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Solid masses: What are the underlying histopathological lesions?



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KEYWORDS

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Abstract The ultrasound signs of breast masses are explained by the histopathological data. Ultrasound masses are classified according to their shape and margin. Round or oval masses are benign when their margins are circumscribed (fibroadenoma, intramammary lymph node); on the other hand, with non-circumscribed margins (microlobulated or irregular), masses that are round or oval may be cancers. Seven histological types of round cancers have been identified: grade III invasive ductal carcinoma, colloid or mucinous carcinoma, medullary carcinoma, intramammary metastases, intracystic papillary carcinoma, lymphoma and high-grade phyllodes tumors. Irregularly shaped ultrasound masses with non-circumscribed margins are predominantly cancers but may in some cases be benign lesions such as sclerosing adenosis, a radial scar, fibroadenoma or phyllodes tumor.

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The ultrasound signs of breast masses are explained by the histopathological data. The shape and the margin of a mass depend on its histological type and its tissue composition. In practice, in ultrasonography there are two major groups of breast masses: round or oval masses and irregularly shaped masses.

Round and oval masses

Fibroadenoma

Fibroadenoma (FA) is by far the most widespread benign breast tumor. A fibroadenoma can be encountered at any age, but most frequently occurs in young women (25–35 years old),

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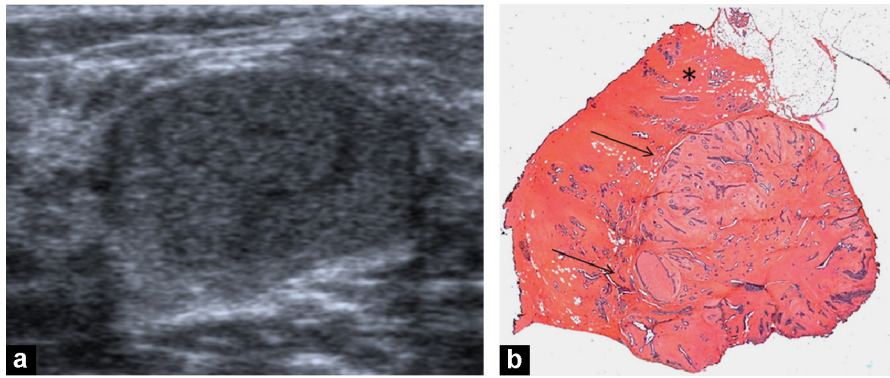


Figure 1. Ultrasound and histological appearance of a typical fibroadenoma: a: ultrasound appearance of a well-defined oval mass, corresponding histologically to a fibroadenoma; b: histological section of a tumorectomy sample ($\times 1.25$ magnification) from a fibroadenoma. A peripheral pseudocapsule can be seen (arrows) due to compression of the adjacent breast parenchyma (asterisk).

with a second perimenopausal peak at about 50 years of age. FA is a hormone-dependent tumor, sensitive to estrogens: its radiohistological appearance thus varies over time.

Macroscopically, a FA appears oval or macrolobulated and typically may measure up to 3 cm. There is a peripheral pseudocapsule in contact with the packed and displaced adjacent mammary parenchyma, so that the surgeon is able to enucleate the lesion easily during surgery (Fig. 1). Microscopically, the FA develops at the expense of the terminal ductal lobular unit and contains a variable proportion of stroma and epithelial tissue (Fig. 2). The stromal component is more or less cellular and may include myxoid and hyaline changes and calcifications. When the FA shows cystic alterations, apocrine metaplasia or sclerosing adenosis, it is known as complex fibroadenoma (Fig. 3). The stromal component increases with the age of the patient and can become calcified; the epithelial component decreases (Fig. 4) [1].

The definition of juvenile FA is not the age at which it appears – only 5 to 10% of FAs in adolescents are juvenile FA – but the histological appearance. Juvenile FA is defined microscopically by the presence of a very richly cellular stroma. Differential diagnosis with a phyllodes tumor can

be difficult, in particular from biopsy samples. The long axis of a juvenile FA can measure up to 6 to 10 cm (Fig. 5) [2,3].

FA is a benign tumor. In rare cases (1/1000), as in normal breast tissue, carcinomas *in situ* can develop within the FA. These are predominantly lobular carcinomas *in situ* but in 15% of cases they are ductal (Fig. 6) [4].

On clinical examination, a FA is a painless, mobile, firm mass. It may become painful when necrotic changes occur, particularly during pregnancy and lactation (partial or complete infarction). FAs may be multiple and bilateral in 20 to 25% of cases.

In ultrasound, the typical appearance of FA is of a slightly macrolobulated (two to three macrolobulations), oval mass, with its long axis parallel to the skin and a well-defined circumscribed margin, an isoechoic or discretely hypoechoic, homogeneous, internal echostructure, sometimes with posterior acoustic enhancement, and the presence of a fine continuous peripheral capsule (corresponding histologically to the adjacent compressed mammary parenchyma). The FA may have internal septa visible with ultrasound (Fig. 7a) [5–7].

FA may also have a less typical ultrasound appearance [8,9]:

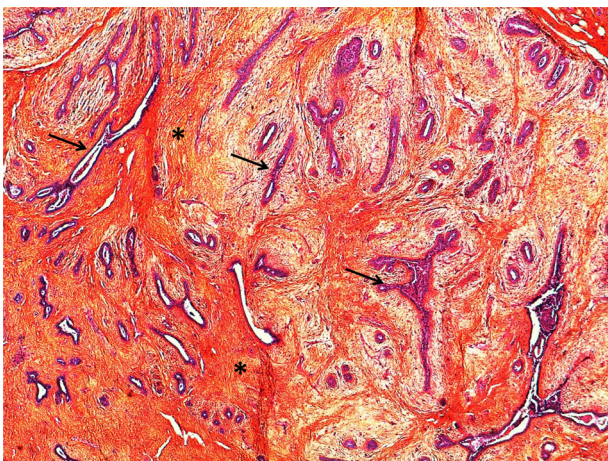


Figure 2. Histological appearance of a fibroadenoma. Histological section ($\times 20$ magnification) of a fibroadenoma showing the uniformly distributed, biphasic, epithelial (arrows) and stromal (asterisk) proliferation.

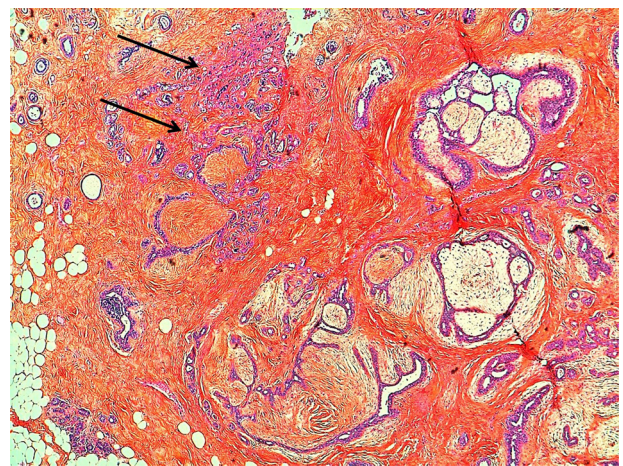


Figure 3. Histological appearance of a complex fibroadenoma. Histological section ($\times 10$ magnification) showing a fibroadenoma with apocrine metaplasia and sclerosing adenosis (arrows).

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