



ICONOGRAPHIC REVIEW / *Breast imaging*

Breast cancers with round lumps: Correlations between imaging and anatomopathology

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KEYWORDS

Round tumours;
Mucinous;
Medullary;
Metastasis;
Lymphoma

Abstract A round lump with a well-defined outline is, in most cases, benign. However, in 10 to 20% of all cases, a round and well-defined lump may correspond to a cancer. Most often, it consists of grade III infiltrating ductal carcinoma (IDC). Other histological sub-types may provide round masses with smooth contours: colloid carcinoma (still called mucinous carcinoma), medullary carcinoma, intramammary metastases, intra-cystic papillary carcinoma, lymphoma and high-grade phyllode tumours.

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Most round and well-circumscribed lesions are benign: cyst, fibroadenoma, intramammary lymph node. However, in about 10 to 20% of the cases, a round and well-defined tumour may correspond to a cancer [1]. Seven histological types have been identified: grade III infiltrating ductal carcinoma (IDC), colloid carcinoma or mucinous carcinoma, medullary carcinoma, intramammary metastases, intracystic papillary carcinoma, lymphoma and high-grade phyllode tumours.

Grade III infiltrating ductal carcinoma

Infiltrating carcinoma accounts for 80% of all breast carcinomas. The mean age at the time of the diagnosis is 56 years. The most common means of discovery is the palpation of a tumour in 70% of the cases. It involves a radiological anomaly in 30% of the cases. In 40 to 60% of the cases, axillary adenomegaly is present at the time of the diagnosis.

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In the mammogram, IDC presents as a round mass, with irregular and spiculated contours although, in 10 to 20% of the cases, the contours are regular. The morphological presentation depends on the histological grade with contours that are much more micro-lobulated in grade III while the contours are more often spiculated in grade I. In a retrospective study on 120 patients with IDC, the mammograms, in 72% of the cases of low grade IDC, detected masses with spiculated contours as opposed for 24% of the cases of grade III IDC. However, 66% of the cases of grade III IDC presented masses with poorly defined contours as opposed to 22% of the cases for the low grade IDC [2]. By sonography, the sharp contours of grade III IDC correspond to the absence of a peripheral stroma reaction, due to the rapid growth of the tumour. The grade III IDC presents a hypoechogenic, rounded lesion, with a major axis not parallel to the skin and well-defined or even micro-lobulated contours. There is no posterior attenuation. However, it is possible to observe a true posterior enhancement due to the intra-tumoral hypercellularity (Fig. 1).

From a histological point of view, it involves little differentiated carcinomateous proliferation consisting of cells presenting moderate to marked cytonuclear atypies and a high mitotic index. Scarff Bloom Richardson grading (SBR) is used as a histoprognotic score that assesses three factors: the tumoral architecture, the nuclear pleomorphism and the mitotic index (Fig. 1d). Grade III IDC is a less favourable prognosis than grade I or II IDC [3].

Mucinous or colloid carcinoma

Mucinous carcinoma is a rare tumour (7% of the breast cancers) mainly affecting the elderly patient (≥ 75 years). The prognosis is better than that of IDC [4].

In the mammogram, mucinous carcinoma, still called colloid carcinoma, presents as a rounded, well-defined mass that may comprise thin lobulations, although without associated calcifications. In the sonogram, the mass is often difficult to detect since it is isoechogenic at the mammary parenchyma with low or no posterior attenuation. In MR imaging, this mass is in distinct T2 hypersignal, due to its rich mucin content (Fig. 2).

Macroscopically, it is a round, well-defined tumour that is soft when cut. There are two anatomopathological forms: pure and mixed. The term "colloid carcinoma", strictly speaking, is reserved for the pure form, consisting of glandular formations and/or carcinomateous framework arranged within large pools of mucus. The mixed form comprises a double component associating tumour cells producing mucus and infiltrating ductal cells. This histological specificity accounts for the sometimes variable presentation of colloid carcinoma in the imaging [4]. In the pure colloid form, the tumour is rounded, well defined, not calcified while in the mixed form, the edges are spiculated and irregular and micro-calcifications appear, thereby resembling the radiological presentation of IDC (Fig. 2d and e).

In its pure form, colloid carcinoma is a good prognosis with less lymph node metastases (10-year survival: 87–90.4%) [5]. In its mixed form, the prognosis is identical that of IDC.

Medullary carcinoma

This is a rare tumour (5% of the breast cancers), mainly affecting young women under the age of 35 years [6].

In the imaging, medullary carcinoma appears as a round or oval mass, with well-defined lobulate contours. In the sonogram, this mass has a very hypoechogenic centre, with posterior acoustic enhancement (Fig. 3). In MR imaging, the lesion presents in hyposignal T1 and hypersignal T2 with well-defined contours. It enhances in an annular fashion after the injection of contrast product, and thin internal septa may be enhanced [7].

Medullary carcinoma is histologically typical and is characterised by the association of a little differentiated carcinomateous component and predominant lymphoid infiltration (WHO definition) (Fig. 3e). It has the particularity of being "triple negative" (hormone receptors to estrogens and progesterone, Her2 negative) although the prognosis is rather favourable, considering the good tumour response to chemotherapy and radiotherapy.

Several studies [8] seem to find a relationship between the presence of a BRCA1 mutation and the occurrence of medullary carcinoma (30 to 60% of all medullary carcinomas are found with a BRCA1 mutation).

Intracystic papillary carcinoma

This lesion is rare (0.5 to 2% of breast cancers), mainly affecting patients over the age of 60 years [9]. Clinically, intracystic papillary carcinoma (ICPC) may come in the form of a more or less palpable mass, responsible for single duct, sanguinous or sero-sanguinous, nipple discharge in 20 to 34% of the cases, when symptomatic. In 50% of the cases, it is retroareolar but may be detected in any quadrant of the breast.

In the mammogram, the lesion is rounded or oval, well defined, with lobulated edges and may be the seat of pleomorphic micro-calcifications. In the sonogram, in its typical form, the papillary lesion presents like a solid, well-limited nodule within a dilated duct, preferentially located in the retroareolar region. The echostructure is more or less heterogeneous, corresponding to cystic or haemorrhagic rearrangements. The Doppler mode reveals rich inner vascularisation, with a great many vessels (Fig. 4). The sensitivity of sonography to differentiate the benign or malignant papillary lesion is not significant and evaluated at 56% [10].

Macroscopically, the lesion is rounded, often well limited by a fibrous capsule. In microscopy, it consists of a tumoral lesion of papillary architecture developed within a dilated milk duct. The immunohistochemical markers targeting the myoepithelial cells, not always visible with standard staining, are negative (Fig. 5).

ICPC is a good prognosis, for certain authors identical to in situ ductal carcinoma.

Metastases

Intra-mammary metastases are very rare: the frequency is estimated at between 0.5 and 6.6% according to the study [11]. Melanoma, lymphoma and lung cancer are the three

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