BENIGN BREAST MASSES SIMULATING CARCINOMA: MAMMOGRAPHIC FINDINGS

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ABSTRACT

Mammography is now a more widely used procedure in the diagnosis of breast disease. The only breast diagnosis of importance is carcinoma because it can cause a woman's death. The pitfalls of mammographic diagnosis are increasingly recognised. The roentgen appearance of some benign disease process may simulate carcinoma. Accurate diagnosis depends on a wide knowledge of various disease processes. We present 23 cases of different benign lesions that may be easily confused with carcinoma.

INTRODUCTION

The goal of accurate mammographic interpretation is to identify malignancy of the breast and distinguish between normal and abnornal breast tissue. An irregular marginated mass on mammography is a primary sign of breast carcinoma. However, a variety of benign lesions may also present as an irregularly marginated mass radiographically. (1) We present various benign lesions that may simulate carcinoma on mammography and suggest criteria for a differential diagnosis.

MATERIALS AND METHODS

We have collected a total of 23 cases of ill-defined or irregularly marginated mass on mammography which proved to be benign lesions. Mammograms were obtained with dedicated screen-film mammographic units (Lorad MII or MIII). Standard craniocaudal and mediolateral oblique views of each breast were obtained and magnification or other supplemental views were taken when indicated. Sonograms were obtained in all patients using 5-7.5 MHz linear array transducers (Aloka SSD-630,650). Excisional biopsy was done in 7 cases, incision and drainage in 1 case, and aspiration in 4 cases. Culture was obtained in 5 cases. Seven cases were treated conservatively.

RESULTS

Table 1. lists the diagnosis and number of patients.

There were 9 cases of abscess in the non-lactating breast. Mammography showed an ill-defined mass (Fig 1A) and sonography showed an ill-defined echoic mass with central low echo (Fig 1B). Histologic section revealed abscess in one case. Cultures were reported as having no growth in 2, staphylococcus in 2 and proteus in one case. Three cases were treated conservatively with antibiotics.

The histopathological diagnosis of fibroadenoma was confirmed in two cases. One was 54 years old and the other one was 47 years old. Mammograms showed an irregular mass (Fig 3) with solid appearance from ultrasound in both cases.

Biopsy findings confirmed fat necrosis in two irregular masses (Fig 4).

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Localized fibrocystic change was pathologically proved in two cases (Fig 5&6), one presenting as an irregular mass and the other as an ill-defined mass.

Three cases of hematoma were diagnosed, two resulting from surgery and one from blunt trauma. Mammographic findings were irregular mass, (Fig 7) ill-defined mass and well-defined mass with partlially irregular margin (Fig 8) in one case each. Sonography showed mixed echoic mass in all cases. Symptomatic treatment showed resolution of the lesions in all cases.

Post surgical scar was diagnosed in two cases that had irregular mass lesions (Fig 9). Follow up study showed stability of the lesion in one case and resolution of the lesion in the other one.

Three cases showed triangular density at the medial aspect of the breast on the craniocaudal view (Fig 10) with no palpable mass. No definite lesion was found on sonography. Sternal insertion of the pectoral muscle was diagnosed in these cases.

DISCUSSION

Abscess of the breast in the lactating period is a well known disease, and the diagnosis can be easily

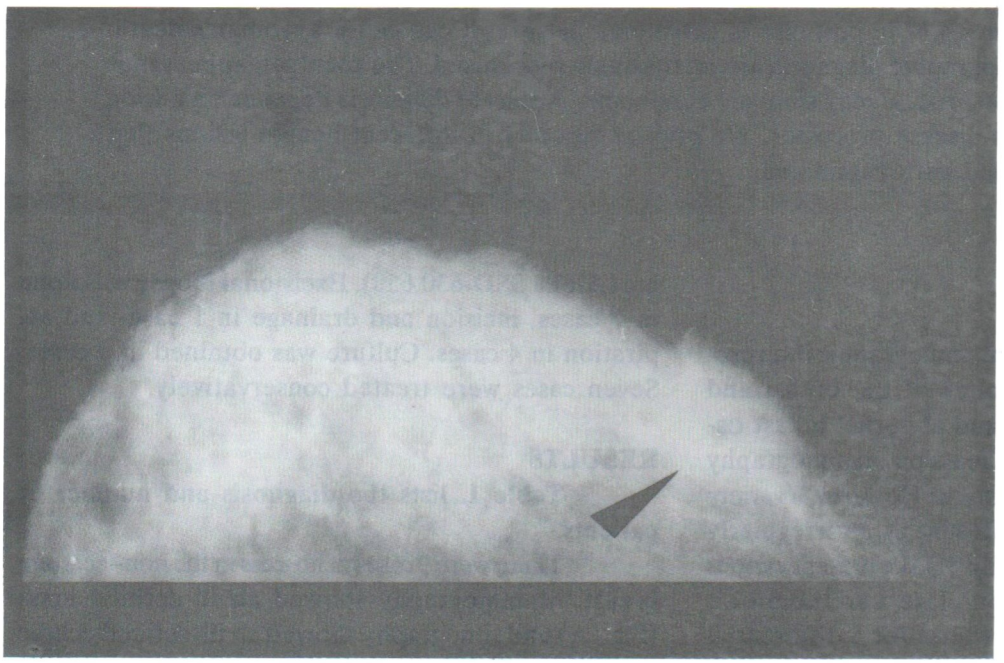

Fig 1A.
43-year-old woman with mass and pain in the right breast. Exagerated craniocaudal view of the right breast showing an ill-defined mass (arrow head) in the tail of the breast.

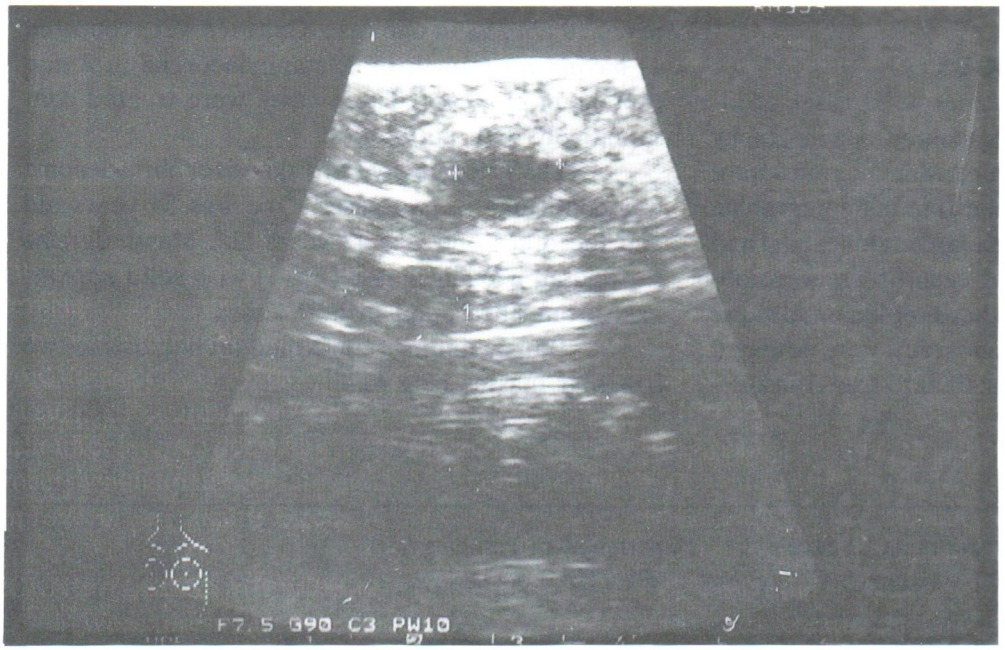

Fig 1B.
Ultrasound: an ill-defined echoic mass with central low echo.

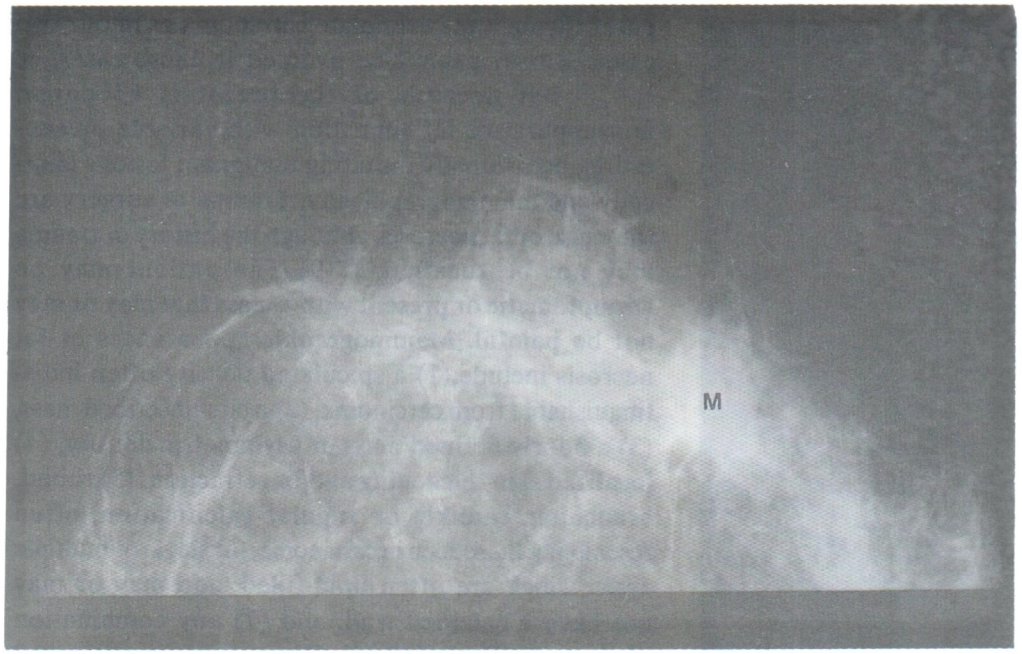

Fig 2.
42-year-old woman with pain in the right breast. Craniocaudal view of the right breast showing an irregular mass (M). Aspiration obtained pus.

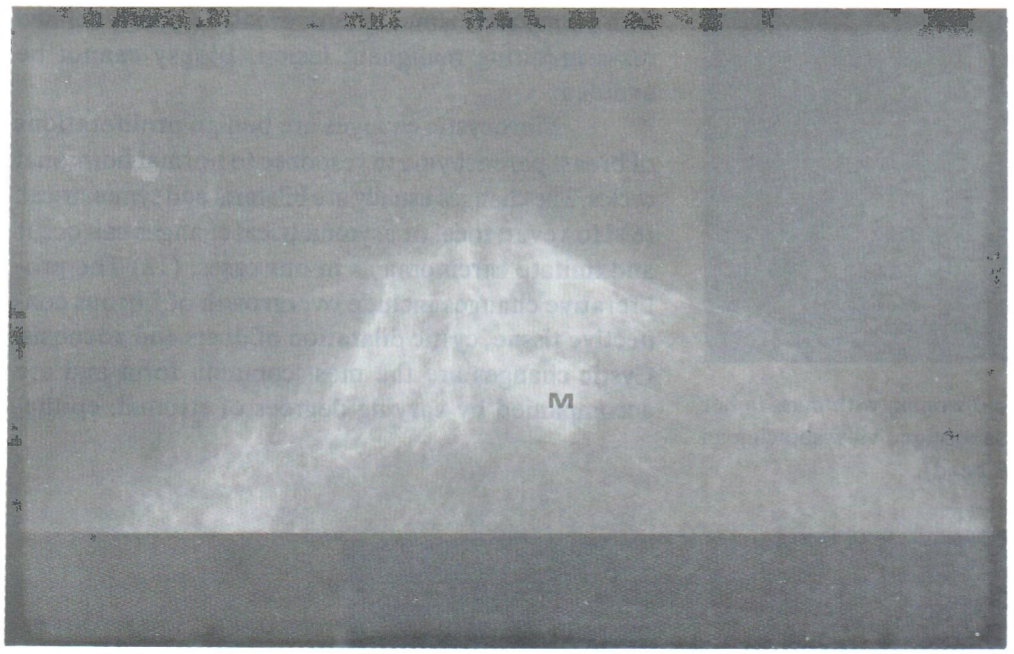

Fig 3.
Fibroadenoma. 54-year-old woman, had a history of right mastectomy for breast carcinoma 2 year ago. She was referred for her first routine follow-up mammograms. Left craniocaudal view showing a well circumscribe mass but indistinct anterior border (M). Biopsy was recommended and revealed fibroadenoma.

made from clinical presentation. Abscess in the non-lactating breast, however is less common and more difficult to diagnose. (2) The patients may present with a breast mass without typical signs of inflammation, and mammography will therefore play a role to exclude malignancy. The most common mammographic findings were a focal area of increased density with spiculation or architectural distortion which can simulate carcinoma. (3-4) Sonographic findings of ill-defined echoic mass with central low echo are helpful for diagnosis of abscess. (5) Diagnostic aspiration and antibiotics might be definitive and prevent unnecessary surgery.

Fibroadenoma is an estrogen-induced tumor of the breast, which usually appears before the age of 30 years. Mammographic findings of a fibroadenoma are a very well defined, round, ovoid or lobulated lesion. This tumor usually regresses after menopause because of mucoid degeneration hyalinization and involution of epithelial components. (6) When fibroadenoma occurs in a patient over 30 years, uncalcified and partially obscured by overlying breast

Fig 4. Fat necrosis. 42-year old woman with mass in her left breast. Mediolateral oblique view showing an irregular mass (arrow head).

parenchyma it may simulate carcinoma as in our two cases. Biopsy cannot be avoided in these cases.

Fat necrosis of the breast is a benign, nonsuppurative inflammation with variable presentation, occasionally imitating malignant lesions clinically and mammographically. Trauma or surgery are the cause of fat necrosis, although the history of trauma may not be recalled. (7-9) The patient may be asymptomatic or present with a mass that may or may not be painful. Mammographic appearances of fat necrosis include;(1) a spiculated density often indistinguishable from carcinoma, (2) a circumscribed mass, (3) a poorly defined mass or asymmetric density, (4) localized skin thickening and/or retraction, (5) round, branching, rodlike, or angular calcification, often resembling those seen in carcinoma, (6) single or multiple cysts, which are often lipid-filled, and may or may not have a calcified wall, and (7) any combination of these findings. (10-11) Our two cases presented with a lump and mammograms revealed a poorly defined mass imitating malignant lesion. Biopsy cannot be avoided.

Fibrocystic changes are benign proliferations of breast parenchyma in response to normal hormonal cycles. The changes usually are bilateral and symmetrical. (6) However, focal or asymmetrical changes can occur and imitate carcinoma as in our cases. (12) The proliferative changes include overgrowth of fibrous connective tissue, cystic dilatation of ducts and adenosis. Cystic changes are the most common form and are accompanied by varying degrees of stromal, epithe-

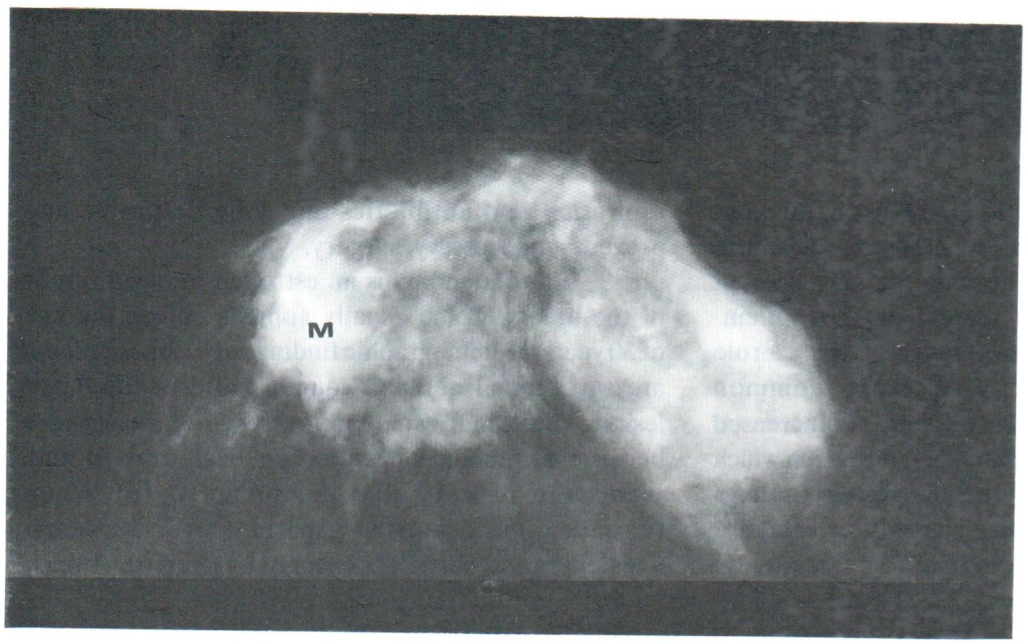

Fig 5.
Focal fibrocystic change. 40-year-old woman with mass in her right breast. Craniocaudaul view showing an irregular mass (M).

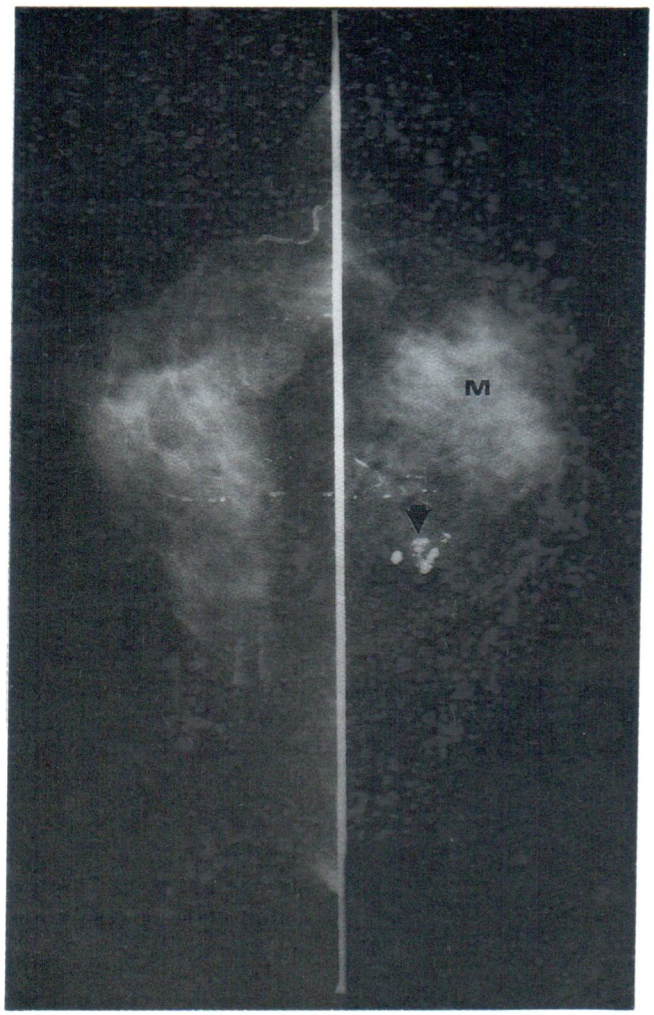

Fig 6. Focal fibrocystic change. 64-year-old woman with mass in her left breast. Bilateral craniocaudal views showing an ill-defined mass in the left breast (M). Calcified degenerating fibroadenoma is also seen (arrow head.)

lial hyperplasia and apocrine metaplasia. Fibrous connective tissue proliferation is probably the least common form and is responsible for many so-calles clinical "thickenings" of the breast. We can not avoid biopsy in these two cases.

Hematoma may result from blunt or surgical trauma. It may be loculated and appear as a well-defined mass or be interstitial and dissect through the tissues, creating a diffuse density on mammography. Sonographic appearance of an acute hematoma is a mixture of echogenic areas and hypoechoic fluid pockets. Mature hematoma has the typical sonographic appearance of a well-circumscribed, anechoic mass with posterior enhancement. (6,13-15) Overlying skin ecchymosis or surgical scar may suggest the diagnosis. Hematoma usually resolves within 2-4 weeks, although some persist 8 weeks or longer. The combination of history, mammographic and sonographic appearance can suggest the diagnosis and avoid unnecessary biopsy.

Intraparenchymal scars after biopsy appear as poorly defined masses, often with spiculated margins. The rate of scar formation depends on the size of parenchymal resection, volume of post surgical fluid collection and whether it was drained postsurgically. Benign biopsy changes often resolve more quickly and completely. Radiolucencies within the central area of soft-tissue density suggest scarring. The spicules of carcinoma are symmetrically placed around the periphery of the tumor mass and are extremely straight, but the spicules of scarring are asymmetric and somewhat curvilinear. (14-18) However, Sickles et al did

Fig 7.
Hematoma. 25-year-old woman with mass in her right breast. She had history of nipple operation 1 month earlier. Right craniocaudal view showing an irregular mass (M).

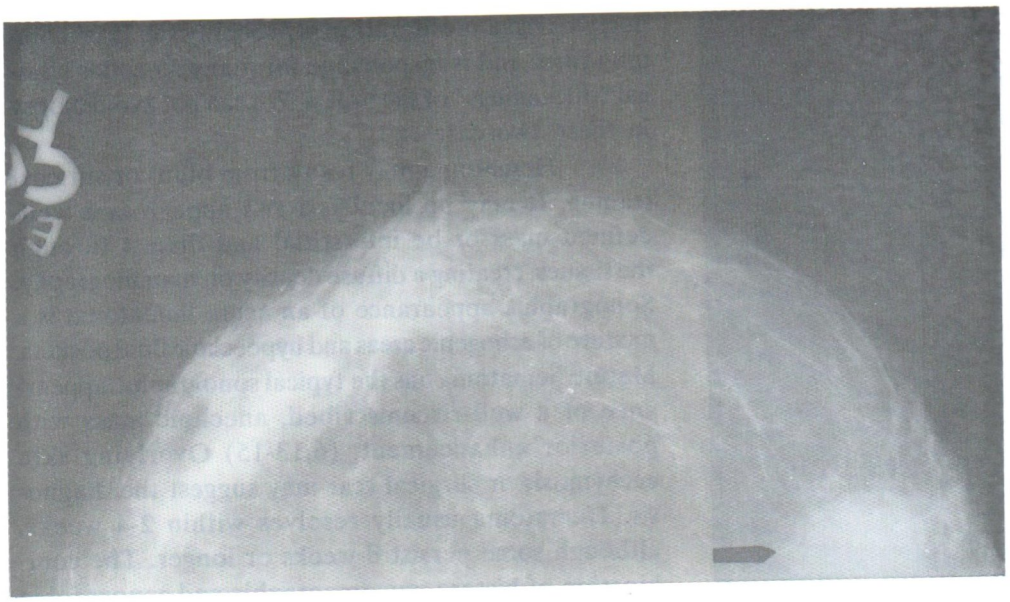

Fig 8A.
Hematoma. 40-year-old woman with history of blunt trauma and a lump in her left breast. A. craniocaudal view of the left breast showing a well-defined mass with partially irregular border (arrow).

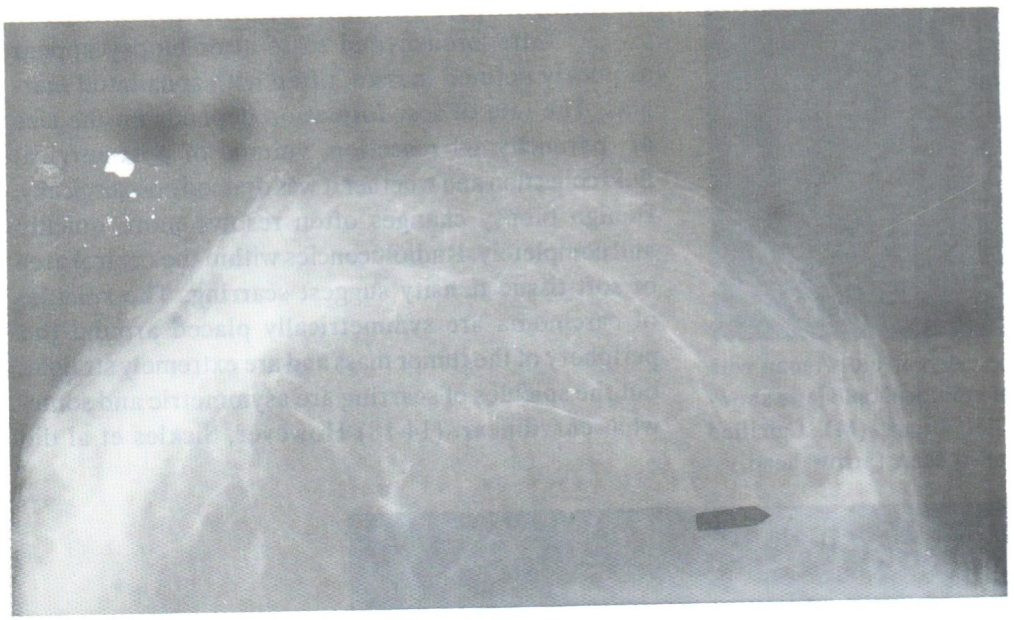

Fig 8B.
follow up study 2 weeks later showing resolution of hematoma.

not rely on these criteria. The clinical history, physical examination and comparison with previous studies are necessary for management. (16,17) On physical examination scarring uncomplicated by fat necrosis is perceived as induration rather than a mass. On sequential studies, scar should decrease in size. Progression of abnormalities should prompt immediate biopsy.

Britton et at reported the presence of a rounded or triangular density at the medial aspect of the breast on craniocaudal view with no palpable mass. This density represents the medial portion of the pectoral muscle, which is included because of vigorous retraction of the breast and slight external rotation during positioning for the craniocaudal view. (19) It may be seen unilaterally, bilaterally or may not be imaged in other women due to a variety of normal appearances of the pectoral muscle. Familiarity with its typical appearance can prevent biopsy of this normal structure.

In summary, the key mammographic feature distinguishing carcinoma from benign breast masses

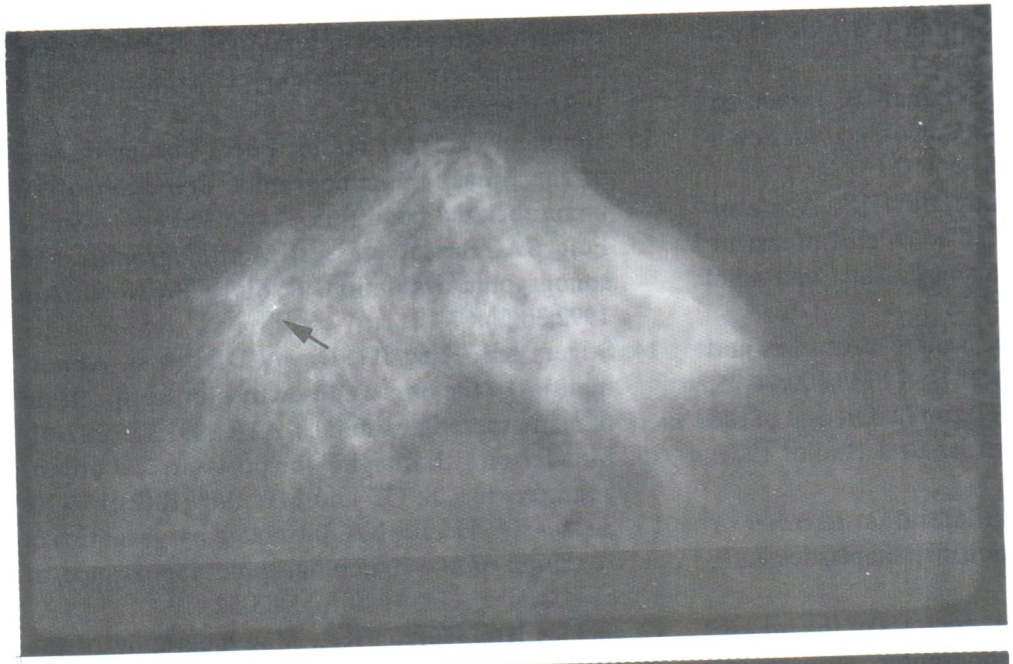

Fig 9.
Post surgical scar. 40-year-old woman, post excision benign breast mass on the right side 1 year earlier (same case as Fig.5). Craniocaudal view of the right breast showing a stellate mass (arrow) with no palpable mass.

Fig 10.
Sternal insertion of pectoral muscle. Screening mammography of a 40 year-old-woman showing a triangular soft tissue density (arrow head) at the medial aspect of the right breast on craniocaudal view.

is its irregular or ill-defined margin. However, there are many breast lesions having these features. Awareness of the varied mammographic features is essential to avoid unneccessary biopsy, but lesions in which there is a suggestion of malignancy should undergo biopsy without delay. A wide knowledge of various disease process will help in accurate diagnosis and ultimately improve breast health care.

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Table 1. Diagnosis and number of cases

Diagnosis	Number of cases
Non-lactating abscess	9
Fibroadenoma	2
Fat necrosis	2
Focal fibrocystic change	2
Hematoma	3
Scar	2
Sternal insertion of pectoral muscle	3