Usefulness of ultrasounds in the management of breast phyllodes tumors

G. BERNARDI, G. Cavallaro, M. Indinnimeo, A. Fiore, L. Basso, G. D’Ermo, G. De Tomà, A. Cavallaro

SUMMARY: Usefulness of ultrasounds in the management of breast phyllodes tumors.

Introduction. Breast phyllodes tumors (PT) are uncommon fibroepithelial lesions having potential malignant features. These tumors have characteristic features, like pleomorphism, mitoses and overgrowth of the stroma with possible infiltrative margins. The clinical behaviour could be unpredictable, since the relatively high recurrence rate despite correct surgical strategy. Conventional diagnostic examinations show high sensitivity and specificity, but cannot demonstrate the differences between benign and malignant PT. MRI is not more effective.

Patients and methods. Sixteen patients affected by PT have been surgically treated at our Institution. All patients received mammography and ultrasonography (US) as preoperative diagnostic work-up.

Results. In 13 patients, US was effective in preoperative diagnosis of PT. Mammography was uneffective in detecting breast lesions in 5 cases, while in 11 cases mammographic findings presented benign features, with a round opacity with moderate tissue density and well-defined wall.

Conclusion. US remains the most useful diagnostic test in detecting PT. However, there is no test effective in identifying malignant PT. In case of suspicion, fine needle biopsy should be performed.

KEY WORDS: Phyllodes tumors - Breast - Ultrasounds.

Iscrizione negli tumori filloidi della mammella.

G. BERNARDI, G. Cavallaro, M. Indinnimeo, A. Fiore, L. Basso, G. D’Ermo, G. De Tomà, A. Cavallaro

Introduzione. I tumori filloidi della mammella sono rare neoplasie fibroepiteliali con potenziale malignità. Questi tumori hanno caratteristiche tipiche, come pleomorfismo, mitosi e crescita abnorme dello stroma, con possibile infiltrazione dei margini. Il comportamento clinico può essere imprevedibile, a causa dell’alto rischio di recidive locale anche dopo una resezione chirurgica adeguata. Gli esami diagnostici convenzionali hanno elevata sensibilità e specificità, ma non riescono a distinguerne la malignità. La risonanza magnetica non sembra fornire informazioni aggiuntive.

Pazienti e metodi. Sedici pazienti affetti da tumore filloide sono stati trattati chirurgicamente presso il nostro Dipartimento. Tutti i pazienti hanno subito mammografia ed ecografia mammaria prima dell’intervento chirurgico.

Risultati. In 13 pazienti l’ecografia è stata efficace nell’identificare preoperatoriamente il tumore filloide. La mammografia non ha rilevato la lesione in 5 casi, mentre nei restanti 11 casi ha evidenziato caratteristiche di benignità della lesione, con opacità rondeggiante e margini ben definiti.


RIASSUNTO: L’ecografia nei tumori filloidi della mammella.

G. BERNARDI, G. Cavallaro, M. Indinnimeo, A. Fiore, L. Basso, G. D’Ermo, G. De Tomà, A. Cavallaro

Introduzione. I tumori filloidi della mammella sono rare neoplasie fibroepiteliali con potenziale malignità. Questi tumori hanno caratteristiche tipiche, come pleomorfismo, mitosi e crescita abnorme dello stroma, con possibile infiltrazione dei margini. Il comportamento clinico può essere imprevedibile, a causa dell’alto rischio di recidive locale anche dopo una resezione chirurgica adeguata. Gli esami diagnostici convenzionali hanno elevata sensibilità e specificità, ma non riescono a distinguerne la malignità. La risonanza magnetica non sembra fornire informazioni aggiuntive.

Pazienti e metodi. Sedici pazienti affetti da tumore filloide sono stati trattati chirurgicamente presso il nostro Dipartimento. Tutti i pazienti hanno subito mammografia ed ecografia mammaria prima dell’intervento chirurgico.

Risultati. In 13 pazienti l’ecografia è stata efficace nell’identificare preoperatoriamente il tumore filloide. La mammografia non ha rilevato la lesione in 5 casi, mentre nei restanti 11 casi ha evidenziato caratteristiche di benignità della lesione, con opacità rondeggiante e margini ben definiti.


KEY WORDS: Phyllodes tumors - Breast - Ultrasounds.

Tumori filloidi - Mammella - Ecografia.

Introduction

Breast phyllodes tumors (PT) are uncommon fibroepithelial lesions, accounting for 0.3 to 1.0% of all primary breast tumors (1) and having potential malignant features in approximately 25% of cases (2). These tumors are structurally similar to fibroadenomas, but have characteristic features, like pleomorphism, mitoses and overgrowth of the stroma with possible infiltrative margins, thus making the distinction from fibroadenomas straightforward (3).

PTs have been first described by Müller in 1838 (4), and named cystosarcoma phyllodes, and since the first description, they have been named in more than 60 synonymous (5). Currently, the term of cystosarcoma phyllodes should be reserved to tumors having histological
sarcomatous features. It has been demonstrated that the stroma of PT is mainly monoclonal, while the epithelium is polyclonal, and the interactions between stroma and epithelium could be essential in the mechanisms of tumor development (6).

The clinical behaviour of these tumors could be unpredictable, due to relatively high recurrence rates, despite of correct surgical resection (7). Local recurrences develop in 8 to 40% of patients in various reports, while distant metastases occur in 0-21% of patients, thus depending on the number of cases and of aggressive lesions (7).

Conventional diagnostic examinations i.e. Mammography (MM) and Ultrasonography (US), show high sensibility and specificity rates (8), but cannot discriminate between benign and malignant PT. Magnetic Resonance Imaging (MRI) is not more effective (9), and, due to few data and the high costs, it is not used routinely.

Patients and methods

From 1996 to 2006, 16 female patients (age 27-54, median 43) affected by breast phyllodes tumor have been surgically treated in our Departments.

All patients received preoperative MM and US; breast MRI was performed in 3 cases. In four cases, ultrasound-guided Fine Needle Aspiration (FNA) was performed by 19-21 Gauge needle.

Site, form and size, outlining, tissue density and possible presence of microcalcifications were assessed by MM.

US scan was performed using a real-time multifrequency linear probe (7.5-10 Mhz) and a convex probe for larger tumors (2.5-3.5 Mhz) (Hitachi H19, Esaote, Genoa, Italy) evaluating possible intralesional features, such as echogenicity, posterior enhancement or acoustic attenuation of the echoes, and assessing the intralesional blood supply by means of color-Doppler device.

Results

The lesions were found in the right and in the left breasts in nine and seven patients, respectively. In 83.3% of cases the patients presented a palpable breast lump.

In all cases the lesion was reported to have rapidly increased in size, with local pain and, in three cases, local reddening of the skin.

US demonstrated in all cases the presence of a breast lesion. In 13 patients, US was effective in preoperative diagnosis of phyllodes tumor, showing the presence of a solid, round shaped mass with regular smooth margins, posterior acoustic enhancement, remarkable size (from 4 to 15 cm), and absence of microcalcifications (Fig. 1). In one case (Fig. 2), US detected the presence of a grossly malignant neoplasm, having large size, irregular shape and margins, with hypo- and hyperechoic areas. In the remaining two cases, US was unable to distinguish PT from fibroadenomas. Color-Doppler assessment always showed intra- and peritumoral hypervascularization (Fig. 3).

MM was uneffective in detecting breast lesions in 5 cases, while in 11 cases MM findings presented a round opacity with moderate tissue density and well defined margins (Fig. 4).

Due to the uncertainty of preoperative diagnosis, MRI was performed in three cases, showing low signal intensity on T1- and T2-weighted images, and increased signal (T2-weighted images) in the tissue surrounding the tumor in two of these three cases. Preoperative cytology was performed in four patients having lesions > 4 cm, always showing the presence of a proliferative process (Not Otherwise Specified, NOS), thus recommending for excisional biopsy.

All patients underwent surgery, and in all but one case conservative surgery was performed.

Histology showed the presence of phyllodes cysto-
sarcoma in three cases, low-malignancy grade phyllo-
des tumor in five, and benign phyllodes tumor in eight
cases. Of the four patients who presented local recurrence,
two had a pathological diagnosis of phyllodes tumor with
low malignancy degree, and two of malignant phyllodes
tumor.

During follow-up, four patients showed local recur-
rence, with need for further surgical excision. In three
of these cases the tumor was treated and controlled by
local excision; while one patient underwent four surgi-
cal excisions, being her initial histological diagnosis of
phyllodes tumor with high rate of interstitial atypia. This
patient finally received radical mastectomy, and defini-
tive histologic diagnosis showed liposarcomatous de-
germination.

Discussion

PT is currently defined as a peculiar variant of fi-
broadenoma with the potential to grow to a very large
size, to relapse after surgical excision, and to present ma-
linant features (1, 8, 9). According to World Health Or-
ganization classification (1), there are three types of PTs,
depending on the histopathological features: benign, ma-
linant and borderline.

The etiology of PTs is still unknown, while it
mainly affects Asian women in the age group of 35-55
years (6, 9). Several Authors believe that pathological
features of PTs are fundamental to optimize their ma-
agement (10-11), while others emphasize that there is no
relationship between biologic behaviour and histologic
finding (6, 7), and that all PTs should be treated as po-
tentially malignant lesions. The only factor that could
be considered predictive for local recurrence is the sta-
tus of the margins of the resected specimen (6), while tu-
mor size, advocated by some as potential predictor of ma-
linancy and/or local recurrence, has been found not to
be an important prognostic factor and, in some series,
absolutely benign tumors > 12-15 cm have been re-
ported (12, 13). Another sign which may rise the suspicion
of malignancy is the rate of tumor growth. Although tu-
mor size is not related to its recurrence, it may influen-
ce the management, and possibly suggest the choice of
mastectomy, in case of a large tumor-to-breast ratio. In
the other instances of PTs, conservative surgery, with ade-
quate resection margins, remains the treatment of choi-
ce.

The diagnostic work-up includes MM and US, whi-
le the employment of MRI is still limited mainly due to
its costs. Furthermore, recent studies have not shown a
clear superiority of MRI over US in the diagnosis of PT
(8). While MM usually cannot show the differences
between fibroadenomas and PT, often revealing the pre-
sence of a well-defined mass with no specific features (14),
US is more effective, as PT appears as a round shaped
lump, with smooth or lobulated margins, and hetero-
genous hypoechoic texture, presence of fluid-filled spa-
ces (cystic foci), and the absence of microcalcifications
and sometimes posterior acoustic enhancement (15).
Some of these features can also be found in fibroadenomas
(16-18), that usually appear as hypoechoic and relatively
homogenous ovoid tumors with smooth and rarely lo-
bulated margins.

Currently three characteristics can be useful in the dia-
agnosis of malignancy for PT:
a) size of the lesion: usually malignant PT are lar-
ger than benign ones (5-15), even if several stu-
dies report benign PT larger than 5-7 cm in di-
ameter;
b) vascularization: malignant lesions exhibit neoan-
giogenesis (19, 20), which can be evaluated by the
use of color “and pulse” Doppler (15, 17),
showing perilesional or intralesional hyperva-
sularization. However, some recent studies (21-23)
have shown no significant differences between
benign and malignant PT in terms of vascularization and number of intratumoral vessels;
c) the ‘retrotumor acoustic phenomenon’: posterior enhancement is considered to be an indeterminate sonographic feature, whereas posterior shadowing is considered to indicate a malignant tumor (24, 25). Several studies have shown US posterior enhancement in 50-75% of phyllodes tumors, whereas posterior shadowing was found in 0-7% (15, 26); however, other reports indicate that the retrotumor acoustic phenomenon is not characteristic of PT, so it is not helpful in distinguishing benign from malignant PT (17).

In our experience US proved very useful in the diagnostic work-up of PT, as it did identify phyllodes tumors in about 90% of cases, thus giving indications for surgery. The problems we encountered were mainly due to the uncertainty of preoperative identification of malignancy, and this issue was encountered by other Authors who have previously dealt with this condition. Currently, preoperative cytohlogy and/or histology are effective in showing the presence of PT, but there is no test that can distinguish benign from malignant lesions. In relation to cytology, this is, probably, to be referred to the non homogenous features of this tumor that do not allow adequate cytologic sampling (3, 11). Stromal proliferation and nuclear polymorphia with increased mitotic activity, typical of malignant phyllodes tumor, are not always demonstrable on cytologic smears. However, the current indication for FNA in case of PT is the high suspicion of malignancy detectable by US, as it has been suggested by previous researches (15, 17).

Conclusion
At present, US is the most useful imaging test to diagnose PT, with an actual effectiveness of about 95-100% (100% sensitivity and 87.5% specificity), as it has been demonstrated by the present research and, also, by previous papers. However, there is no test available yet to distinguish benign and malignant PT, and to recommend FNA in case of suspected malignancy.

Conflict of interest statement
The Authors state that this is an original study and there is no conflict of interest concerning this paper.

References
Usefulness of ultrasounds in the management of breast phyllodes tumors


