Mammographic calcifications: anatomical/pathological classification and differential diagnosis

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Introduction

Breast calcifications are a common finding at routine screening mammography. Many of these calcifications clearly represent benign or malignant breast disease, but in a significant number of cases they remain indeterminate. The goal of the present exhibit is twofold: (1) to present an anatomical/pathological classification of the most common calcifications to explain their morphology and distribution pattern; (2) to provide a convenient mammographic classification system to increase the diagnostic accuracy in the differentiation of mammographic calcifications.

ANATOMICAL CLASSIFICATION

Lobular Calcifications

Lobular calcifications are found predominantly in cystic and benign hyperplastic (“fibrocystic”) changes. The former include microcysts (microcystic adenosis) and milk of calcium cysts (Fig. 1). The latter include adenosis, epitheliosis (Fig. 2) and slerosing adenosis (Fig. 3). Calcifications in invasive or in situ lobular carcinoma are non-specific.

Ductal Calcifications

Ductal calcifications are most frequently associated with ductal carcinoma (Fig. 4) or with benign changes such as secretory disease (Fig. 5). Their shape and disposition are the result of the condition of the duct of which they are a “cast”.

Extraductal Calcifications

Extraductal calcifications are found in floradenedomas (Fig. 6) and in the extraductal stromal tissue. The latter includes fat necrosis (Fig. 7), vascular calcifications (Fig. 8), foreign bodies (Fig. 9), skin calcifications (Fig. 10) and pseudocalcifications (Fig. 11).

MAMMOGRAPHIC CLASSIFICATION

Benign

Indeterminate

Malignant

Pathognomonic Calcifications

Many calcifications have features that allow confident categorization into benign (Fig. 12) or malignant (Fig. 13) types.

Indeterminate Calcifications

The remaining calcifications lack pathognomonic features and are called “indeterminate”. They can, however, be further characterized on the basis of morphology of the individual calcifications* (Fig. 14), distribution pattern (Fig. 15), associated anamnestic and clinical findings and evolution over time (Fig. 16).

Conclusion

Pathognomically benign calcifications need no further work-up and pathognomically malignant calcifications should be biopsied. The choice between follow-up or biopsy for indeterminate calcifications should be the result of careful analysis of individual morphology of the calcifications and their distribution pattern, with incorporation of anamnestic and clinical information and evolution over time (if available).

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