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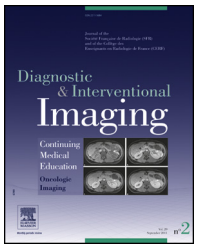

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# Anatomical-radiological correlations: Architectural distortions

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**Abstract** Architectural distortions consist of convergence areas and local retractions at the border of the gland. The authors examine the semiologic features of the distortions and their different causes, together with their pathological anatomy correlations. The predominant benign causes are the proliferative Aschoff body and the main malignant cause is infiltrating lobular carcinoma.


## Definition

Architectural distortions are due to defective connective tissue harmony and include convergence areas and local retractions.

In the majority of cases they reflect a benign lesion, although after masses and microcalcifications, they are the third leading appearance of cancers and are difficult to detect and manage. This article reviews the different causes of distortions, together with their anatomical-radiological correlations.

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## Mammography appearances

### Convergence areas

Convergence areas consist of convergent spicules but with no central mass. They produce a star shaped appearance, occasionally called a ''black star'' as they have no dense centre unlike the classical stellar appearance with a dense centre or mass with spiculated borders, known as a ''white star'' (Fig. 1).

A white star reflects centrifugal development of lesions, which begin at the centre and almost invariably represent an infiltrating carcinoma. The spicules are the centrifugal extension of the lesions (Fig. 2).

The white star is therefore classified as BIRADS category 5.

Conversely, in the majority of cases, a black star represents centripetal development of lesions from retraction generated by the centre of the lesion (Fig. 3). The black star

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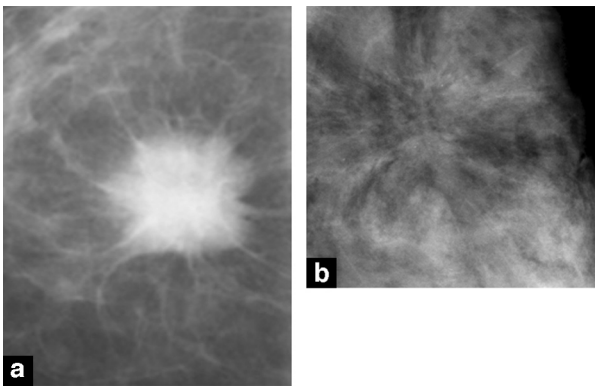


**Figure 1.** Mass with spiculated outlines (a) formed from a dense centre and spiculated outlines with very high likelihood of malignancy, to be classified as ACR category 5 and to be compared to the convergence area (b) where spicules are present with no central mass and which is classified as category 4.

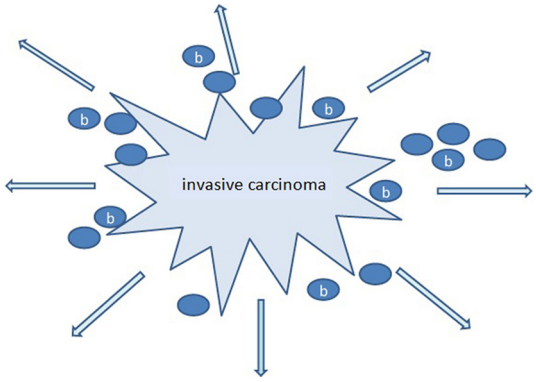


**Figure 2.** White star (infiltrating ductal carcinoma): this is a centrifugal lesion invading the benign breast structures (b) peripherally.

is classified as category 4 as it is only malignant in 10 to 40% of cases [1].

The distinction between a black star and a white star is not always straightforward on mammography if the dense centre is small (Fig. 4).

## Retractions at the edge of the gland

These are difficult to diagnose and are identified by comparison, examining for loss of continuity at the boundary of the gland. They may involve the superficial (Fig. 5) or deep (Fig. 6) boundary of the gland.

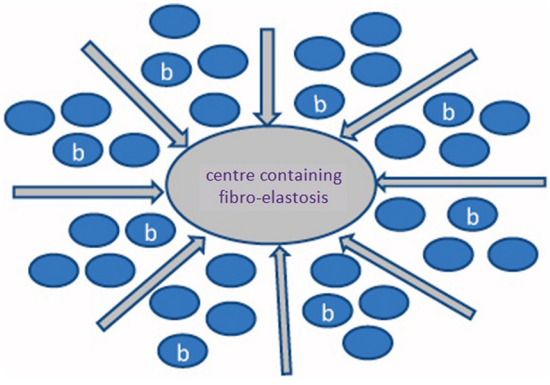


**Figure 3.** Black star (radial scar): the benign breast structures (b) converge towards the centre containing fibro-elastosis.

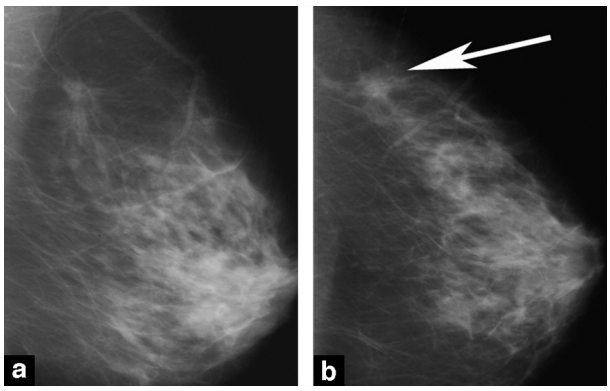


**Figure 4.** Appearances suggestive of a left superior convergence area on the oblique view (a) with no obvious centre: this is better seen on the postero-anterior view (arrow) (b) on which a mass is present.

# Benign causes

## The proliferative Aschoff body or radial scar

### Mammographic appearances

These are generally found on routine mammography as a convergence area without a dense centre, confirmed on a local compression view (Fig. 7).

Some mammography appearances are suggestive of the Aschoff body: thin long spicules which are occasionally curved or paired with radiotransparent bands, no palpable mass even in superficial lesions and no dense centre (Fig. 8), although these signs are not sufficiently specific as 30% to 60% of cases are malignant [2]. Only 66.2% of a series of 142 distortions suggestive of radial scarring [3] were in fact radial scars, whereas 28.6% were malignant and 7% were fibrocystic disease.

### Diagnosis and management

Faced with these mammographic appearances, an ultrasound is required. If this is positive, the Aschoff body can be diagnosed from a needle biopsy.

Management is controversial if pure radial scarring is present: the conventional approach is to excise the lesion as in 1/3 of cases, examination of the surgical specimen reveals either atypical lesions (15 to 20%) or an infiltrating or in situ carcinoma (15%) [3—5], which may not be seen on biopsy as it is occasionally located at the periphery of the lesion.

Others suggest no treatment for an Aschoff body diagnosed on needle biopsy, if a sufficient number of samples are taken and if no atypia is present [6,7].

Surgery, however, continues to be recommended for a proliferative Aschoff body because of the difficulty in monitoring distortions and the risk of under-estimation on needle biopsy [5].

If the ultrasound is normal, the question of diagnosis arises. Two approaches may be used: