e-ISSN 3050-8460
Journal of Dermatology Research

ATHENAEUM SCIENTIFIC PUBLISHERS

Case Report

Eccrine Porocarcinoma Arising from a Benign Eccrine Poroma: A Rare Coexistence in a Single Lesion

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Citation: Hamad R, et al. Eccrine Porocarcinoma Arising from a Benign Eccrine Poroma: A Rare Coexistence in a Single Lesion. J Dermatol Res. 2025;6(3):1-6.

https://doi.org/10.46889/JDR.2025.6301

Received Date: 08-08-2025

Accepted Date: 01-09-2025

Published Date: 08-09-2025

Abstract

Background: Eccrine Poromas (EPs) and Eccrine Porocarcinomas (EPCs) are rare adnexal tumors of the eccrine sweat glands, with EPCs representing the malignant counterpart. While EPCs may arise de novo, they can also develop from the malignant transformation of EPs, a process that remains poorly understood. The coexistence of both benign and malignant components within a single lesion is exceptionally rare, posing significant diagnostic challenges and emphasizing the importance of thorough histopathological evaluation.

Case Presentation: We present a 72-year-old Asian male with a longstanding lesion on the lower right leg, the initial diagnosis was proposed as a squamous papillomatous lesion, the tumor was later classified as Squamous Cell Carcinoma (SCC) before a comprehensive histopathological review revised the diagnosis to EPC with coexisting EP. The malignant component demonstrated nuclear pleomorphism, increased mitotic activity and ductal differentiation, while the benign portion retained a uniform cellular architecture with no significant atypia. Immunohistochemical analysis confirmed ductal differentiation and supported the eccrine origin, emphasizing the role of histopathology and molecular markers in distinguishing EPC from SCC and other cutaneous neoplasms.

Conclusion: This case underscores the complexities of diagnosing EPC, particularly in its coexistence with EP, reinforcing the need for meticulous histopathological and immunohistochemical assessment to avoid misdiagnosis. A review of the literature further contextualizes the clinical, histopathological and molecular findings, reinforcing the necessity of an interdisciplinary approach for accurate diagnosis and optimal management. As research into molecular markers and targeted therapies advances, this case highlights the ongoing need for standardized diagnostic guidelines and further investigation into the mechanisms of malignant transformation in eccrine tumors.

Keywords: Eccrine Poromas; Eccrine Porocarcinomas; Immunohistochemical Studies

Introduction

Eccrine Porocarcinoma (EPC) is a rare malignant tumour of the sweat glands, first described by Pinkus and Mehrengen in 1963 [1]. Accounting for only 0.005% of all epithelial skin neoplasms, EPC remains poorly understood with limited literature available on pathogenesis and optimal management. EPCs most frequently arise on the lower extremities, with 50% appearing on the lower limbs but can also appear on the head, scalp, upper extremities, trunk and abdomen and are most common in adults aged 60-70 with primary lesions on the head being most common in some reports [2,3]. There is a predilection for acral surfaces, reflecting the distribution of sweat glands. Distant metastases are more common in primary lesions on the genitalia and buttocks whilst primary lesions of the head and neck have a higher incidence of lymph node metastases. Whilst most reports suggest no gender predilection, some suggest a female predominance of up to 70% of subjects [4].

These tumours originate from the intraepithelial portion of the eccrine sweat gland (acrosyringium) and can arise de novo or result from the malignant transformation of benign EP in 18% of cases [4]. The exact aetiology remains unclear, though factors such as chronic exposure to radiation, light and immunosuppression have been implicated in EP and EPC development [5,6].

Case Presentation

A 72-year-old Asian male with a past medical history of polio presented with a longstanding lesion on the lower right leg that had become darker and raised. In 2013, a warty lesion measuring 30 × 30 mm with a raised centre was biopsied. The pathology report described a squamous papillomatous lesion with multiple clonal nests of basaloid cells showing cytological atypia, occasional mitoses and dyskeratotic cells. Immunohistochemistry for Ki-67 showed brisk proliferative activity in clonal nests. The lesion was diagnosed as clonal dysplasia.

A second biopsy in 2014 was performed after the lesion became painful, revealing clonal seborrhoeic keratosis with underlying vascular telangiectasia and no keratinocyte dysplasia. The patient was discharged with no further intervention. In March 2024, the patient re-presented with persistent scabbing and bleeding of the lesion. A shave biopsy reported moderately to poorly differentiated Squamous Cell Carcinoma (SCC) with areas of encysted morphology extending to full thickness. No perineural or lymphovascular invasion was noted.

On pathology review, the diagnosis was revised to EPC, exhibiting features close to hidroacanthoma simplex/poroma. Poromatous differentiation with ductal lumina within nests of lesional cells in the epidermis, previously interpreted as encysted morphology, was noted. The presence of ductal differentiation and mucin production supported this revision.

A subsequent punch biopsy in July 2024 (14 × 13 mm, calf) revealed mild acanthosis with nests of keratinocytes and occasional ducts, but no significant atypia or invasive malignancy. This was diagnosed as a benign poroma. An MDT review concluded that the March 2024 shave biopsy (initially diagnosed as SCC) was in fact an EPC, while the July 2024 punch biopsy confirmed a separate benign poroma. The lesion was excised with wide margins and as of six months post-excision, no recurrence has occurred. CT scan showed no evidence of metastases.

Histological examination of the excised lesion revealed nests of cells with bland round nuclei and moderate amounts of cytoplasm, sharply demarcated from the surrounding epidermal keratinocytes (Fig. 1). Focal small cystic spaces and ductal structures were identified within these nests (Fig. 2,3). Immunohistochemical analysis demonstrated moderately strong positivity for GATA3 in the lesional cells (Fig. 4), while CEA highlighted occasional ducts (Fig. 5). These findings further support the diagnosis of EPC with ductal differentiation.

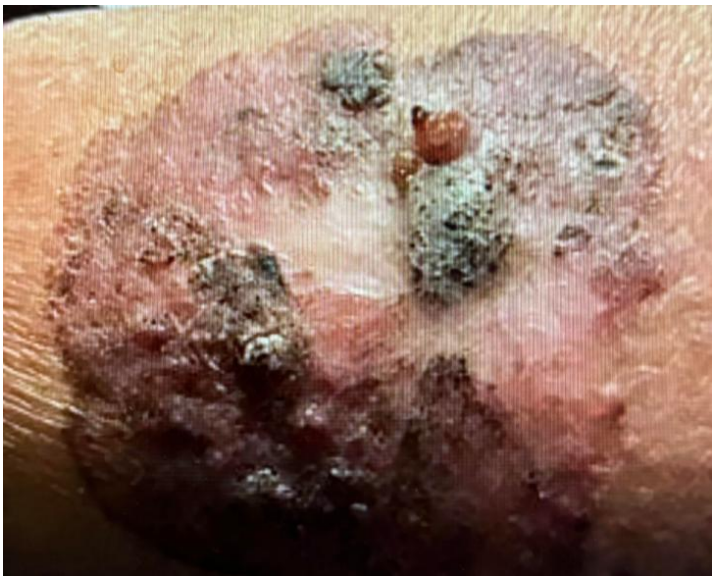

Figure 1: Clinical presentation of the lesion on the lower right leg, appearing as an irregular, exophytic, ulcerated plaque surrounded by erythematous and crusted regions, interspersed with dark brown to black necrotic centres.

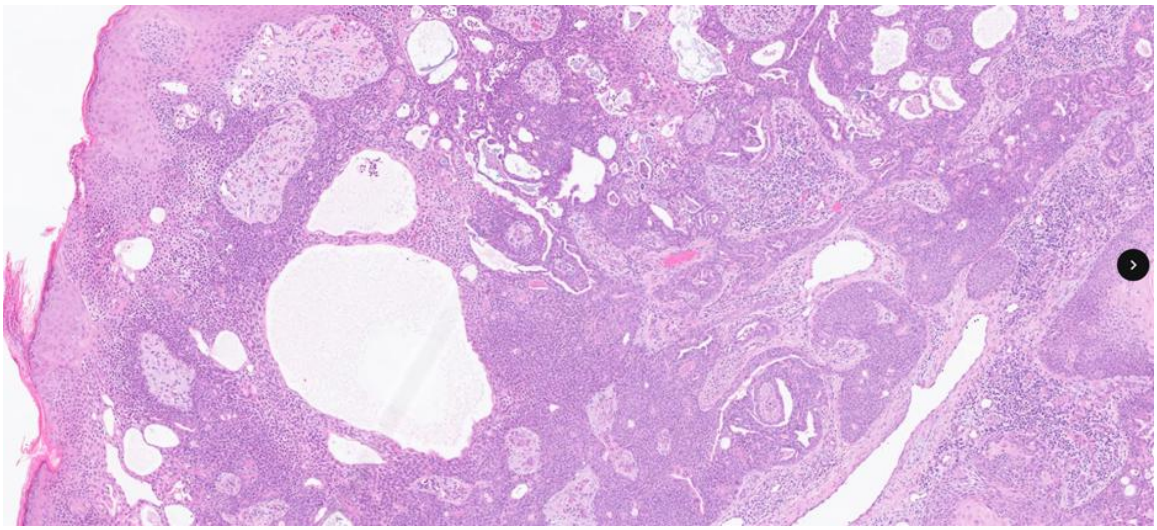

Figure 2: Histological image demonstrating a biphasic lesion with both benign and malignant components. The well-demarcated nests with ductal differentiation and cystic spaces suggest an eccrine origin, characteristic of eccrine poroma. In contrast, adjacent areas exhibit infiltrative growth, nuclear pleomorphism and architectural disarray, consistent with Eccrine Porocarcinoma (EPC). These findings highlight the malignant transformation within a pre-existing poroma.

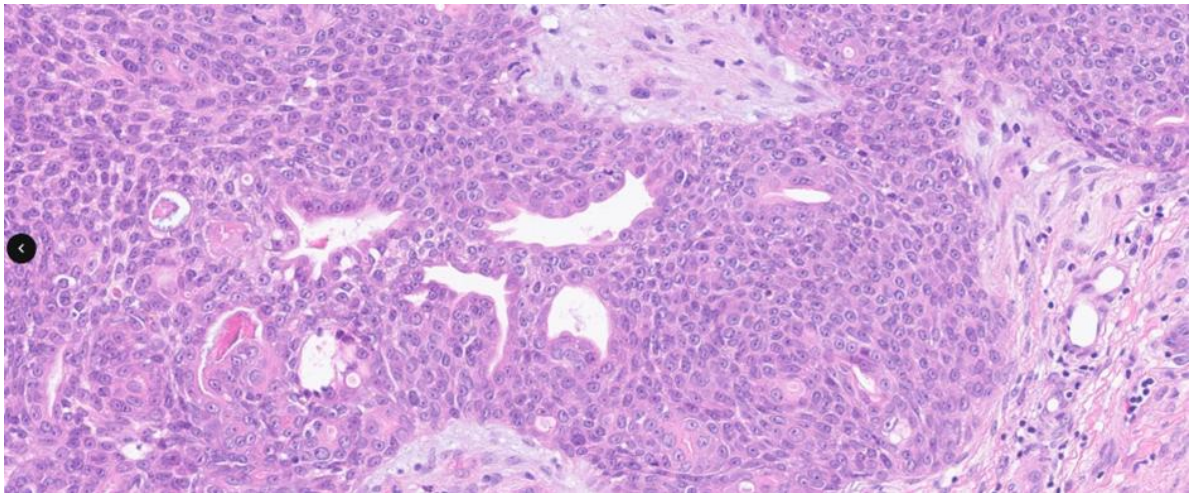

Figure 3: This higher magnification image reveals marked nuclear pleomorphism, prominent nucleoli and increased mitotic activity, all indicative of malignancy.

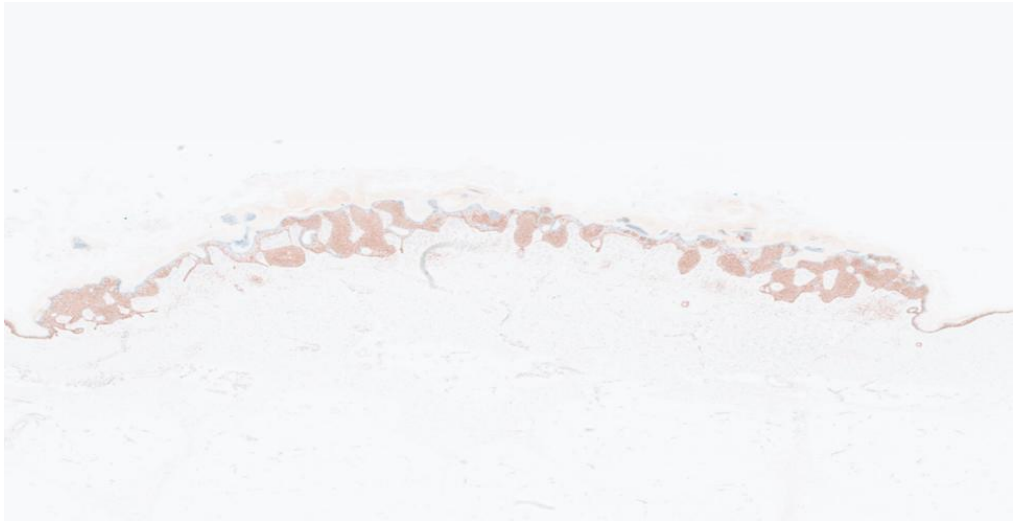

Figure 4: Immunohistochemical analysis demonstrated moderately strong positivity for GATA3 in the lesional cells.

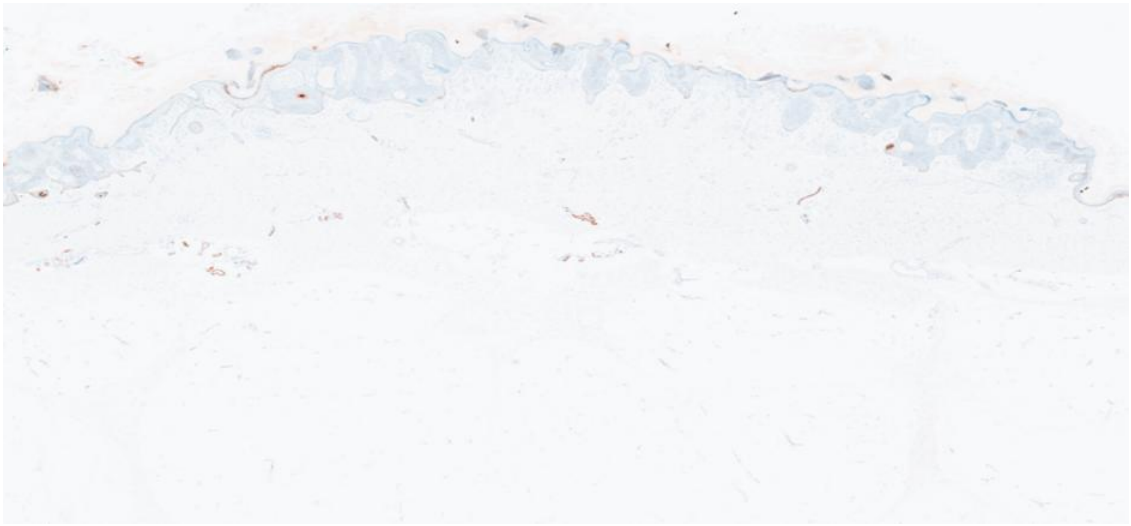

Figure 5: Carcinoembryonic Antigen (CEA) highlighted occasional ducts.

The presence of irregular ductal structures within tumor nests supports eccrine differentiation. Compared to the adjacent benign poroma, the EPC component shows loss of cellular cohesion, asymmetric growth and cytological atypia, reinforcing the diagnosis of malignant transformation from a benign precursor.

Discussion

The coexistence of EP and EPC within a single lesion presents significant clinical difficulties and highlights the potential for malignant transition within benign adnexal tumours. It demonstrates the necessity of careful histopathological evaluation for an accurate diagnosis, especially in longstanding lesions, as the transition to malignancy takes a mean of 8.5 years [3]. EPC can develop from long standing naevus sebaceous and actinic lesions as well as EP, moreover, EPC lacks unique dermoscopy features as similar findings are observed in dermoscopy of both EP and EPC such as white to pink halo and polymorphous blood vessels [7].

Clinically there are also similar characteristics to squamous cell carcinoma, basal cell carcinoma, hidradenocarcinoma and seborrheic keratosis, contributing to the two misdiagnoses in this case of seborrheic keratosis and SCC, with SCC being the main referral diagnosis. However, certain features may be associated with poor prognosis such as ulceration, rapid growth, spontaneous bleeding, pain and multi nodularity [8]. These may also be used to differentiate between EPCs and EPs, the latter typically being asymptomatic and slow growing [4].

In most cases of EPC ductal differentiation with nuclear pleomorphism is observed and can help distinguish from EP in which there is typically uniform cell architecture. High mitotic activity, cytological atypia and tumour necrosis are also recognised features aiding a diagnosis of EPC [9]. Hyperchromatic nuclei and prominent nucleoli also help set apart EPC from EP [10]. There is often acanthosis as seen in this case. EPCs can exhibit three distinct tumour border patterns 8; infiltrative, with malignant clusters infiltrating the dermis, pushing, with a well defined dermal border around a polypoid tumour or pagetoid with an intraepidermal tumour spread resembling Paget's disease.

An infiltrative growth pattern in Eccrine Porocarcinoma (EPC) is linked to poorer prognosis, local recurrence, lymphovascular invasion, deep tumor invasion (>7 mm) and high mitotic activity (>14 mitoses/HPF) [11]. This pattern, along with features like central necrosis (seen in up to 54% of cases), mitoses, asymmetric architecture and squamous differentiation (found in 36.4% of EPCs), is more common in EPC than benign poromas [12]. Squamous differentiation's classification remains debated, reflecting the complexity of malignant transformation and contributing to diagnostic challenges with squamous cell carcinoma, which shares similar aggressive features [5,11].

Immunohistochemistry helps diagnose Eccrine Porocarcinoma (EPC) and distinguish it from benign poromas and other tumors. Ki-67 indicates malignancy and recurrence risk [13]. Altered Rb, p16 and p53 expression differentiate EPC from benign lesions

[14]. EMA and CEA highlight ductal structures, with EMA more sensitive but not specific, as both can be positive in squamous cell carcinoma [15]. Additional markers are needed for definitive diagnosis.

Chemotherapy generally shows limited effectiveness in Eccrine Porocarcinoma (EPC), with low response rates to agents like carboplatin or cisplatin, though some reports suggest combination regimens or single-agent docetaxel may improve outcomes [16,17]. Adjuvant radiotherapy combined with chemotherapy can achieve good locoregional control in high-risk cases, but radiotherapy alone has not significantly improved overall survival [18].

Immunotherapy, particularly PD-1 inhibitors such as pembrolizumab and nivolumab, has shown promising results in advanced or metastatic EPC, sometimes inducing remission after other treatments fail [19]. Despite these advances, wide surgical excision with clear margins remains the cornerstone of treatment due to EPC's aggressive nature, often requiring adjuvant therapies to reduce recurrence [20,21]. On the other hand, radiotherapy has been shown to have no significant impact on overall survival [21].

This case highlights the diagnostic and clinical challenges EPC presents, particularly in its coexistence with EP, reinforcing the importance of early detection, thorough histopathological evaluation and surgical excision with clear margins for optimal outcomes. The process of malignant transformation from EP to EPC remains incompletely understood, necessitating further research into the genetic and epigenetic drivers to refine diagnosis and identify therapeutic targets. Emerging treatments such as immunotherapy show promise but require additional validation in larger studies. Establishing standardized diagnostic and treatment guidelines is crucial to improving outcomes for this rare malignancy.

Conclusion

A physical examination is insufficient to diagnose EPC as it mimics several other skin conditions including Squamous Cell Carcinoma (SCC), basal cell carcinoma, seborrhoeic keratosis, hidroacanthoma and pyogenic granuloma and has several overlapping clinical features with EP. Consequently, histopathological and immunohistochemical analyses are required. Early diagnosis and excision of EP are critical to prevent malignant transition which leads to significantly worse outcomes, including metastases and mortality. This report highlights a unique case of EPC coexisting with benign EP emphasizing the importance of meticulous histopathological evaluation and interdisciplinary diagnostic approaches.

Conflicts of Interest

The authors declare no conflict of interest in this paper.

Funding

None

Authors' Contributions

All authors contributed to conceptualization, treatment execution, manuscript writing and final approval.

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