THE ROLE OF ECHOGRAPHY IN THE EVALUATION OF GYNECOLOGICAL NEOPLASIA

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SUMMARY

Physiological and pathological echograms of the female genital tract are examined. Following a rapid review of the literature, the role of echography in gynecology is evaluated on their decennial experience.

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INTRODUCTION

The ultrasonic method has been used in gynecology for about twenty years ([1, 2, 3, 4, 5]), and it is based on the recording of the echoes of the waves emitted and the modifications that occur when these pass through structures of varying density.

MATERIAL AND METHODS

The bidimensional technique (B scan) offers a full thickness image of the tissues examined, and the images thus obtained provide information regarding the phisiological and pathological structures of the pelvis ([6]).

PERSONAL OBSERVATIONS

The uterus is always visualized when the bladder is full, and it generally appears as a tipically inverted pear formation. The profile, due to the reflection of the ultrasound on its surface, is sharp. Internal echoes are absent because the myometrium and the endometrium have a similar acoustic impedance. The uterine cavity is pratically virtual and is visualized only post-partum. At the side of the uterus, the adnexa are usually visible as small echo-refracting masses. The neck and fundus of the uterus are clearly seen and thus its transverse, antero-posterior and longitudinal diameters may be measured. In addition, anterior or in retroflexion situation, may be detected, as well as hypoplasic or globular (as seem in multipara) development ([7, 8, 9, 10, 11, 12]) (fig. 1).

The study of the bladder is not specifically gynecological, however, pelvic pain, mistakely attribuited to genital causes, often depends on it.

The anterior and posterior bladder wall may be observed, as well as eventual alterations in outline due to the presence of calculi, polyps or neoplasia and emptying anomalies. It is difficult to visualize the rectum because the presence of air in the cavity impedes the transmission of the ultrasounds.

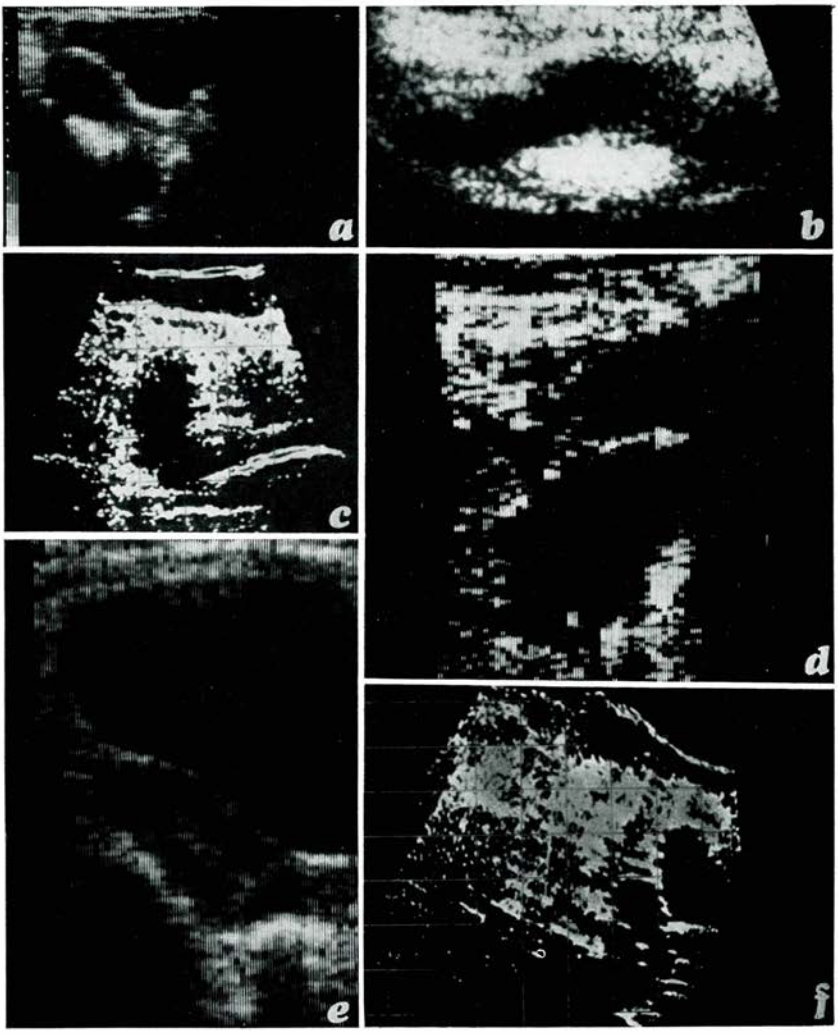

Fig. 1. — *a*) Normal uterus, longitudinal scansion; *b*) Normal uterus and ovaries, transverse scansion; *c*) Anteflexed uterus, longitudinal scansion; *d*) Retroflexed uterus, longitudinal scansion; *e*) Puerperal uterus, longitudinal scansion; *f*) Hypoplasic uterus longitudinal scansion.

When the rectum is occupied by solid material, it is possible to see the echo-reflecting surface of the sacrum and carry out a pelvimetry ([7, 10, 13]) (fig. 2).

The ultrasonic features of an uncomplicated myoma are completely typical ([14, 15, 16]) (fig. 3). Frequencies varying from 1 to 5 MHz are helpful in the diagnosis of the nature of the tumor. With a frequency of 1 MHz alone, the entire posterior wall is clearly outlined. The myoma walls in this image are thick, regular and dense. A frequency of 2 MHz reveals the lateral walls and some echoes of the posterior wall of the tumor, while 4 MHz are completely absorbed by the anterior

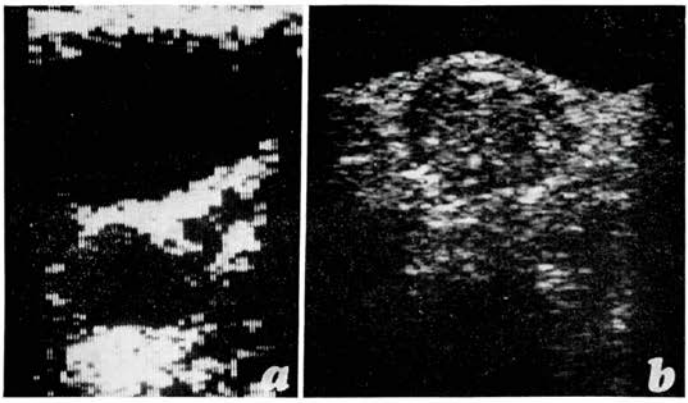

Fig. 2. — *a*) Image of bladder and rectum in patient with total hysterectomy, according to Meigs, transverse scansion; *b*) Myoma, transverse scansion.

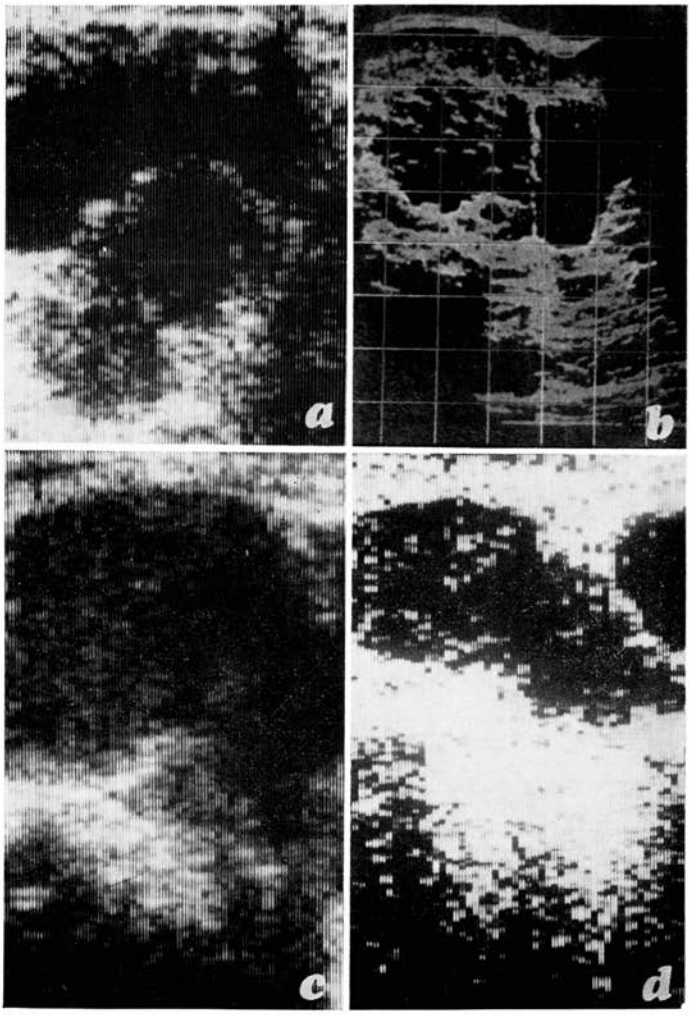

Fig. 3. — Myoma; *a*) transverse scansion; *b*) *c*) *d*) longitudinal scansion.

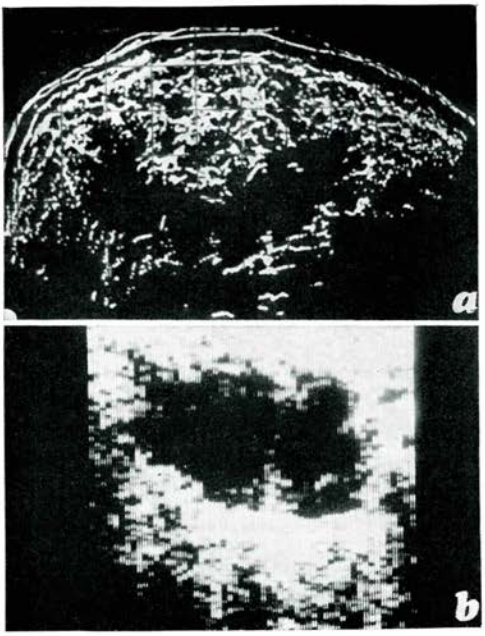

Fig. 4. — *a*) Bifed uterus, transverse scansion; *b*) septate uterus, transverse scansion.

wall. By maintaining the frequency constant and varying the sound intensity, the myoma image modifies since the tissue permeability is directly proportional to the intensity.

Measurements of fibromas are possible with an Ascan or an electronic marker. Uterine fibromas in degeneration lose their characteristic property of being inaccessible to high frequency bands; in fact necrobiosis and edematous infiltration remarkably increases the tumor's permeability so that the posterior wall is clearly drown at a frequency of 2 MHz, and expecially at 4 MHz.

In addition, the numerous reflecting surfaces of the tumor cause the formation of multiple echoes which together evoke an image of a hydatiform mole ([17]).

These echoes are absent in the non-degenerated tumors where the fibrous structure gives a homogeneous echo-refraction (fig. 4).

Furthermore, with this method it is possible to diagnose septate, arcuate and bifid uterus (fig. 5), as well as the presence of irregular cavity echoes in Asher-mann's syndrome, the absence of the uterus in Rokitansky's syndrome, expansive processes of the neck and finally, the site of intrauterine contraceptives ([1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 18]) (fig. 6).

The typical echogram of an ovarian cyst (fig. 7) shows the tumor capsule well delimited by a thin, smooth, well drawn line. The anterior wall of the cyst may be confused with the echoes of the abdominal wall, and the homogeneous liquid

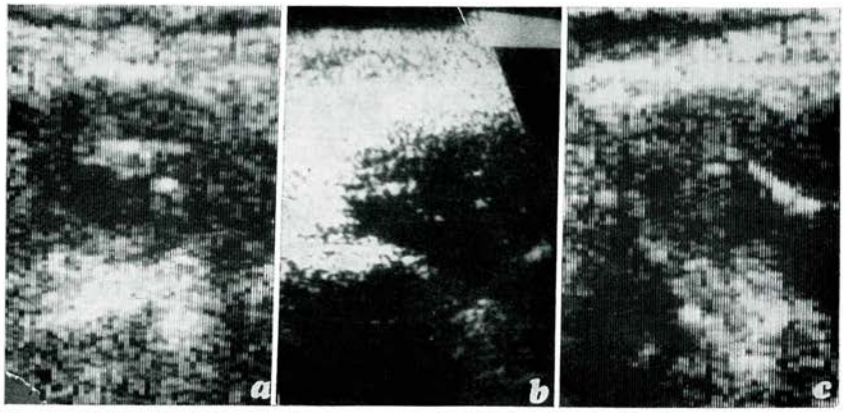

Fig. 5. — *a*) *b*) and *c*) Intrauterine contraceptive in site, longitudinal scansion.

contents constitues a non-echo reflecting medium. The use of high intensities does not change the image. The intracystic liquid absorbs the ultrasonic band slightly, and this permits the passage of high frequency waves; thus, the posterior wall of the cyst and its outlines are clearly seen no matter which frequency is employed. Multilocular cysts may be diagnosed when thin, sharp sepimentations are visualized within the liquid formation [2, 3, 4, 5, 6, 7, 10, 13, 14, 16, 17, 19, 20, 21] (fig. 8).

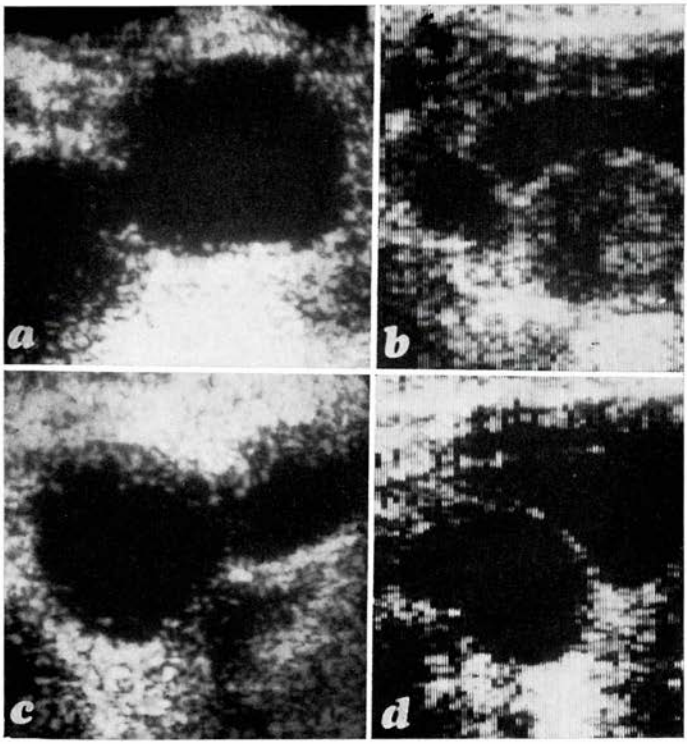

Fig. 6. — *a*) *b*) *c*) and *d*) Ovarian cysts, transverse scansions.

It is currently impossible to diagnose malignancy with the ultrasonographic method, however, some characteristic of the image obtained are suspected for malignant neoplasia.

A mass appearing as a complex solid-cystic structure, irregular shape and outline, echo-reflecting, dishomogeneous papillary expansions within a cyst, solutions of continuity in the wall, and, finally, a concomitant ascites fluid all suggest neoplastic degeneration [22,23,24,25,26,27,28] (fig. 9).

Reflections of the ultrasonic waves by the solid structures in the dermoid cyst given rise to intratumoral echoes; absorption of the ultrasonic band impedes complete visualization of the posterior wall of the cyst.

The endometrial cyst constitute a remarkable diagnostic problem, and appear a poorly homogeneous, vaguely limited cyst with the presence of internal echoes [2, 7, 9, 10, 18, 20, 21, 22] (fig. 10).

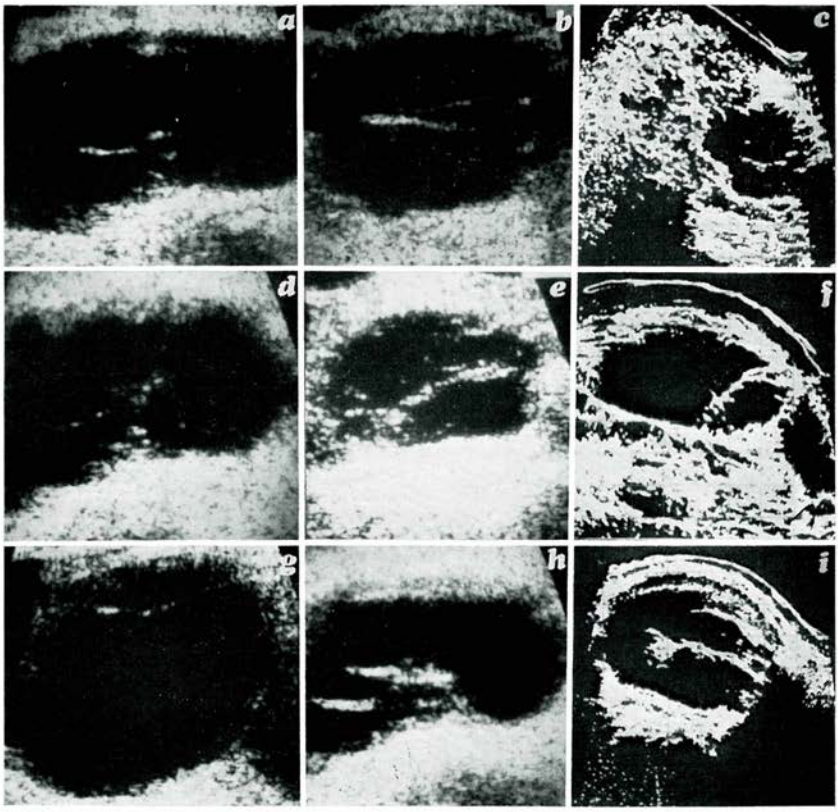

Fig. 7. — Septate cysts; *a*) *b*) *d*) and *g*) transverse scansions; *c*) *e*) *f*) *h*) and *i*) longitudinal scansions.

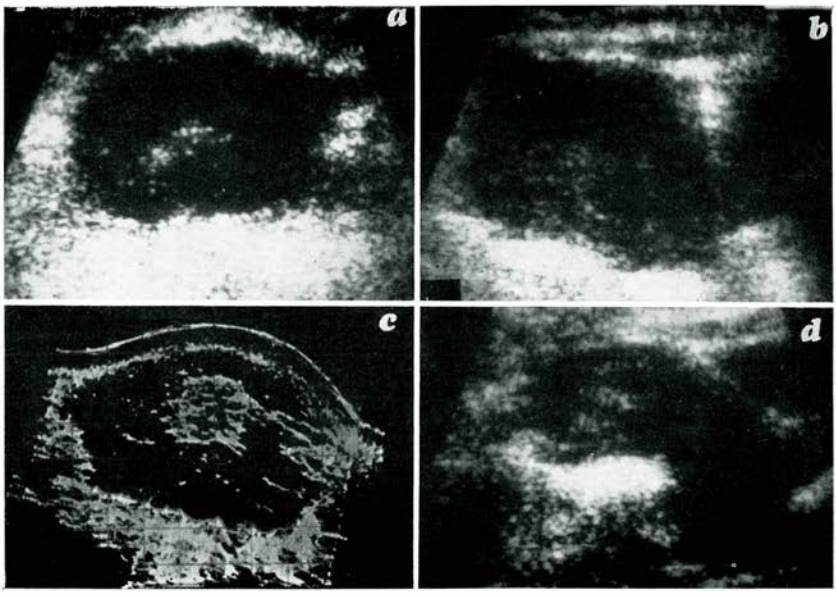

Fig. 8. — Ovarian cancer; *a*) and *c*) transverse scansions; *b*) and *d*) longitudinal scansions.

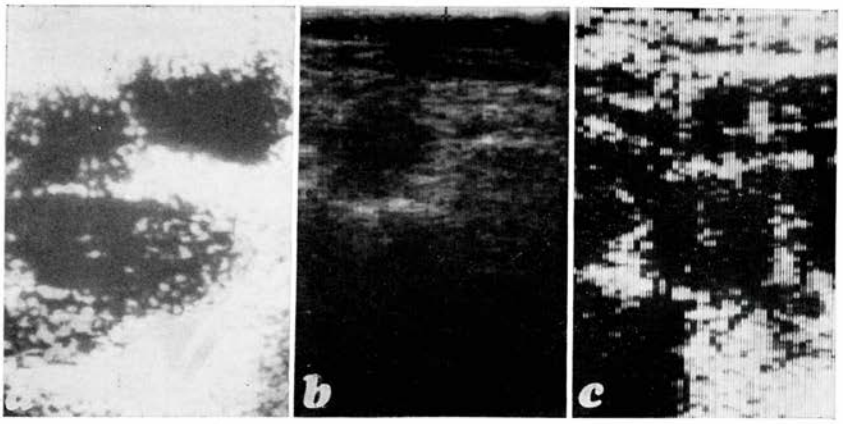

Fig. 9. — *a*) Dermoid cyst, trasnverse scansion; *b*) *c*) Endometrial cyst, transverse scansion.

Adnexal adherences generally appear as complex structures. The presence of fibrous strands determines a cystic-type image with unprecise limits that rarely allows an exact diagnosis to be reached. Differentiation from malignant tumefaction is pratically impossible, and many Authors report the highest number of diagnostic failures in the interpretation of these images ([29,30]).

In the case of ascites fluid, ultrasounds permit a differential diagnosis with the cystic formations. In this case, in fact, the edges of the image are sharp and regular, and internal echoes are absent. Instead, in the presence of ascites, the surface image is irregular, and echoes reflected from the intenstinal loops which vary in position in the lateral decubitus, may be noted. With a diagnostic echograph, it is possible to follow the movements of the intestinal loops with waves manoeuvres ([2, 5, 6, 7, 9, 10, 11]) (fig. 11).

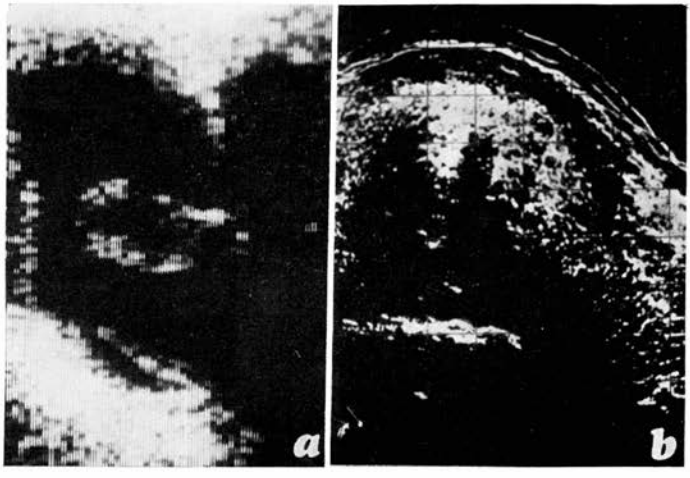

Fig. 10. — Images of ascites collection, longitudinal scansions *a*) Uterus suspended in ascites fluid; *b*) Uterus absent.

DISCUSSION AND CONCLUSION

From an analysis of the literature, it may be seen that the recognition of a malignancy has remarkable limitations. Currently, the ultrasonic method is absolutely not a substitute for other examinations in gynecology, but instead is considered a valuable complementary procedure whose routine use may be useful in the diagnosis of gynecological neoplasias.

Patients with neoplastic pathology in our clinic undergo pre- and post-operatory examination during chemotherapy treatment. In this case, the aim of echography is to search for eventual recurrences and to observe their volume variations during antiblastic therapy. In this field, the method has remarkable limitation since tumoral progression or regression is often quantifiable only in fractions of millimeters and therefore is impossible to detect despite the technical perfection of modern equipment.

For a good examination result, the echograph image should be carried out with a careful study of the echoes and their intensity, luminosity, number proximity, concentration, arrangement and profundity should be evaluated. A hasty interpretation of the echograph image, in fact may lead to an incorrect classification of the picture, thus diminishing the validity of the exam itself. The great diffusion of ultrasonic equipment therefore should be accompained by a satisfactory technico-clinical preparation which is indispensable for achieving good results during examination.

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