Invasive Well-Differentiated Keratinizing Squamous Cell Carcinoma arising from Epidermal Inclusion Cyst of the Plantar Foot: A Case Report

Crystal Gunsch, DPM[1], Paul J. Carroll, DPM[2], Karen K. Evans, MD[3], Christopher E. Attinger MD[4]

1: Resident PGY3, Podiatric Surgery, MedStar Washington Hospital Center, Washington, DC, USA 2: Attending Physician, MedStar Georgetown University, Department of Podiatric Surgery, Washington, DC, USA 3: Associate Professor, Department of Plastic Surgery, MedStar Georgetown University Hospital, Washington, DC, USA 4: Professor, Department of Plastic Surgery, MedStar Georgetown University Hospital, Washington, DC, USA

STATEMENT OF PURPOSE

Epidermal inclusion cysts are commonly encountered benign lesions. Malignant changes of these cysts are rare with few cases reported, most of which in the head and neck region. Specific signs and symptoms may aid the diagnosis and determine when a comprehensive histological evaluation is warranted. This case report is of a healthy 47-year-old who underwent an elective forefoot surgery and subsequently developed a benign keratinous cyst to her plantar foot with malignant transformation to squamous cell carcinoma (SCC).

LITERATURE REVIEW

Epidermal inclusion cysts are keratin-filled cystic lesions that typically occur subcutaneously or intradermally and are histologically benign. They are most frequently encountered in the trunk, head, and neck region, but can occur anywhere on the body [1]. Traditionally these cysts are described as originating from the infundibular portion of the hair follicle. When occurring in glabrous regions, such as the plantar foot, the etiology is more likely traumatic epidermal implantation into the dermis [2, 3]. The incidence of malignant transformation of epidermal inclusion cysts to squamous cell carcinoma (SCC) is very rare, with an estimated range of 0.011 to 0.045% [4]. The pathogenesis of malignant transformation is poorly understood, but it is suggested that chronic irritation or repetitive trauma to the epithelial lining of the cyst may contribute [5].

Frank et al. performed a literature review for documented cases of SCC arising from cutaneous epidermal inclusion cysts. From the 41 cases documented and reviewed, the most common site of cyst occurrence was the head and neck. There were no lower extremity cases identified. The most common presenting symptoms were pain, rapid cyst enlargement, and overlying skin changes such as erythema, ulceration, or drainage [5].

CASE STUDY

This case study presents a healthy 47-year-old female with past medical history of hypertension and tobacco use who underwent an elective second metatarsal head resection for a painful callus in 2010. She was treated for five years at an outside hospital for a non-healing wound with possible osteomyelitis that resulted in a second ray amputation. She presented to our clinic with a painful open, draining wound that appeared clinically infected. Radiographs were indeterminate for osteomyelitis [Figure 1].

Initial surgical debridement was performed with identification and resection of a cyst that measured 8.0 x 1.0 x 2.5 cm plantar to the 2nd metatarsal. All bone excised was negative for osteomyelitis. Histopathology reported the cyst as a benign keratinous cyst, negative for atypia or malignancy. The wall of the cyst was reported as having fragments of verrucous squamous keratosis with focal reactive epitheliomatous hyperplasia and dermal chronic inflammation, but also negative for dysplasia or malignancy.

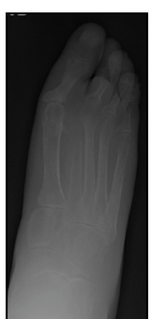

Figure 1. Radiograph of patient upon initial evaluation

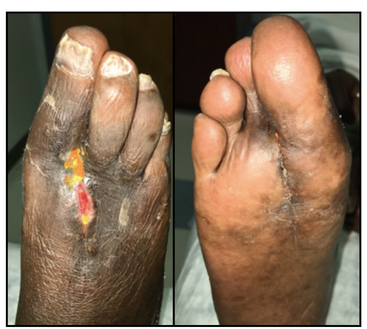

Figure 2. Clinical photo following initial excision of epidermal inclusion cyst; non-healing dorsal incision.

CASE STUDY CONTINUED

After a four month period of uneventful healing, the patient re-presented to our clinic with a draining sinus tract from the incision site [Figure 2]. MRI revealed a hyper-intense collection extending from the skin in the region of clinical concern into the soft tissues of the first web-space [Figure 3]. Repeat surgical debridement was performed and intraoperatively a cyst with sebaceous material was found to have reformed plantarly to the second metatarsal. It was fully excised and sent to pathology. At this time, the histopathology report resulted as invasive well-differentiated keratinizing squamous cell carcinoma with verrucous features.

An oncology consultation was obtained and the patient underwent wide excision until clear margins were noted. She required a free vastus lateralis flap to cover the defect. One year later, the patient presented with a draining sinus tract and an MRI suggestive of squamous cell carcinoma recurrence. Intraoperative biopsy results confirmed recurrence. Given the extent of her wound, the patient opted to not pursue neoadjuvant treatment and proceeded with a right below knee amputation to manage her recurrent SCC.

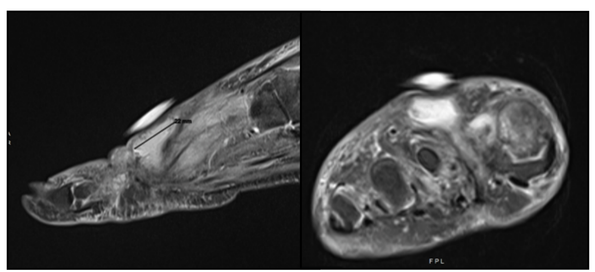

Figure 3. MRI revealing hyper-intense collection extending from dorsal to plantar aspect of foot.

DISCUSSION

Clinically, potentially malignant epidermal inclusion cysts can be very difficult to distinguish from benign cysts. Atypical symptoms that raise suspicion for malignant transformation may include recurrence after excision, ulceration of overlying skin, or rapid growth. If an infected cyst is suspected, failure to respond to medical treatment should also raise concerns. [5, 6]

In this case report, malignant features can be observed such as recurrence of the patient's cyst in four months with an overlying non-healing and draining wound. As previously mentioned, the exact mechanism of malignant transformation is unknown. The setting of increased irritation, both from chronic infection and weight-bearing, may have played a role in this patient. To the best of our knowledge, this is the first case reported of SCC arising from an epidermal inclusion cyst of the plantar foot.

Due to the very low incidence of malignancy in epidermal inclusion cysts, routine surgical excision is not advised and therefore detailed pathological evaluation of the cyst may not always be performed [4]. It is important to recognize potentially malignant features so appropriate histopathological evaluation and treatment can be implemented.

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