

THORACIC SURGERY

Editors
M. MONTORSI
P. GRANELLI

II

MONDUZZI EDITORE

1988 SURGICAL UPDATING

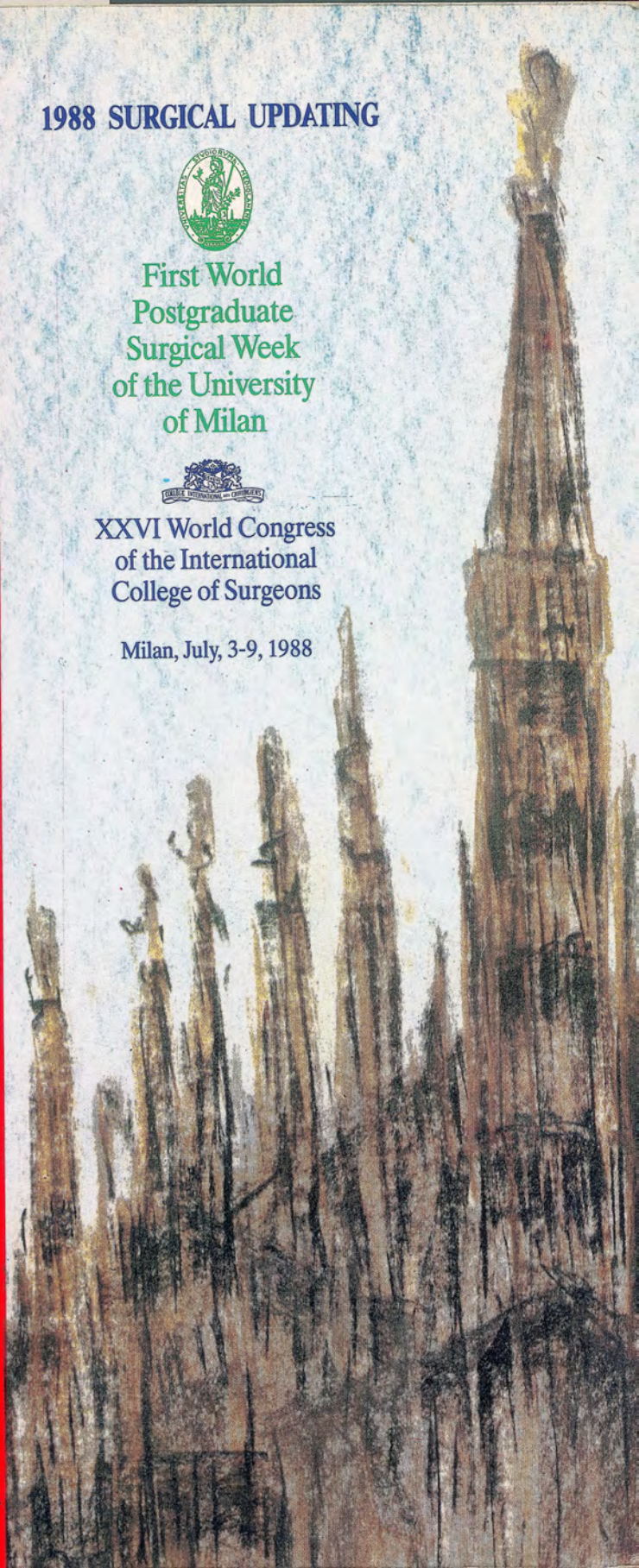


First World
Postgraduate
Surgical Week
of the University
of Milan



XXVI World Congress
of the International
College of Surgeons

Milan, July, 3-9, 1988



SURGICAL ECHOGRAPHY AS DIAGNOSTIC AND STAGING TOOL IN BREAST PATHOLOGY

E. Durante, L. Cavazzini*, M. Pampolini, G.B. Dalla Valle,
G. Cavallesco

Institute of Surgical Pathology

**Institute of Pathology*

University of Ferrara (I)

SUMMARY

Echography has become increasingly important and an irreplaceable tool in detection and management of breast lesions. The main reason is that it represents the only way to obtain a structural and tomographic representation of fibroglandular breast and its non invasiveness is ideal for short-term follow-up. This paper describes the experience of authors with a real-time unit sector scanner in a series of 6804 patients. Special emphasis has been placed on the indications for breast echography and on the technique of examination in supine position that is very useful for ultrasonically guided biopsy and staging of lesions. Results demonstrate a sensitivity of 96.5% with a specificity of 97.9%.

INTRODUCTION

The early diagnosis of breast lesions is still a major medical problem in that there is a lack of suitability in clinical examination and - in the same time - morbidity and mortality of cancer is by far the most important problem that concern the breast today

The breast echography, since the first use of A-Scan by Wild and Neal in 1951, has become increasingly widespread and nowadays it represents a well known diagnostic procedure, even if it is still discussed its ancillary or autonomous role. This questionable point of view is caused by the fact that breast echography is one of the most demanding applicative fields, requiring beside a deep

knowledge of normal anatomy and its surgical pathology, even an excellent knowledge of its physiology. The echography, in fact, is not a mere picture but, showing an interaction between sound beam and tissues components, is a technique depicting a sub-macroscopic anatomy.

The development of dedicated water-path whole breast automated scanners and of real-time units with dedicated transducers has yielded the possibility of examining the whole breast, widening the diagnostic performance. The digitalized image and computer analysis of many parameters let a better evaluation of morphological-structural characteristics and their volumetric relationships, allowing, besides a diagnosis, a correct staging. This permits a suitable surgical procedure even in benign pathology than in cancer. An accurate comparison between echographic and surgical-pathologic specimen has permitted an improvement and a widening in differential diagnostic criteria, particularly for proliferative lesions.

MATERIALS AND METHODS

From many years we perform breast echography with real-time equipment and at present we use a last generation instrument Kretz Technik Combison 320-5 with Doppler system. We routinely perform the examination by a sector mechanical scanner with 3 rotating 5 MHz transducers and we use a 7.5 MHz single transducer for texture analysis of selected areas. Both transducers have a stand-off Proxon^R device that allows better contact with skin determining a constant, slight compression. This, joint to breast flattening in supine position, let obtain an almost optimum 90 degrees beam-tissues interface. To the 7.5 MHz transducer is attachable a special built device for ultrasonically guided biopsy with an angle of 30 and 45 degrees. Moreover to the 7.5 MHz transducer is attachable a 9 MHz continuous wave Doppler transducer. Computer analysis and multiple display image allows to obtain a three-dimensional lesion study, so making easier the eye-perception, and improving the evaluation of any minimal change with its staging.

The breasts are scanned with open arm and hand under patient's head. When the breast are very large the body is slightly obliqued. Survey scans are done throughout both whole breasts.

Our experience is based on 6804 patients studied in the Institute of Surgical Pathology in cooperation with Institute of Pathology of University of Ferrara. Every six month each echographic diagnosis has been verified in order to establish the accuracy rate of echography and its relative clinical benefit. Of patients studied 1022 have an histological or cytological verification and 292 have been found malignant.

An accurate comparison between the echographic picture and all surgical specimens has been performed in order to detect any correlation between echography and tissues. This has been even closer to truth by using F.N.A.B., that avoiding surgical excisional biopsy in cancer, let us to obtain a specimen without morphological and topographical alterations.

The main indications for echography have been patients presenting predominant fibroglandular breast (Tab. I).

Tab. I
INDICATIONS FOR BREAST ECHOGRAPHY

- Screening tool for women with predominant or solely fibroglandular breast "dense breast";
- Symptomatic patients;
- Pregnant women;
- Women at high risk for personal or family history of cancer;
- Women with proliferative mastopathy;
- Women with prosthesis;
- Women treated by conservative surgery;
- Women with phlogosis;
- Women in whom there is indication for space out radiologic controls or are afraid to undergo mammography;
- Localization three-dimensional of non-palpable lesions;
- Male patients.

RESULTS

Established and new criteria have been utilized for differentiating benign from malignant lesions and benign between their selves. If a lesion has any of the criteria of malignancy it is considered possibly malignant and referred for biopsy. This increases the rate of accuracy. Misinterpretation can be avoided by careful examination of each image, but not always. In fact, in our experience we have found that there are a lot of different echographic pattern both for carcinoma and for proliferative benign lesions, so one must be aware of this and especially trained. The use of echography in combination with cytopathology provides a further increase of diagnostic accuracy.

Data are available on 1022 patients, at this moment. Tumours

Tab. II
ECHOGRAPHIC DETECTION OF BREAST CARCINOMAS

Sensitivity	$\frac{282}{292}$	= 96.57%
Specificity	$\frac{6376}{6512}$	= 97.91%
False positive ratio	$\frac{136}{6512}$	= 2.08%
False negative ratio (within 14 months)	$\frac{10}{292}$	= 3.42%
Accuracy of positive prediction	$\frac{282}{418}$	= 67.46%
Accuracy of negative prediction	$\frac{6376}{6386}$	= 98.84%

were present in 28.5% of the verified group with a sensitivity of 96.5% and a specificity of 97.9% (Tab.II).

The false positive rate has been of 2.08% while the false negative rate has been 3.4% within 14 months. The accuracy of positive prediction has been 67.4% whereas the accuracy of negative prediction has been 99.8%. Without taking into consideration 114 cases classified as suspect and all cases verified only cytologically, the diagnostic accuracy has been of 96.5% in benign lesions and of 92% in malignant lesions. The most frequent cau-

Tab. III
STAGE OF BREAST CARCINOMAS
ECHOGRAPHICALLY DIAGNOSED

Stage	N° of cases
T _{is}	14
T ₀	43
T ₁	173 → 66 < 10mm → 107 > 10mm
T ₂	50
	<u>280</u>

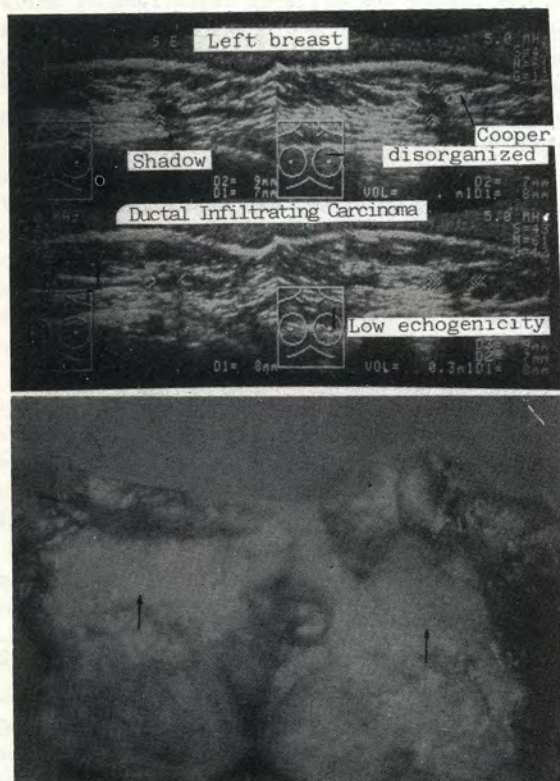


FIG. 1

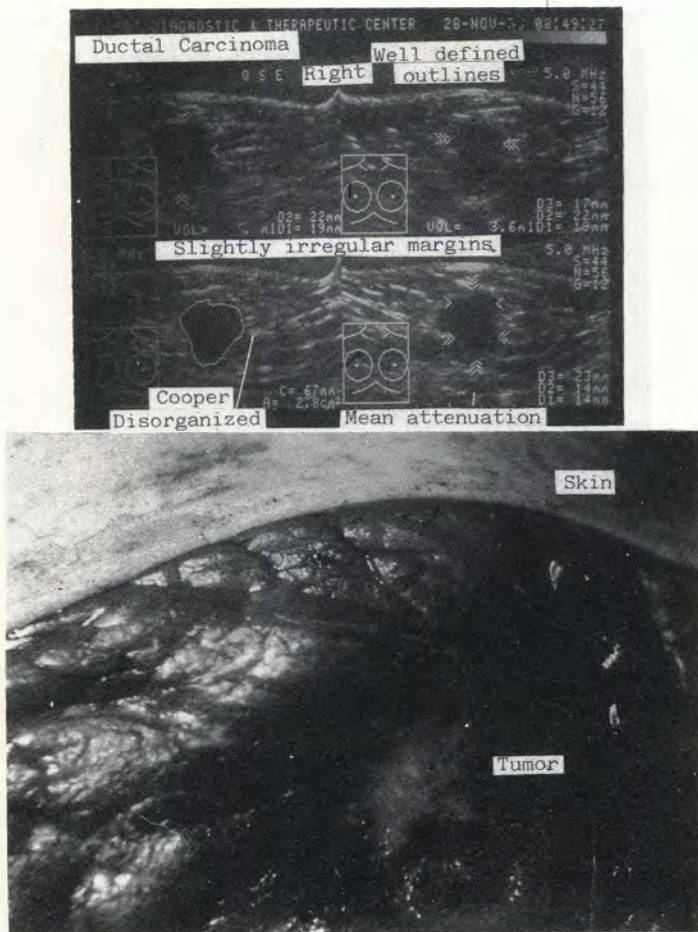


FIG. 2

se of false positive diagnosis of carcinoma has been the fibroadenoma, 6 cases, and 2 cases of calcified fibroadenoma. The discrimination between small malignant and non malignant lesions may cause diagnostic problems in many of others listed pathologies as in case of fat necrosis and proliferative lesions.

There have been 10 cases misdiagnosed as having benign lesions. Of these, 2 cases has been diagnosed as having a fibroadenoma and 8 cases as having a fibrocystic disease. The correct diagnosis has been made at moment of echography in 2 cases by ultrasonically guided biopsy and in the remaining .8 cases the diagnosis has been made respectively within 8 months in 4 cases, 6 months in 1 case, 7 months in 1 case, 14 months in 1 case and 2 months in 1 case. The stage of the tumor at moment of diagnosis, made echographically, has been always T₁.

Of 114 cases classified as suspect the most frequent lesion encountered has been the fibroadenoma and calcified fibroadenoma in 15+5 cases.

In 2 cases has been discovered a carcinoma. Anyway 61 cases (53%) were proliferative lesions so it was closely indicated an excisional biopsy, because cytology was unable in

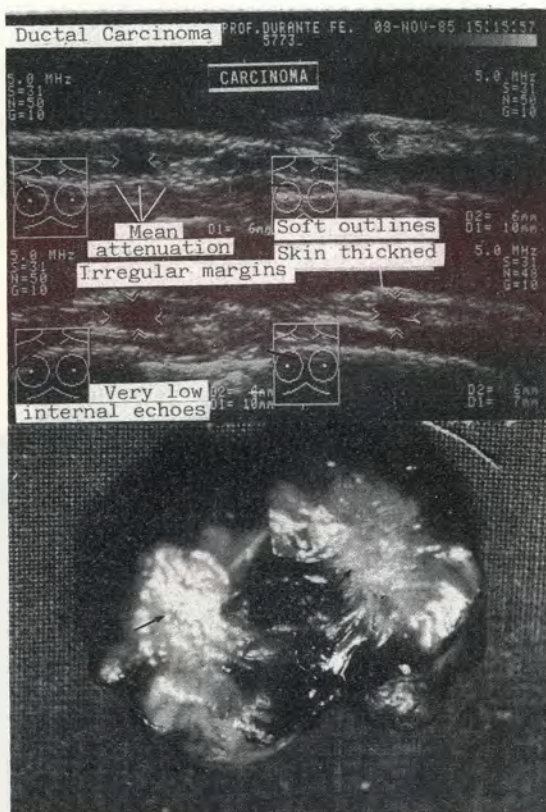


FIG. 3

offering the needed security. In the same way, as in atypical epitheliosis, the histological examination by itself may have troubles in showing a confident diagnosis. It is beyond doubt that both fibrocystic disease and nodular fibrosis are diagnostic mistakes but it is only in overstaging that we can identify in situ carcinomas.

Using all achievable parameters by three-dimensions real-time imaging we staged all diagnosed tumors (Tab.III) that had a closed anatomical agreement (Fig.1-2-3-4). This allowed to plan in advance a suitable surgical operation.

CONCLUSIONS

Even after many years of experience, technical improvements and the introduction of dedicated automated and real-time scanners opinions about the role of breast echography diverge and the accuracy rate reported in the diagnosis of carcinoma vary significantly. We think that the proper use of a well fitted unit in the referred cases showed as clinical indications, associated with a required clinical knowledges, may bring useful results, even improved to those still obtained.

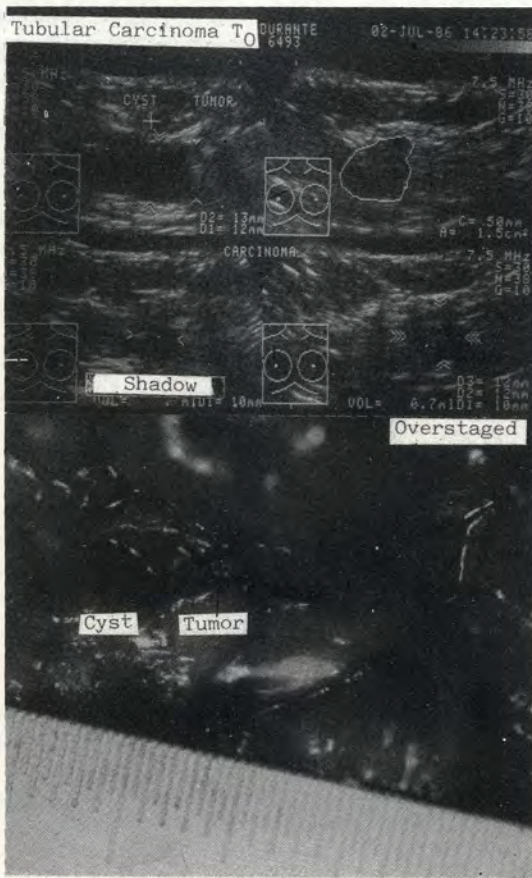


FIG. 4

The advantages of echography can be summarized as follows:

- since echography is noninvasive it is ideal for short-term follow-up;
- its high sensitivity in the study of dense breast makes echography an important and irreplaceable tool in detection and staging of lesions.

One of disadvantages of this diagnostic method is that it is a time-consuming and expensive procedure because of the narrow field of vision. One important limitation associated with echography is its inability to discover microcalcifications but now this limit has been overcome by using high frequency transducers that can detect microcalcifications of 0.2mm.

An other important limitation is that echography is strictly physician-dependent, and requires a great deal of knowledges and technical-clinical experience, being necessary an immediate and persistent interpretative evaluation.

It is beyond doubt that nowadays echographic criteria do not offer enough confidence in displaying all breast cancer since minimal breast cancer actually does not modify in a significant way the architectural and structural characteristics of the breast. By

this, in any proliferative disruption we have increasingly used needle aspiration biopsies under ultrasonic guidance. The addition of this technique has allowed us to make definitive diagnosis in the majority of patients.

A further reason of interest for echography is that echomammography more than just a method to diagnose carcinoma, has a major role in the definition of breast morphology which is most useful as a method of reassurance for those large number of relatively young women who present with painful, often nodular, dense breasts. We have used echography in these patients for remove anxiety.

On the basis of obtained results we reccomend the use of echography as diagnostic and staging tool in fibroglandular breasts, examining the patient in the supine position, which is the best-suited for performing aspiration procedures with real-time scanner.

REFERENCES

Durante E., Cavazzini L., Pampolini M.: Echographic characteristics of breast proliferative lesions and diagnostic possibilities Abstracts Sixth Congress of the European Federation of Societes for Ultrasound in Medicine and Biology, Helsinki, 1987, p.10.

Jellins J., Kobayashi T.: Ultrasonic examination of the breast. John Wiley & Sons, New York, 1983.

Jellins J., Kossoff G., Croll J.: Proceeding of the Fourth International Congress on the Ultrasonic Examination of the Breast. Witton Press, Sydney, 1985.

Kobayashi T., Hayashi M., Arai M.: Echographic characteristics and ultrasonic tissue characterization in breast tumor. J UOEH 7(4):419, 1985.