

Solid Papillary Carcinoma of the Breast: Mammographic and Ultrasound Appearance with Histopathologic Correlation



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Abstract

Solid papillary carcinoma (SPC) is a rare breast tumor that is most common in older women [1-3]. These tumors make up approximately 1-2% of breast cancers in women [2,3]. These tumors are typically benign unless they invade adjacent structures or have distant metastases [1]. The gold standard for diagnosis is histopathology, however, evaluation with mammogram and ultrasound are critical. The purpose of this report is to present a case example of solid papillary carcinoma on mammography and ultrasound with pathology correlation.

Keywords: Solid Papillary Carcinoma; Ultrasound; Mammography

Abbreviations: DCIS: Ductal Carcinoma in Situ; SPC: Solid Papillary Carcinoma

Introduction

Solid papillary carcinoma (SPC) is a rare form of breast cancer that tends to occur in postmenopausal women [1,3]. It has a peak prevalence between 40 and 75 with a mean age of 55 at diagnosis [2]. Symptoms include a palpable mass or bloody discharge [2,4]. Papillary carcinoma tends to have a better prognosis than other forms of breast carcinomas, likely due to their slow growth rate [3]. The 10-year survival rate has been reported to be 100% [3].

Diagnosis is made more difficult as neither mammography nor ultrasound are sensitive or specific to determine malignancy [4]. Histopathology is required for definitive diagnosis and can help to elucidate the subtype. When the tumors have cystic components, they are known as intracystic papillary carcinomas [3]. When cellular proliferation has masked the basic papillary properties, it is termed solid papillary carcinoma [2].

Case Study

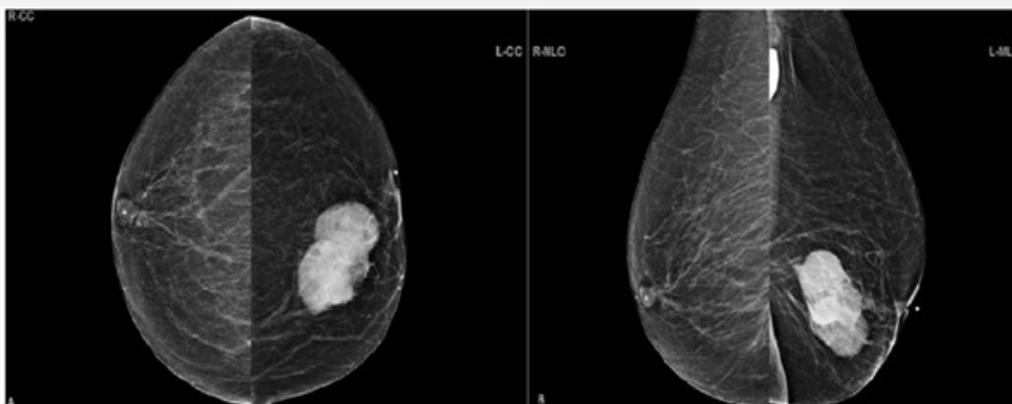


Figure 1: CC (A) and MLO (B) views demonstrate an irregular mass in the inferior inner quadrant of the anterior left breast. The mass measures approximately 4.0 x 6.5 cm in AP and TV dimensions. No abnormality is detected in the contralateral breast.

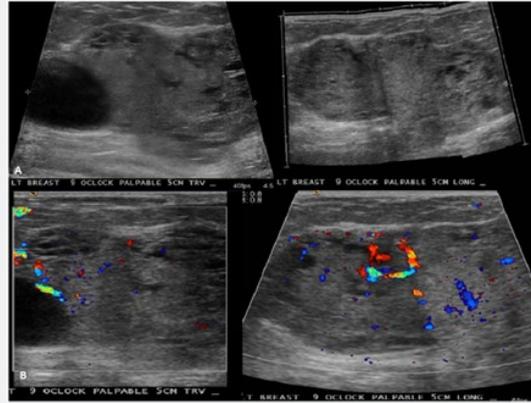


Figure 2: Targeted US of the left breast shows an irregular, solid and cystic mass at the 9 o'clock position 5 cm from the nipple (A). The mass measured approximately 3.0 x 5.0 x 6.5 cm (AP, TV and CC dimensions) and had moderate internal vascularity on color flow. The mass measured approximately 3.0 x 5.0 x 6.5 cm (AP, TV and CC dimensions) and had moderate internal vascularity on color flow. (B).

An 87-year-old postmenopausal female presented with a palpable left retroareolar mass. We hope to emphasize the imaging findings. Diagnostic mammogram (Figure 1) demonstrates an oval circumscribed mass at approximately 9 o'clock at anterior to middle depth of the left breast. There were architectural changes of the left breast with skin thickening and retraction. No associated calcifications. The right breast was negative. A targeted ultrasound of the left breast was performed, as depicted in Figure 2. Sonographic evaluation revealed an oval circumscribed, hypochoic, complex solid and cystic mass with internal vascularity. This mass was categorized as BIRADS 4 and core needle biopsy was recommended for pathologic diagnosis.

Core needle biopsy was performed on the same day and showed a focus of low-grade ductal carcinoma in-situ (DCIS) arising in a background of an atypical papillary lesion. Subsequent lumpectomy demonstrated a 5.5cm x 5.5cm x 4.0cm well-circumscribed mass with well-formed fibrous capsule (Figure 3). The tumor cells were round and arranged in a nodular growth pattern separated by thin fibrovascular cores. The cells demonstrated low grade nuclear features with no tumor necrosis. The cells were relatively monotonous with homogenous chromatin. These morphologic features are consistent with solid papillary carcinoma.

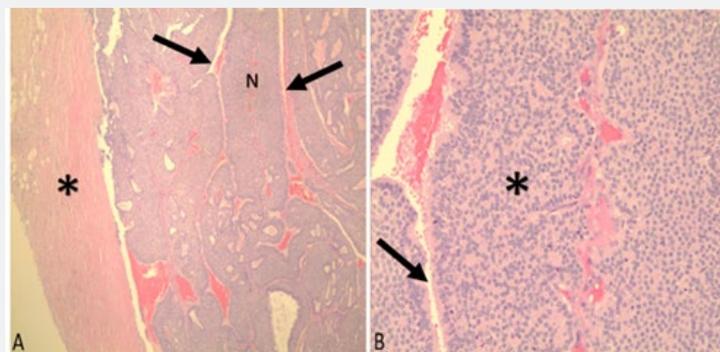


Figure 3: (a) Histopathology of the well-circumscribed mass at 4x magnification demonstrates a well formed fibrous capsule (asterisk). The tumor has a solid growth pattern separated into variable sized nodules (N) by thin fibrovascular cores (black arrow). (b) Cytomorphology of the tumor cells at 10x magnification shows low grade nuclear features (asterisk). Fibrovascular core (black arrow) is also noted.

Discussion

Papillary carcinoma is a rare, malignant form of breast cancer with an incidence of 1-2% [2,3]. They are low-grade neoplasms that arise from ducts and are considered a variant of DCIS [3]. These tumors tend to present in postmenopausal women but can affect younger women as well [1,3]. They clinically present as palpable, centrally located masses or bloody discharge [2,3]. They are predominantly (95%) unilateral [1].

Mammography is non-specific with respect to papillary carcinoma. Findings range from occult to large masses. Malignant masses may be irregularly shaped without circumscribed margins and contain microcalcifications. The sensitivity of mammography is low at 67% with a specificity of less than 10% in regard to differentiation of benign versus malignant papillary lesions [4]. Ultrasound is utilized as an adjunct and may show ductal dilation which points towards an intraductal lesion [4].

Solid papillary carcinomas are well-defined but can have mixed cystic and hemorrhagic compartments [3,4]. The most sensitive way to evaluate these lesions is by ultrasound. Findings on ultrasound include a “frond-like” mass inside a dilated duct, a complex intra cystic lesion, or a homogeneous solid lesion [1-3].

Invasive papillary carcinomas can present when large in size due to bulky cystic components [2,3]. Malignant papilloma tends to be non-parallel with an echogenic halo and posterior acoustic enhancement [5]. Most papillomas (77%) appear as a mass on MRI. Approximately 20% appear as non-mass enhancement with fewer being occult on MRI. Most malignant papillomas have circumscribed margins on MRI. ADC values are less useful for differentiating between benign and malignant masses as they can be similar. Lesion size has an important role for malignant prognostication as masses over 10mm are high risk for malignancy. High risk lesions also tend to demonstrate complex cystic structure. Another risk factor for malignancy is a regional or segmental distribution [6].

Histologically, solid papillary carcinoma presents as a well-circumscribed mass with a well-formed capsule. The tumor cells have low grade nuclear features and form multiple nodules separated by thin fibrovascular cores. SPCs usually have dense cellular proliferation that masks the basic papillary properties. They can also have microcystic and pseudorosette formation as well as mucinous differentiation [1]. Histology is necessary to establish malignant potential [3]. When the tumor cells are clearly beyond the fibrous capsule of the lesion, the diagnosis of invasive (solid) papillary carcinoma is made [1].

Noninvasive papillary carcinomas have a favorable prognosis. In some cases, invasive SPCs can have distant metastases without axillary node involvement [1]. As invasion commonly occurs at the periphery of the tumor, complete excision or total/partial mastectomy is recommended if SPC is identified on biopsy [1]. Papillary carcinomas have a slower growth rate than other forms of breast cancer and have a better prognosis [3]. The 10-year survival rate has been reported to be 100% [3].

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