Pictorial Essay

MAMMOGRAPHIC FEATURES OF TYPICAL BENIGN CALCIFICATIONS

Malai MUTTARAK,M.D.
Ladda CHALOEYKITTI,BSc.

Calcifications in the breast are important because they may be the first and only sign of breast carcinoma. However, the great majority of calcifications found on mammograms are associated with benign disease. Careful analysis of size, shape, number, density and distribution of calcifications can help in differential diagnosis of benign from malignant calcifications. The purpose of this paper is to present a variety of a typical mammographic benign calcifications in order to avoid unneccessary biopsy of these calcifications.

VASCULAR CALCIFICATIONS

Vascular calcifications (Fig.1A,B) typically appear as linear, parallel calcifications along the vessel walls, producing a "railroad track" configuration when well developed. Differentiation from fine linear malignant calcification may be a problem when arterial calcifications are in the very early forming.

CALCIFIED FIBROADENOMA

Fibroadenomas are the most common breast masses seen in women younger than 35 years of age. Calcificatons occur when they undergo degeneration. Early calcification in a fibroadenoma frequently occurs at the periphery of the mass (Fig.2). By the time, calcifications in fibroadenoma become larger and more extensive. Finally, the soft tissue masses are no longer appearent, leaving only typical large coarse "popcorn-like" calcifications (Fig.3-5).

SECRETORY DISEASE

Secretory disease, or ductal ectasia or plasma cell mastitis, occurs most often in perimenopausal or postmenopausal women. They are frequently bilateral. The cause of duct ectasia is uncertain but may be related to the accumulation of thickened secretion within the ducts that eventually lead to dilatation and rupture of the duct walls. The calcifications associated with this condition may be intraductal, in the wall of the duct, or periductal, and the morphology depends on the location (Fig.6,7). Those occur in the duct lumens appear as smoothly marginated solid cores that are longer and wider than the casting malignant calcifications. Calcifications within the walls or periductal present as hollow cylinders.

MILK OF CALCIUM IN CYSTS

In cystic hyperplasia, milk of calcium may be secreted into the fluid showing the characteristic mammographic appearance as smudge like densities on the craniocaudal view and calcium-fluid level when the breast is imaged in the upright projection with a lateral beam (Fig.8,9). These calcifications behave similary to the sediment at the bottom of a cup of tea, resulting in their designation as teacup calcifications. Its recognition is important because this lesion has no known malignant potential and biopsy is unnecessary.

EGGSHELL OR RIM CALCIFICATIONS

These calcifications are frequently seen in the walls of tiny cysts and may also occur in cases of fat necrosis secondary to blunt trauma, surgical incision, or radiation therapy. The calcifications may be very thin, 1 mm. or less or have thicker walls (Fig.10).

Department of Radiology, Faculty of Medicine, Chiang Mai University, Chiang Mai THAILAND

DERMAL CALCIFICATIONS

Dermal calcifications are usually related to a chronic inflammatory process such as folliculitis and are often located in sebaceous glands (Fig.11). Typically, they are very well defined margins and a central lucency, regional or diffuse distribution. Obtaining tangential views to the area of concern will proved that calcifications are actually within the skin. Other skin lesions that may calcify include nevi, hemangiomas, skin tags and dystrophic calcifications associated with scarring.

FOREIGN-BODY INJECTION GRANULOMAS

Patients who have had silicone or paraffin injections for augmentation of the breasts several years ago are found to have very dense breasts with multiple nodules. On mammogram, calcifi granulomas are round or ring like appearance simil to those of fat necrosis. Siliconomas (Fig.12A,E trend to be larger in size than paraffinomas (Fig.12C but the mammographic features of all such lesions are both characteristic and clearly benign.

SUMMARY

Calcifications occur in the breast are frequently associated with benign disease. However, mammographically detected calcifications are frequently the only sign of breast cancer. While some benign calcifications cannot be distiguished from those of malignancy and biopsy is usually needed to confirm the diagnosis. There are many typically benign calcifications that radiologists should be familiar with in order to avoid suggestion biopsy of these calcifications.

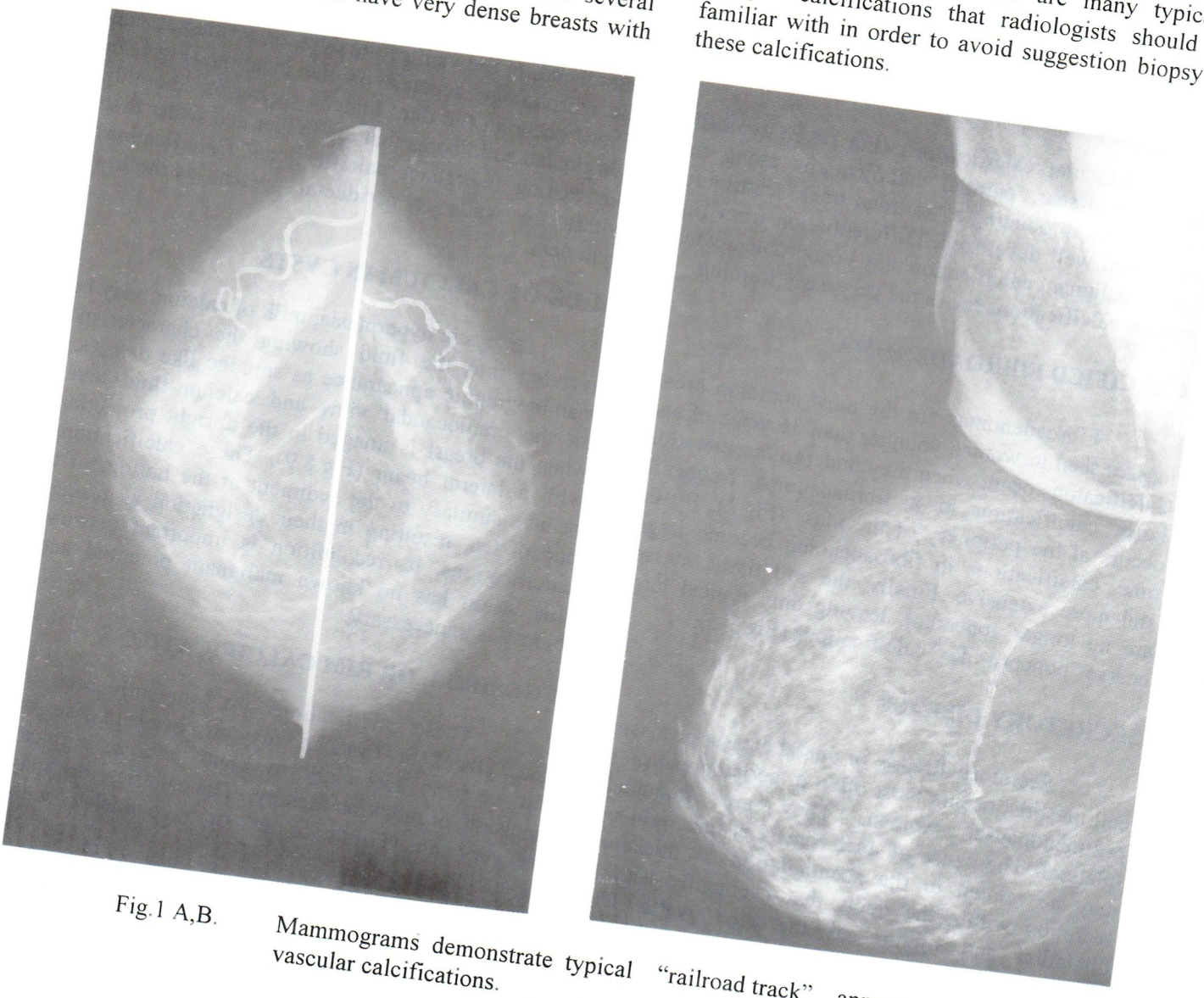


Fig.1 A,B. Mammograms demonstrate typical "railroad track" appearance of vascular calcifications.

g.2 Demonstrating early peripheral calcification in a well circumscribed fibroadenoma.

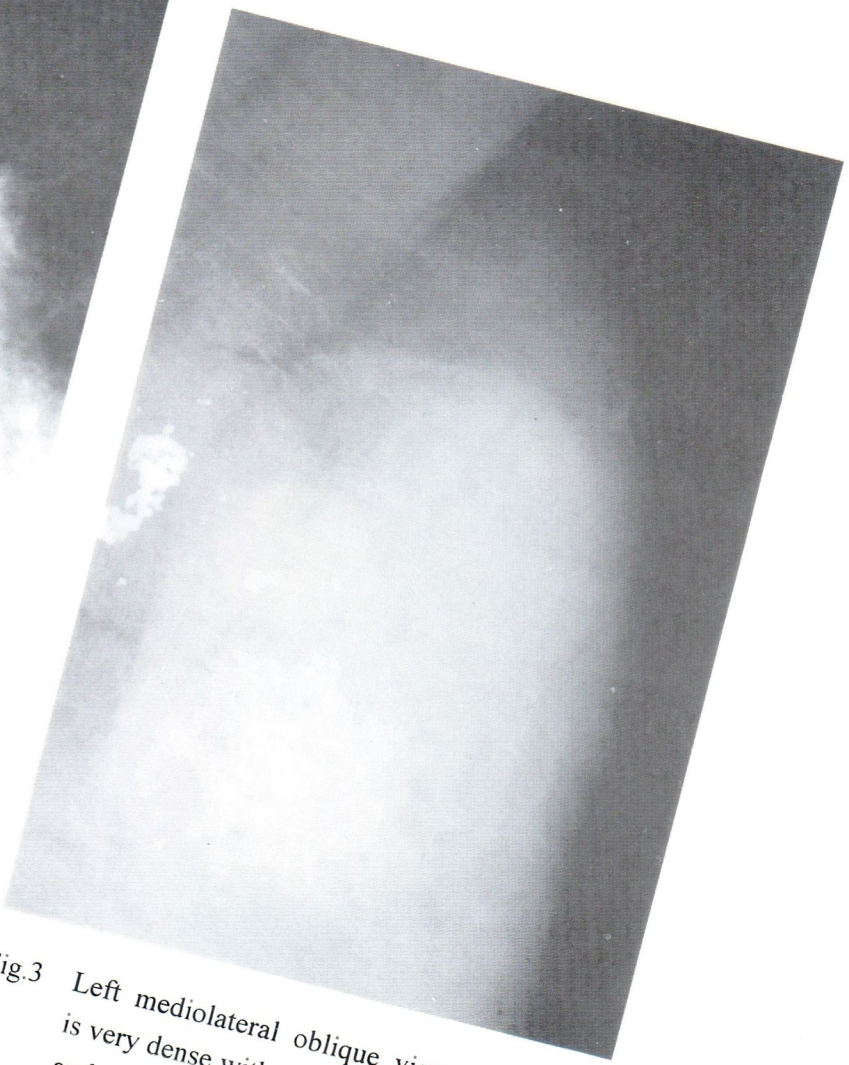


Fig.3 Left mediolateral oblique view. The breast is very dense with a large well define mass and very coarse, dense calcifications. Excisional biopsy revealed fibroadenoma with calcification.

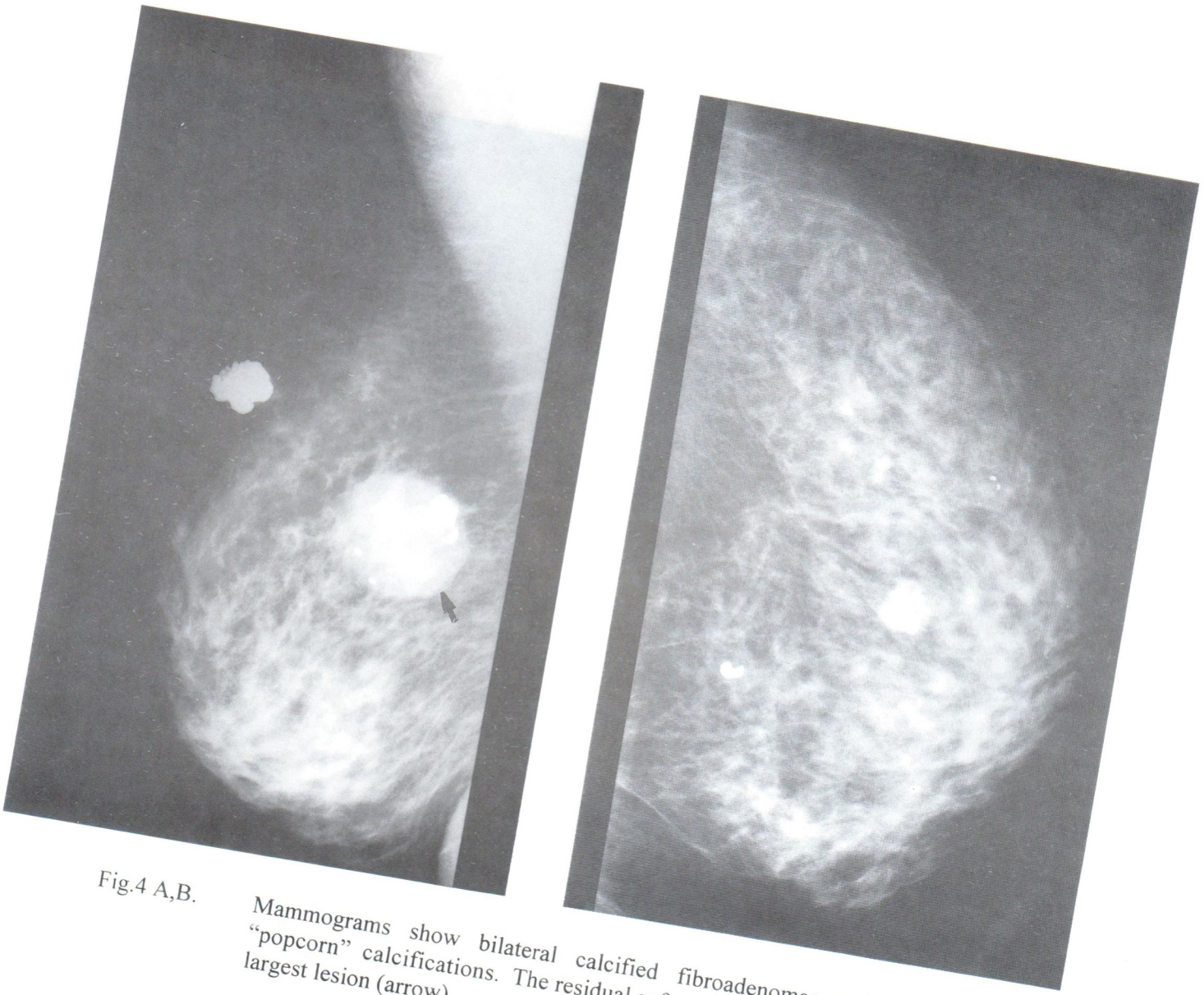


Fig.4 A,B. Mammograms show bilateral calcified fibroadenomas with typical "popcorn" calcifications. The residual soft tissue mass is visible for the largest lesion (arrow).

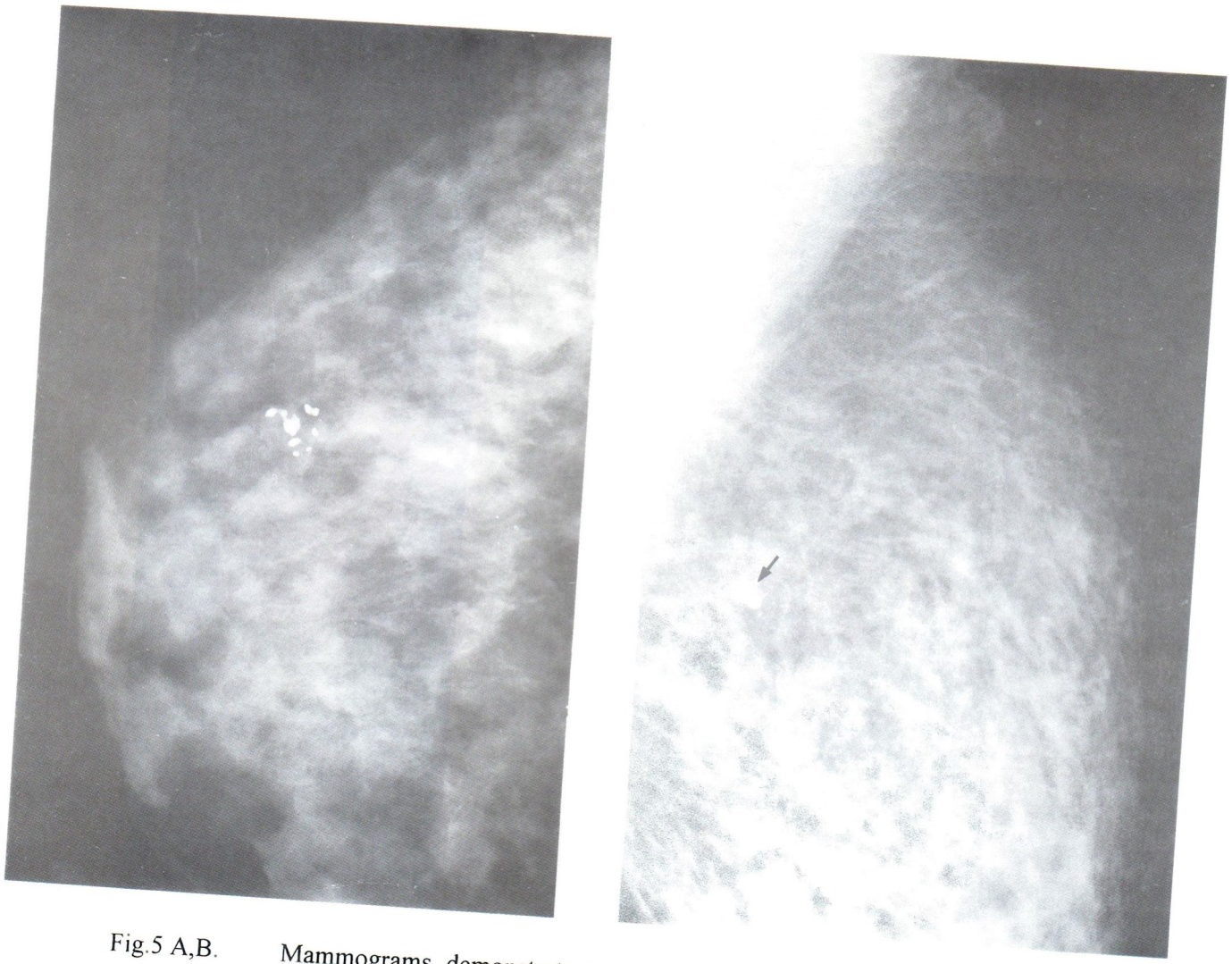


Fig.5 A,B. Mammograms demonstrate coarse calcified degenerating fibroadenoma with regression of soft tissue component.

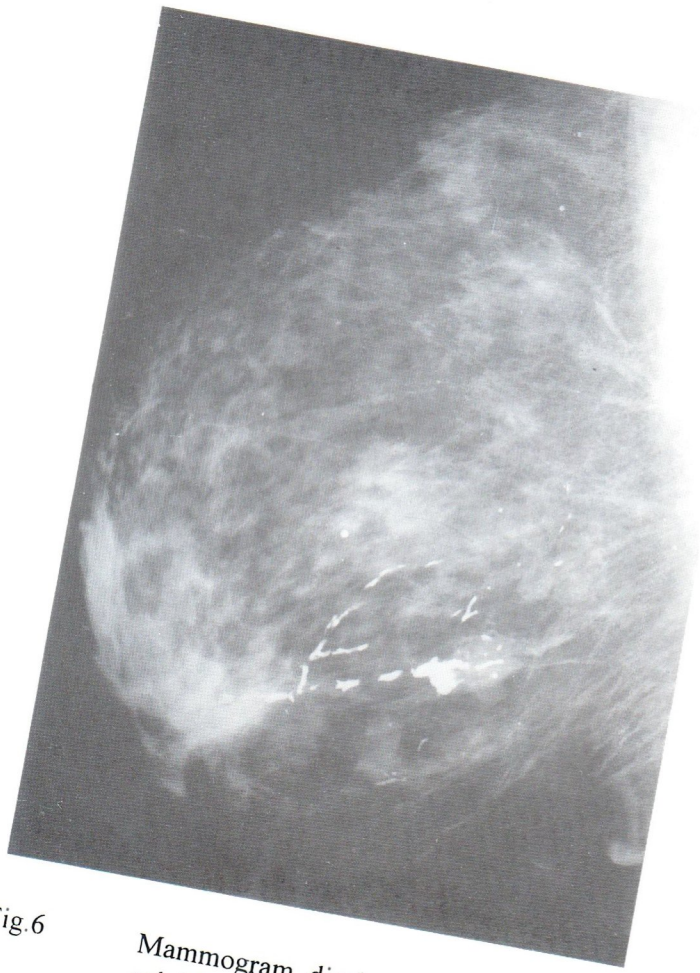


Fig.6 Mammogram discloses large rod- like calcification in duct lumens, secondary to secretory disease.

Fig.7 Mammogram shows three types of typical benign calcification. Radilroad track appearance of arterial calcification (arrow) eggshell calcification of fat necrosis or cyst (arrow head) and rod - like ductal calcifications oriented toward the nipple.

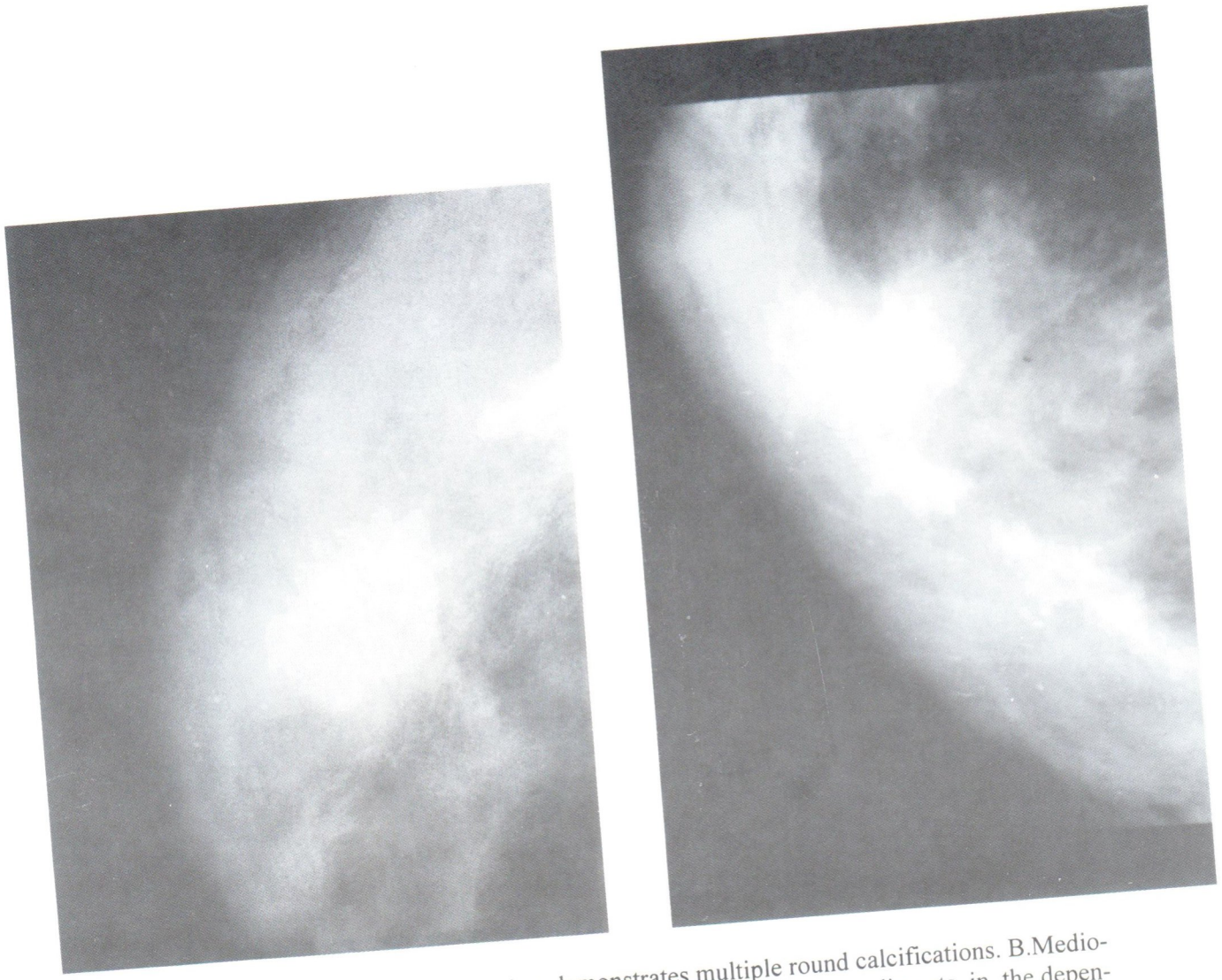


Fig.8 A. Craniocaudal view demonstrates multiple round calcifications. B.Mediolateral oblique view shows milk of calcium sediments in the dependent portion of cysts.

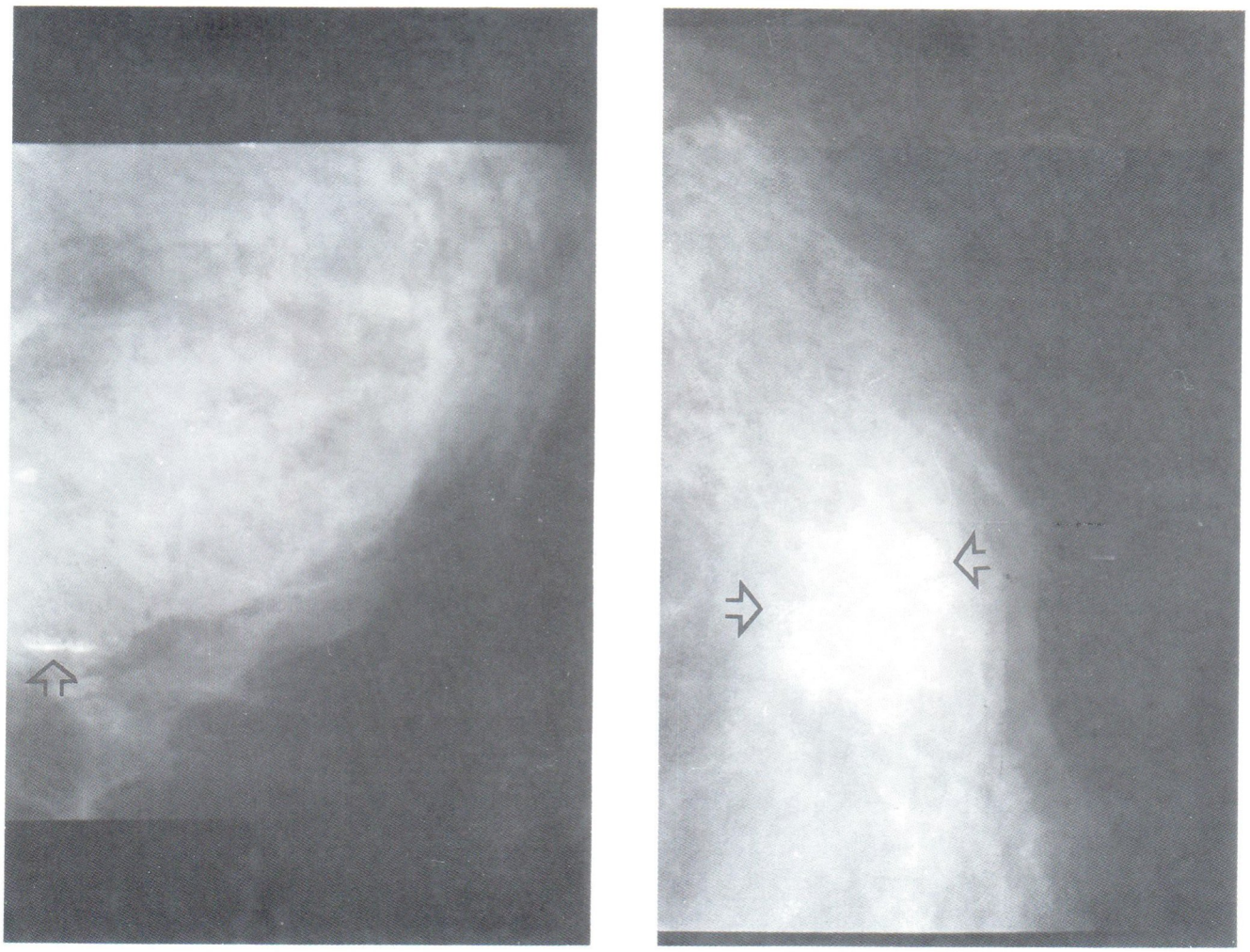
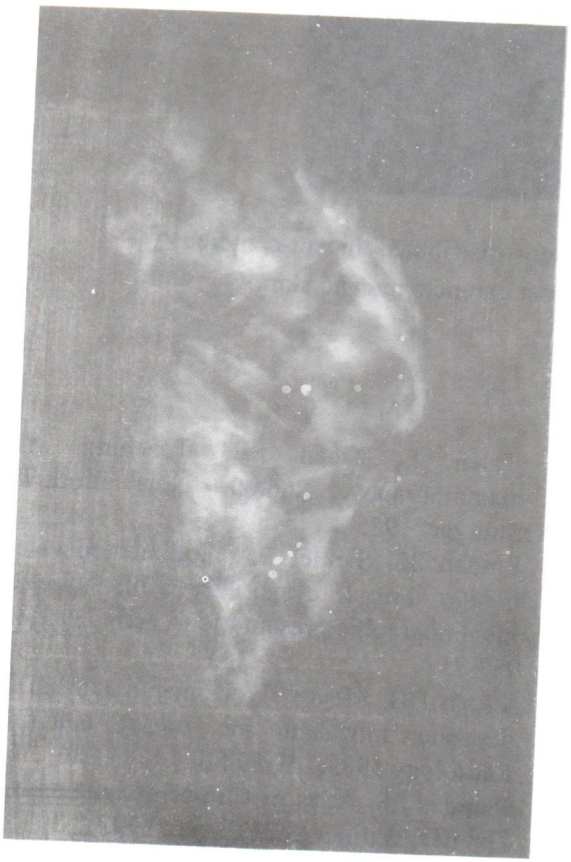


Fig.9 Milk of calcium. Multiple well defined particles sediment in lower most portion of a large cyst to form a horizontal pattern (arrow) on MLO view (A) and round pattern (arrow) on CC view (B).

A

B



C

D

Fig.10 A-D. Mammograms show multiple small and large eggshell or rim calcifications.

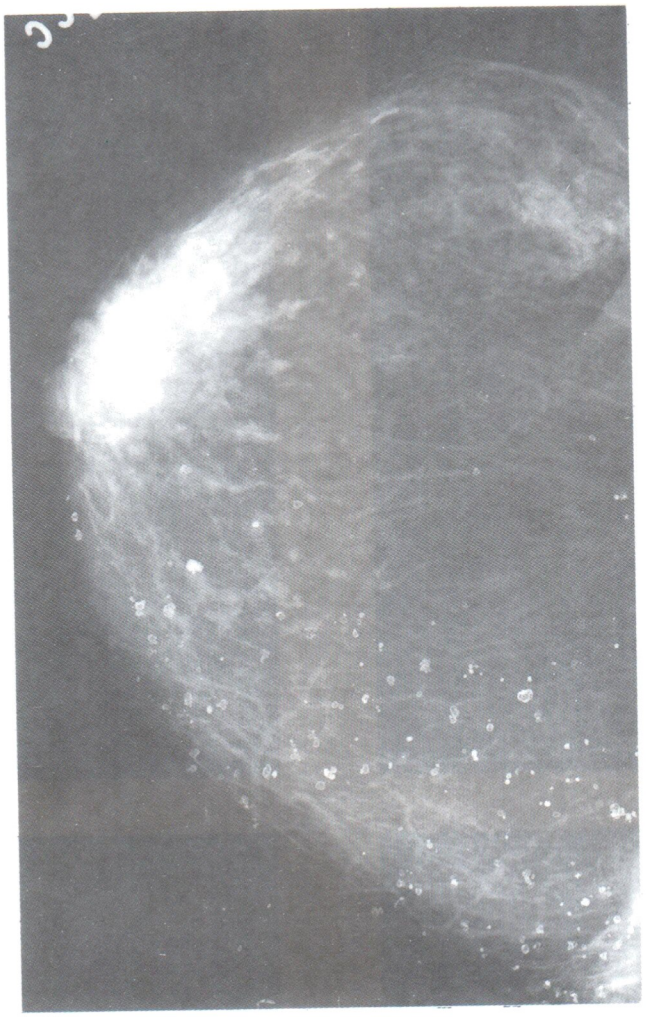


Fig.11 Craniocaudal view shows diffusely distributed lucent-centered calcifications overlying both breast parenchyma and skin.

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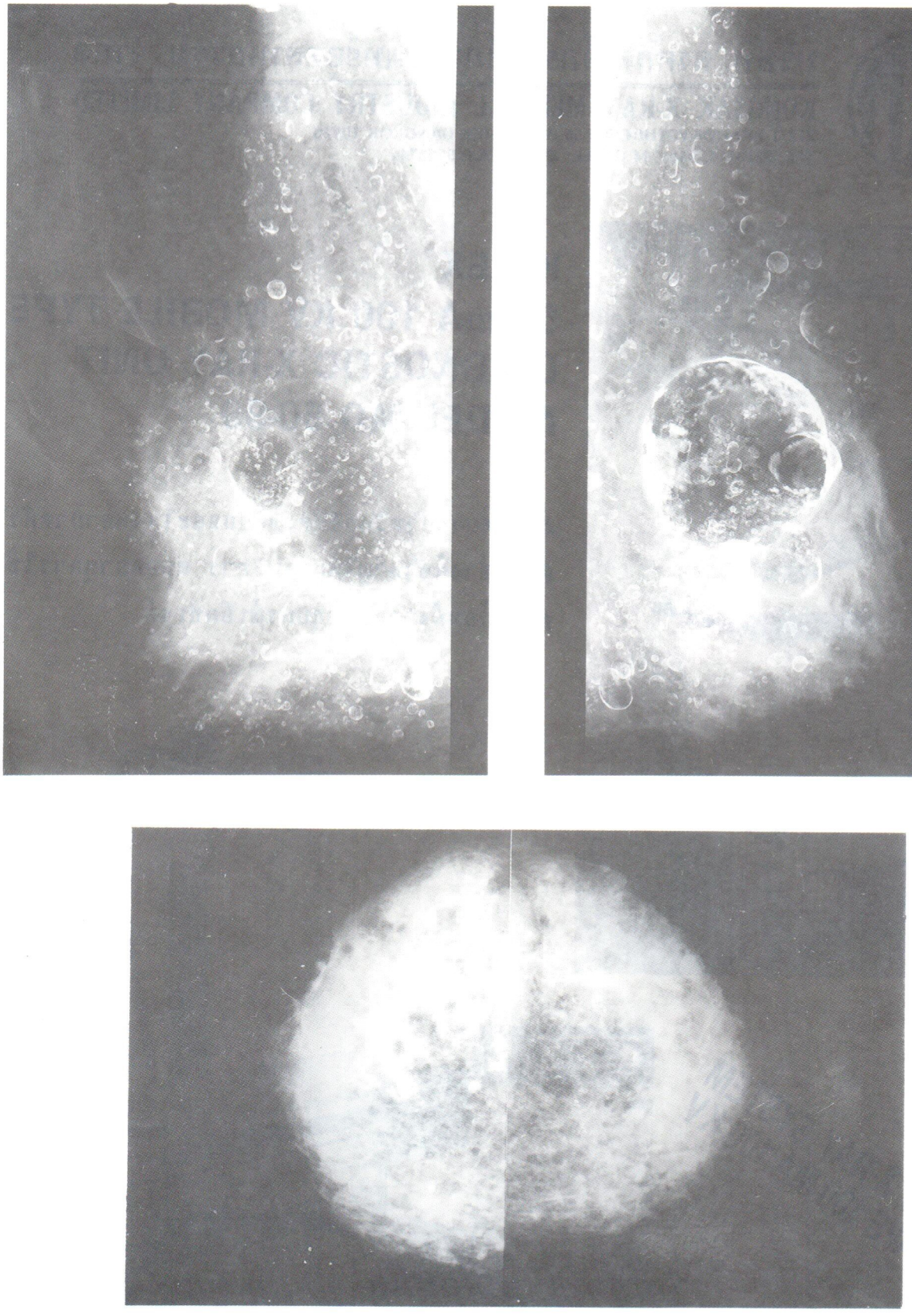

Fig.12 A,B,C. Foreign-body-injection granulomas. A,B. Siliconomas are large and rim calcification, C.paraffinomas, appearing as much smaller nodules.