Angiolipoma of the Breast: A Pictorial Review of Imaging Features

with Histopathologic Correlation

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Introduction

First described by Bower a century ago and established as a pathologic entity by Howard and Helwig in 1966, angiolipoma (AL) is a mesenchymal lesion composed of mature adipose tissue with variable degree of angiomatous proliferation. It is an uncommon variant of lipoma, representing 5-17% of all benign fatty tumors. AL typically presents as multiple, palpable, painless/borderless lesions on the upper extremities and trunk and is more common in males. Although less common in the breast, AL can present as a solitary, superficial, painless mass on mammary breast exam or as a non-palpable lump on mammography.

AL is a slow-growing tumor with no potential for malignant transformation. In the breast, the lesion is most commonly described as a round or oval, circumscribed, subcutaneous mass without overlying skin changes. Surgical excision is not necessary but may be performed for cosmesis. Although breast angiolipoma (BAL) is a lesion predominantly of adolescents and young adults, cases have been reported at ages ranging from 1.8-82 years. Unlike extramammary AL, BAL is usually painless. An increased familial incidence for BAL has been described although the mode of inheritance is unclear.

The World Health Organization (WHO) 2002 classification of tumors of soft tissue and bone subclassifies AL into two categories: low vascular density (low-vascularity) and cellular (consisting predominantly 50% of vascular tissue). The cellular subtype has been reported to comprise 25-30% of all lesions.

This study presents the largest series to date of BAL in the radiologic literature. The data was previously published in 2010 with the objective of delineating the criteria for pathologic diagnosis of AL versus lipoma biopsy. Although the AL was most common vascular tumor of the female breast (52%), all vascular lesions combined represented only 0.27% of over 34,000 surgical breast specimens. We discuss the radiographic appearance of BAL, radiographic murmurs, and characteristics which differentiate the two subtypes.

Materials and Methods

The pathologic specimens database at Henry Ford Hospital, Detroit, MI was queried for breast angiolipoma diagnosed via core needle biopsy or excision. A total of 52 tumors in 49 female patients were identified between 1992 and 2010 which had been detected by palpation or screening mammography. These cases were cross-referenced by the pathology PACS database and electronic medical records system to retrieve relevant imaging studies, patient demographics, and clinical information. Male patients were excluded because they typically did not have imaging prior to excision.

Results

When compared with the cellular subtype, low-vascularity BAL was far more common (71% of cases versus 29%), had significantly longer mean age at presentation (54 years versus 64 year), and had significantly larger masses (3.0 cm versus 9.6 cm). Most BAL were visible by mammography (85%) but none (0%) were visualized on ultrason. In comparison, low-vascularity BAL was usually visualized on ultrason (63.6%) but rarely by mammography (9.1%). Whereas low-vascularity BAL was commonly diagnosed by palpation (97%), cellular BAL was usually detected on screening mammogram (71.4%). Diagnosis was made by core-needle biopsy in 42.9% of cases and by excision in 57.1% of cases.

Pathologic Features

On gross pathology, all 33 cases of excised BAL in our series were well-circumscribed with a tan-yellow to tan-brown cut surface. 14 cases had vascular component greater than 50% (often 80-90%) and were classified as cellular subtype. Both cellular and low-vascularity tumors were represented by mature adipose tissue intimately admixed with a capillary-type anastomosing vascular proliferation (Figure 4) where both vascular and lipomatous tissue formed a circumscribed mass. Overall tendency was toward higher vascular density at the periphery of the lesions. Intratumoral fibrin thrombi were very common (95.9%) and are not seen in other vascular breast tumors. (Figure 5) No specimens contained histologic evidence of calcifications. A distinguishing feature was the presence of scattered short spindle cells between the capillaries in all cases of cellular BAL but in no cases of low-vascularity BAL.

Low-vascularity Breast Angiolipoma

As this subtype is typically detected on mammogrm, inaccuracy of cellular BAL in patients younger than 40 is difficult to estimate since screening is not performed in this age group. This may account for the upward trend in age at diagnosis. Mammographic appearance as a round or oval, isodense, circumscribed mass is non-specific. (Figure 2) No mammographic findings unique for BAL have been reported so diagnosis prior to excision is difficult. One of the most common BAL, visualized on MRI appears as an oval mass which is peripherally hyperintense and centrally isointense to fibroglandular tissue in an suppressed T1-weighted and T2-weighted images. (Figure 3) Peripheral post-contrast enhancement is due to its vascular component. This enhancement follows a Type 3 kinetics curve which is more characteristic of malignancy than a Type 1 or Type 2 curve and may confuse the diagnosis.

Larger mean size at presentation is likely due to the fact that this subtype is mammographically occult, it may need to reach a large enough size to be detected by palpation. Typical sonographic appearance is a superficial, oval, uniformly hypechoic, circumscribed mass on grayscale imaging (similar to extrammary AL). (Figure 1) These features suggest a benign fatty lesion with overlap between other variants such as lipoma and fibroliposarcoma (hamartoma). As expected, no significant intraductal vascularity is seen with color Doppler imaging.

Cellular Breast Angiolipoma

Typical imaging features of BAL have been described. Historically, cellular BAL has been shown to mimic malignancy on mammography.3 Of our cases were deep within the breast, mimicking an intracanalicular lesion. A predominantly isochromatic mass containing well-circumscribed capillary-sized vessels of variable caliber has been reported. A circumscribed, hypocellular mass with intense posterior acoustic shadowing was found to be a rare case of a cellular BAL visualized on ultrason.5 Microcalcification within a BAL has been observed on mammography and on core-needle biopsy. A cellular BAL was usually detected on screening mammogram (71.4%). Diagnosis was made by core-needle biopsy in 42.9% of cases and by excision in 57.1% of cases.

Typical Imaging Features

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3 cases were located deep within the breast tissue. Rare cases of cellular BAL demonstrated focal architectural and/or histologic atypia. These atypical features can pose a diagnostic dilemma between BAL and other vascular tumors of the breast such as well-differentiated angiosarcoma. Prominent vasculature with the breast can mimic AL. (Figure 6)

Discussion

Angiolipoma is a rare, benign vascular neoplasm which can occur in the breast. The two subtypes of AL – low-vascularity and cellular – can be differentiated by the degree in size at presentation and performance of visualization on ultrasound and mammography respectively. If low-vascularity BAL has characteristic angiographic features and typical pathologic features, biopsy is usually sufficient to establish a benign diagnosis without the need for excision. However for cellular BAL, morphologic features are usually indeterminate and pathologic diagnosis may be challenging given the rich vascularity and occasional atypia. In order to mitigate the risk of sampling error, excision is usually recommended.

References