Epidermal inclusion cyst in male nipple: A case report and a brief review of the literature

ZUHAIR D. HAMMOOD[1,2], SASAN M. AHMED[2], RAWA M. ALI[3,4], HIWA O. BABA[5], RAWAND O. BAQER[6], RONAK S. AHMED[7,8], KAROKH K. MOHAMMED[9], ARI M. ABDULLAH[3,10], SHVAN H. MOHAMMED[2,6] and FAHMI H. KAKAMAD[2,11-13]

[1]Department of Surgery, Tikrit Teaching Hospital, Tikrit, Saladin Governorate 34001, Iraq; [2]Kscien Organization for Scientific Research (Middle East office), Sulaymaniyah 46001, Iraq; [3]Department of Pathology, Smart Health Tower, Sulaymaniyah 46001, Iraq; [4]Department of Pathology, Hospital for the Treatment of Chemical Weapons Victims, Halabja 46018, Iraq; [5]Department of General Surgery, Smart Health Tower, Sulaymaniyah 46001, Iraq; [6]Xzmat Polyclinic, Rizgari, Kalar, Sulaymaniyah 46001, Iraq; [7]Department of Dermatology, Smart Health Tower, Sulaymaniyah 46001, Iraq; [8]Sulaymaniyah Teaching Center for Treatment of Skin Diseases, Sulaymaniyah 46001, Iraq; [9]Smart Health Tower (Raparin Branch), Ranya 46012, Iraq; [10]Department of Pathology, Sulaymaniyah Teaching Hospital, Sulaymaniyah 46001, Iraq; [11]Department of Scientific Affairs, Smart Health Tower, Sulaymaniyah 46001, Iraq; [12]Department of Thoracic and Vascular Surgery, Smart Health Tower, Sulaymaniyah 46001, Iraq; [13]College of Medicine, Department of Clinical Sciences, University of Sulaimani, Sulaymaniyah 46001, Iraq

Received December 7, 2025; Accepted July 7, 2026

DOI: 10.3892/wasj.2026.496

Abstract. Epidermal inclusion cysts (EICs) are keratin-filled nodules that commonly occur on the face, trunk, neck, scalp and extremities; however, their occurrence in the nipple is exceedingly rare. The present case report describes a rare case of a male patient with an EIC located in the nipple. A 29-year-old male presented with a 3-year history of a progressively enlarging left nipple mass associated with pain and intermittent yellowish discharge. A clinical examination revealed a mobile, well-circumscribed lesion measuring ~10 mm in diameter. Surgical excision was performed, and a histopathological examination confirmed an infected EIC with no evidence of malignancy. In addition, a review of the literature was performed which identified only a limited number of reported cases of nipple EICs, with only one previously documented case involving a male patient. Diagnosis can be challenging due to the rarity of this condition and typically relies on imaging modalities, particularly ultrasonography, with definitive confirmation by histopathological examination. Surgical excision remains the treatment of choice, providing both diagnostic confirmation and complete removal of the lesion while minimizing the risks of recurrence and potential malignant transformation. The present case report highlights the importance of including EICs in the differential diagnosis of nipple lesions in male patients.

Correspondence to: Dr Fahmi H. Kakamad, College of Medicine, Department of Clinical Sciences, University of Sulaimani, HC8V+F66, Madam Mitterrand Street, Sulaymaniyah 46001, Iraq
E-mail: kakamad.fahmi@gmail.com

Key words: epidermal inclusion cyst, sebaceous cysts, nipple, male breast

Introduction

Epidermal inclusion cysts (EICs), also termed epidermoid or infundibular cysts, are benign, keratin-filled nodules often misidentified as sebaceous cysts containing sebum rather than keratin (1). These lesions result from the entrapment of epidermal cells. Although the terms 'EIC' and 'sebaceous cyst' are frequently used interchangeably in clinical practice, the two are histologically distinct: True sebaceous cysts arise from sebaceous glands and contain sebum, whereas EICs are lined by stratified squamous epithelium and contain laminated keratin (1). Recognizing this distinction is clinically relevant, as nipple EICs are exceedingly uncommon and are readily mistaken for other benign or malignant breast lesions (2). Although EICs can occur at any site on the body, they are most commonly found on the face, trunk, neck, extremities and scalp, while their occurrence in the breast, particularly in the nipple area, is exceedingly rare (2,3). These cysts can develop at any age, but are more frequently observed in adulthood, typically during the third and fourth decades of life, and are more prevalent in males, with a male-to-female ratio of 2:1 (3,4). Although the precise basis for this male predominance has not yet been fully established, it has been attributed to the androgen-driven stimulation of the pilosebaceous apparatus and sebaceous gland activity, together with the higher frequency of acne, folliculitis and cutaneous trauma in men, all of which favor the follicular occlusion and epidermal implantation that underlie cyst formation (3,4).

The pathogenesis of EICs is closely related to the pilosebaceous unit, as these lesions are generally believed to originate from the infundibulum of the hair follicle. In the majority of

cases, they arise spontaneously when the follicular orifice becomes plugged, resulting in the progressive retention and lamellated accumulation of keratin within an epithelial-lined cavity that may communicate with the skin surface through a central punctum (3). Alternatively, true inclusion cysts develop when fragments of the surface epidermis are displaced into the dermis, where the implanted epithelium continues to proliferate and keratinize; the designation epidermal inclusion cyst is often reserved for these acquired, implantation-related lesions (3,5).

A number of factors have been implicated in the development of EICs. The disruption or occlusion of the follicular unit is central to their formation, and individuals with acne vulgaris are consequently predisposed, as retained comedones may give rise to multiple cysts (3). Local trauma is a well-recognized precipitant, since penetrating or blunt injury, surgical incisions, needle biopsy and, in the breast, procedures such as reduction mammoplasty can implant epidermal elements into the dermis (2,5). Other contributory factors reported in the literature include chronic inflammation, human papillomavirus infection and prolonged ultraviolet exposure, whereas multiple or atypically distributed cysts may occasionally indicate an underlying genetic disorder, such as Gardner syndrome (3).

Cutaneous cysts are broadly categorized into true cysts and pseudocysts based on their morphology and differentiation patterns. True cysts include those lined with a stratified squamous epithelium and those lined with a non-stratified squamous epithelium, whereas pseudocysts lack an epithelial lining. Epidermoid cysts belong to the category of true cysts (1). The literature demonstrates that epidermal cysts in uncommon sites, such as the breast, axillary lymph node and nipple are rare (1,2,4). The majority of cases are effectively managed through excision and show no recurrence (3).

The present case report describes a rare case of EICs located in the nipple of a male patient. In addition, a review of the literature is performed to identify similar published cases.

Case report

Patient information. A 29-year-old male patient presented to Smart Health Tower, Sulaymaniyah, Iraq, on September, 2024, with a 3-year history of swelling in his left nipple associated with pain. Additionally, the patient reported recurrent episodes of pain, tenderness and yellowish discharge from the nipple. An investigation of his past medical, surgical and family history did not reveal any notable findings. He was an active smoker and consumed alcohol occasionally.

Clinical findings. A clinical examination revealed a small, tender, soft-tissue growth on the left nipple of the patient. It was a centrally located, freely movable cyst with a smooth surface and well-defined margins, measuring ~10 mm in diameter (Fig. 1).

Diagnostic assessment and therapeutic intervention. Laboratory tests and radiological imaging were not conducted. As the lesion presented as a small, superficial, clinically typical cutaneous cyst confined to the nipple skin, and the patient elected to proceed directly to excision, an ultrasonography was not performed. Based on the clinical findings, the physician suspected an EIC in the nipple. The patient underwent surgical excision of the nipple using an elliptical incision under local anesthesia, and the excised tissue was sent for a histopathological examination. The tissue was fixed in 10% neutral-buffered formalin at room temperature (20-25˚C) for ~24 h before routine tissue processing and paraffin embedding. Sections of 4 μm thickness were prepared and stained with hematoxylin and eosin (H&E; Merck KGaA) according to the manufacturer's standard protocol. Staining was performed at room temperature, with hematoxylin for ~5 min, followed by differentiation and bluing, and eosin for ~1-2 min. The stained sections were examined using a light microscope (BX43; Olympus Corporation). Histopathological analysis confirmed an infected keratinous cyst consistent with an EIC of the nipple, with no evidence of malignancy (Fig. 2).

Follow-up. The post-operative period was uneventful, and no recurrences were observed at the 4-month follow-up. The cosmetic outcome was satisfactory, with preservation of the nipple contour and no evidence of distortion or deformity of the nipple anatomy.

Discussion

EICs, also referred to as epidermal cysts, infundibular cysts, or sebaceous cysts, are benign, keratin-filled sacs that arise from the overgrowth or localized proliferation of epithelial cells within the dermal or subcutaneous layers (6).

These cysts can develop in various body parts; however, their occurrence in the nipple is rare. They typically appear as nodules beneath the skin and have a noticeable central punctum. In contrast to sebaceous glands, they are not formed from these glands and primarily contain keratin instead of sebum. Therefore, they differ from sebaceous cysts. Despite these differences, the terms ‘sebaceous cysts’ and ‘epidermoid cysts’ are frequently used interchangeably in clinical practice (1). They may be clinically and radiologically misidentified as other benign or malignant lesions, making an accurate preoperative diagnosis challenging (7). EICs vary in size, ranging from 4 mm, as documented by Dilek *et al* (8), to 3.4 cm, as described by Ak *et al* (9). The cyst in the case described herein measured ~10 mm in diameter, placing it within the moderate range of reported sizes.

The formation of EICs typically arises from factors, such as trauma, epithelial proliferation and minimal inflammation. These cysts may develop in the breast through various mechanisms that damage the epidermis and lead to its implantation within the breast tissue. Such mechanisms include congenital cysts caused by obstructed hair follicles or pores, trauma, reduction mammoplasty, or needle biopsy (5). Jain *et al* (10) documented a case involving a 15-month-old girl who developed an EIC following blunt trauma inflicted by her mother, who had squeezed the child's breast during the neonatal period to express ‘witch's milk’. Conversely, in the case report by Dilek *et al* (8), which described the case of a 27-year-old woman, no history of trauma was reported. Similarly, in the present case report, the patient reported no history of trauma or surgical interventions in the nipple area where the cyst was identified.

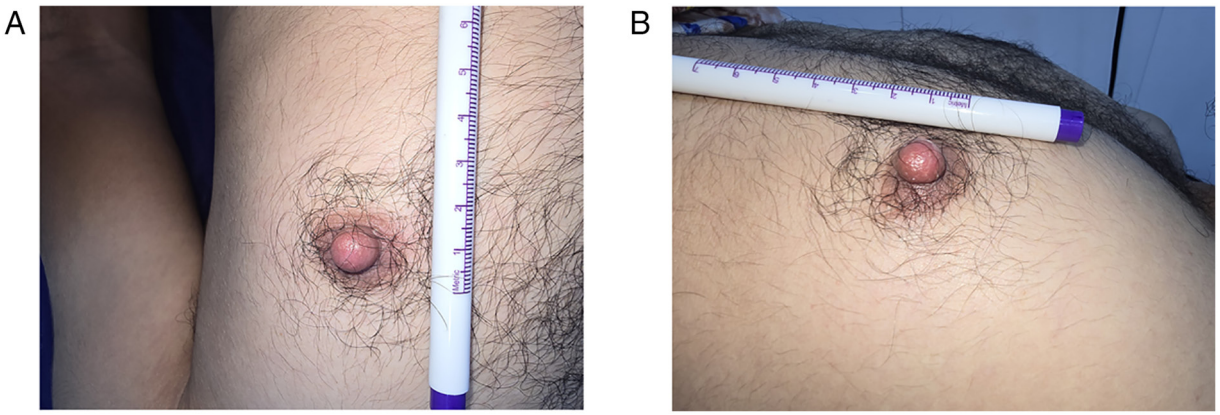

Figure 1. (A) Anterior view of an epidermal inclusion cyst in the nipple of the male patient. (B) Lateral view of an epidermal inclusion cyst in the nipple of the male patient.

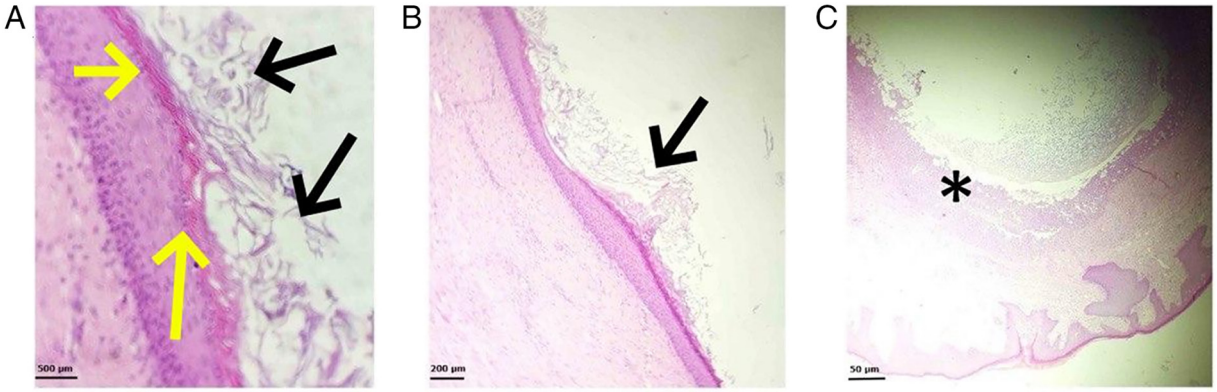

Figure 2. (A-C) Histopathological images illustrating a cyst within the reticular dermis lined by keratinizing stratified squamous epithelium with a well-defined granular layer and laminated keratin within the lumen. Black arrows indicate the laminated keratin, and yellow arrows indicate the granular layer. The asterisk (*) in panel C denotes the area shown at higher magnification in panels A and B. No associated adnexal structures or other teratomatous elements are identified. Hematoxylin and eosin (H&E) stain. Original magnifications: (A) x400, (B) x100 and (C) x40.

Although a history of trauma or surgical intervention is a well-recognized cause of EICs, a considerable proportion of these lesions, including the present case, arise in its absence, reflecting the several non-traumatic mechanisms by which they may form. The majority of spontaneous cysts are considered to originate from the pilosebaceous unit, developing when the follicular infundibulum becomes occluded and desquamated keratin is progressively retained within an epithelial-lined cavity; this process may be promoted by conditions that favor follicular plugging, such as acne vulgaris and its associated comedones (3). In the breast and nipple, EICs may additionally result from squamous metaplasia of the columnar cells lining dilated ducts, a change reported in association with fibrocystic disease, fibroadenoma and phyllodes tumors, as well as from the congenital sequestration of ectodermal rests displaced during embryonic development (2). The nipple-areolar complex is particularly rich in pilosebaceous structures and Montgomery glands, providing an anatomical substrate for spontaneous follicular or ductal obstruction, whereas human papillomavirus infection and chronic ultraviolet exposure have been implicated as contributory factors in a subset of cases (3). Collectively, these mechanisms explain how an EIC, such as that observed in the patient described herein, may develop in the nipple despite the absence of any preceding trauma or surgical manipulation.

In addition, herein, a review of the published literature was conducted using the PubMed, Google Scholar and Scopus databases. The search employed combinations of the key words 'epidermal inclusion cyst', 'epidermoid cyst', 'nipple' and 'breast'. Articles published in the English language up to the time of manuscript preparation were screened, and relevant case reports were included for analysis. The review identified six reported cases of EICs involving the nipple, highlighting the rarity of this condition (Table I) (1,2,4,8-10). These lesions are typically characterized by slow growth and an indolent clinical course and are often asymptomatic, which may explain why patients do not readily associate their development with a history of prior trauma or local injury. The majority of reported cases presented as painless, well-circumscribed nodules, consistent with the generally benign nature of EICs. For example, the cases described by Marchesi *et al* (4) and Jain *et al* (10) were entirely painless, whereas Dilek *et al* (8) reported a symptomatic lesion associated with pain. The present case report shares similarities with the latter report, as the patient experienced localized pain in addition to nipple swelling. Notably, the lesion was

Table I. Review of cases of epidermal inclusion cysts of the breast and nipple reported in the literature.

Authors/year of publication	Age	Sex	Study design	Size	Location	Imaging tool	Intervention	Follow-up	(Refs.)
Abdullah *et al*, 2024	55 Years	Female	Case report	13 mm	Axillary lymph node	Ultrasound	Mass removal	No recurrence	(1)
Dilek *et al*, 2014	27 Years	Female	Case report	4 mm	Nipple	Ultrasound	Excisional biopsy	No recurrence	(8)
Ak *et al*, 2022	51 Years	Male	Case report	34 mm	Breast (subareolar)	Ultrasound	Surgical excision	No recurrence	(9)
Paliotta *et al*, 2016	70 Years	Female	Case report	31x30 mm	Breast (lower outer quadrant)	Ultrasound	Excisional biopsy	No recurrence	(2)
Jain *et al*, 2012	15 Months	Female	Case report	8x8 mm	Nipple	N/A	Excisional biopsy	N/A	(10)
Marchesi *et al*, 2014	39 Years	Male	Case report	13 mm	Nipple	Ultrasound	Excisional biopsy	No recurrence	(4)

also associated with intermittent discharge and clinical signs of infection, features that are uncommon among previously documented nipple EICs. These findings suggest a more complex clinical presentation compared with the majority of reported cases, which were largely asymptomatic and detected because of progressive enlargement or cosmetic concerns.

An additional noteworthy aspect of the case described herein is the sex of the patient. The overwhelming majority of nipple EICs reported in the literature have occurred in female patients. To the best of current knowledge, only one previous case involving a male nipple has been documented. Furthermore, the symptomatic nature of the lesion, including pain, intermittent discharge and secondary infection, distinguishes it from most previously reported cases and more closely resembles the uncommon painful presentation described by Dilek *et al* (8). Given the scarcity of reported male nipple EICs, important aspects of their clinical behavior, diagnostic evaluation, and optimal management remain insufficiently characterized (8). The detailed documentation of such cases is therefore essential to improve recognition, facilitate accurate diagnosis, and expand the existing evidence base regarding this rare clinical entity.

A variety of conditions are included in the differential diagnosis of male breast masses, ranging from benign lesions, such as gynecomastia, fibrocystic changes, fibroadenomas, hematomas, abscesses, and lipomas to malignant conditions like ductal carcinoma, metastases and lymphoma (9).

Among the available diagnostic modalities, ultrasonography is the primary and preferred technique for nipple EICs, as it confirms the cystic nature of the lesion and rules out any association with the mammary gland or other tumors (2,4). A physical examination alone is unreliable, since these lesions present as smooth, round nodules that are difficult to assess by palpation. Mammography has a reported diagnostic accuracy of approximately 79%, whereas magnetic resonance imaging documented in only a few cases, has also shown consistent accuracy in detecting breast EICs (2). According to studies, fine-needle aspiration cytology and fine-needle aspiration biopsy may support the diagnosis, but are less reliable than ultrasonography (2,11). In the present case report, ultrasonography was not performed; the diagnosis was instead confirmed by excisional biopsy and histopathological examination.

The complications of EIC include rupture, inflammation and abscess formation (5). Malignant transformation into squamous cell carcinoma within the cyst wall has been reported in rare cases, occurring in ~2% of patients (6). Solid nodules are detected within the cyst wall, which should raise suspicion for malignant degeneration (1). In the present case report, while clinical signs of infection were observed, no evidence of malignant transformation was identified.

Small, uncomplicated cysts generally do not require treatment. However, in the event that removal is preferred, it can be performed through a simple surgical excision, ensuring the cyst and its wall are completely and instantly removed (1,3). All surgically excised epidermoid cysts should undergo pathological examination to confirm complete removal, rule out misdiagnosis, prevent recurrence, and reduce the risk of malignant transformation (2,3). According to the literature, the post-operative period and follow-up are uneventful, with no reported recurrence of the nipple EIC (4,8,10).

The present case report has a number of limitations that should be mentioned. First, pre-operative imaging, in particular ultrasonography, was not performed; thus, the imaging characteristics of the lesion could not be documented and associated with the histopathological findings. Second, the post-operative follow-up was relatively short (4 months); although no recurrence was observed, a longer period of surveillance would more reliably exclude late recurrence. Finally, as a single case report, these observations cannot be generalized, and larger series are warranted to better define the presentation and management of male nipple EICs.

In conclusion, the present case report adds to the very limited literature available on EICs of the male nipple, representing one of the small number of documented cases. It reinforces that EICs should be included in the differential diagnosis of a male nipple swelling. Clinically, ultrasonography is the preferred modality for pre-operative characterization, whereas complete surgical excision with histopathological confirmation remains both diagnostic and curative; this approach ensures a favorable prognosis with a minimal risk of recurrence and allows malignant transformation to be excluded.

Acknowledgements

Not applicable.

Funding

No funding was received.

Availability of data and materials

The data generated in the present study may be requested from the corresponding author.

Authors' contributions

ZDH and FHK were major contributors to the conception of the study, as well as to the literature search for related studies. SMA and SHM contributed to the literature search, data acquisition and interpretation, and manuscript preparation. ROB and KKM contributed to the design of the study, literature review, critical revision of the manuscript, and the processing of the table. HOB and RSA assisted in the diagnosis and management of the patient and participated in manuscript review. AMA and RMA were the pathologists who performed the diagnoses. FHK and SMA confirm the authenticity of all the raw data. All authors have read and approved the final manuscript.

Ethics approval and consent to participate

Written informed consent was obtained from the patient for participation in the present study.

Patient consent for publication

Written informed consent was obtained from the patient for the publication of the present case report and any accompanying images.

Competing interests

The authors declare that they have no competing interests.

References

1. Abdullah AM, Omar SS, Qadir AA, Salih AM, Pshtiwan LR, Ahmed RS, Ali RM, Baba HO, Mohammed RO, Ali HO and Kakamad FH: Epidermal inclusion cyst in an axillary lymph node with breast cancer: A case report. Mol Clin Oncol 21: 72, 2024.
2. Paliotta A, Sapienza P, D'ermo G, Cerone G, Pedullà G, Crocetti D, DE Gori A and DE Toma G: Epidermal inclusion cyst of the breast: A literature review. Oncol Lett 11: 657-660, 2016.
3. Hoang VT, Trinh CT, Nguyen CH, Chansomphou V, Chansomphou V and Tran TT: Overview of epidermoid cyst. Eur J Radiol Open 6: 291-301, 2019.
4. Marchesi A, Parodi PC, Palitta G, Marchesi M and Vaienti L: A 'Polypoid' nipple: An unusual case of epidermoid cyst. J Plast Reconstr Aesthet Surg 67: e27-e28, 2014.
5. Kini YK, Kharkar VR, Rudagi BM and Kalburge JV: An unusual occurrence of epidermoid cyst in the buccal mucosa: A case report with review of literature. J Maxillofac Oral Surg 12: 90-93, 2013.
6. Lee JY: Giant epidermal inclusion cyst of the axilla: A case report with diagnostic ultrasound imaging features. Radiol Case Rep 17: 64-67, 2022.
7. Abu-Mandeel E, Saadeh A, Rababaa H and Al-Share MS: Epidermal inclusion cyst of the axilla with calcifications. Radiol Case Rep 18: 784-787, 2023.
8. Dilek N, Dilek AR, Saral Y and Şehitoğlu I: Epidermoid cyst on the nipple: A rare location. Breast J 20: 203-204, 2014.
9. Ak M, Yurtsever C, Cakir OF and Yurtsever N: Epidermal inclusion cyst in male breast: How to differentiate from other male breast lesions. Radiol Case Rep 17: 3919-3922, 2022.
10. Jain S, Sarkar R, Garg VK and Khurana N: Epidermal inclusion cyst or giant milium of the nipple. Indian J Dermatol Venereol Leprol 78: 103, 2012.
11. Singh M, Maheshwari B, Khurana N and Jain S: Epidermal inclusion cyst in breast: Is it so rare? J Cytol 29: 169-172, 2012.