

DUCTAL LUCENCY IN X-RAY MAMMOGRAPHY

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ABSTRACT

x-ray mammography is a widely performed procedure in the diagnosis of the diseases of the breast, and is able to reveal ductal abnormalities such as ductal dilatation & calcification. We, hereby, report a case of ductal lucency demonstrated by X-ray mammography, which is an uncommon finding. It may represent normal physiology or pathological processes.

INTRODUCTION

Ductal lucency is an uncommon mammographic finding, described when the decreased-density ductal arborization is observed through the density of surrounding breast tissue. Due to the larger size of the lactiferous ducts as they converging to areolar area, demonstration of ductal lucency is more easily in central part of the breast. In this report, we present a non-lactating patient coming to the surgical clinic with a suspected mass in her Rt. breast, and further mammographic study disclosed lucency of the ducts in another breast.

CASE REPORT

In May 1993, a 26-year-old Thai female came to the surgical clinic due to suspicion of mass in her Rt. breast. She was single, and had no history of pregnancy, nipple discharge, or previous surgery. The breast examination reveals nodularity of right breast at the upper-inner and upper-outer quadrants. The left breast and both axillary areas were unremarkable. Physical chest examination revealed normal heart and lungs.

Abdominal examination showed no abnormality. X-ray and ultrasonographic mammography were performed. The right breast was normal, as well as the ultrasonographic mammography of the left breast. The interesting finding was the lucency of the ductal arborization in her left breast seen in X-ray mammography. (Fig. 1-4)

Since the patient had no symptom concerning the left breast, specific treatment was not given at that time. The patient was followed up at the surgical clinic at 2, 6, & 12 months after the X-ray mammography for the right breast nodularity. There was still no problem in her left breast.

DISCUSSION

In the adult mammary gland, there are 15 to 20 irregular lobes of breast tissue converging to the nipple, separated by thin fibrous septa that are irregular and poorly defined. Each lobe is drained by its own lactiferous duct. On cross section of the nipple, each major duct can be seen, 2 to 4.5 mm in diameter, lined by stratified squamous epithelium. The ducts end in a local dilatation beneath the areola, the sinus lac-

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tiferous. Each duct is constricted as it passes to the summit of the nipple and ends as an independent opening, 0.4 to 0.7 mm in diameter; or several ducts may join below the summit of the nipple and drain through a common orifice. Thus, the excretory ducts may be as few as six to eight. Distention of the subareolar ducts with inspissated secretions and epithelial debris is considered a normal anatomic variation [1].

The breasts also have cyclic variation with the endometrium [2,3,5,6,7]. During the “**proliferative phase**” of the menstrual cycle (days 3-7) there is an increase in the number of mitoses of the acinar cells of the lobules without secretions. In “**follicular phase**” (days 8-14), the acini appear to have more collagen, while mitotic activities diminished. “**Luteal phase**” occurs between days 15-20, revealing vacuolization in the cells of the lobule and secretions are visible in the ducts. Loosening of the stroma within the lobules are noted followed by true apocrine secretion

into the distended duct lumen during “**secretory phase**” (days 21-27). The tissue within the lobules become edematous and there is venous congestion, which probably accounts for some of the discomfort many women experienced premenstrually. Active secretion appears to end during the “**menstrual phase**” of day 28 to day 2, and then the cycle repeat itself [2,3].

The lobular as well as the ductal systems are capable of secretion and absorption. Evidence of *milk secretion* may even be found in the normal breast during non-lactating periods in the form of *secretory lobules*. But even apparently resting lobules and ducts produce small amount of secretory products e.g. various mucosubstances and fluid which are partly re-absorbed and partly transported to the surface via the ductal system [5]. The concentration of fat in these secretions, if high, will account for the ductal lucency observed in X-ray mammography performed in non-lactating patient, and the nipple discharge may not be found



Fig. 1

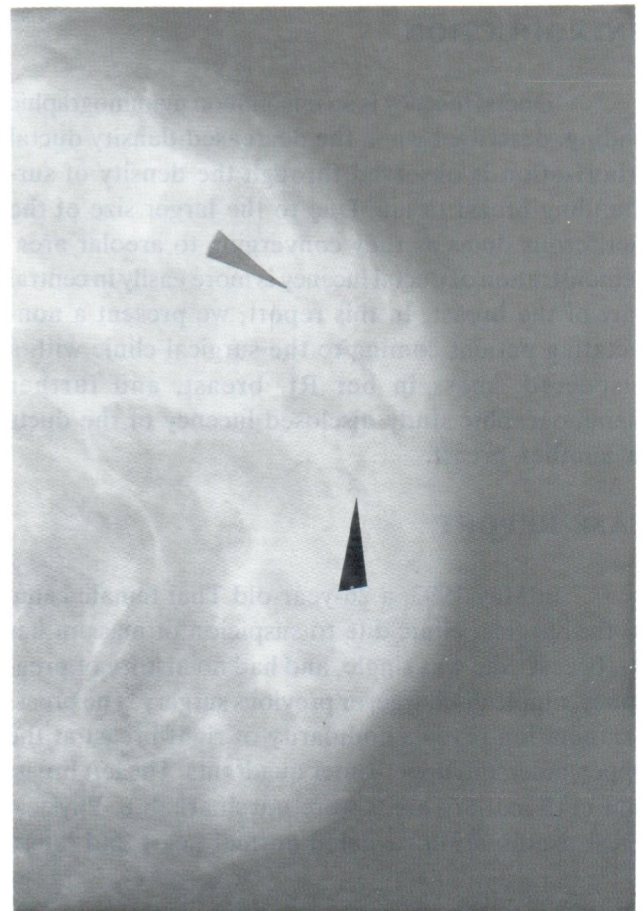


Fig. 2

X-ray mammography in medio-lateral oblique projection (Fig.1) and cranio-caudal projection (Fig.2) of the patient's left breast showed ductal lucency at juxta-areolar and subareolar area

due to resorption of the secreted materials by the lobular and ductal systems.

Occasionally, breast lobules may contain dilated ductules with epithelial changes identical to those seen in pregnancy or lactation. This pregnancy-like change occurs in women who are neither pregnant nor lactating. Some women are nulliparous. The frequency of this change is remarkably constant in both autopsy and surgical series, which is about 3% in each series [6].

The ductal lucency also can be seen if we perform the mammogram during lactation, owing to when lactation takes place, milk from apocrine cells and membrane-encapsulated fat globules from the epithelial cells are secreted to fill the lactiferous ducts results in widening of their caliber [2,4]. Following the end of lactation, the milk secretion ceases, generally some ductal ectasia remains and involution of the lactiferous ducts may be prolonged [4]. It takes at least 3 months after cessation of lactation for the breast

to return to its nonlactational histologic appearance [6].

The **Chiari-Frommel Syndrome** is a condition in which there is prolonged lactation which may persist for months or years after pregnancy. It appears to be related to abnormal secretory and neural ovarian function. Other components of the syndrome include uterine atrophy, secondary amenorrhea, headache, back pain and depression. The Chiari-Frommel syndrome is rare and should not be confused with the much more frequent occurrence of persistent serous breast secretion following cessation of lactation. The latter belongs to the spectrum of “**secretory disease**” and is caused by incomplete or prolonged involution of lactiferous ducts. This condition may be verified with ductography. A natural contrast ductogram results whenever there is a high concentration of fat in the ductal contents, resulting from pathological lactation [4].

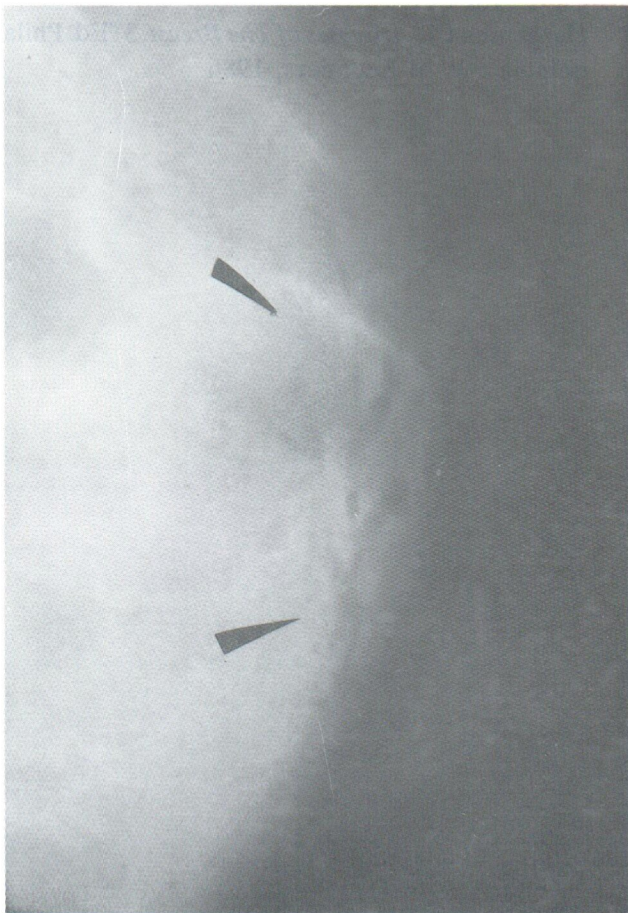


Fig. 3

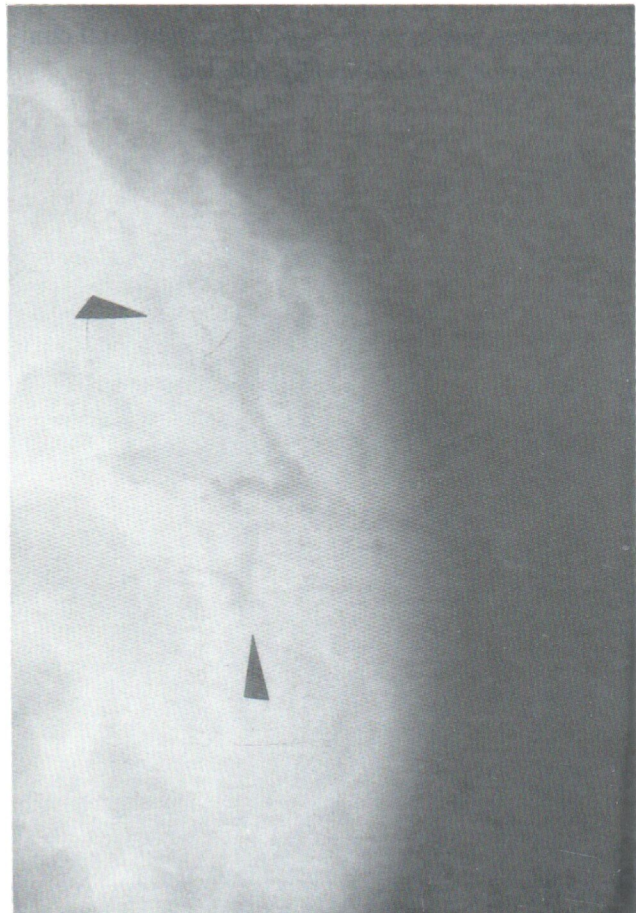


Fig. 4

Fig.3-4 : Magnification view of the lucent ducts from Fig.1 and Fig.2 respectively

A variant of Chiari-Frommel syndrome is the **Forbes-Albright syndrome** which consists of amenorrhea and galactorrhea associated with acromegaly, without any preceding pregnancy [4].

Spontaneous lactation has been documented following chest wall trauma. Surgery on the chest wall that may or may not involve the breast may produce spontaneous lactation. The patient, after one week of resection of pulmonary hamartoma, was reported to begin lactating normal milk which change to serous discharge with menstruation but returned to normal milk following menstruation [1].

In conclusion, we have reported a case of mammographically demonstrated ductal lucency. This is an uncommon finding, and particularly uncommon when observed in the patient without preceding pregnancy, chest wall trauma, history of nipple discharge, or any complaint about that breast. According to one-year follow up without any sign or symptom, we considered that the ductal lucency in this patient is due to the normal physiologic variation of the breast. However, the ductal lucency in X-ray mammography can represent either normal physiology or pathological processes, history review of the patient and clinical correlation are eventually needed.

ACKNOWLEDGEMENT :

We would like to thank Urupong Medical Center for providing materials in this study, and Mrs.R. Jaovisidha for preparing the manuscript.

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