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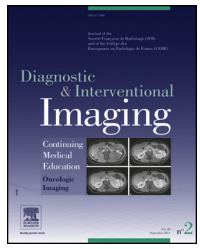

CONTINUING EDUCATION PROGRAM: FOCUS...

Breast lumps in pregnant women

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Abstract Breast lumps detected during pregnancy are generally benign and reflect fibroadenoma, lactating adenoma, cysts, infarction of the breast or galactocele. Although rare, the possibility of breast cancer must also be considered to avoid any delays in diagnosis. After patient questioning and clinical examination, the first imaging modality to use is ultrasound. No further assessment is called for if lesions are categorized as BI-RADS 2 and no suspicious clinical signs are observed. Depending on the clinical setting, lesions classified BI-RADS 3 require monitoring and mammographic assessment (which can be helpful in diagnosing cancer and incurs no risk to the embryo or fetus). If the clinical signs are unclear and/or the lesion(s) are categorized as $\geq$ BI-RADS 4a, then mammography and often biopsy should be performed. Strict BI-RADS scoring (American College of Radiology) should be applied, bearing in mind that benign lesions can appear suspicious during pregnancy, and some cancers can exhibit what seem to be reassuring characteristics.

The breast during pregnancy

Physiological changes to the breast during pregnancy [1—3]

Estrogen and progesterone production by the corpus luteum during the first trimester of pregnancy and by the placenta during the second trimester, lead to lobule and duct proliferation and development, involution of adipose tissue and increased breast vascularization. Mononuclear inflammatory cells also infiltrate the breast tissue. Estrogens stimulate the developing lactiferous duct system, whereas progesterone stimulates lobule development. The proliferative process is most pronounced during the first 20 weeks of pregnancy.

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Lobule growth continues during the 2nd and 3rd trimesters via cellular proliferation as well as increased cell size. Myoepithelial cells become flattened and less prominent whereas epithelial cells are enlarged. During the 2nd trimester, secretory substances accumulate in the epithelial cells of lobule acini, and during the 3rd trimester increased levels of prolactin promote alveolar cell differentiation and initiate lactogenesis.

During the second half of pregnancy, the proliferative process slows and changes to the secretion pathway involved in milk production increase. Lobule size increases and interlobular adipose tissue disappears until lobules are separated only by thin layers of connective tissue.

The changes to the secretion pathway do not occur evenly within the breast during pregnancy. Some authors consider that localized hyperplasic lactating adenoma, that can cause one or more palpable lumps visible using imaging techniques, is an extreme manifestation of the heterogeneity of this process [1].

Some of the histological changes that occur during pregnancy can be visualized such as physiological adenosis, calcifications within milk-secreting acini and dilated ducts. Preexisting lesions may undergo changes due to variations in the hormonal environment; thus fibroadenoma, hamartoma and fibrocystic breast disease may show secretory, cystic and/or necrotic changes.

Clinical changes

Clinical examination reveals a darkening of the nipple and areola, a more prominent nipple and dilated superficial skin veins as from the end of the first trimester. During the final stages of pregnancy, breast adipose tissue nearly completely disappears and is replaced by hard, tight lobes; the skin becomes thinner. A little colostrum may be released by breast massage. Clinical examination can be challenging due to the increased size of the breasts, their sensitivity and especially their harder, more nodular consistency.

A previously palpable lump can be concealed during pregnancy by hypertrophic breast tissue, or may increase in size, hence the importance of examining the patient's breasts at the beginning of pregnancy and then at regular intervals during its course.

Changes in imaging findings

Duct ectasia is frequently observed using ultrasound. The breast is more hypoechoic due to lobular hyperplasia and duct dilation; its echogenicity is more or less homogeneous.

Mammograms of pregnant women generally show a higher tissue density because of the young age of the women but also due to glandular development and adipose tissue atrophy, which decreases the sensitivity of mammography. Even so, mammography remains a very helpful modality for diagnosing breast cancer and should therefore be performed if there is the slightest doubt.

Sometimes benign, round and regularly-shaped secretory microcalcifications may be observed.

Pre-pregnancy assessment is important to monitor changes such as increased size or heterogeneity of existing lesions (particularly fibroadenoma, hamartoma and cysts) during pregnancy.

Breast lumps during pregnancy

Clinical examination

When a patient consults for a palpable lump that she has detected, she should be questioned and thoroughly examined in order to confirm the presence of a mass, describe it and prescribe the appropriate complementary investigations.

Questioning should be aimed at determining the date of appearance of the lump, as well as individual patient history (possible known fibroadenoma) and familial history.

Clinical examination is based on careful breast inspection and palpation and comparison with the contralateral side to:

- confirm the presence of the mass;
- identify its location and size;
- describe its consistency and mobility;
- detect related signs: skin retraction, nipple changes, discharge, lymph nodes, signs of inflammation, pyrexia.

Finding a breast lump in a young pregnant woman whose mind is already set on the upcoming birth is a particularly upsetting and stressful situation. Everybody, including the patient, her family but also the clinician, would prefer to say ''it's nothing'', ''we shall see once the baby's been born''.

However, since the patient brought herself to consult, something is already wrong — the rot has set in — and the problem must be resolved now, during pregnancy.

Why? Because in the great majority of cases (80%) the lump is benign [3] and the patient can be reassured and continue her pregnancy relieved. And when it is cancer, the delay in diagnosis (still very frequent) due to postponing investigations until after delivery, may have serious consequences.

Indeed, the types of cancer that typically occur during pregnancy are very often aggressive and require fast, multidisciplinary management. Breast specialists consider it to be one of the rare ''breast emergencies''. Clinicians should also be aware that efficient treatment of the mother is possible, and can generally be implemented during pregnancy.

Imaging findings during pregnancy [3—10]

The consistency of clinical and imaging findings regarding lump location, size and shape should always be verified.

Ultrasound

Ultrasound is used as the first-line imaging technique. It enables accurate diagnosis of simple cystic lesions and sometimes helps to confirm the clinician's feeling that there is actually no lump but just normal fibroglandular tissue. It allows accurate investigation of solid lesions.

Benign lesions, particularly fibroadenomas and hamartomas, may increase in size during pregnancy, become heterogeneous and undergo infarction. They may therefore look suspicious by imaging techniques so if in doubt samples should be obtained.

Mammography

When 4-view mammography is performed, the mother receives a dose of radiation of about 3 mGy and the dose