Exposed hardware in a patient with invasive keratinocyte carcinoma

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INTRODUCTION

The care of patients with aggressive keratinocyte carcinomas (KCs), including squamous cell carcinoma (SCC) and basal cell carcinoma, is often multidisciplinary and includes dermatologic surgeons, plastic surgeons, otolaryngologists, and other surgical subspecialties. Complex reconstructions might require osteosynthetic material, such as porous polyethylene plates and mesh. Complications of titanium implants include infection, poor wound healing, fistula formation, hardware exposure, and hardware malfunction, which might necessitate hardware removal.[1] Failure of implanted alloplastic material can initially present with chronic ulceration, but other possible etiologies of ulceration include impaired wound healing, an infectious process, inflammatory skin disease, or a recurrence of skin cancer. It is recommended for dermatologists to be aware of and knowledgeable about implantable materials and associated potential complications because they often provide long-term follow-up for these complex conditions. We present a case of a patient who presented with exposed hardware following extensive surgical treatment for invasive KC.

CASE REPORT

An 81-year-old man with a history of multiple KCs, including SCC of the left forehead, sought treatment for recurrent stage III (T4, N0, M0) SCC with orbital invasion. Prior treatment included Mohs micrographic surgery and skin grafting. The patient underwent resection by an otolaryngologist, and the tumor was found within the orbit, with extension into the frontal sinus, posterior orbital wall, ethmoid sinus, and inferiorly into the superior edge of the medial maxillary wall. The orbital wall was reconstructed using titanium mesh embedded within a polyethylene implant, and, in 2012, a free flap was performed, followed by radiation and left eye enucleation.

Abbreviations used:

KC: keratinocyte carcinoma
SCC: squamous cell carcinoma

The patient recovered from surgery but, over the next few years, continued to develop additional primary KCs at sites separate from the location of reconstruction, including SCCs on the right submental neck, right forehead, and left ear. Acitretin was taken for 2 months for chemoprevention of KC[2] but was discontinued in early 2016 because of poor wound healing. One month later, the patient had significant pain and a small erosion of his left medial orbital rim, which he attributed to chafing from the bridge of his eyeglasses. Given concern for possible SCC recurrence with supratrochlear nerve involvement, a shave biopsy was obtained at the site of the patient's pain (Fig 1, *A*). There was a white linear plaque lateral to the biopsy site. Initially, this clinically appeared to be lichenification caused by recurrent friction from the patient's eye patch. The biopsy performed to rule out recurrent SCC showed spongiotic psoriasiform dermatitis likely of multifactorial etiology from past radiation therapy and erosive pustular dermatosis. He soon developed a 2-cm ulcer with clear exposure of the implant (Fig 1, *B*). Continued expansion of the ulcer while awaiting surgical resection raised concern for

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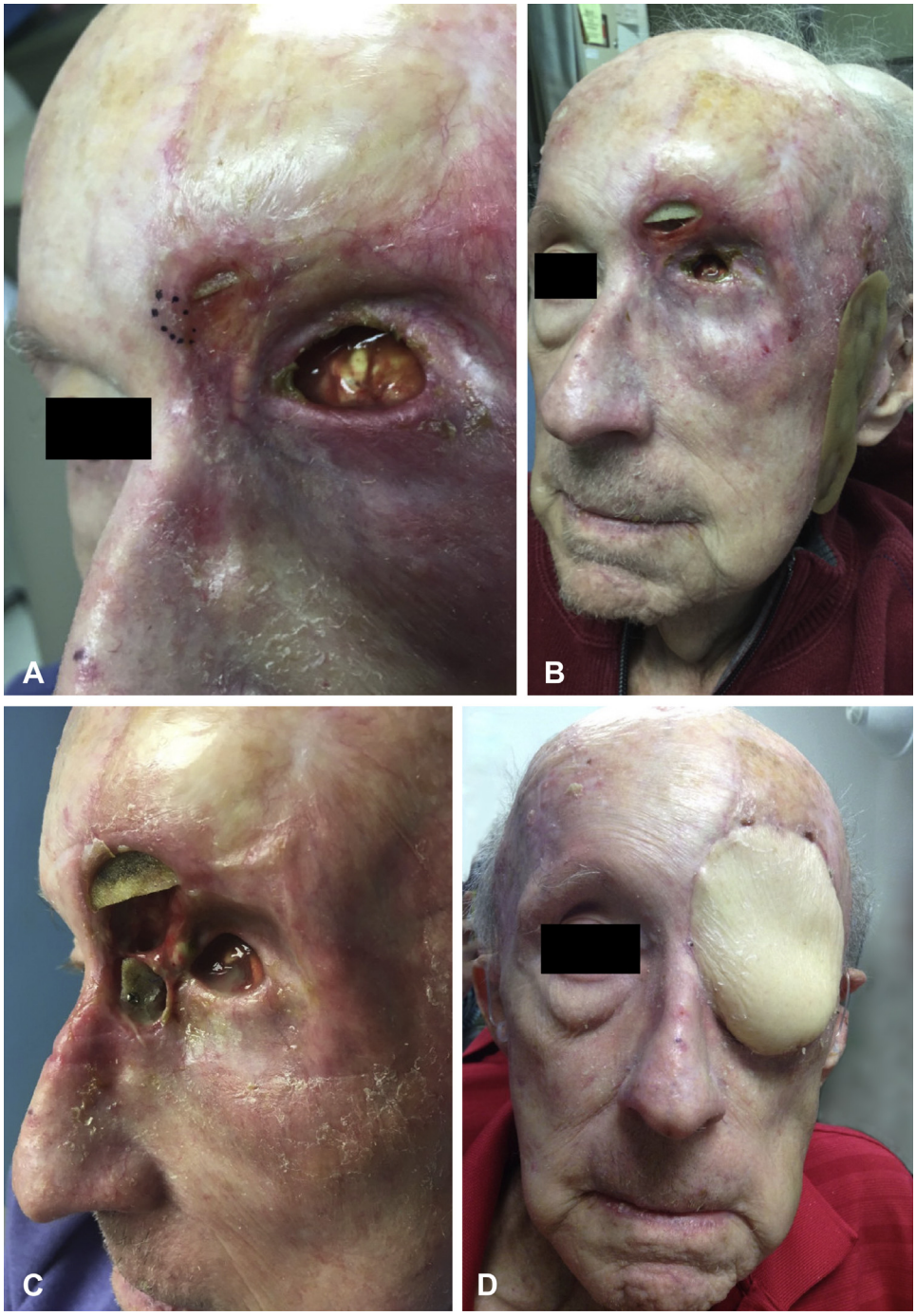

Fig 1. **A**, Dotted outline of biopsy site and white, linear, lichenified plaque lateral to biopsy site. **B**, Two-centimeter ulcer with exposure of porous polyethylene implant. **C**, Continued expansion of the ulcer, which raised concern for infection, recurrent squamous cell carcinoma, acitretin complication, or an inflammatory dermatosis such as pyoderma gangrenosum or erosive pustular dermatosis. **D**, Patient after hardware removal, left orbital exenteration, and free flap reconstruction.

infection, recurrent SCC (assuming sampling error of the previous biopsy), poor wound healing secondary to prior usage of acitretin, and inflammatory dermatoses such as pyoderma gangrenosum or a variant of erosive pustular dermatosis (Fig 1, *C*). Treatment consisted of removal of hardware, left

orbital exenteration, and free-flap reconstruction (Fig 1, *D*). The patient remains free of recurrent SCC at this site and without further surgical complications 14 months after the initial skin breakdown.

DISCUSSION

Treatment of high-risk KCs is most often surgical because this yields the highest likelihood of cure.[2] Surgical treatments include wide local excision and Mohs micrographic surgery, but invasive and aggressive cancers might require multidisciplinary surgical management.[3] Extensive KCs invading surrounding structures might require reconstruction with osteosynthetic materials such as titanium plates and mesh after the cancer is removed. The most common alloplastic materials used in head and neck reconstruction include metals (mainly titanium), ceramics (bioactive glass, calcium phosphate, hydroxyapatite, β-tri-calcium phosphate, aluminum hydroxide), plastics (acrylate, porous polyethylene), and composites.[4] Permanent alloplastic materials including porous polyethylene embedded with titanium mesh facilitate tissue and blood vessel growth[5] and are widely used in craniofacial reconstruction because they have been shown to reduce foreign body reactions and capsule formation and are able to osseointegrate.[6] Use of hardware for surgical reconstruction of tissue defects after resection of invasive cutaneous malignancies can be complicated by ulceration and exposure. Removal of symptomatic craniofacial hardware is a generally accepted practice and has been described in the maxillofacial literature in the context of palpability, exposure, infection, pain, hardware malfunction, and secondary reconstructive surgery.[1,7] Dermatologists should be aware of these potential complications, learn to recognize these various implanted materials, and consider a broad workup to evaluate the underlying cause, which might include infection, radiation dermatitis, recurrent tumor, metabolic or iatrogenic impairment of wound healing, or an inflammatory dermatosis.

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