Breast abscess: Radiological features and differential diagnosis from abscessual carcinoma

Poster No.: C-0478
Congress: ECR 2010
Type: Educational Exhibit
Topic: Breast
Authors: D. Distefano, P. Belli, M. Costantini, E. Bufi, C. Ierardi, L. Bonomo; Rome/IT
Keywords: breast abscess, cancer, inflammation
DOI: 10.1594/ecr2010/C-0478

Any information contained in this pdf file is automatically generated from digital material submitted to EPOS by third parties in the form of scientific presentations. References to any names, marks, products, or services of third parties or hypertext links to third-party sites or information are provided solely as a convenience to you and do not in any way constitute or imply ECR's endorsement, sponsorship or recommendation of the third party, information, product or service. ECR is not responsible for the content of these pages and does not make any representations regarding the content or accuracy of material in this file.

As per copyright regulations, any unauthorised use of the material or parts thereof as well as commercial reproduction or multiple distribution by any traditional or electronically based reproduction/publication method is strictly prohibited.

You agree to defend, indemnify, and hold ECR harmless from and against any and all claims, damages, costs, and expenses, including attorneys' fees, arising from or related to your use of these pages.

Please note: Links to movies, ppt slideshows and any other multimedia files are not available in the pdf version of presentations.

www.myESR.org
Learning objectives

• To show mammographic, sonographic and Magnetic Resonance (MR) findings of breast abscess.
• To illustrate typical radiological findings and to evaluate minimal features that could differentiate breast abscess from abscessual carcinoma.

Background

Breast abscess is a relatively rare but serious complication of mastitis. Generally mastitis is defined as an inflammation of the breast that may or may not be associated with infection. Mastitis can occur in all population: the reported incidence of mastitis varies from a few to 33 % of lactating women, and less than 10% in non-lactating ones. Mastitis either resolves under antibiotic therapy or evolves towards an abscess especially if treatment is delayed or inadequate. The reported incidence of abscess complicating mastitis ranging from 5% to 11%.

The most common causative organism of abscess is *S. Aureus*, followed by *Streptococcus*.

*S. Aureus* is generally more invasive from the onset and the abscesses tend to occur more frequently, even in case of an immediate medical treatment. *Streptococcus* usually causes a diffuse mastitis, with focal abscess formation in advanced stages.

Abscesses are commonly treated with appropriate antibiotic therapy. In recent years several authors have described the efficacy of ultrasound-guided needle aspiration and intracavitary irrigation with local anesthetic and afterward with sterile saline solution instead of surgical incision and drainage in the breast abscess management.

Breast abscess can mimic inflammatory cancer. However the rate of associated malignancies with breast abscess is very low.

The suspicion of malignant abscess increases if after 7-10 days of therapy inflammatory symptoms do not dissipate and if female patient are non-lactating and above 40 years of age. Any female presenting with inflammatory breast symptoms that fail to respond to antibiotic therapy must be immediately subjected to a biopsy to exclude any possibility of malignancy.
Unfortunately clinical signs don't help in differentiating benign from malignant abscess because typical signs are similar for both conditions such as enlargement, tenderness, increased cutaneous temperature, dermal redness of the involved breast.

An accurate diagnostic evaluation and a careful analysis of minimal radiological features may help in distinguishing these two pathological entities. However the discrimination between benign and malignant abscess represent a diagnostic challenge because of overlapping of clinical features and various imaging findings; so a fine needle aspiration or core biopsy are essential if any diagnostic doubt exists.

**Imaging findings OR Procedure details**

Mammography generally is not the first diagnostic procedure in the suspicious of breast abscess because, as mentioned previously, abscess occurs in greater frequency in young lactating women. So in the acute stage, when the breast is very painful and has an increased density due to the ongoing inflammatory process, ultrasound is the first step for a correct identification of an abscess cavities.

Mammographic features of breast abscess are variable and not specific, ranging from ill-defined mass with benign or malignant features (Fig.1) on page 4 and focal asymmetric density (Fig.2) on page 5. Other common mammographic signs are edema and skin thickening; nipple retraction is frequently observed in case of subareolar localization. Microcalcifications are very uncommon. Some lesions may be obscured by dense glandular tissue, making mammographic evaluation difficult.

Patients with inflammatory breast disease generally present nodal involvement: axillary lymph nodes usually appear like round or oval opacity of variable size, with absence of fatty hilum especially in case of malignancy (Fig.1) on page 4.

Ultrasonography (US) is the best imaging option for detecting abscessual lesions and guiding abscess drainage. US allows to identify and evaluate the extent, size, site and internal characteristics of abscess cavities. Furthermore US permit to monitor the efficacy of therapy, to evaluate the onset of any complications, to guide a possible aspiration and to act follow-up until the abscess is no longer visible and the patient becomes asymptomatic.

Abscess cavities are usually seen at ultrasonography as ill-defined oval or round masses with anechoic/hypoechoic areas, internal echoes, septations and thick irregular vascularised wall (Fig.3) on page 6. Benign abscesses often showed fluid-debris levels and good through transmission of sound (Fig.4) on page 7. In case of cancer the lesion usually appears more homogeneous and lesion wall seems more thin: these
findings can be associated with posterior acoustic shadowing (Fig. 5 on page 8 and Fig. 6 on page 9).

Other typical sonographic features associated with breast abscess are skin thickening caused by edema and areas of echogenicity change ranging between decreased parenchymal echogenicity and increased fat echogenicity caused by inflammation.

Ultrasound evaluation allows to identify possible fistulous tract that complicate abscess cavities inadequately treated or non-drained (Fig.7) on page 10.

Magnetic Resonance Imaging (MRI) may help diagnosis of breast abscess providing morphological, dynamic and functional informations that could be useful in distinguishing benign from malignant entities.

Both benign and malignant abscesses showed a central hyperintense area on T2-weighted sequences and hypointense on T1-weighted sequences. The shape of the lesion is extremely variable and margins are commonly irregular. Abscess cavities are hyperintense on diffusion sequences due to restriction of diffusion (Fig.8, Fig.9 on page 12, Fig.10, Fig.11 on page 14 and Fig.12 on page 15). In the evaluation of minimal signs, benign abscess presents more frequently multilayered tick wall (Fig.11 on page 14) or multiloculated cavities (Fig.8) on page 11 whereas malignant lesion often show thin peripheral enhanced wall (Fig.10 on page 13 and Fig.12 on page 15).

Images for this section:
Fig. 1. Oblique and axial views of right breast show large ill-defined low-density mass in the upper-external quadrant. Axillary lymphnodes don’t have fatty hilum. Histopathological result: abscessual carcinoma.
Fig. 2. Axial views: focal asymmetric density in the external quadrant of the right breast.
Histopathological result: benign ascites
Fig. 3. Complex mass with anechoic central area and thick irregular wall. A benign abscess was diagnosed on biopsy.
Fig. 4: Benign abscess: an hypoechoic lesion with irregular morphology in the upper-internal quadrant of the left breast.
Fig. 5. Malignant breast abscess: large, oval hypoechoic mass with indistinct margins and posterior enhancement. The lesion corresponding to a palpable mass located in the upper quadrants of the right breast.
Fig. 6. Complex heterogeneous mass with internal echoes, indistinct margins and posterior acoustic shadowing. Biopsy revealed an invasive ductal carcinoma.
Fig. 7. Hypoechoic lesion with irregular morphology and two vascularized periferical poles. A fistulous tract is identify on US examination. An invasive ductal carcinoma was diagnosed on biopsy.
Fig. 8. Woman with subareolar benign abscess. Contrast-enhanced T1-weighted images show an irregular multiloculated lesion associated with nipple retraction.
Fig. 9. The lesion detected in the upper-internal quadrant of the left breast is irregular, inhomogeneously hyperintense on T2-weighted sequences. After injection of contrast solution, the lesion shows irregular margins and peripheral enhancement. On DWI the lesion is strongly hyperintense, with low ADC value (0.84x10⁻³ mm²/s). Histological result: benign abscess.
Fig. 10. In the upper-external quadrant of the left breast, contrast-enhanced T1-weighted-images reveal a lesion with irregular enhanced margins and suspicious dynamic curve. An abscessual carcinoma was diagnosed on biopsy.
Fig. 11. Large mass with central area hyperintense on T2 weighted sequence and hypointense on T1-weighted sequence is located in the upper quadrants of the left breast. Contrast-enhanced T1-weighted image shows multilayered thick enhanced walls. A region of interest placed at the margins of the lesion shows low ADC value ($0.6 \times 10^{-3}\text{mm}^2/\text{s}$). Histological result: benign abscess.
Fig. 12. Axial and longitudinal contrast-enhanced T1-weighted sequences reveal a lesion with central necrotic area and peripheral enhancement. Dynamic curve is suspicious for malignancy (plateau). The lesion is hyperintense on DWI with ADC value suggestive of high cellularity ($1.19 \times 10^{-3} \text{ mm}^2/\text{s}$). Histological result: invasive ductal carcinoma.
Conclusion

The differential diagnosis between benign abscess and abscessual carcinoma remains a diagnostic challenge.

Radiological findings and patient's clinical course may help to predict the benign or malignant nature of abscessual lesions, even if the definitive diagnosis is usually based on histological results.

Personal Information

Daniela Distefano, Paolo Belli, Melania Costantini

Departement of Bio-Imaging and Radiological Sciences

Università Cattolica del Sacro Cuore

L.go A. Gemelli, 8

00168 Rome, Italy

References


