Agenesis of Lactiferous Duct of Breast – A Case Presentation

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Introduction

A galactocoele is a benign breast lesion consisting of a cyst containing thick, milky fluid with a high fat content, most commonly seen in a young lactating women.[1] A blocked lactiferous duct, generally as a result of fibrosis from previous infection, is normally the cause. Patients usually present with a painless palpable lump in the breast which is freely mobile. Treatment is complete aspiration, which is generally successful. Recurrence is common following successive pregnancies. We present a young primiparous woman with a galactocoele caused by an agenesis or atresia of lactiferous ducts. Absence of lactiferous duct openings on the corresponding segment of the nipple and absence of lactiferous ducts in the corresponding segment of breast on Ultrasonography gives evidence for this inference. An extensive literature search, including current texts and indexed journal data revealed no previous reports of such a case.

Case Study

A 24 year old primipara, 8 months post partum, presented with a 3 month history of a tender lump in the right breast. Clinical examination revealed a 7 cm x 7 cm firm lump in the right breast. Fine needle aspiration revealed a milky fluid. Cytology showed the presence of numerous macrophages and neutrophils on a thick eosinophilic background, consistent with the an infected cystic lesion. The patient had no past medical history of mastitis. On closer examination of the nipples, duct openings were absent from the 9 o'clock to 11 o'clock positions on the right side, consistent with the positioning of the galactocoele. Pits in this region were explored using a 3-0 lacrimal duct probe (Fig. 1), but all were blind ending. Cranio caudal and medio lateral oblique views on mammography demonstrated lactating breast with galactocoele in right breast and significant right axillary lymphadenopathy – BI-RADS category II and agenesis of ducts in the right upper outer quadrant (Fig. 2A,2B). Imaging of the lactiferous ductal systems of both breasts using high resolution ultrasound identified an absence of lactiferous ducts in the upper segment of the right breast (Fig. 3), the stroma appeared to be homogenous with no evidence of patient or compressed ducts. Only patient ducts in the lower segment which were dilated draining milk (Fig. 4).

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Differential Diagnosis

When considering the diagnosis of galactocoele, it is important to rule out the differential diagnosis for the case described. In a young lactating women the most common diagnosis are oil cyst comprised of triglycerides: hamartoma containing fat, glandular tissue and connective tissue: lipoma comprised of mature fat cells: and an enlarged intramammary lymphnode. All may have similar presentation and radiological appearances, but their diagnosis can be determined by a combination of imaging with cytology if necessary.[2] As with any breast lump, malignancy must also be ruled out.

Discussion

Breast develops from the mammary ridges, present in the fourth week of gestation, which lie from the future axilla to the future inguinal/medial thigh region. The lactiferous

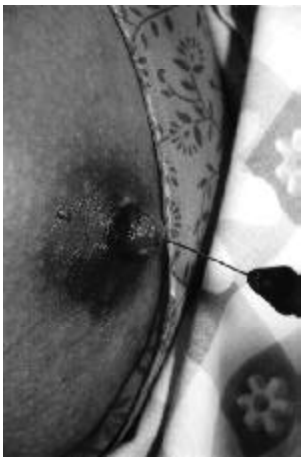
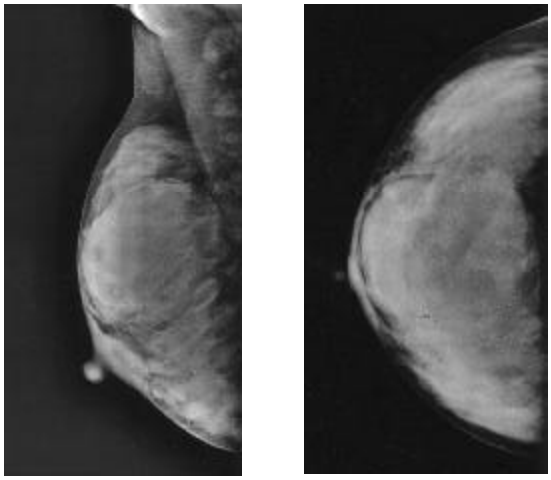


Fig. 1 : Pits explored using lacrimal duct probe.



Figs. 2A,2B : Craniocaudal and mediolateral oblique views on mammography.

ducts and associated glandular tissue are highly specialized apocrine glands. They are formed by an intrusion of proliferating ectodermal cells from the mammary ridges. By the fifth week, the remnants of this ridge from the primary buds of the mammary glands. Secondary buds occur by the twelfth week and become canalized, by fusion of small segments of lumen that arise within the solid core of cells. This process occurs during the third trimester, forming lactiferous ducts, of which there are 15-25 at birth. These ducts open onto the mammary pit, which everts to

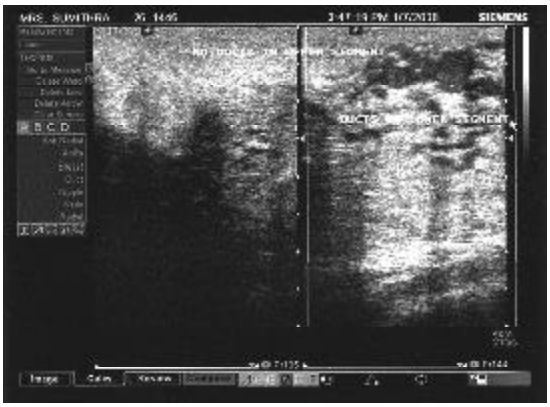


Fig. 3 : Ultrasound scan demonstrating lack of ducts in the upper segment of right breast.

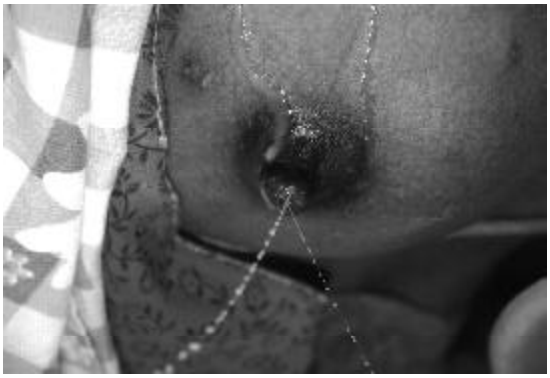


Fig. 4 : Only patent ducts in the lower segment which were dilated, draining milk.

become the nipple several weeks after birth.[3] Extensive breast development occurs after birth, initiated primarily at onset of puberty. Ductal elongation occurs primarily under the influence of oestrogen, growth hormone (GH), insulin-like growth factor 1 (IGF-1) and epidermal growth factor (EGF). Progesterone, prolactin and thyroid hormone stimulate ductal branching and alveolar budding. During pregnancy the breast undergoes further maturation and development, with an increase in glandular tissue. Prolactin levels increase, but its lactogenic effect is opposed by a concurrent rise in circulating progesterone. The progesterone levels drop suddenly following parturition, enabling milk

production. Oxytocin release stimulated by suckling induces the 'let down' reflex enabling milk release via the nipple.[4] In this case absence of a complete lactiferous duct system on ultrasound, coupled with a paucity of ductal openings on the nipple, suggests a diagnosis of partial agenesis of the duct. As glandular tissue is formed from the branching proliferations of the lactiferous ducts, we propose that the lack of an adequately developed ductal system is a result of incomplete development, such as a failure of the canalization process, or a regression of the patent ducts after forming. Both atresia and agenesis of ductal systems are well described in other organ systems. The mechanisms and aetiologies for each defect may not be understood fully, and differ between conditions. In biliary atresia, the biliary tree is destroyed by fibrotic change noenatally or in early life, leading to jaundice of the neonate and kernicterus.[5] Paramesonephric malformations and agenesis may lead to disorders in the formation of the genitals and kidney.[3] Embryological defects in lymph vessel formation cause the autosomal dominant condition of milroy's oedema.[6] Children may present with incomplete canalization of the nasolacrimal ducts, leading to dacryocystitis or epiphora.[7] It has been described that the traditional teachings concerning the anatomy of the breast is not quite accurate. An ultrasound study of lactating breasts found that it was common to have ductal systems that were not patent, with the normal range of patent ducts ranging 4-18, with an average of 9.[8] Other studies have described a range of just 1-17,[9] compared to the traditional teachings of 15-20. These findings support the hypothesis that this galactocoele may be the result of a non-patent lactiferous duct, which is the result of an anomaly in the development process of the gland, rather than an acquired blockage of the ducts secondary to fibrosis. The incomplete agenesis of the lactiferous duct has resulted in glandular tissue capable of secretory activity, without providing a viable outflow tract. A histological specimen of the lobule in question might be supportive of this theory; however, due to the practical limitations in this case this was not feasible.

Conclusion

It was referred to us as doubtful mass lactating breast. On further investigations, the mass proved to be benign, as a result of absence of ducts in the upper quadrant.

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