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Case Reports and Series

A Rare Presentation of a Giant Epidermoid Inclusion Cyst Mimicking Malignancy

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ABSTRACT

Epidermoid inclusion cysts, infundibular cysts, and retention cysts are dense, well-encapsulated benign soft tissue lesions that develop after a portion of the epidermis has become implanted in the dermis on a follicular surface such as the scalp, face, or trunk. However, on acral surfaces such as the palms and soles, these cysts present <10% of the time. Typically, these lesions will not progress to sizes >5 cm. However, a rare subtype of epidermal cysts known as giant epidermal cysts tends to be much larger. Unlike epidermal inclusion cysts, giant cysts lack a central punctum, present on areas of thick skin lacking hair follicles, and affect an older patient population. Because of their large size and unique characteristics, few cases of giant epidermal cysts localized to the foot have been reported. We present a case report of a 57-year-old male with a rapidly growing, large, ulcerated, atypical epidermal inclusion cyst that had developed on the medial aspect of his hallux with underlying osseous changes. In this particular case, the location, overlying skin changes, and rapid growth of the lesion raised suspicion for malignancy. In the present report, we discuss the unusual features of this particular cyst and the etiologies, treatment course, and short-term outcomes regarding this unique tumor.

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Epidermal inclusion cysts (EICs) are benign, mildly tender, soft-to-firm masses that rarely reach a size >5 cm. These lesions might or might not be adherent to the surrounding soft tissue structures. Berlin (1) in his large histopathologic study of 2720 patients reported a rate of 7.2% of plantar lesions, and Ozawa et al (2) found <10% occurred on the extremity, with the palm of the hand and sole of the foot the most rare. Predisposition for cyst formation on the scalp, trunk, or other follicular surfaces can result from blockages in the pilosebaceous units, which are not present on the plantar surface of the foot (3,4).

Other etiologies include cyst formation when a portion of the epidermis becomes implanted into the dermis secondary to atraumatic or traumatic means. The palms and soles might be more prone to traumatic cysts because they are at the greatest risk of penetrating-type injuries (5). One study reported the case of a Vietnam veteran who developed an epidermal cyst after stepping on a punji stake made of bamboo during the Vietnam War (6). Another study reported cysts that had developed on an infant's heel secondary to multiple needle sticks from blood sampling (7). Injections, callus and wart

debridements, puncture wounds, and shoe impingement are all causes of possible traumatic implantation that can result in EICs.

Two theories exist for cyst formation resulting from atraumatic means. Infection with human papillomavirus (HPV) strains 57 and 60 might cause epidermoid metaplasia of the eccrine duct epithelium by delaying cell cycle arrest and differentiation. This, in turn, will cause epithelial proliferation and thickening of the skin, resulting in cyst formation (8). When a plantar verruca is present on the weightbearing surface, a portion of the wart can penetrate into the dermis and cause a cyst. The second theory was described by Yale in 1974 and included mislaid residual ectodermal tissue during embryogenesis causing atraumatic cyst formation (3). The recommended treatment is surgical excision of the lesion, because good prognostic indicators or staging levels are not available and the malignant transformation rate has been as great as 9.2% (2,5).

Case Report

Our patient, a 56-year-old nondiabetic male with a history of gout, hypertension, and hypothyroidism, presented to our clinic complaining of a large ulcerated painful mass on his medial left hallux. The patient stated that the mass had first appeared 6 months earlier but had then rapidly grown in size during the past 3 months. The patient denied any trauma to the area and had never had lesions similar to

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Fig. 1. Clinical appearance of ulcerated soft tissue mass on the plantar-medial left hallux.



Fig. 2. Close-up view of the ulcerated soft tissue mass on the plantar-medial left hallux.

this before. However, the patient had been seen by another podiatrist for wart debridement at that location within the previous year, which had since resolved. The patient denied any recent gout attacks and had been taking long-term gout medication prescribed by his primary care physician. The mass was so large that he had had to cut out a portion of the soft neoprene toe box of his shoe to accommodate the mass. On clinical examination, the lesion measured 4.6 cm × 4.8 cm × 0.9 cm, was well-adherent and firm, and did not transilluminate (Figs. 1 and 2). No bruit was heard, and no palpable thrill was evident. The mass had a hypergranular base without sinus tracts, active drainage, purulence, or probe to bone.

Radiographs were obtained, which revealed a soft tissue mass and a small cystic area in the distal medial head of the proximal phalanx of the hallux underlying the mass (Figs. 3 and 4). No apparent periosteal reaction was present, and the cortex appeared intact. Advanced imaging studies appropriate for this lesion such as magnetic resonance imaging (MRI) or ultrasonography (US) were considered; however, owing to the rapid growth and clinical presentation of the mass, rapid, more definitive, surgical resection was recommended. The differential diagnosis for the mass included epidermoid carcinoma, squamous cell carcinoma, sarcoma, fibroma, lipoma, and Gardner syndrome (2-5).

The patient was brought to the operating room and placed on the table in a supine position. Intravenous (IV) sedation was used, in addition to a local block for anesthesia. An ankle tourniquet was applied to the extremity and inflated to 225 mm Hg. Blunt dissection using a hemostat was performed around the periphery of the mass to free it from any surrounding structures. Intraoperatively, the mass had a stalk that extended into the interphalangeal joint of the hallux (Fig. 5). The mass was completely excised. The mass had extended down to the level of bone but had not invaded the cortex (Fig. 6). The gross appearance of the specimen was yellow, firm, and rubbery and measured 4.6 cm × 4.8 cm × 1.3 cm (Fig. 7). A Jamshedi needle was used to obtain a bone biopsy of the intraosseous cyst in the distal medial head of the proximal phalanx, which was sent for microbiologic and pathologic examination. A curette was used to remove any remaining epithelial lining in the cystic area. The redundant skin was sharply resected, and

deep closure was completed with 3-0 Vicryl suture (Ethicon, Somerville, NJ). Skin closure was completed with 3-0 nylon suture, and a Silastic drain was placed in the incision site to prevent fluid entrapment in the remaining dead space (Figs. 8 and 9). The incision site



Fig. 3. Radiographic image showing the increased soft tissue contour and intraosseous cyst in the distal medial proximal phalanx.

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