
PICTORIAL ESSAY

Encapsulated Papillary Breast Carcinoma: Anatomopathological and Clinicoradiological Aspects

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ABSTRACT

Encapsulated papillary carcinoma or intracystic papillary carcinoma of the breast is a rare tumour and is a special subtype of carcinoma. The most relevant histological characteristic is the absence of a myoepithelial cell layer. The lack of such a layer leads to uncertainty in diagnosis and consequent management, depending on whether the tumour is considered an invasive neoplasm or an in-situ neoplasm. This article illustrates the histological characteristics of this subtype of breast cancer, its most common imaging presentation, clinical findings, diagnosis, and treatment.

Key Words: Breast neoplasms; Carcinoma, papillary; Magnetic resonance imaging; Mammography; Ultrasonography

中文摘要

乳腺包裹性乳頭狀癌：病理解剖學和臨床放射學的討論

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乳腺包裹性乳頭狀癌或導管內乳頭狀癌為一種罕見的乳腺腫瘤亞型。其最主要的組織學特徵是沒有肌上皮細胞層，以致令其診斷和及後的治療有不確定性，包括其是否可以認為是侵入性腫瘤或者原位腫瘤。本文闡述乳腺包裹性乳頭狀癌的組織學特徵、其最常見的影像學表現、臨床表現、診斷以及治療原則。

INTRODUCTION

Encapsulated papillary carcinoma (EPC), also known as intracystic or encysted papillary carcinoma, is a rare tumour that represents less than 2% of all breast cancers.¹ This subtype of breast tumour mainly affects elderly postmenopausal women and manifests as clinically palpable changes in the breast or bloody discharge.² However, these tumours can

be asymptomatic and detected only on imaging. Mammography and ultrasonography are the main diagnostic methods, and the most common radiological presentation described in the literature is a mass, often in the retroareolar region.³

There is controversy in the literature regarding the histological classification of EPC, specifically whether

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it should be considered an invasive carcinoma or an in-situ carcinoma. This distinction, however, has probably no clinical relevance because of the excellent prognosis in most cases.⁴

The aim of this article was to perform a case review of the most common imaging findings and histological characteristics of EPC. The cases were selected from the breast imaging department at the University of São Paulo, Brazil.

HISTOLOGICAL ASPECTS

Encapsulated papillary carcinoma is a subtype of papillary carcinoma that is located in dilated ducts and may extend to peripheral branches. It is characterised by thin fibrovascular cores of neoplastic epithelial cells of low or intermediate grade that are surrounded by a fibrous capsule. The tumour may be a single lesion (central) or multifocal. Macroscopically, the lesion presents as a friable mass within a cystic cavity. The myoepithelial cell layer is often absent in the papillae or in the periphery of the lesion.^{4,5} The absence of a myoepithelial cell layer, which is characteristic of invasive carcinomas, can be demonstrated with the combined use of immunohistochemical markers, such as p63 and high-molecular weight cytokeratins (CK 5/6, CK 14), which generally yield negative results (Figures 1 and 2).⁶

The absence of the myoepithelial cell layer raises the possibility that EPC is a minimally invasive, low-grade, or indolent form of invasive carcinoma rather than an in-situ lesion. As a consequence of this controversy, there is no consensus on which T stage to use to classify these lesions. The 2012 World Health Organization classification of tumours of the breast recommends that EPC be managed as a non-invasive carcinoma.¹ Usually, EPCs are found alone, but foci of low-grade ductal carcinoma in situ (DCIS) in the surrounding breast parenchyma are frequently observed.¹

CLINICORADIOLOGICAL FEATURES

Clinically, EPC of the breast may present as a palpable, mobile mass with or without bloody nipple discharge. The tumour can be large, mainly because of the cystic component. No palpable axillary lymph nodes are usually detected. On mammography, the most common finding is a solitary oval or round mass (Figure 3a), with microlobulated or circumscribed margins (Figures 4a, 5a, and 6a). Because desmoplastic reaction is not a

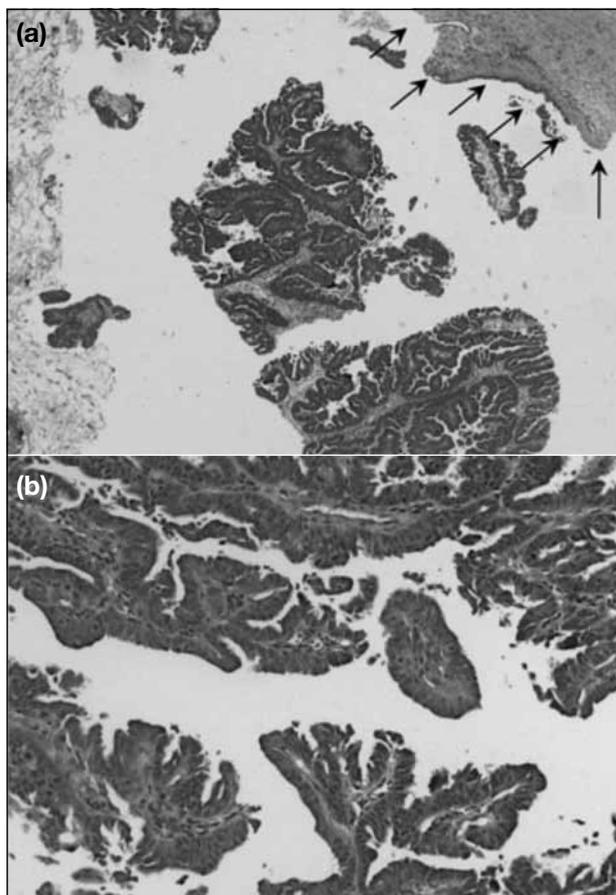


Figure 1. A 62-year-old woman presenting with a palpable mass in the right breast. (a) Photomicrograph of encapsulated papillary carcinoma showing a thick fibrous capsule (arrows) surrounding a nodule composed of delicate fibrovascular stalks (H&E; original magnification, x4), covered by (b) a monomorphic population of neoplastic epithelial cells of low or intermediate grade (H&E; original magnification, x4).

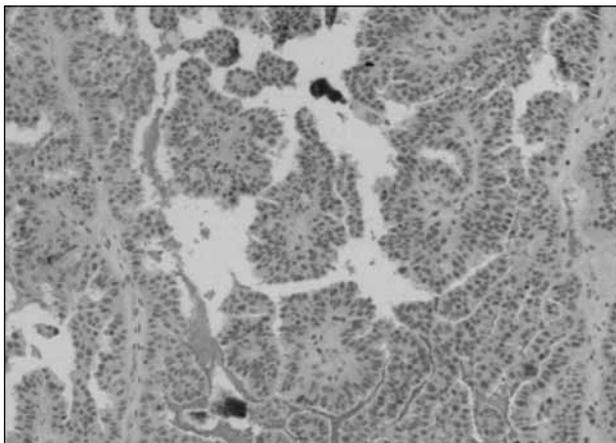


Figure 2. Immunohistochemical staining of patient from Figure 1, showing negativity for myoepithelial cell marker (anti-p63 antibody; original magnification, x10)

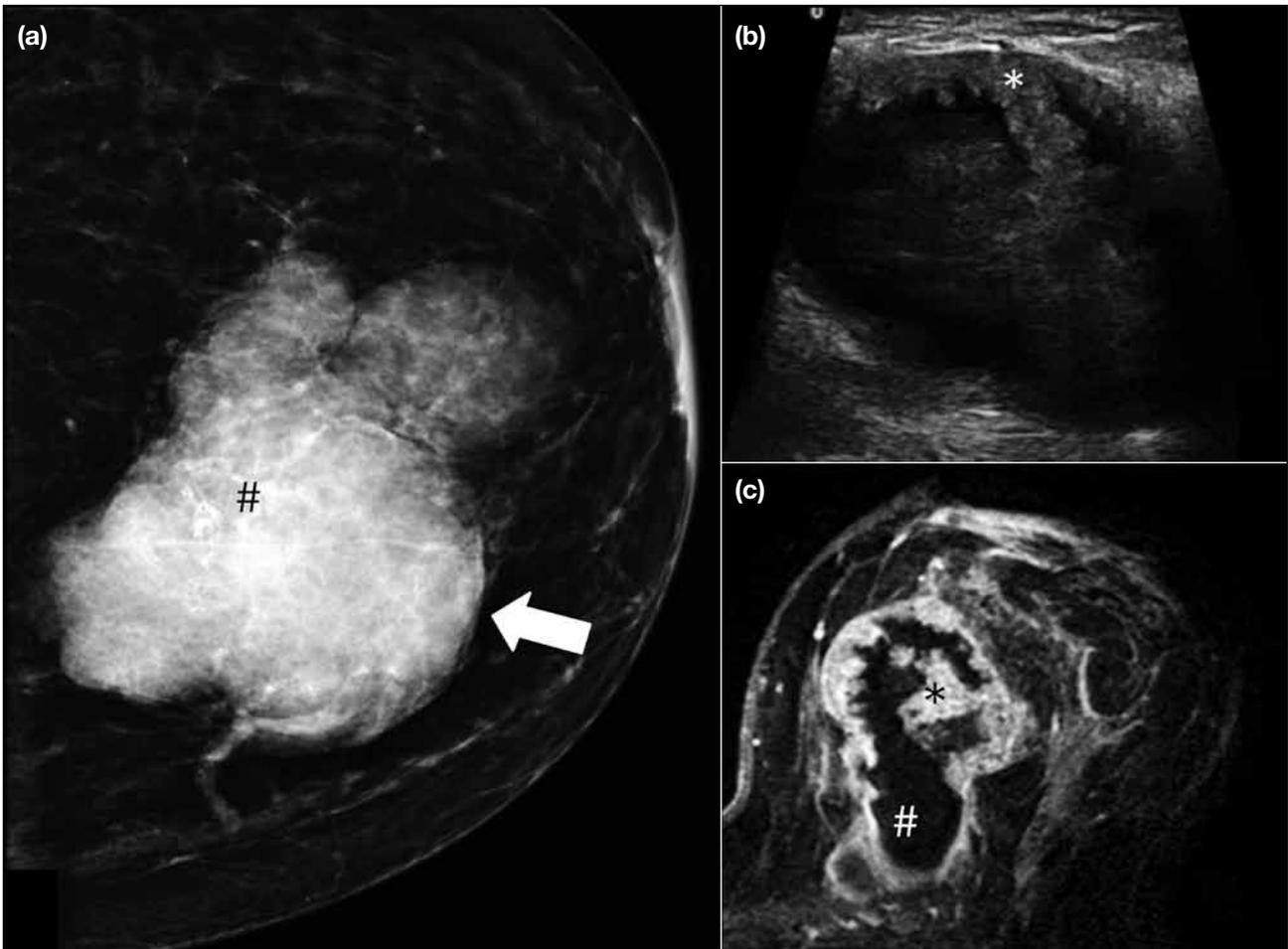


Figure 3. (a) Craniocaudal mammogram of the left breast of a 54-year-old woman showing a hyperdense irregular mass (#) with circumscribed margins (arrow) and pleomorphic calcifications, occupying the medial quadrants of the breast. (b) Ultrasound image showing an oval complex mass with circumscribed margins and a peripheral solid component (*) with centripetal projections. (c) T1-weighted contrast-enhanced magnetic resonance image showing an irregular mass (#) with a necrotic centre and solid (*) components.

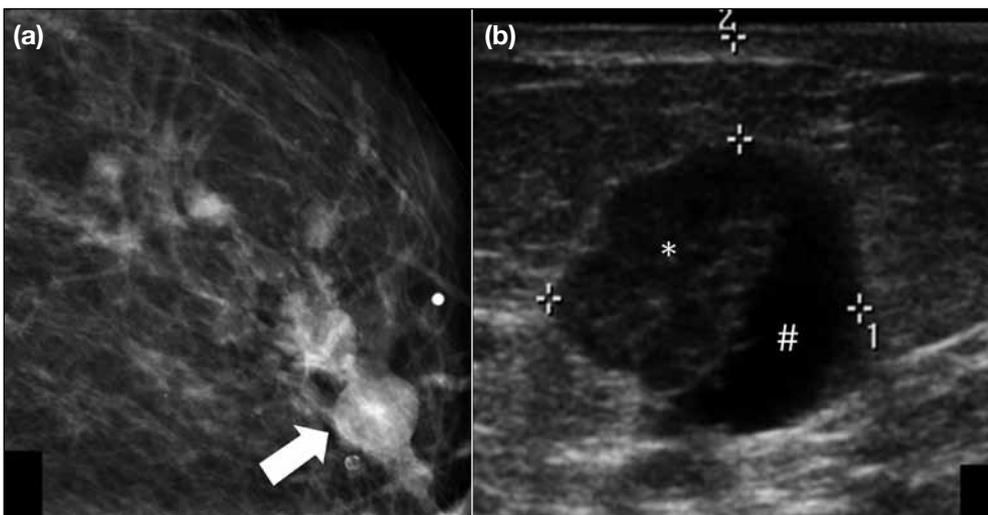


Figure 4. (a) Compression mammogram of the left breast of a 63-year-old woman showing an isodense oval mass (arrow) with obscured margins located in the upper quadrant of the breast, corresponding to the palpable feature of the mass (radiopaque marker on the skin). (b) Ultrasound image showing an oval mass, with circumscribed margins (calipers, region 1), complex solid (*) and cystic (#) pattern, and longest axis parallel to the skin, located at the junction of the upper quadrants of the breast.

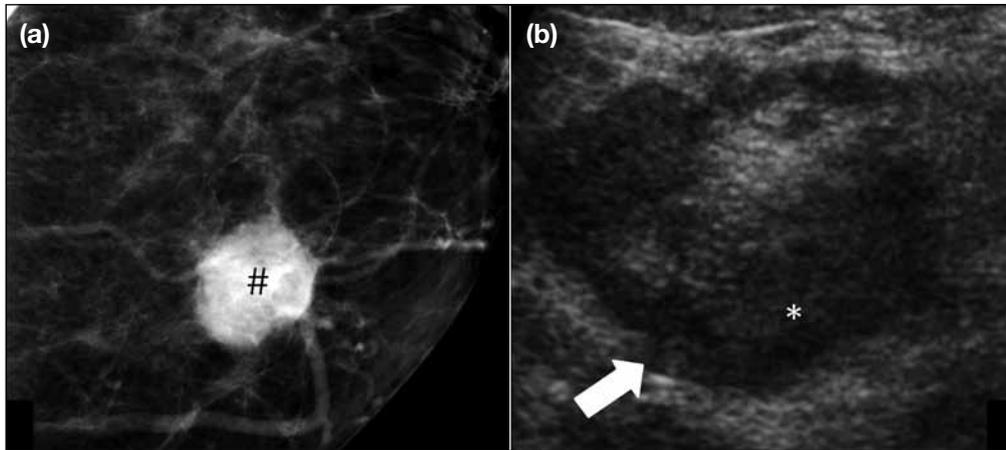


Figure 5. (a) Compression mammogram of the left breast of a 54-year-old woman showing an oval nodule as a hyperdense mass (#) with indistinct margins, located in the inferomedial quadrant. (b) Ultrasound image showing a hypoechoic oval mass (*) with indistinct margins (arrow) and longest axis parallel to the skin, located in the inferomedial quadrant.

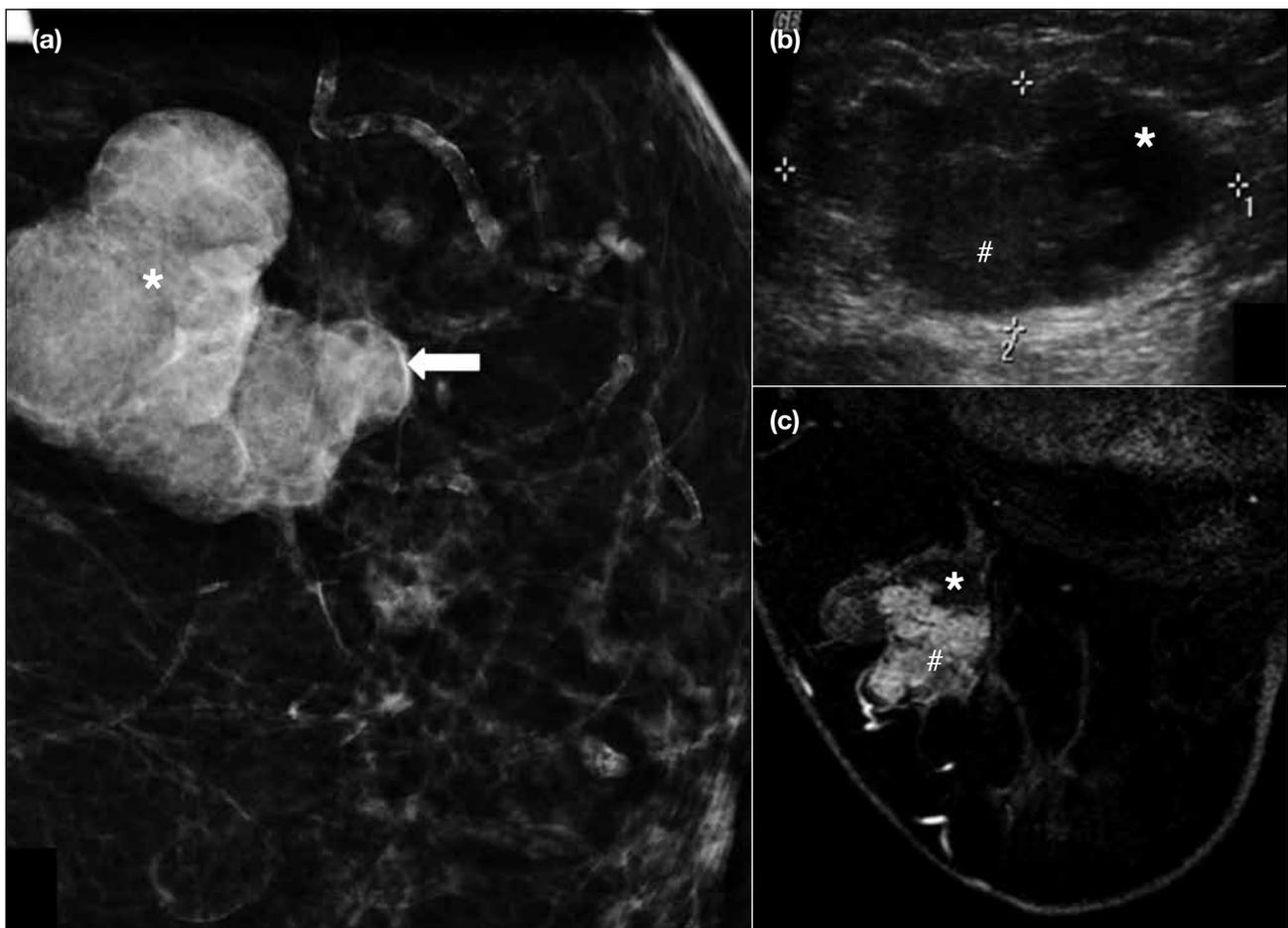


Figure 6. (a) Compression mammogram of the left breast of a 47-year-old woman showing an oval hyperdense (*) nodule with microlobulated margins (arrow), located at the junction of the lateral quadrants. (b) Ultrasound image showing a solid-cystic complex mass (*) with the solid (#) component at the left portion of the image, irregular morphology, circumscribed margins, and longest axis parallel to the skin, located at the junction of the lateral quadrants of the breast (calipers). (c) T1-weighted magnetic resonance image after intravenous contrast injection showing oval complex mass with circumscribed margins and cystic (*) and solid (#) components.

common feature of EPC, mammographic spiculation is rarely found. Calcifications are not uncommon and are mainly amorphous or pleomorphic.²

The diagnosis is usually made by ultrasonography. Typical findings are the presence of a complex (solid-cystic) mass (Figures 3b, 4b, and 6b) that is oval and has circumscribed or microlobulated margins (Figures 5b and 7a). Acoustic posterior enhancement and vascularisation within the solid portion can also be evident on Doppler imaging (Figure 8a).⁷

On magnetic resonance imaging (MRI), a mural nodule within a cystic lesion can be observed. Morphology is

commonly oval or round, with circumscribed margins (Figure 8b). Hyperintensity in T1-weighted MRI can be found owing to haemorrhagic components (Figures 6c and 7b). Heterogeneous or rim enhancement has also been described in association with EPC (Figure 3c).⁸

The morphological appearance of EPC lesions determines further investigation by percutaneous biopsy, most often guided by ultrasound by virtue of its lower cost and the ability of real-time scanning. Cytological analysis of the fluid aspirated from the cystic portion of complex (solid-cystic) nodules often does not provide enough information because neoplastic cells may be missed. It is therefore advisable to sample

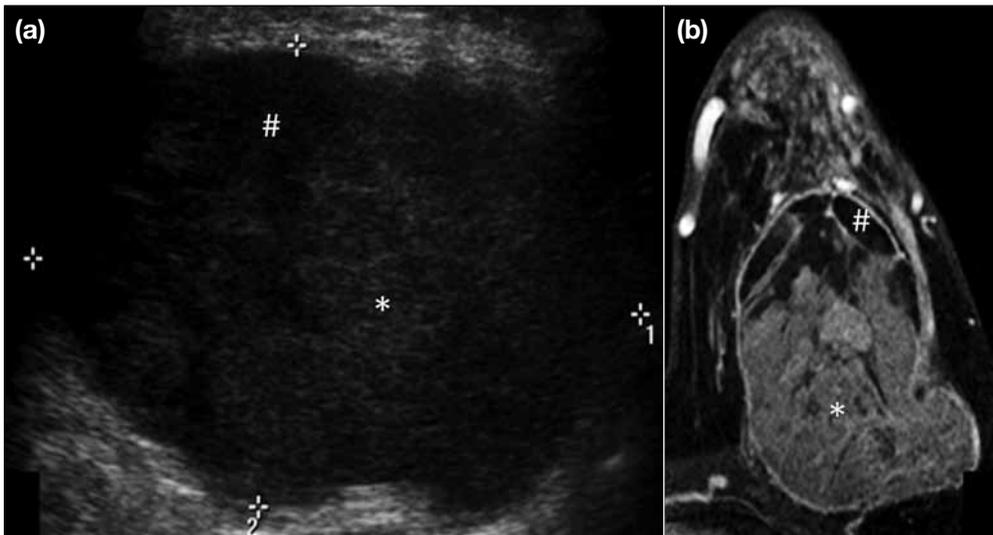


Figure 7. (a) Ultrasound image of the left breast of a 61-year-old woman showing a complex cystic (#) and solid (*) lesion that was oval with indistinct margins (calipers), located in the superolateral quadrant. (b) T1-weighted magnetic resonance image after intravenous contrast injection (dynamic study) showing a complex cystic (#) and solid (*) mass with enhancement of the solid portion, occupying the superolateral quadrant.

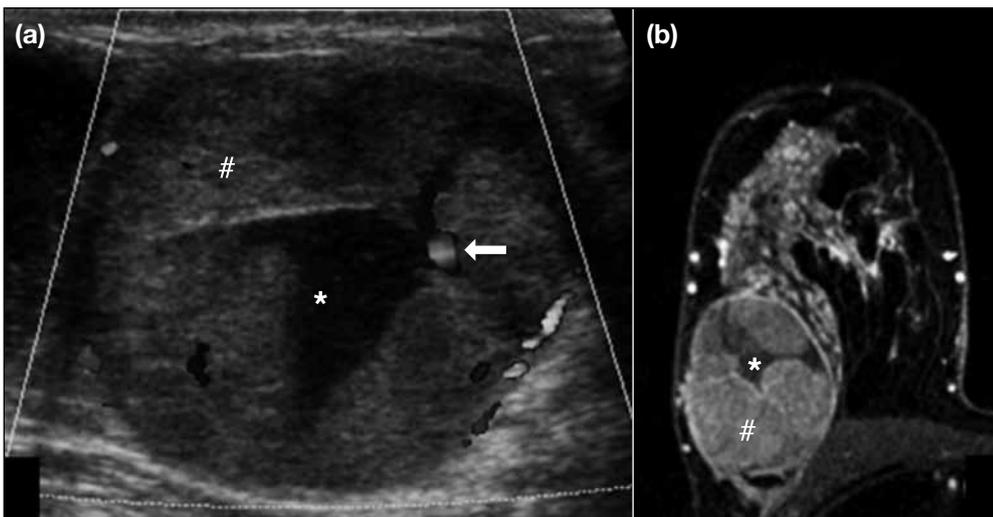


Figure 8. (a) Doppler ultrasound image of a complex solid (#) and cystic (*) mass with oval morphology, circumscribed margins, and intranodular flow (arrow) in the solid component, located in the superolateral quadrant of the right breast in 49-year-old woman. (b) T1-weighted magnetic resonance image after contrast enhancement showing an oval mass with circumscribed margins, complex solid (#) and cystic (*) pattern, and enhancement of its solid portions, located in the superolateral quadrant.

the solid portion of these masses, preferably by core biopsy. In cases of complex nodules of small size, vacuum-assisted percutaneous biopsy is recommended. Titanium-clip insertion after removal of the specimen is highly recommended to enable localisation of the lesion site during subsequent surgery. When vacuum-assisted biopsy is not available, excisional biopsy for histological evaluation is the next recommended method for an accurate analysis of small suspicious lesions.

Percutaneous biopsy allows histological and immunohistochemical evaluation of breast lesions, with EPCs frequently showing positivity for hormone receptors, no HER2 amplification, and a Ki-67 level of <15% (luminal A profile).

Despite its potentially large diameter on breast imaging, the outcome of EPC is similar to that of DCIS, with a good prognosis (10-year survival, 95%).⁹ Owing to the rarity of this subtype of breast carcinoma, management principles have been established mainly on the basis of small patient series and case reports. The treatment of EPC patients consists of margin-free surgery with sentinel lymph node biopsy, and adjuvant hormonal therapy in cases with positive hormone-receptor status.

DIFFERENTIAL DIAGNOSIS

Papillary Lesions

Papillary lesions are a heterogeneous group of benign and malignant breast tumours. They are characterised by fibrovascular cores with finger-like projections covered by proliferating epithelium. This group includes benign papillomas, atypical papillomas, papillomas with DCIS, papillary DCIS, and solid papillary carcinomas.

The first principle that helps in the differentiation of each subtype is the presence or absence of myoepithelial cells within papillae and at the periphery of involved spaces. Benign papillomas present with myoepithelial cells both within papillae and at the periphery. Atypical papilloma, papillomas with DCIS, and papillary DCIS have no myoepithelial cells within papillae, although they are present at the periphery. In solid papillary carcinomas, these cells are absent within the papillae and may or may not be found at the periphery. This group of lesions presents most commonly as an intraductal mass on sonography and a circumscribed oval mass on mammography. Sometimes, calcifications can be the mammographic finding of a papillary lesion.

Mucinous Carcinoma

Mucinous carcinoma is another special subtype of breast carcinoma and is characterised by the abundant accumulation of extracellular mucin that has been secreted by epithelial tumour cells. Mucinous carcinoma occurs mainly in elderly women, similar to EPC. Imaging usually reveals an oval mass with circumscribed or irregular margins, and sometimes solid-cystic components on sonography.

Medullary Carcinoma

Medullary carcinoma is also a rare type of breast malignancy, but is most commonly found in young women. Imaging findings are similar to those for EPC, with a benign-looking mass, usually with circumscribed margins and oval or round morphology. Histologically, medullary carcinoma is characterised by poorly differentiated cells with marked lymphoplasmacytic infiltration and high nuclear grade, but with no glandular formation.

Fibroadenoma

Fibroadenoma, a benign breast tumour, occurs in young women and presents with epithelial and stromal components. On mammography and sonography, it is characterised by an oval hypoechoic mass with circumscribed margins and sometimes with coarse calcifications.

CONCLUSION

Encapsulated papillary carcinoma is a rare tumour that has an excellent prognosis and mainly affects older women. The classification of this tumour is controversial. It may be interpreted as an invasive or in-situ carcinoma but is often clinically managed as an in-situ tumour. Radiological findings alone cannot distinguish between benign and malignant papillary lesions. Histological study is required to determine the correct diagnosis.¹⁰

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