

Mammary duct ectasia with periductal mastitis presenting as a painful subareolar lump confirmed on triple assessment

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ABSTRACT

Mammary duct ectasia with periductal mastitis is a benign, non-proliferative breast condition commonly affecting perimenopausal women between 40 and 50 years of age. It is characterized by dilatation of the subareolar ducts, accumulation of inspissated secretions, and subsequent periductal inflammation and fibrosis. We report the case of a 43-year-old female who presented with an acutely painful, ill-defined, mobile subareolar lump in the right breast of 4-day duration, without nipple discharge, fever, or axillary lymphadenopathy. She had a background of hypothyroidism and recent menstrual irregularity. Ultrasonography revealed bilateral ductal ectasia with inspissated secretions and periductal fat stranding in the right breast, which was classified as BIRADS III. Fine needle aspiration cytology demonstrated benign ductal epithelial and myoepithelial cells against a hemorrhagic, inflammatory background with numerous cyst macrophages and no cytological atypia, consistent with a benign lesion (Yokohama Category 2). Concordance of clinical, radiological, and cytological findings allowed a confident benign diagnosis of duct ectasia with periductal mastitis, avoiding unnecessary biopsy. This case underscores the importance of the triple assessment approach in evaluating breast lumps and highlights the potential of duct ectasia to mimic malignancy clinically.

Key words: Mammary duct ectasia, Periductal mastitis, Subareolar lump, Triple assessment

Mammary duct ectasia (MDE) is a benign breast condition defined by the dilatation of major lactiferous ducts with accumulation of thick secretions, periductal inflammation, and eventual fibrosis [1]. It accounts for a significant proportion of non-malignant breast disorders and predominantly affects women in the perimenopausal age group [2]. The condition is clinically important because its presentation with subareolar lump, mastalgia, nipple discharge, and occasional nipple retraction, can closely mimic breast carcinoma, potentially leading to unnecessary invasive investigations or patient anxiety [3]. The triple assessment approach, comprising clinical evaluation, imaging (typically ultrasonography or mammography), and cytological or histopathological examination, remains the gold standard in the evaluation of any breast lump [4]. When all three modalities yield concordant benign findings, a confident diagnosis can be established without proceeding to open biopsy.

We present a case that illustrates this principle and demonstrates the clinicopathological features of MDE with periductal mastitis in a perimenopausal woman. The rationale for reporting the present case lies in its

important diagnostic implication: A painful subareolar lump in a perimenopausal woman frequently raises clinical suspicion of malignancy, often prompting invasive tissue diagnosis. This case highlights how careful clinicoradiological-cytological concordance using the triple assessment approach can confidently establish a benign diagnosis of MDE with periductal mastitis, thereby avoiding unnecessary surgical biopsy. In addition, the case reinforces the characteristic FNAC findings categorized under Yokohama Category 2 and serves as a practical teaching example for pathologists and breast clinicians.

CASE REPORT

A 43-year-old married female presented to the outpatient department with a painful lump in the right breast of 4-day duration. The pain was moderate in intensity, non-radiating, and had not changed over the observation period. There was no history of nipple discharge, fever, trauma, or similar complaints in the left breast. The patient was a known case of hypothyroidism and a slipped disc and was on regular medication. Family history was non-contributory. Menstrual history revealed menarche at 16 years of age. For the preceding 6 months, she had

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been experiencing menstrual bleeding every 15 days, accompanied by dysmenorrhea and mastalgia; before this, cycles had been regular and normal. Her obstetric history was G2P2L2; she had breastfed both children for 3 months each.

On general examination, the patient was conscious and well oriented to time, place, and person. Pulse was 72 beats/min, blood pressure was 120/80 mmHg, and respiratory rate was 14/min. Height was 158 cm, and weight was 61 kg. Systemic examination of the cardiovascular system, respiratory system, central nervous system, and abdomen was within normal limits. Local examination of the right breast revealed a single, ill-defined, soft to firm, tender, mobile lump measuring 3 × 2 cm in the subareolar region (Fig. 1). The nipple-areola complex was unremarkable. There was no local rise in temperature, no skin changes (no peau d'orange, dimpling, or ulceration), and no nipple retraction or discharge. Axillary lymph nodes were not palpable. The left breast was unremarkable on examination.

Ultrasonography of both breasts was performed. In the right breast, multiple dilated ducts were identified in the retroareolar region (maximum diameter approximately 4.4 mm), with a few ducts showing echogenic content consistent with inspissated secretions and no internal vascularity. Similar dilated, smooth-walled ducts were noted in the right lower inner quadrant (3–5 o'clock position) with surrounding fat stranding, suggestive of ductal ectasia with periductal mastitis. In the left breast, multiple dilated retroareolar ducts (maximum diameter approximately 3.5 mm) with echogenic content indicated focal ductal ectasia. No suspicious solid lesion, intraductal solid component, or microcalcification was identified in either breast. The overall impression was bilateral ductal ectasia with inspissated secretions and periductal mastitis in the right breast, classified as BIRADS III (probably benign).

Fine needle aspiration cytology (FNAC) of the right breast lump was performed. The smears were adequate but showed scant cellularity (Fig. 2a). Cells were arranged predominantly in benign sheets and clusters and comprised benign ductal epithelial cells along with myoepithelial cells, exhibiting small, round to oval, monomorphic nuclei and moderate cytoplasm (Fig. 2b). The background was hemorrhagic with marked necrosis and showed numerous cyst macrophages along with neutrophils and lymphocytes (Fig. 2a). No granulomas or parasitic elements were identified. No cytological features of malignancy were seen. The findings were categorized as Category 2 (Benign) according to the Yokohama System of Reporting Breast Cytopathology (2023) [5].

Based on concordant clinical, radiological, and cytological findings, a final diagnosis of the right breast lump – benign breast lesion consistent with ductal ectasia/periductal mastitis, was established (Table 1). The triple assessment was internally consistent, allowing confident exclusion of malignancy without surgical biopsy.



Figure 1: Clinical photograph showing a single, ill-defined, soft to firm, tender, mobile right breast lump measuring 3 × 2 cm in the subareolar region (arrow)

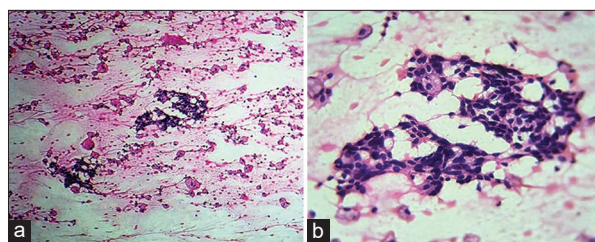


Figure 2: (a) Microphotograph showing a dirty necrotic, hemorrhagic background and numerous cyst macrophages along with neutrophils and lymphocytes. There is scanty cellularity of benign ductal epithelial cells (H&E, ×200); (b) Microphotograph showing benign clusters of breast ductal epithelial cells exhibiting small, round to oval, monomorphic nuclei and moderate cytoplasm. Myoepithelial cells (bare bipolar nuclei) with cystic macrophages are noted in the background (H&E, ×400)

DISCUSSION

MDE is a well-recognized, benign, non-proliferative breast disorder with an estimated prevalence of up to 10% in the general female population. However, it is underreported owing to its often asymptomatic course [1,2]. The condition is most frequently encountered in perimenopausal women in their fourth to fifth decades, as in the present case [3]. The exact etiopathogenesis remains incompletely understood, but the current consensus favors an initial dilatation of the major lactiferous ducts leading to stasis and accumulation of inspissated secretions. Leakage of ductal contents into the periductal stroma incites a chronic inflammatory response involving plasma cells, macrophages, and lymphocytes, ultimately resulting in periductal fibrosis and ductal distortion [1,4]. Recognized predisposing factors include cigarette smoking, multiparity, and hormonal changes associated with the perimenopausal transition [2,3].

Clinically, MDE may present with a spectrum of findings, including a subareolar lump, mastalgia, and nipple discharge that is typically green, brown, or serous in character. Nipple retraction or inversion may occur as a consequence of periductal fibrosis. The present patient's menstrual irregularity, mastalgia, and multiparity are consistent with recognized risk factors. Recent literature has also shown significant associations

Table 1: Differential diagnosis justification based on triple assessment constructed from standard clinicoradiological and cytological diagnostic criteria [3-6]

Feature	Duct Ectasia	Breast Abscess	Fibrocystic Disease	Intraductal Papilloma	Carcinoma
Clinical	✓	✓	✓	✓	✗
Radiology	✓	✗	✗	✗	✗
Cytology	✓	✗	✗	✗	✗
Conclusion	Fits all criteria	Partial fit	Partial fit	Partial fit	No fit

✓ (Tick mark) = the feature/findings are present or supportive of that diagnosis.

✗ (Cross mark) = the feature/findings are absent or not supportive of that diagnosis

with marital status, lactational history, obesity, and breast tenderness.

Importantly, the clinical presentation of an acute, painful, subareolar lump in a woman over 40 years raises the differential of early breast abscess, intraductal papilloma, fibrocystic disease, and breast carcinoma. Similarly, previous published case reports have emphasized the diagnostic challenge posed by MDE. Javadzadeh *et al.* described FNAC features of MDE and highlighted the importance of recognizing cyst macrophages, inflammatory cells, and benign ductal epithelial sheets to prevent overcalling malignancy. Their report closely parallels the cytomorphology observed in the present case, particularly the hemorrhagic-necrotic background with numerous foamy macrophages [3].

Ultrasonography remains highly useful in demonstrating hallmark features such as dilated, smooth-walled ducts with echogenic luminal contents and absent vascularity, all of which were distinctly observed in this case. FNAC plays a central role in the triple assessment of breast lumps. The cytological findings in MDE characteristically include benign ductal epithelial and myoepithelial cells, cyst macrophages, inflammatory cells, and a proteinaceous or hemorrhagic background, with conspicuous absence of atypia [5,6]. These findings were reproducibly present in the current case.

The present case aligns well with larger clinicopathological series, which describe dilated major ducts with luminal secretions, foamy histiocytes, and surrounding chronic inflammatory infiltrate. Compared with isolated case reports, the current case uniquely demonstrates complete triple concordance, clinical, radiological, and cytological, allowing a confident benign diagnosis without the need for core needle or excision biopsy. This complete agreement across modalities substantially enhances the educational and practical value of the report [3,7-10]. The concordance of all three assessment modalities in this case allowed a confident diagnosis without surgical intervention. When discordance exists, for example, when clinical or imaging features are suspicious, but FNAC is benign, core needle biopsy or excisional biopsy is mandated [4].

The spectrum of MDE described in the literature further highlights its diverse clinical manifestations and cytopathological correlates. Standard cytomorphological descriptions in established references such as the

Yokohama System and Rosai and Ackerman's Surgical Pathology emphasize the presence of benign ductal epithelial cells, bare bipolar nuclei, cyst macrophages, and an inflammatory background, all of which were well demonstrated in the present case [5,6]. In addition, Mohammed identified significant associations with multiparity, mastalgia, obesity, and breast tenderness, several of which were also observed in our patient [7]. Walker and Sandison, in one of the earlier clinical studies, emphasized that the lesion may present variably as pain, subareolar lump, nipple discharge, or nipple inversion, reinforcing the need for careful clinical correlation [8]. Unusual presentations have also been documented, including duct ectasia arising in accessory breast tissue, where Zhang *et al.* reported successful surgical management with flap reconstruction [9]. In contrast, Zegpi *et al.* described MDE in the pediatric age group, illustrating that although the disease predominantly affects perimenopausal women, it may rarely occur outside the typical age spectrum [10]. These observations collectively support the broad clinicopathological range of this benign entity and further underscore the value of triple assessment in avoiding overdiagnosis and unnecessary biopsy.

CONCLUSION

MDE with periductal mastitis is an important differential diagnosis in perimenopausal women presenting with a painful subareolar breast lump. Its clinical and imaging features can simulate carcinoma, but the triple assessment approach, comprising clinical evaluation, ultrasonography, and FNAC, enables accurate diagnosis and stratification. Concordant benign findings across all three modalities, as demonstrated in the present case, obviate the need for surgical biopsy and facilitate appropriate conservative management. Clinicians and pathologists must remain cognizant of this entity to prevent misdiagnosis and over-treatment.

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