Inflammatory Syndrome of the Breast

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Learning objectives

Purpose:
1 Differentiating benign/malignant/inflammatory breast lesions especially in the initial diagnosis.

2 Demonstration of the incidence of mastitis at younger ages compared with inflammatory breast cancer.

3 Uses of radiological images in guiding treatment.

Background

Materials and methods:
Mammography and ultrasound images of a group of 54 patients with mastitis, fibrocystic mastosis in acute stage, infected hematoma, herpes mastitis, idiopathic granulomatous mastitis and inflammatory breast cancer, aged between 21 and 68, with clinical manifestation like edema and pain and radiological signs as thickened skin, lymph node and breast calcification, transonic and hipoecogenic breast lesions.

Imaging findings OR Procedure details

Mastitis is an infection of the tissue of the breast that occurs most frequently during breastfeeding, but it can occur even in women who are not breastfeeding or pregnant. Most common etiological organisms: S. Aureus, S epidermidis, streptococcus gains entry into the breast through the nipple and ducts or through broken skin. Mastitis needs to be differentiated from a plugged or blocked duct. A plugged duct is not accompanied by fever, mastitis does require treatment with antibiotics. The skin overlying the blocked duct is often quite red, similar to what happens during mastitis, but less intense. Mastitis is usually also associated with fever and more intense pain as well. The most common findings are diffuse or focal skin and trabecular thickening from breast edema. The goal of treatment for mastitis is to provide prompt and appropriate management to prevent complications such as a breast abscess (Fig. 1 on page 10).
Acute mastitis usually affects younger, lactating women. If a trial of antibiotics does not decrease the signs and symptoms in the inflamed breast, inflammatory breast cancer must be considered, especially in older, nonlactating women. In our study the average of women with mastitis is 31 years.

24 year old nursing female, with inflammatory symptoms for four days in the right breast region (red skin, turgescent breast, pain, difficulty nursing, 38 degree fever). A mammography shows a breast with dense, polynodular structure (Fig. 2 on page 10). In the exterior quadrants are noted two opaque formations at the 3 and 5 o'clock positions with smooth contours. The opaqueness of the formations is similar to that of the rest of the breast, which eliminates the diagnostic of cancer or breast fibroadenoma. An ultrasound examination reveals two large transonic images with internal echoes (Fig. 8 on page 15). A diagnostic is made of acute mastitis with galactocel. A follow-up mammography exam after one month of antibiotic treatment shows a normal mammographic aspect of the breast.

Fig. 11: Mastitis during breastfeeding; mammographic and ultrasound images - a galactocele

References: Dr Mihaela Sebeni et al., Department of Radiology, Coltea Clinical Hospital, Bucharest, Romania.

Granulomatous Idiopathic Mastitis:

Rare chronic inflammatory disease, it occurs at middle ages women (30-45 years) and it can mimic inflammatory breast cancer, plasma cell mastitis, Wegener’s granulomatosis, sarcoidosis, fat necrosis, tuberculosis, duct ectasia and fungal infection. Is not associated with trauma, specific infection, or foreign material.
28 year old comes to the oncology clinic of Coltea hospital for a painless induration of the right breast, without a localized inflammatory response and without any general symptoms. The right breast has a diffuse increased density compared to the other breast and a hard, mobile axillary nodule. Eight months previously, the patient had given birth and nursed for three months. She relates the breast symptoms appeared two weeks after. Breast mammography and ultrasound are performed.

Laboratory results and tumoral markers do not show any abnormalities. Due to the diffuse nature of the lesion, needle-biopsy was not performed. A treatment with antibiotics and anti-inflammatory drugs was prescribed and a one month follow-up visit recommended. After one month, the aspect of the breast remained unchanged and treatment with prednisone was prescribed. After three months from the first clinical and imagistic evaluation, due to the persistence of some of the symptoms, a needle biopsy is performed which reveals inflammatory cells. A diagnosis is made of idiopathic granulomatous mastitis, and continuation of the treatment with prednisone for three more months is recommended. The patient did not return for follow-up. Fig. 12 on page

Fig. 12:Granulomatous mastitis.
References: Dr Mihaela Sebeni et al., Department of Radiology, Coltea Clinical Hospital, Bucharest, Romania.

Herpetic Mastitis:

The most common sites of HSV infection are around the oral cavity and genitalia. However, herpes simplex can affect any skin or mucous membrane surface, in addition to the eyes, central nervous system and viscera.

61 year old female arrives at the hospital accusing pain in the right breast region, with an exanamnetous, suppurating areolar region and local inflammatory response. In the left axilla, the patient has a painful, erythematous eruption with several vesicles. A diagnostic of herpes zoster is made for the axillary eruption, and a presumptive diagnostic of Paget's disease for the areolar lesion. Mammography reveals a breast structure that is diffusely increased in density, with a dense inflammatory areolar and periareolar region (Fig. 5 on page 13), a benign cluster of micro calcifications deep to the areola, and a 1 cm nodule with dense borders in the medial-inferior quadrant (Fig. 6 on page 13). Cytological exam of the periareolar region show an inflammatory infiltrate with neutrophiles and lymphocytes, but with no evidence of Paget's disease. A repeat exam is planned, but the patient is treated with zovirax for the herpes zoster infection and in two weeks time the breast symptoms disappear, which allows a retrospective diagnosis of herpes mastitis to be made. The patient did not show any other cutaneous manifestations. The breast nodule was further investigated and unfortunately a mammary carcinoma with axillary lymph node invasion of the first station was discovered. The patient underwent mastectomy.
Fig. 5: Herpetic mastitis. Dense inflammatory areolar and periareolar region.

References: Dr Mihaela Sebeni et al., Department of Radiology, Coltea Clinical Hospital, Bucharest, Romania.

Infected Hematoma: Breast is one of the most susceptible areas for formation of hematomas due to its vulnerable position as well as the vascularity of its tissue arrangement.

48 year old female requests a mammography for a painful formation of large dimensions situated above the right nipple (Fig. 9 on page 16). Three weeks ago, the patient suffered an acute trauma to the breast (dog bite). The breast was painful and discolored purple. She treated the bite with NSAIDs and local cold compressions. In time, the ecchymosis disappeared and the inflamed region reduced in size, but after 3 days appeared a hard, painful formation with reduced mobility. A mammography showed a dense structure with multiple nodules. The palpable area has a diffuse posterior border, and there is induration of the surrounding skin and tissues (Fig. 4 on page 12). Breast ultrasound shows a hypoecogenic structure with diffuse edges and posterior attenuation (Fig. 7 on page 14). A cancer is suspected and needle-aspiration biopsy is performed. The histological exam shows an infected hematoma. After two weeks of
unsuccessful antibiotic treatment without satisfactory results, surgical draining of the nodule was performed.

**Fig. 4:** Infected hematoma, mammography and ultrasound images.

**References:** Dr Mihaela Sebeni et al., Department of Radiology, Colteia Clinical Hospital, Bucharest, Romania.

In literature a diverse pathology that can produce inflammatory lesions of the breast is described, including some rare causes which have to be known and taken into consideration for a differential diagnosis. The breast can also be influenced by systemic diseases, so a correct diagnosis is important to help increase the chances of recovery.

**Lupic mastitis** is an uncommon presentation of lupus erythematosus profundus or lupus panniculitis, a rare variant of lupus erythematosus characterized by inflammation of the subcutaneous fatty tissue. It is a rare, benign entity, which can associate painful mammary tumors and cutaneous lesions with an atrophic and ulcerative character, having a chronic, discontinuous evolution. This kind of evolution can lead to calcifications and steatonecrosis, which sometimes can be confused with malignant lesions. Without a biological background for lupus, it may be misdiagnosed as an inflammatory breast cancer, thus leading to a non-efficient treatment without immunosuppressive medication.

**Mondor's disease** of the breast is characterized by thrombophlebitis of the superficial veins of the chest wall. Patients with this disease often have abrupt onset of superficial pain, with possible swelling and redness of a limited area of their anterior chest wall or
breast. There is usually a lump present. Ultrasound findings reveal a tubular, hipoechoic, non-compresible structure of variable caliber, within the thrombotic vein.

**Inflammatory Breast Cancer** (Fig. 3 on page 11, Fig. 10 on page 17) is an aggressive and a relatively rare form of breast cancer (from literature: 1-4%). It symptoms include a warm swollen breast unresponsive to antibiotics and skin that may appear dimpled like an orange (peau d'orange). This fast-growing cancer blocks the lymphatics and causes the characteristic skin changes.

In our study 11 patients with inflammatory signs from mammogram and ultrasounds images were diagnosed after guided biopsy with inflammatory breast cancer.

<table>
<thead>
<tr>
<th>MAMMOGRAPHIC IMAGES</th>
<th>NUMBER OF PATIENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>thickened skin</td>
<td>11</td>
</tr>
<tr>
<td>increased density (asymmetry between breasts)</td>
<td>11</td>
</tr>
<tr>
<td>axillary adenopathies</td>
<td>10</td>
</tr>
<tr>
<td>microcalcifications</td>
<td>4</td>
</tr>
<tr>
<td>tumoral masses</td>
<td>5</td>
</tr>
<tr>
<td>nipple retraction</td>
<td>7</td>
</tr>
</tbody>
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**MAMMOGRAPHIC IMAGES IN IBC**
Fig. 3: Tumoral mass and increased density.
References: Dr Mihaela Sebeni et al., Department of Radiology, Coltea Clinical Hospital, Bucharest, Romania.

Images for this section:

Fig. 1: Breast abscess
**Fig. 2:** Breast with dense, polynodular structure
Fig. 3: Tumoral mass and increased density.
Fig. 4: Infected hematoma, mammography and ultrasound images.

Fig. 5: Herpetic mastitis. Dense inflammatory areolar and periareolar region.
Fig. 6: Breast nodule.
**Fig. 7:** Hypoecogenic structure with diffuse edges.
Fig. 8: Two large transonic images - a galactocele.
Fig. 9: Infected hematoma.
Fig. 10: Diffuse inflammatory carcinoma.
Conclusion

1. 20.75% of the patients had radiological signs of malignancy.

2. Inflammatory breast cancer occurs at an older age with an average of 59 years, while mastitis affects mainly young women with an average of 31 years.

3. Inflammation from inflammatory breast cancer is non-responsive to antibiotic treatment, so after a week it should be performed a biopsy and after the results treatment options include chemotherapy, surgery, and radiotherapy.

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