

# A Rare Transformation of Epidermoid Cyst into Squamous Cell Carcinoma: A Case Report with Literature Review

Authors' Contribution:  
Study Design A  
Data Collection B  
Statistical Analysis C  
Data Interpretation D  
Manuscript Preparation E  
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**Conflict of interest:** None declared

**Patient:** Male, 77  
**Final Diagnosis:** Squamous cell carcinoma  
**Symptoms:** Epidermoid cyst  
**Medication:** —  
**Clinical Procedure:** Cyst excision  
**Specialty:** Plastic Surgery

**Objective:** Rare co-existence of disease or pathology  
**Background:** Epidermoid cysts are the most common benign skin lesions that can occur anywhere on the body, and frequently occur on the face, scalp, neck, and trunk. Typically, patients are asymptomatic, and the lesions present as firm skin-colored nodules filled with keratinous or sebaceous materials that are formed by cystic expansion of the epidermal epithelium. Malignant transformation is rare in epidermoid cysts.





**Case Report:** This is a case report of a 77-year-old male Caucasian patient who presented with an epidermoid cyst on the left parietal area. Due to high suspicion, the cyst was surgically excised and sent to pathology which resulted in discovery of malignant squamous cell carcinoma with unclear margins. Aimed at obtaining clear margins, a wide excision was performed, which revealed clean margins and absence of residual cancerous cells. The patient recovered well without major complications.

**Conclusions:** Although the prevalence of epidermoid cysts is high, malignant transformation of epidermoid cysts into squamous cell carcinoma is rare. Due to its scarcity, the exact pathophysiology of malignant transformation is still poorly understood. The differential diagnosis should include the possibility of malignancy for highly suspicious lesions, and proper management guidelines should be established. Surgical resection should be the treatment of choice, and once removed, all surgically excised cysts should undergo pathologic evaluation. As clinicians, it is crucial to stay vigilant and have a low threshold for excision and thorough histological examination of specimens to allow early diagnosis and interventions which can significantly improve patient outcomes. Through the suggested guidelines, we hope to aid in better management and intervention in case of malignant transformation of epidermoid cysts.

**MeSH Keywords:** Carcinoma, Squamous Cell • Cell Transformation, Neoplastic • Epidermal Cyst

**Abbreviations:** EC – epidermoid cyst; SCC – squamous cell carcinoma

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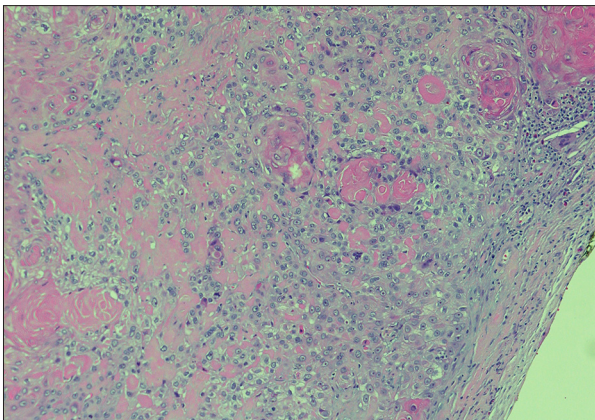
## Background

Epidermoid cysts previously known as sebaceous cysts are the most common benign skin lesions comprising about 85% to 90% of all excised cysts [1]. While they may occur anywhere on the body, they occur most frequently on the face, scalp, neck, and trunk [2]. They are typically asymptomatic and present as firm skin-colored dermal nodules that are formed by cystic expansion of the epidermal epithelium. A nodule is usually filled with keratinous or sebaceous materials, and it appears as a painless, soft lesion of variable sizes. Malignant transformation is rare in epidermoid cysts [3–5]. We present a case of malignant transformation of an epidermoid cyst into a squamous cell carcinoma that arose within the scalp.

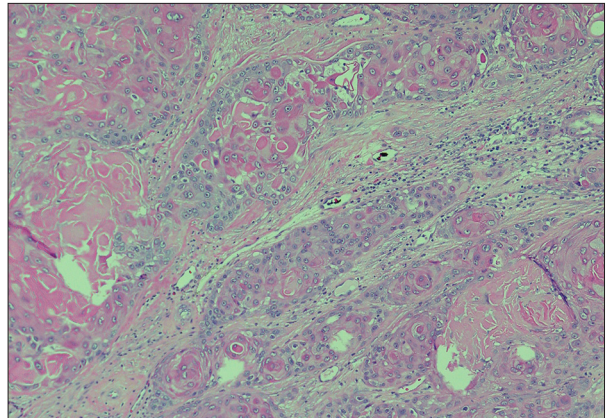
## Case Report

This is a case of a 77-year-old male Caucasian patient who presented with an epidermoid cyst on the left parietal area. His past medical history includes bladder tumor, malignant tumor of left ureter, malignant prostate cancer, and vitamin D deficiency. The patient reported that he has had this epidermoid cyst for a long time, but recently, it has significantly grown in size, which warranted an excision of the mass for further pathologic examination. The skin lesion was excised without any complications, and the specimen was sent to pathology. Unexpectedly, the pathology report revealed moderately differentiated (G2) squamous cell carcinoma (Figures 1, 2). The tumor of 2.1×2.1 cm in size was found to have unclear margins with lympho-vascular invasion.

The patient was initially hesitant in proceeding with additional interventions due to his other pre-existing medical conditions. During a 4-week follow-up visit, 2 intervention options were explained and discussed with the patient who was accompanied by his daughter: 1) a wide excision of the tumor to ensure clear



**Figure 1.** Marked nuclear atypia of the cyst suggestive of malignant transformation.



**Figure 2.** A focus of peritumoral stromal infiltration of the cyst suggestive of malignant transformation.

margins with a small possibility of radiation therapy afterward, or 2) radiation therapy as the primary treatment. Ultimately, the patient decided to proceed with wide excision of the tumor. The specimen retrieved during the wide excision procedure was sent to pathology for additional examination which showed clear margins and absence of any residual cancerous cells. The resulting defect of 4.5×5 cm in size was closed using a modified pinwheel design of 3 fascio-cutaneous flaps. The patient did well without any major complications or additional adjunct chemotherapy or radiations, and the incisions healed nicely.

## Discussion

Epidermoid cysts are very common skin lesions that most people will have at least 1 over the course of their lifetime [6] that may occur anywhere in the body. Although the prevalence of epidermoid cysts is high, malignant transformation of epidermoid cysts into squamous cell carcinoma is rare [3–5]. The incidence reported in the literature widely varies from 0.033% to 9.2% in the English language literature [4,7–9]. The wide variance in the reported incidences is due to the differences in the sample size and the target population; Collins et al. marked the lowest incidence at 0.033% with a sample size of 9000 routine examinations [7] and Bishop et al. marked the highest incidence at 9.2% with a sample of 119 suspicious lesions [8]. There has only been about a dozen cases of malignant transformation of epidermoid cysts to squamous cell carcinoma documented in the literature. The pathophysiology of malignant transformation is still poorly understood, and only some speculations have been suggested that prolonged chronic inflammation in long-standing lesions can promote malignant transformation [1].

Although most epidermoid cysts are benign lesions and malignant transformation is rare, the differential diagnosis should include the possibility of malignancy for highly suspicious lesions;

thus, proper management guidelines should be established. Highly suspicious lesions should be defined as epidermoid cysts with any of the following features: recurrent lesions, rapid growth in size, rapid progression of symptoms [10], larger than 2.0 cm in diameter, and heterogenous mixture of cyst content [11]. Surgical resection should be the treatment of choice for highly suspicious lesions when the lesion is well confined [1,6]. In conclusion, we highly recommend that once removed, all surgically excised cysts for whatever reason should be sent to pathology and examined carefully to identify any red flag features [4,12]. Although the literature lacks sufficient data to determine the effect of pre-existing malignancy on potential predisposition and transformation risk of an epidermoid cyst into squamous cell carcinoma, the potential should not be ignored. In addition, once the transformation of benign lesion to malignancy has been confirmed, the treatment options should be discussed accordingly depending on the tumor type.

As demonstrated in previous studies and reports, it is important to consider the potential effect of sample sizes on the calculated incidences [7–9]. All the while, the true incidence of malignant transformations of epidermoid cysts has been steadily increasing although the underlying etiology is still poorly understood; thus, it warrants other treatment modalities to be considered as well once the transformation has occurred and

been confirmed [10]. Other adjunct treatments might include chemotherapy and radiotherapy which can prove to be beneficial, resulting in increased postoperative survival time [13–15].

## Conclusions

As clinicians, it is crucial to stay vigilant and have a low threshold for excision and thorough histological examination of specimens to allow early diagnosis and interventions, which can significantly improve patient outcomes. Furthermore, effective and efficient communication should be held between the pathologist and the surgeon to facilitate adequate surgical removal in addition to possible reconstructive procedures for larger defects resulting from excision of a lesion [16]. The current set of literature still lacks sufficient data to determine the clear relationship between the presence of malignancy, the possibility of concurrent cancer therapy involvement, and the risk of malignant transformation from epidermoid cyst to squamous cell carcinoma; however, it is important to note that the lack of sufficient data does not equal absence of relationship.

## Conflict of interest

None.

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