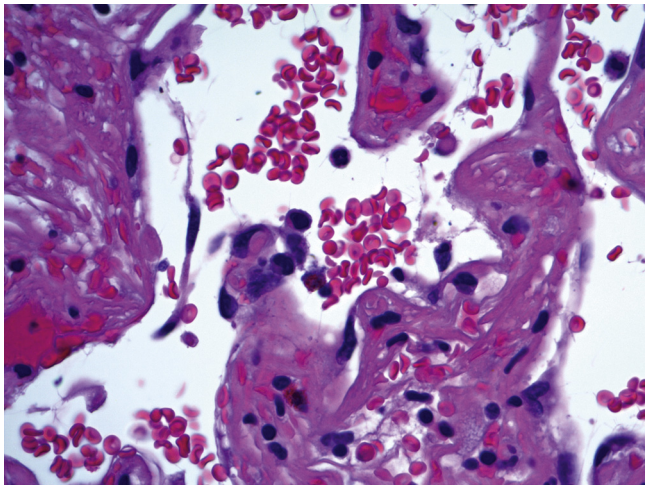

Fig. 4. Focal areas showing cytologic atypia of the endothelial cells. This degree of atypia may contribute to the suspicion of a malignant process (H&E, original magnification 40×).