

Atypical ultrasound appearance of benign breast nodules

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Abstract

Circumscribed breast masses present, frequently a typical ultrasound appearance, with no difficulties in establishing the correct diagnosis. Sometimes, these lesions may have a complex appearance and an ultrasound atypical image, which may lead to difficulties in differentiating them from other benign or malignant breast disorders. This is why, in any case of circumscribed mass discovered on ultrasound, all features should be carefully analysed, in order to avoid unnecessary interventional procedures and, on the other hand, to avoid the misdiagnosis with important therapeutical consequences.

The objective of the present paper is to underline the atypical aspect encountered most frequently in benign breast masses, underlining also the most important semeiological features that should differentiate between them and malignant breast lesions.

Key words: breast ultrasound, atypical lesions, differential diagnosis

Rezumat

Leziunile nodulare mamare prezintă, în general, la examinarea ecografică, un aspect caracteristic care nu ridică probleme speciale de diagnostic diferențial. Uneori însă, aceste leziuni pot avea un aspect complex și o imagine ecografică atipică, care pretează la confuzii de diagnostic cu alte leziuni mamare benigne sau maligne. Din acest motiv, se impune o analiză atentă a tuturor caracterelor semiologice ale leziunilor nodulare mamare, cu scopul, pe de o parte de a evita manoperele intervenționale inutile și, pe de altă parte, de a evita greșelile de diagnostic cu întârzierea tratamentului corespunzător.

Articolul de față își propune să treacă în revistă aspectele ecografice atipice întâlnite cel mai frecvent în cazul leziunilor nodulare benigne mamare, cu sublinierea elementelor semiologice de diagnostic diferențial între acestea și leziunile mamare maligne.

Cuvinte cheie: ecografia sânelui, leziuni atipice, diagnostic diferențial

Cysts are some of the most frequent benign breast lesions. They appear at about 50% of the women between 30 and 40 years of age. Even if they are sometimes symptomatic, causing pain or palpable lumps with clinically uncertain features, in most of the cases they are asymptomatic, being discovered accidentally at breast ultrasound [1].

Simple cysts appear as round or oval anechoic masses, well defined by a smooth wall, with acoustic enhancement and bilateral, thin (less than 2 mm) shadowing (fig1) [2-4].

Even if the typical cysts are easy to diagnose, in the current practice most of the breast cysts have an atypical appearances, which may lead to confusions with other benign or malignant lesions.

The acoustic enhancement can be absent in small cysts, in cysts located in extremely dense, hyperechoic breast parenchyma or in those with deep location (anterior to the chest wall) (fig 2) [5].

Old or recurrent cysts may have low-density internal echoes and a thick wall with ill-defined margins (fig 3),

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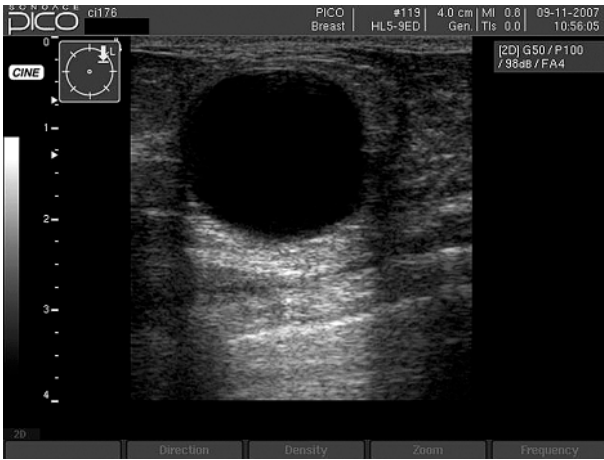


Fig 1. Typical ultrasound appearance of a simple cyst.

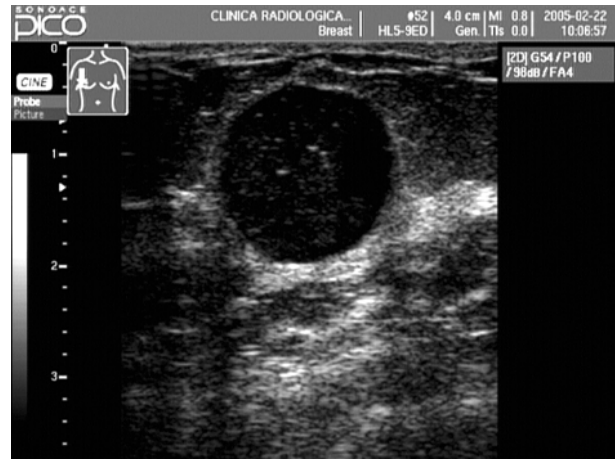


Fig 4. Mucinous carcinoma, with low density internal echoes and with hyperechoic, well defined margins, suggesting an old or recurrent cyst.



Fig 2. Atypical cyst, showing no posterior enhancement because of the deep location.



Fig 5. An invasive ductal carcinoma with extensive necrosis, suggesting a cysts because of the apparent anechoic content, with a few very low density internal echoes, with well defined margins.



Fig 3. Cyst with acute inflammatory signs, showing a thick, circumferential wall-

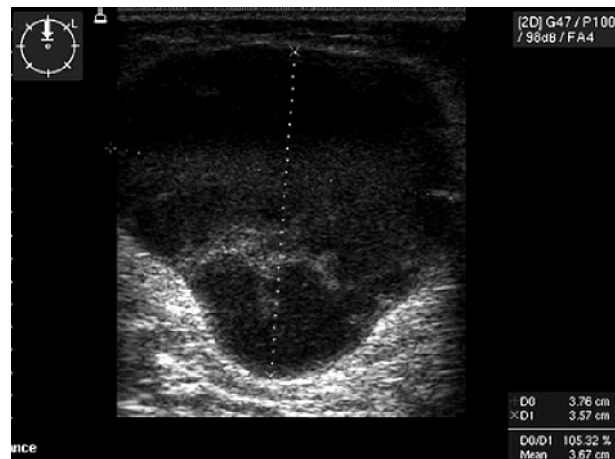


Fig 6. Primary breast lymphoma, presenting like a very hypoechoic mass, with low internal echoes and well defined margins.

which makes them difficult to differentiate from fibroadenomas, particular types of breast carcinoma (mucinous or medullary) (fig.4) or, more rarely, from invasive ductal carcinoma (fig 5) or breast lymphoma (fig 6) [5].

Also, in the case of old cysts, the viscid content may become hyperechoic and lead to various aspects: if it fills completely the cyst, this will appear as a hyperechoic lesion (fig 7), sometimes with a thin anechoic rim (fig 8). Another pattern encountered is this type of cyst is the one with vertical or oblique fluid-fluid level (fig 9). If the content is plaqued on the wall, the suspicion of intracystic proliferation is raised. In this case the shape of the interior contour (concave versus convex) will differentiate the two entities (fig 10) [1].

Inflammatory cysts or cyst with intracystic haemorrhage will have a fluid-debris level, meaning low density,

dependent internal echoes, represented by the white or red blood cells within the cyst. The internal echoes will change position with changes in patient position, similarly to the sludge in the gallbladder. The wall of these cysts will be also uniformly thickened, indicating inflammation. They are fast growing, tender lumps which frequently needs aspiration.

Cystic septations can be thin (most often resulting from conglomeration of lesions, as in Reclus disease) (fig11) or can be thick and irregular (as in papillary carcinoma) (fig12) [6].

Intracystic proliferations represent parenchymal proliferations inside the cystic lesion. They can be small, regular, signifying most often benign lesion (intracystic papilloma) (fig13) or can be large, inhomogeneous, irregular or microlobulated (as in papillary carcinoma)

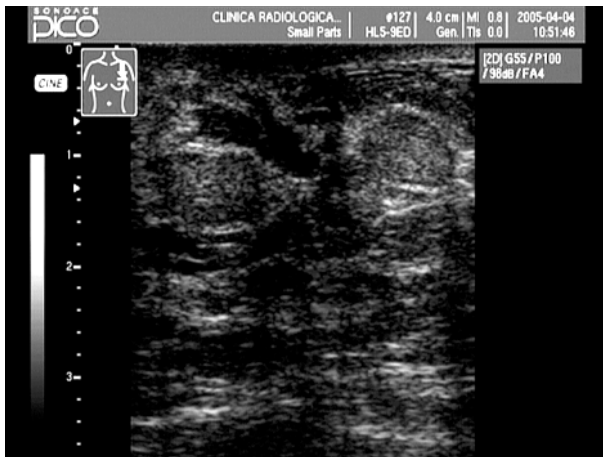


Fig 7. Old cysts which, due to the viscid content, became hyperechoic on ultrasound.



Fig 9. Cyst with oblique fluid-fluid level.



Fig 8. Old cyst, presenting as a hyperechoic well defined lesion with an anechoic circumferential rim.

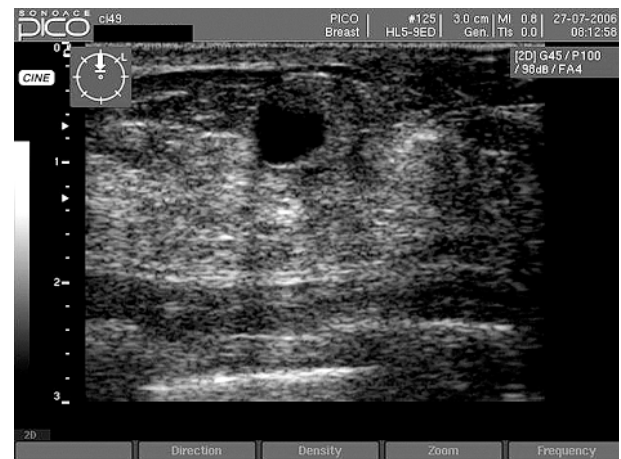


Fig 10. Cyst with viscid content, plaqued on the wall, suspicious of intracystic proliferation but with an internal concave margin, typical for a complex cyst.

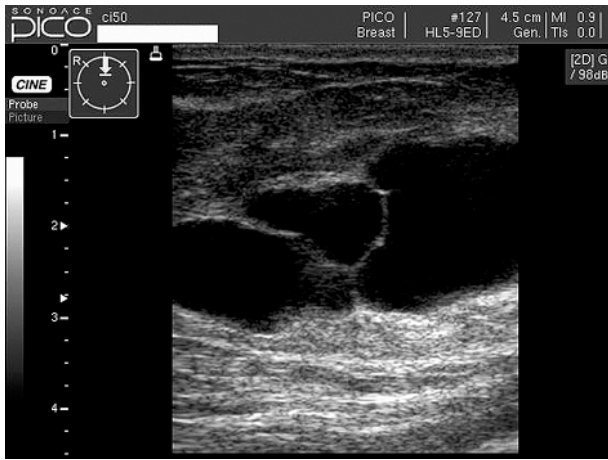


Fig 11. Thin septations resulting from conglomeration of lesions (Reclus disease).



Fig 14. Complex lesion suggesting an intracystic large, inhomogeneous, irregular proliferation, diagnosed as papillary carcinoma.



Fig 12. Papillary invasive carcinoma, with a complex internal structure, predominantly anechoic but with thick and irregular internal septae.



Fig 15. Doppler ultrasound of an intracystic proliferation (intracystic papilloma) demonstrating the central fibrovascular stalk.



Fig 13. Intracystic proliferation, small and regular, proved to be, after excisional biopsy, an intracystic papilloma.



Fig 16. Typical ultrasound appearance of a fibroadenoma.

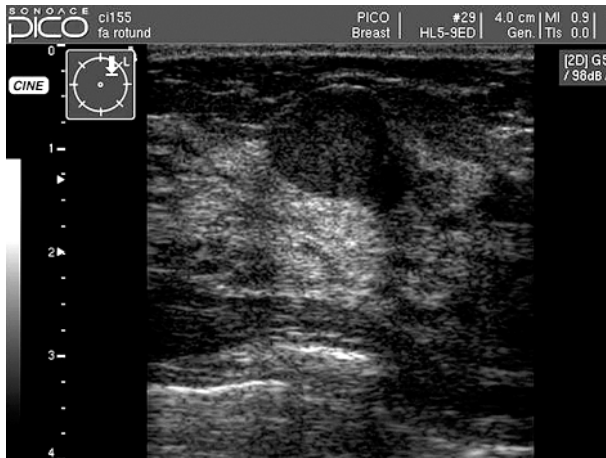


Fig 17. a. Round, well defined, homogeneous solid lesions, proved to be a fibroadenoma.



Fig 17. b. Round, well defined, homogeneous solid lesions, proved to be a malignant fibrous histiocytoma.

(fig 14). In both cases, a central fibro vascular stalk can be visualized on Doppler examination, differentiating them from apocrine metaplasia (fig 15) [1,7].

Other signs of papillary carcinoma are irregular, thick or invaded wall.

In any case in which suspicion of cystic malignancy is raised, aspiration cytology should be avoided because, in most of the cases, the aspirate will not reveal malignant cells and, furthermore, the residual solid component will be difficult or impossible to find for further evaluation with percutaneous or excisional biopsy. In all these situations, excision with consecutive pathological examination is mandatory for a correct differentiation between papilloma and intracystic papillary carcinoma [8].

Breast **fibroadenomas** appear most frequently between 25 and 35 years of age and they represent the most

frequently solid breast nodules. They may be multiple or unique, located uni- or bilateral. They are hormonally dependent and may become larger during pregnancy or lactation [1].

The typical ultrasound pattern of fibroadenoma is as an oval shape or gently lobulated lesion, with medium density and homogeneous echostructure (fig 16) [1, 2, 7].

They are well defined lesions, surrounded by a pseudocapsule of compressed breast tissue, best visible on the anterior and posterior surface of the fibroadenomas, where the ultrasound beam is perpendicular to the nodule.

Atypically, fibroadenomas can be round, such lesions being difficult to distinguish from atypical, complex cysts or, less common, from breast metastasis (fig 17 a,b). Also, they can be lobulated, rising the suspicion of primary breast malignancy.



Fig 18. Old fibroadenoma with sclerotic or hyalinized stroma, showing intense shadowing.



Fig 19. Old fibroadenoma with large calcifications, suspicious for malignancy.

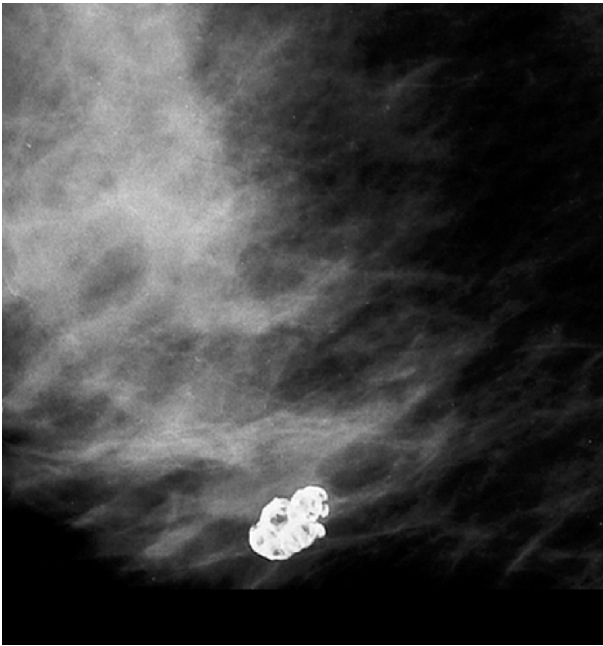


Fig 20. Mammogram of the same patient as in figure 19, showing the typical benign “pop-corn” calcifications developed in the fibroadenoma.



Fig 21. Inhomogeneous structure of the fibroadenomas, with small cysts inside the solid nodule, due to the presence of apocrine metaplasia.

Some fibroadenomas may present as extremely hypoechoic masses, raising the suspicion of malignancy.

Old fibroadenomas may present posterior shadowing either because of degeneration, with sclerotic or hyalinised stroma (fig 18) either from the calcifications that may appear (fig 19) [1]. In this last case, especially if the calcifications are large, masking the lesion, further evaluation with mammography should be performed in order to correctly characterize the calcifications (with a mammographically typical “pop-corn” appearance) (fig 20) [9-10].



Fig 22. Solid lesion, with small cysts inside, leading to an inhomogeneous structure, proved to be a florid adenosis.



Fig 23. Solid, large lesion, in which the small cysts and the fast growing rate suggested the diagnosis of phyllodes tumor.



Fig 24. Phyllodes tumor with large cystic areas (suggestive of malignancy), difficult to differentiate from other breast malignancies.

The inhomogeneous structure of the fibroadenomas, with small cysts inside the solid nodule is due to the presence of apocrine metaplasia (fig 21) [1]. This fibroadenomas are difficult to distinguish from phyllodes tumor or florid adenosis (fig 22).

Phyllodes tumor are rare (less than 1% of all breast tumors), with a peak incidence between ages 45 and 49 years. They can occasionally occur in teenagers and clinically they are characterised by a rapidly growing rate [1]. Phyllodes tumors may either benign or malignant. The histology of phyllodes tumor is similar to that of fibroadenomas but with a more hypercellular stroma.

On ultrasound they appear typically like fibroadenomas, e.g well circumscribed, mildly to moderately hypoechoic, with a thin, echogenic capsule. Neither ultrasound or citological examination are unable to differentiate between these two entities therefore, in the cases where suspicion of phyllodes tumor is raised, surgical excision should be performed in order to have a correct diagnosis [11-14].

Because of the tendency of haemorrhage and cystic necrosis, phyllodes tumour may have an inhomogeneous structure, with small flattened cysts, 3 to 10 mm in diameter [1]. These parietal cysts can be suggestive for the diagnosis (fig 23). If the cystic areas are large, the differential diagnosis with cystic papilloma, abscess or papillary carcinoma can be difficult (fig 24).

Other benign or borderline conditions, as papillomas, oil cysts, radial scar, typical or atypical epithelial hyperplasia, pseudoangiomatous hyperplasia can have indeterminate ultrasound appearance and, in many cases, can mimic malignant lesion. In all these situations special attention as well as further investigations (FNAB or percutaneous biopsy) is needed.

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