



Objectives

Inflammatory breast diseases encompass a wide range of conditions, with frequent diagnostic dilemma in differentiating infection from non-infective mastitis and inflammatory breast disease cancer. This presentation reviews the imaging features of various inflammatory breast diseases and their mimics.

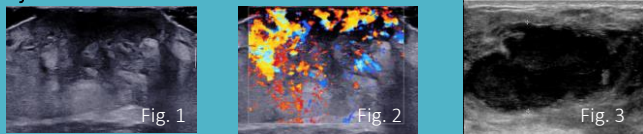
Materials and methods

Cases diagnosed to have inflammatory breast disease radiologically or pathologically from year 2007-2019 were retrieved from the radiology information system of Queen Elizabeth Hospital. The mammographic and sonographic findings were retrospectively reviewed.

Results

A total of 294 patients have been identified with median age of 38 years (range, 11-84 years). Ultrasonography (USG) was performed in all cases while mammography (MMG) in 42 cases. Most cases were infective mastitis or abscesses (n=241). Non-infective inflammatory diseases included granulomatous mastitis (n=21), diabetic mastopathy (n=8), xanthogranulomatous mastitis (n=3) and lupus mastitis (n=1). Iatrogenic mastitis related to breast augmentation (n=7) & surgery (n=4) were reported. Five cases of inflammatory breast carcinoma & 7 cases of abscess-mimicking breast tumors were reported.

Infective Mastitis and Breast Abscess



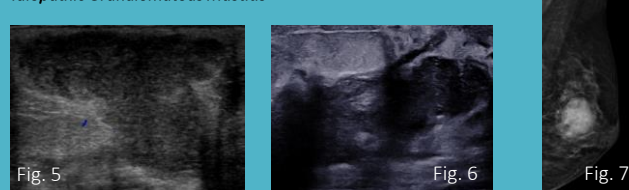
Most infective mastitis cases are related to lactation, presenting clinically with fever, mastalgia and skin erythema, usually caused by *Staphylococcus aureus* or *Streptococcus*. USG is most commonly used to diagnose this condition, revealing subcutaneous tissue & parenchymal thickening (Fig. 1) with increased vascularity (Fig. 2). Anechoic fluid collections without solid component (Fig. 3) suggestive of abscess formation can occur. MMG is seldom performed in the acute stage due to patient's pain, revealing skin & trabecular thickening with irregular-shaped high-density masses. Treatment is with antibiotics and ultrasound-guided drainage of fluid collections. Follow-up is mandatory to ensure complete resolution.

Iatrogenic mastitis



Infections following invasive procedures are a common cause of breast infection. Diagnosis is usually based on the appropriate clinical history. Seven cases in our series occurred after breast augmentation (6 with PAAG injection, 1 with silicon implant) and 4 cases following mastectomy. Imaging commonly reveals evidence of previous augmentation or surgery, with high density masses on MMG and irregular fluid collections with internal echogenicities representing either gas or injected material on USG (Fig. 4).

Idiopathic Granulomatous Mastitis



Rare form of non-infective mastitis that usually affects parous premenopausal women with a history of lactation. Its clinical and radiological presentation can mimic infective mastitis. Aseptic abscesses +/- sinus tract formation may occur (Fig. 5). Another form of presentation is similar to breast malignancy, presenting with suspicious irregular-shaped, non-circumscribed hypoechoic masses on USG (Fig. 6) and high density masses on MMG (Fig. 7). Diagnosis is usually confirmed on histology, demonstrating non-caseating granulomata with epithelioid macrophages & Langhans-type multinucleated giant cells. Treatment with oral steroids or immunosuppressants is recommended.

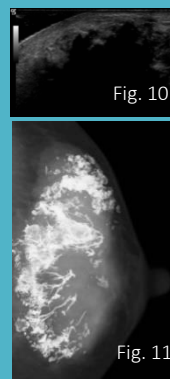
Diabetic Mastopathy



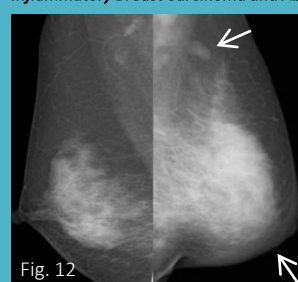
Diabetic mastopathy is frequently mistaken for malignancy due to their similar radiological presentation. It usually occurs in patients with longstanding insulin dependent diabetes, presenting with large painless hard breast masses. On MMG, irregular-shaped masses or asymmetrical densities (Fig. 8) can be seen. On USG, non-circumscribed hypoechoic masses with significant posterior acoustic shadowing (Fig. 9) are most commonly seen. Multifocal or bilateral involvement is common. Diagnosis is usually confirmed on histology.

Lupus Mastitis

Mastitis is an uncommon presentation of systemic lupus erythematosus (SLE), manifesting clinically as subcutaneous masses or nodules, with or without skin erythema and mastalgia. Radiological manifestations of lupus mastitis are non-specific. On MMG, majority of cases show dystrophic coarse calcifications compatible with fat necrosis (Fig. 11). Irregular non-circumscribed masses (often of high density), asymmetry and focal asymmetry are common. On USG, non-circumscribed hypoechoic non-circumscribed mass with strong posterior shadowing is the most common presentation (Fig. 10). Biopsy is required to exclude underlying cancer. Treatment is with immunosuppressants.

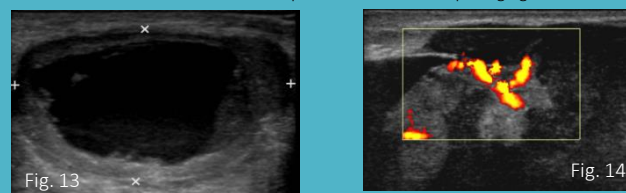


Inflammatory Breast Carcinoma and Abscess-mimicking Breast Tumors



Inflammatory breast cancer is an invasive aggressive disease presenting clinically with skin edema, erythema & warmth and mastalgia. MMG findings include skin thickening, increased breast density and coarsened trabeculation (Fig. 12). On ultrasound, mixed solid-cystic lesions or collections, which can be circumscribed or non-circumscribed, can be seen (Fig. 13), mimicking infective mastitis.

However, malignant inflammatory lesions are more likely to show solid components (Fig. 14), calcifications and abnormal lymph nodes (enlarged with cortical thickening) (Fig. 12). Lesions tend to occur either centrally or dorsally within the breast, while infective abscesses are mostly subareolar. Malignant lesions are not usually associated with lactation and remain persistent on follow-up imaging.



In our series, most cancers were invasive ductal carcinomas (n=8). Others included Phyllodes tumors (n=2), papillary carcinoma (n=1) & invasive lobular carcinoma (n=1). Two breast cancers showed cystic lesions on USG initially mimicking non-puerperal breast abscesses, one of which had positive aspirate culture, but follow-up imaging after resolution of inflammatory symptoms showed suspicious masses proven malignant on biopsy.

Conclusion

Recognizing the imaging features of various inflammatory breast diseases is vital. Breast abscess aspirate may be sent for cytology if clinically suspicious. All breast abscesses warrant follow-up imaging to ensure complete resolution. Non-puerperal presentation or lesion persistence should raise suspicion for malignancy and prompt early imaging-guided core biopsy.

References

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