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Galactography: an important and highly effective procedure

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Abstract Galactography should only be performed if there is spontaneous bloody or serous discharge from a single lactiferous duct of one breast. If this is observed, only pathologic processes instead of normal breast tissue are removed upon surgery and there is a close correlation between radiologic results and pathologic findings. Galactography localizes intraductal pathologic processes precisely and thus contributes to minimal volume surgery.

Keywords Galactography · Papilloma · Ectatic duct · Carcinoma

Appearance

Opacification of lactiferous ducts with non-ionic contrast agent is called galactography [1, 2, 3]. Galactography is performed as an extension of mammography when nipple discharge is present. It is the only diagnostic procedure that is able to depict and precisely localize small intraductal pathologic processes. There are basically two types of normal lactiferous systems: one that shows repetitive arborization extending deeply into the breast tissue with tapered ends, and one with only short side arms extending from the main duct and showing blunt ends [4, 5]. There are numerous characteristic pathological findings in galactography [1]. The most common finding is papilloma followed by ectatic ducts and a combination of both. The least common finding is carcinoma of the breast [6, 7].

Explanation

The reason for the great difference in appearance of normal lactiferous ducts (Figs. 1, 2) is not known. Pathological processes, however, can be explained very well.

The most common pathological finding in milk ducts is papilloma, a benign neoplasia originating from the ductal epithelium. It is a small, round tumor with a smooth margin. Accordingly, in galactography it appears as an intraductal, round, well-demarcated lucency [3, 4, 5, 6, 7, 8] that either is small enough to allow complete opacification of the ductal tree or occludes the duct completely (Fig. 3). It almost always is located in the major subareolar ducts and may occur as a solitary lesion or as a group of small lesions.

Ectatic ducts are quite common. This pathological finding of smoothly tapering dilated ducts occurs in fibrocystic disease and usually affects only one of the 8–12 lactiferous ducts of a breast (Fig. 4). Sometimes a communicating cyst contributing to discharge is opacified.

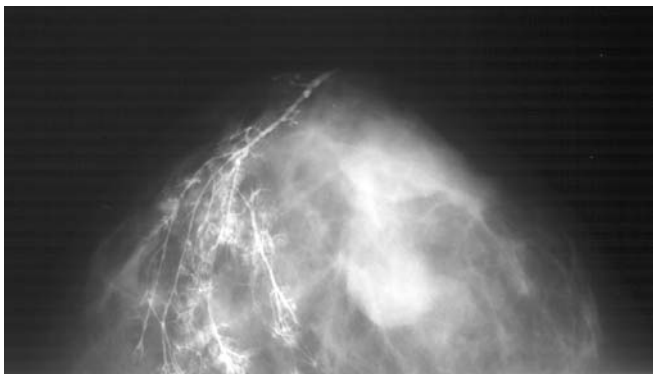


Fig. 1 Normal lactiferous duct: repetitive arborization tapering into the depth of the breast

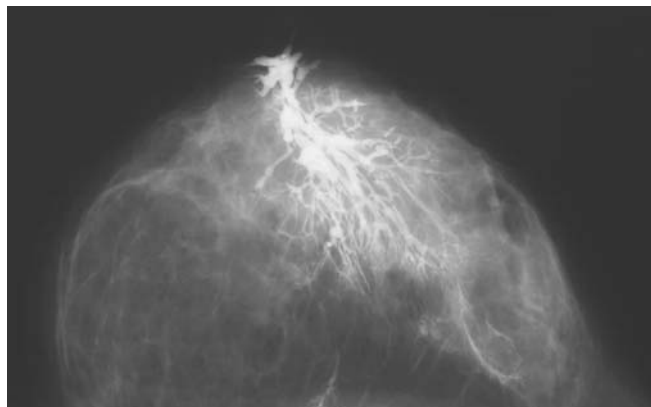


Fig. 4 Alternating serous and bloody and nipple discharge. Ectatic duct. No further pathology. Surgery is necessary to stop discharge

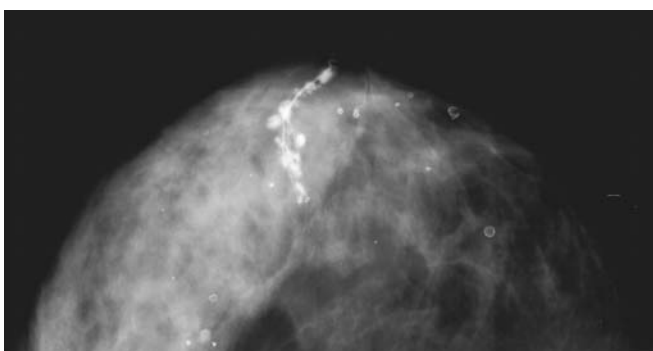


Fig. 2 Normal lactiferous duct: short side arms with blunt ends branching from the main duct. No repetitive arborization

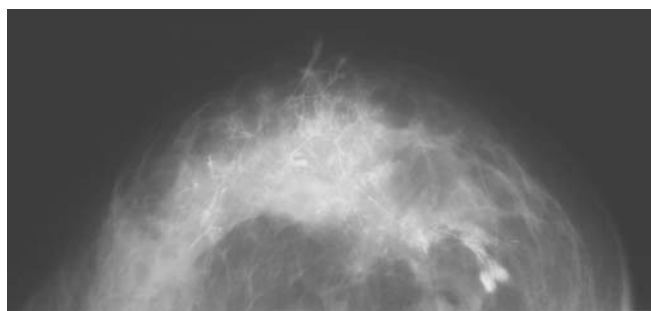


Fig. 5 Bloody nipple discharge. No pathology on the plain mammogram or on ultrasound. Irregular filling defect characteristic of intraductal growth of a carcinoma. Pathology: minimally invasive duct carcinoma in the area of non-filling

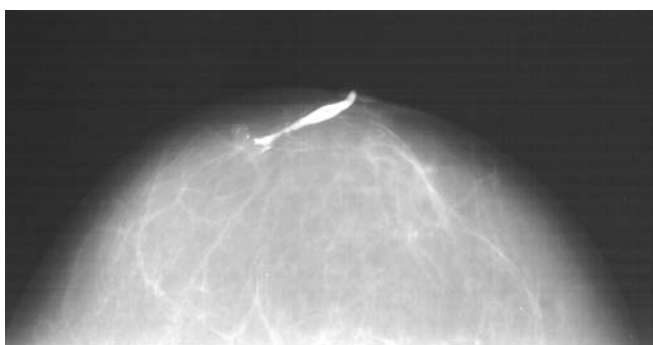


Fig. 3 Bloody nipple discharge. Papilloma in a major subareolar duct. Round, sharp margin. Total occlusion of the duct

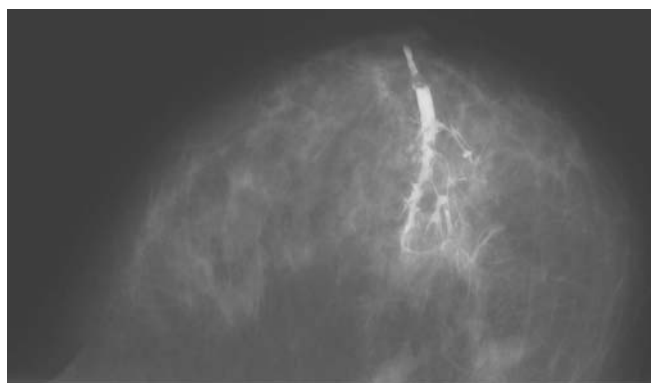


Fig. 6 Bloody nipple discharge. No pathology on the plain mammogram or on ultrasound. Irregular contour of duct, partially non-filling, distortion of architecture characteristic of intraductal growth of a carcinoma. Pathology: non-invasive duct carcinoma

Fig. 7 Bloody nipple discharge. No pathology on the plain mammogram or on ultrasound. Irregular contour of duct, partially non-filling, distortion of architecture characteristic of intraductal growth of a carcinoma. Pathology: invasive duct carcinoma

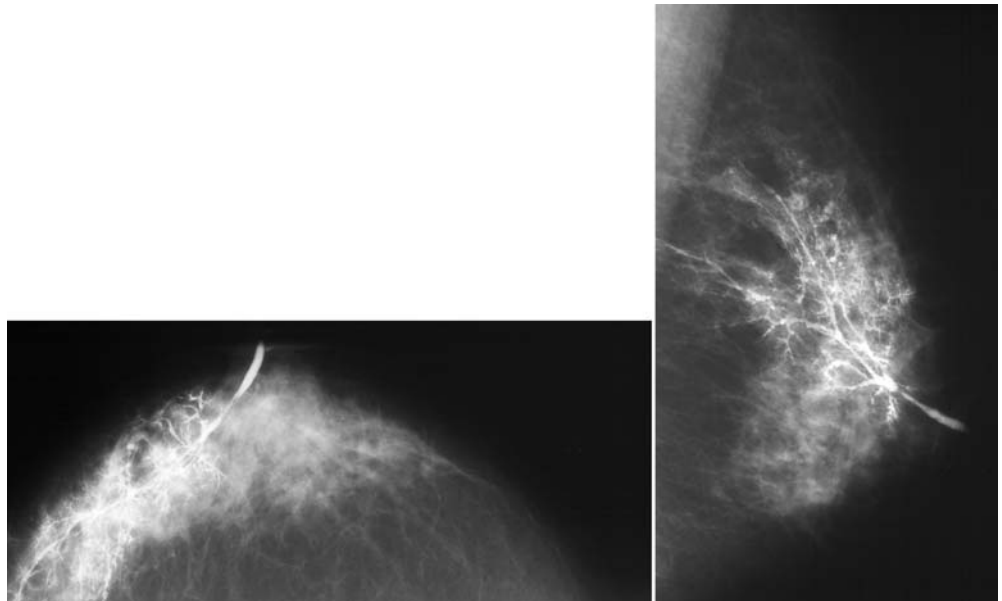
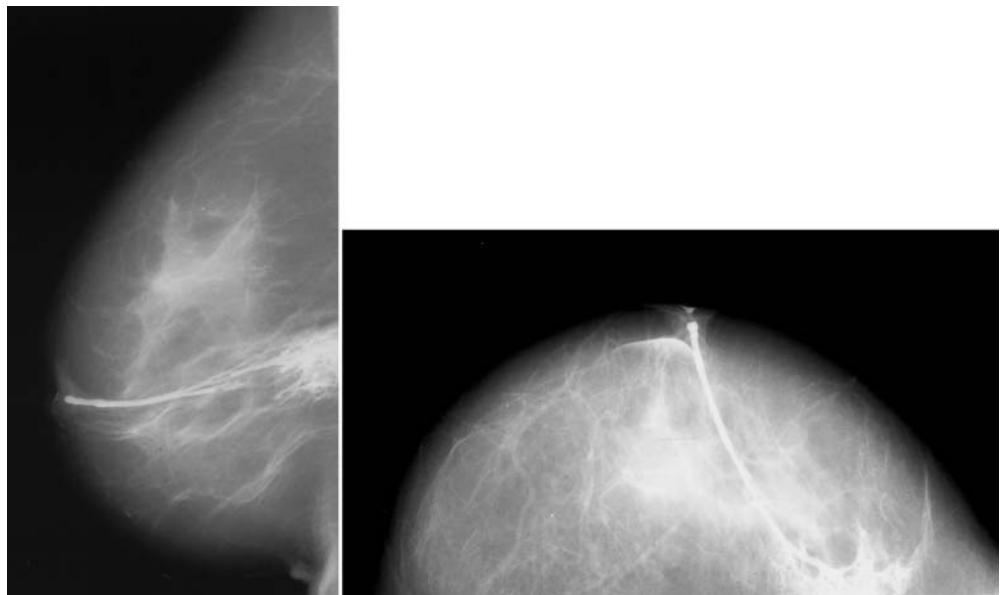


Fig. 8 Bloody nipple discharge. Mammogram showed density near the chest wall. Galactography was performed to see if the area of density is the origin of discharge or if there is another possible cause of discharge. Galactography shows that a second focus is not present. Irregular duct system near the chest wall. Extravasation of contrast media



There are cases of carcinoma of the breast that, like the benign lesions discussed, present with nipple discharge and are not visible or poorly visible on mammography, ultrasound, or MRI of the breast. They can only be shown on galactography. Carcinoma presents with an irregularly margined, distorted, and displaced duct that shows one or more irregular filling defects thus partially obliterating the normal ductal pattern (Figs. 5, 6, 7, 8). Figure 9 shows normal and pathological appearances of lactiferous ducts.

Discussion

Nipple discharge is a common problem in women and demands proper attention by the gynecologist as well as the radiologist. It is the radiologist's responsibility to perform a galactography under strict consideration of the indication for that exam. It should only be performed if there is spontaneous serous or bloody discharge from a single duct of one breast [6, 7, 8, 9, 10]. This makes sure that upon surgery pathology – and not normal breast tissue – is removed. Discharge that only occurs upon ap-

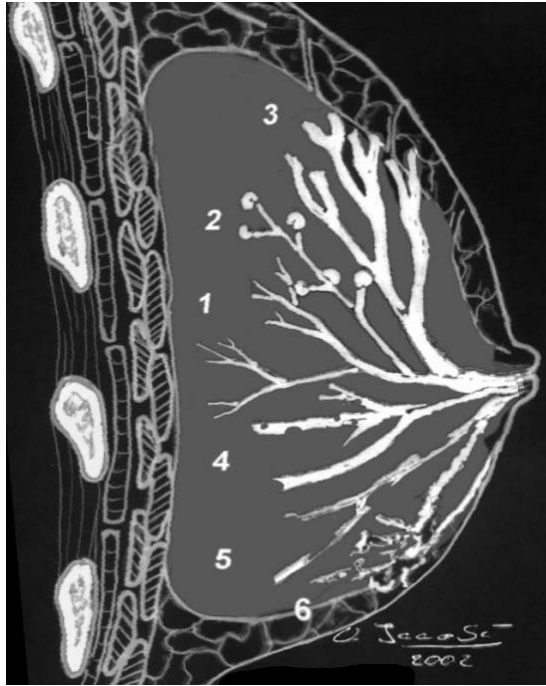


Fig. 9 Appearance of normal and pathologically altered ducts. In the *upper half* the two types of normal ducts and ectatic ducts are shown (1, 2, 3). The *lower half* depicts papilloma (4) and two types of carcinoma (5, 6)

plying pressure to the breast or the nipple and discharge from more than one lactiferous duct usually is not caused by a local process; thus, the problem cannot be solved by a local diagnostic and/or surgical procedure.

Spontaneous nipple discharge from one duct, serous or bloody, is caused by papilloma, ectatic duct, or carcinoma of the breast. All three conditions are local entities. Papilloma and ectatic ducts almost never show a recognizable change in mammography [11, 12] and there are numerous carcinomas spreading confined to the duct that are not visible on mammograms. In these cases galactography is the only procedure that can characterize and precisely localize the lesion so that it can be surgically removed with a small volume of tissue [6, 12, 13, 14, 15]. Other methods of localization, such as injection of blue dye into the duct, is not precise enough because the dye quickly diffuses into the surrounding tissue. Resection within a small volume of tissue is of particular importance for the benign lesions [16].

Conclusion

Galactography should only be performed in patients with spontaneous serous or bloody discharge from a single lactiferous duct of one breast. If this rule is followed, galactography yields excellent results with high diagnostic efficiency and very good correlation to pathology. It thus contributes substantially to the surgical approach in that it localizes lesions very precisely. Consequently, both benign and malignant lesions can be removed with the smallest possible tissue volume leaving the woman with only a small defect. In the case of diffusely spreading carcinoma, galactography is able to depict the extent of spreading more than any other method so that preoperative planning is facilitated.

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