

BREAST DIAPHANOSCOPIC SEMEIOLOGY

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Transillumination of the breast⁽¹⁾ consists in the study of the shadows or of the more translucent areas that are projected upon the surface of the organ by normal and pathological structures when interposed between a source of light and the eye of the observer.

The source of light used was a quartz halogen lamp, of illumination power 150,000-300,000 lux, contained in a short length conical limiter, necessary in order to disperse the heat of the lamp and to focus the emergent light.

The increased intensity of illumination enabled the image to be photographed and the work could be done in semi-obscurity.

TEST TECHNIQUE

The test is carried out in the dark room.

The source of illumination is placed below the breast, starting with the one presumed to be healthy, so as to assess the total transparency. Then the various sections of the breast are examined, compressing it between the probe and the other hand, and always making a symmetrical comparative test against the contralateral region. Depending on the site of the lesion, the optimal incidence is sought, so that the lesion is as close as possible to the point of emergence of the radiations.

It is important to make an appropriate analysis of the intensity of the emergent light, so that shadows of thin opacity can also be assessed.

SUMMARY

After having briefly described the technique of diaphanoscopic examination of the breast, the Authors illustrate the normal and pathological findings. Since the diaphanoscopic images can only give a rough, inadequate and not often pathognomonic idea of the symptomatology of a given condition, the pathological symptomatology is recorded by illustrating the diaphanoscopic pictures of various mammary conditions. The Authors recognize to mammary diaphanoscopia a role of complementary test in studying breast diseases, since the information provided by this technique need to be integrated with the clinical findings and possibly with the mammography report.

NORMAL DIAPHANOSCOPIC SEMEIOLOGY

The fat present in the breast is transparent to light rays and provides the background contrast, orange-red in colour, against which the intensely black linear shadows of the superficial vessels stand out. In normal conditions the transparency of the breast may be much reduced in the vicinity of the nipple, especially if it is intensely pigmented.

Diagrams can be made of some normal diaphanoscopic pictures. The breast with abundant adipose tissue appears to be *homogeneously transparent*, while in pregnancy and during lactation it appears intensely and *homogeneously opaque*.

The transparency of the breast may appear *dyshomogeneous* as compared to the presence, in variable proportion, of adipose and fibro-glandular tissue.

PATHOLOGICAL DIAPHANOSCOPIC SEMEIOLOGY

Mammary affections may appear on diaphanoscopic examination as shadows that are different in intensity, homogeneity, shape and extension, or as areas of relatively greater transparency in relation to the colour of the background. Only in a few cases shall we encounter images that are pathognomonic of a given condition for this reason it is preferable to find out in what way the different mammary conditions may be presented on diaphanoscopic examination.

Inflammatory, acute, subacute and chronic processes will appear as areas of opacity.

In cases of acute mastitis the breast appears intensely and homogeneously opaque. The capacity diminishes by degrees as the inflammatory process resolves. Abscesses and galactoceles are also intensely opaque (fig. 1, B). The "foci" of plasma cell mastitis are seen as areas of thin, slight opacity with blurred outlines. In cases of chronic aspecific periductal inflammation the opacity will be dyshomogeneous, sometimes as a strip, in a retro-areolar position. Lipophagic granulomas are thinly opaque or completely transparent.

Lipomas and *fibromas* bring about no change in the background transparency.

Fibroadenomas generally give shadows, of varying intensity, in relation to the structure and diameter of the node; the outlines of the opacity are fairly sharp and their dimensions are almost analagous to

those of the node as seen in clinical and radiological examination.

Malignant tumours give an opacity of various intensity, sometimes massive, and at any rate more intense than might be suspected from the size of the nodule.

The shadow produced by malignant tumor more often appears with blurred outline and its extension is nearly always larger than the nodule, which can be found by palpation and mammography (fig. 1, C).

The superficial vascularization on the tumor is frequently stronger and irregular (fig. 1, D).

After radiotherapy, in cases of sterilization, there will be total disappearance of the tumoral opacity.

In cases of carcinomatous mastitis the breast opacity is intense and diffuse.

Small and deep tumours, and the colloid forms, will escape diaphanoscropy and will be completely transparent.

The *dysplastic forms*, appearing as dense areas with blurred outlines, retain their transparency or have slight dyshomogeneous opacity: the areas of sclerosing adenosis are frequently slightly opaque.

Mammary cysts show different properties depending on their content.

Cysts containing an opaque-brown fluid appear as shadows of slight opacity with fairly sharp outlines.

Cysts containing blood appear as intensely opaque areas with sharp outlines. This finding is extremely interesting because it enables blood cysts, which are always suspect, to be recognized without operation.

Cysts containing a clear fluid appear of the same colour as the background if they are immersed in a normal tissue or as areas with relatively greater background transparency if immersed in an intense fibro-glandular proliferation (fig. 1, E). This finding, when present, unequivocally indicates the cystic nature of the opaque node present on the radiograph⁽³⁾.

The *intracanicular papilloma* (single or multiple) does not alter the background

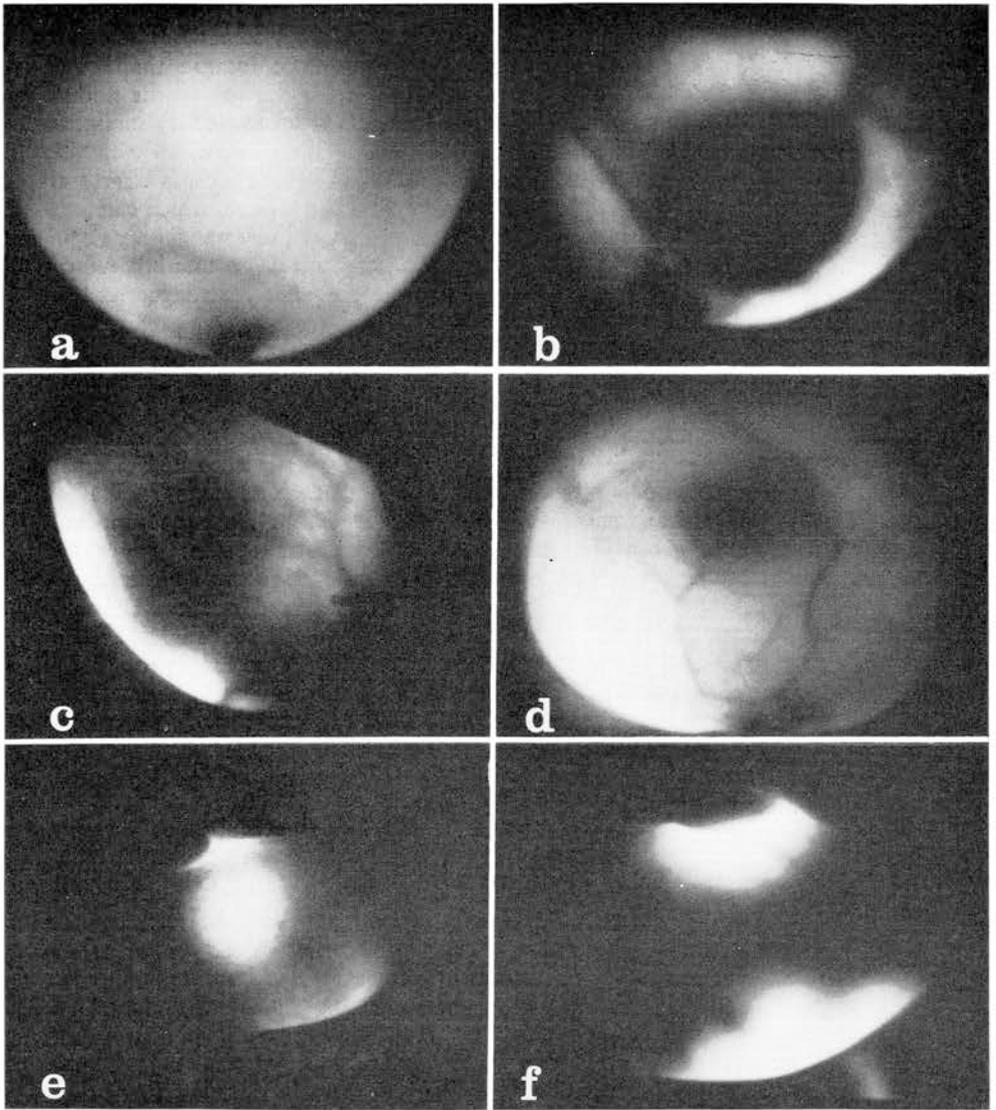


Fig. 1. — a: Diaphanoscopic appearance of a normal breast with abundant adipose tissue. b: Intense opacity with sharp outlines, due to an infected galactocele. c: Extensive opacity with blurred outlines, due to carcinoma. d: Slight opacity due to small carcinoma: note the accentuated vascularization. e: More transparent area in background, due to cysts with clear content. f: Extensive and intense opacity with irregular outlines, due to considerable ecchymosis.

transparency; but in cases of papilloma with abundant bleeding, an intensely opaque and well circumscribed shadow may be demonstrable, as well as, in some cases, the drainage duct formed like a small opaque strip, linking the nodule to the nipple⁽⁴⁾.

Extravasation of blood, however slight, causes a very intense shadow, with more or less defined outlines (fig. 1, F), which will always be larger than any palpable node. This opacity gradually disappears as the extravasation is reabsorbed.

A *mammary infarct* will appear as an area of intense opacity; this may disappear with the recovering.

CONCLUSIONS

Diaphanoscopic findings, though they may vary according to the nature and structure of the affection, only rarely present pathognomonic characteristics; the diaphanoscopic findings in fact depend also on the site, the shape and the size of the pathological formation, on the distance between it and the source of illumination and on the type of contiguous structures⁽⁵⁾. The same kind of cancer, for example, may give shadows of different opacity, depending on its site and dimensions, just as the same opacity may be due either to a benign or a malignant affection.

For these reasons the symptomatology of diaphanoscopic shadow is nearly always insufficient in itself to give the correct differential diagnosis. A correlation with the clinical findings may provide a better interpretation of the diaphanoscopic findings (e.g. hypertransparent cysts, large dysplastic dense areas of normal transparency, mammary infarct, haematoma, etc.) but mostly, it is the correlation with the mammography findings that will provide the

most useful information to be extracted from transillumination⁽²⁾.

This method, therefore, should not be considered an instrumental test to be used in diagnosing mammary conditions as a substitute for other techniques, but rather a complementary test which will integrate and facilitate the interpretation of the clinical and mammographic findings. From this point of view diaphanoscopic is scarcely useful in fibro-adenomas and in cysts with a brownish content, since the demonstration of these lesions is not of diagnostic help. Otherwise the technique can be useful in cases of malignant neoplasmas in radiographically dense breasts, in cases of fibroma, in cases of cysts containing blood or clear fluid.

Diaphanoscopic finding may also have priority value in trauma and mammary infarct, since, in these cases, the diaphanoscopic may often be the only test for demonstrating the lesion.

In conclusion, we can say that the proper role of transillumination of the breast as a complementary investigation is recognized. It deserves to be applied as a routine, being a simple, harmless test which is not expensive and may at least be a determining factor in the differential diagnosis between malignant and benign processes and among the different benign conditions.

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BIBLIOGRAPHY

- 1) Caporale L.: *Min. Med.*, I, 952, 1931.
- 2) Di Maggio C.: *Rad. Med.*, 62, 41, 1976.
- 3) Di Maggio C., Pescarini L., Ricci G.: *Senologia*, 3, 69, 1978.
- 4) Cutler M.: *Surg. Gyn. Obst.*, 48, 721, 1929.
- 5) Gros Ch., Quenneville Y., Hummel Y.: *J. Rad. Electrol.*, 53, 297, 1972.