

## Squamous Cell Carcinoma, Keratoacanthoma-type Within a Tattoo

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# Squamous Cell Carcinoma, Keratoacanthoma-type Within a Tattoo

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Lehigh Valley Health Network, Allentown, Pennsylvania

## Case Presentation:

**Patient:** 64 year-old Caucasian male.

**History of Present Illness:** Patient presents with new growths on his right outer leg that have been present for four months. Lesions appeared within the red ink portion of his tattoo. He admits to burning sensation if touched but denies itching and bleeding. Patient tried using antibiotic ointment which he believes made the lesions larger.

**Medical History/Surgical History:** Four cutaneous squamous cell carcinomas with two being the keratoacanthoma type, emphysema, hepatitis C, coronary artery disease, myocardial infarction, cerebral vascular accident, tonsillectomy, inguinal hernia s/p herniorrhaphy

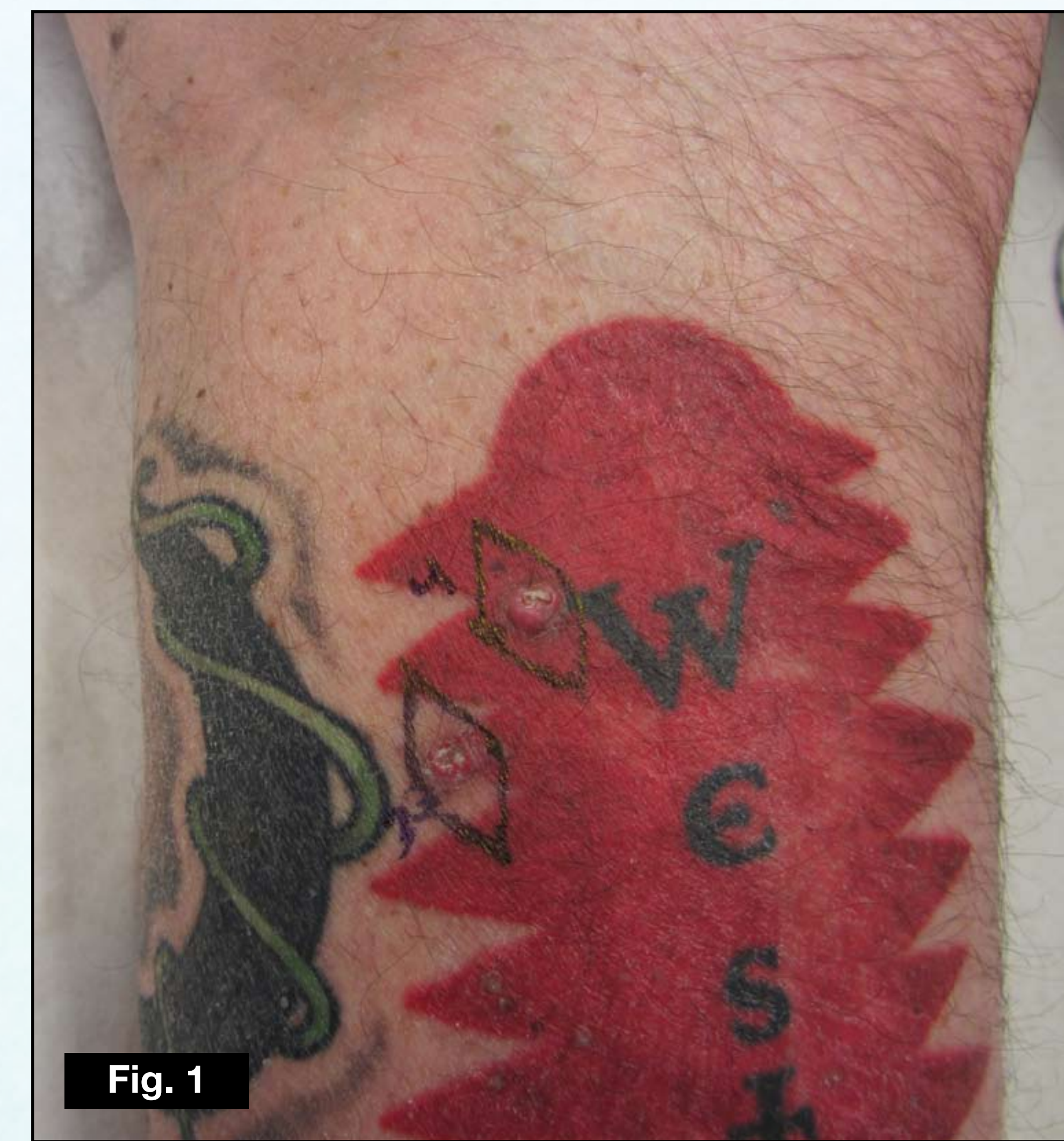
**Medications:** Apixaban, esomeprazole, and tiotropium inhaled

**Previous Treatments:** Wide local surgical excision and excisional biopsies

**Physical Examination:** There is a large tattoo comprised predominantly of red ink on the right anterior leg. Within the red portion of the tattoo are four scattered erythematous, crateriform, keratotic papules and nodules ranging in size from 0.6-1.1 cm.

**Studies:** *Advanced Dermatology Associates, LTD.* (AD15-00774, 1/21/2015) 1. Right inferior lateral lower leg: "Well-differentiated squamous cell carcinoma, keratoacanthoma type, involving the reticular dermis and transected at the base of the specimen."

(AD15-01682, 2/13/2015) 2. Right lateral lower leg, anterior; 3. Right lateral lower leg, proximal posterior; 4. Right lateral lower leg, proximal superior: "Atypical squamous proliferation, consistent with early evolving or regressing well-differentiated, invasive squamous cell carcinoma, keratoacanthoma-type, with adjacent superficial dermal and focal intracorneal red tattoo pigment, completely excised. AFB-Fite, Gram, PAS, and GMS were each performed and were negative for infectious organisms."



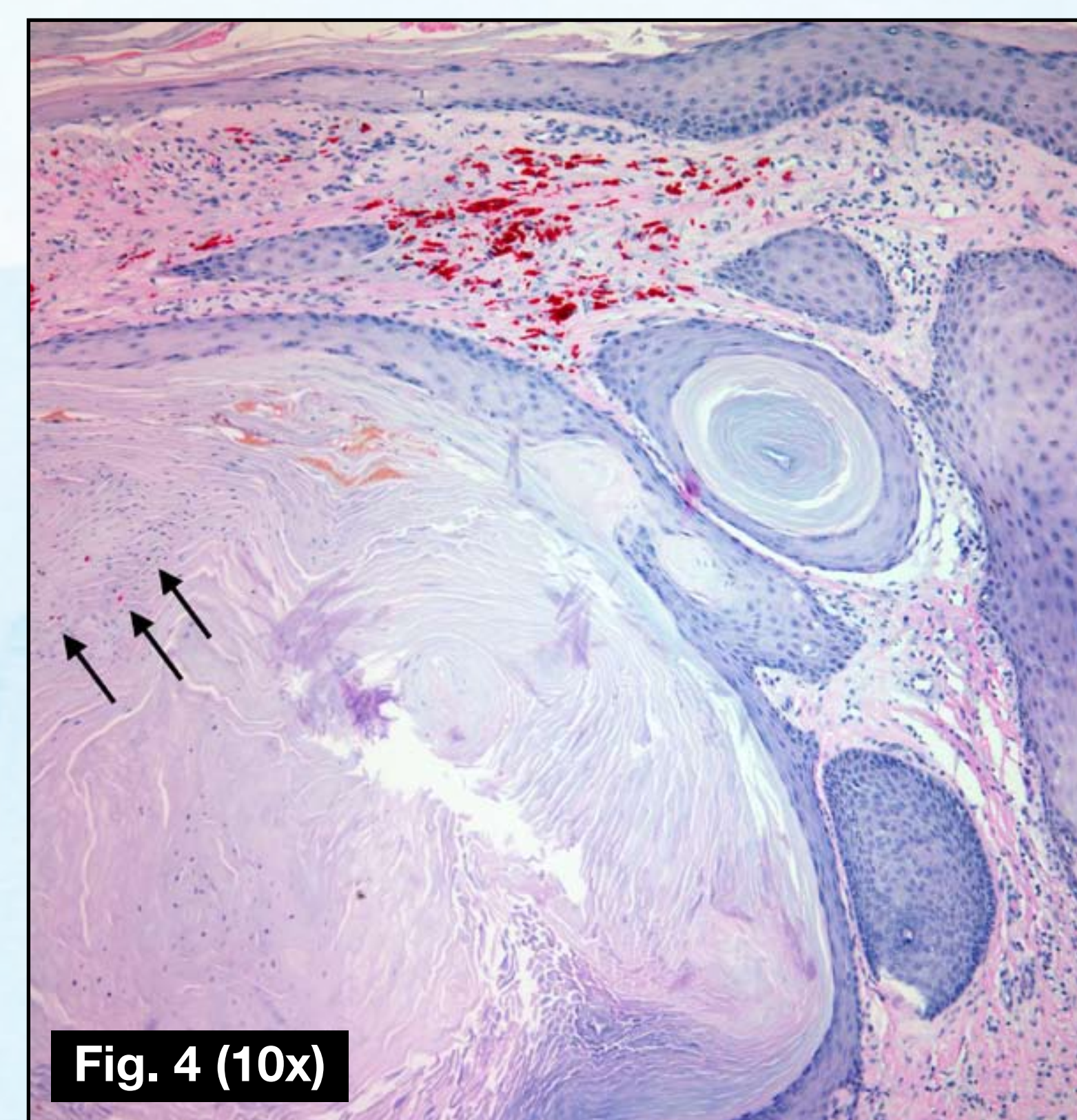
**Figure 1:** Two crateriform, keratotic nodules located within red tattoo pigment on the right lateral lower leg, proximal superior and proximal posterior measuring 8 mm and 9 mm respectively.



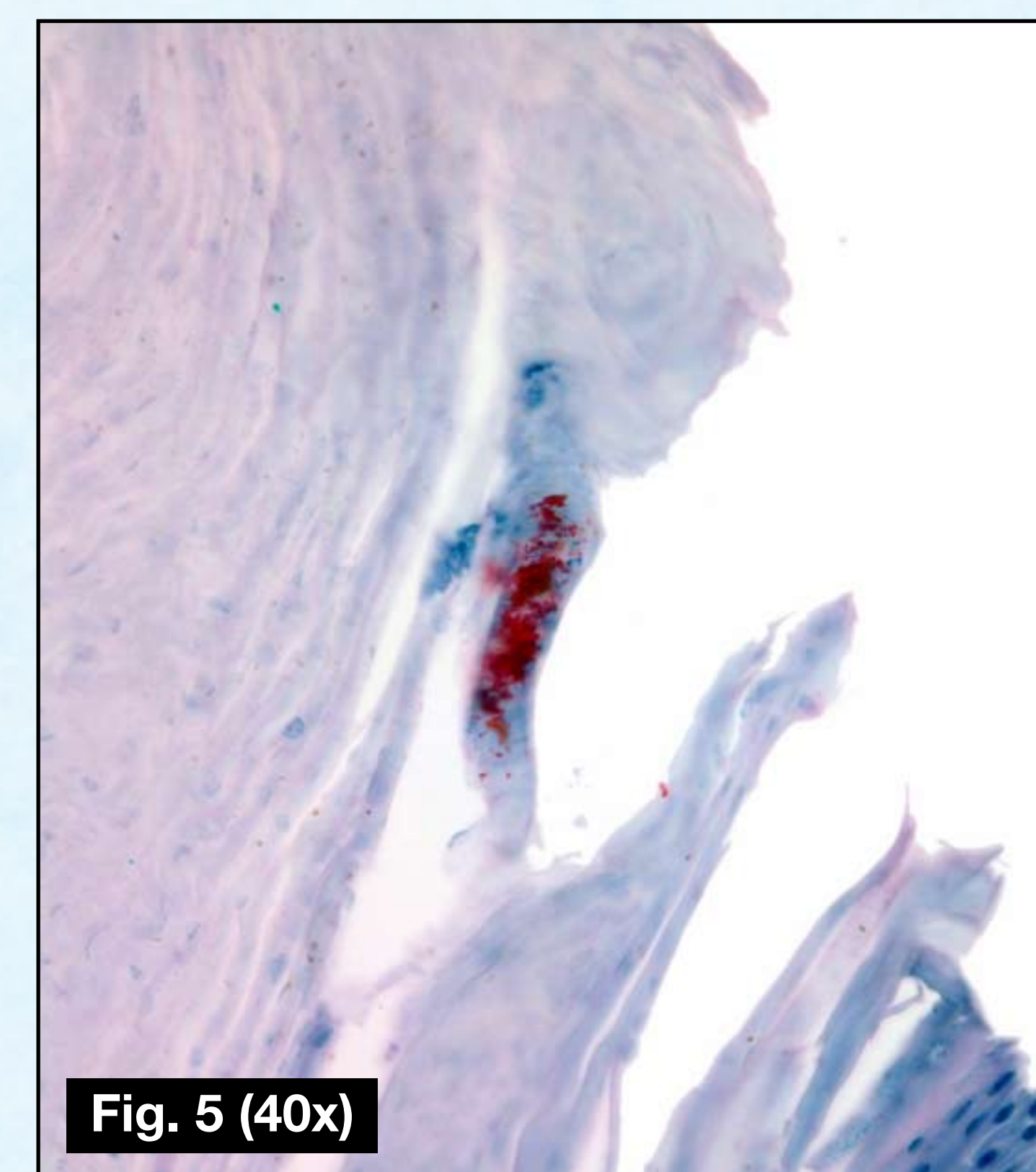
**Figure 2:** A 1.1 cm crateriform, keratotic nodule located within the red pigment of the tattoo on the right lateral lower leg, anterior.



**Figure 3:** Atypical squamous proliferation consistent with keratoacanthoma. Note the red tattoo pigment embedded in the apex of the cutaneous horn (see arrow).



**Figure 4:** Atypical cystic squamous proliferation with notable red tattoo pigment in the surrounding dermis and focally embedded in the cutaneous horn (see arrows).



**Figure 5:** High power view of red tattoo pigment embedded in the apex of the cutaneous horn.

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## Discussion:

Keratoacanthoma (KA) is a common keratinizing squamous cell neoplasm characterized by rapid growth and spontaneous involution. Though the origin is not completely understood, ultraviolet light, carcinogenic exposure, genetics, immunosuppression, viral infection and trauma have been associated with development of KA. Tattoo-induced KA is less commonly reported. It typically presents as a rapidly enlarging crateriform nodule most commonly on sun-exposed skin. Clinically the lesion may resemble a viral verruca, squamous cell carcinoma, and mycobacterial or fungal infection.

Histopathologically, KA demonstrates a well-circumscribed, keratin-filled invagination of the epidermis with hyperkeratosis, parakeratosis, and acanthosis. Atypical squamous cells may be present but cellular atypia is less remarkable as the lesion matures. Histopathological differential includes pseudoepitheliomatous hyperplasia, squamous cell carcinoma (SCC), and verrucous carcinoma. Pseudoepitheliomatous hyperplasia is a similar appearing, rapidly growing lesion that is often difficult to distinguish from KA; histopathological correlation is required for diagnosis. A history of rapid growth and development may help distinguish KA and SCC clinically.

Most cutaneous reactions associated with tattoos occur within red ink. A case series of 11 KAs associated with tattoos demonstrated that 82% were within or in close proximity to red ink. Mercuric sulfide (cinnabar), sienna (ferric hydrate), sandalwood, brazilwood, and organic pigments (aromatic azoic compounds) have all been found in red ink. Mercury compounds were eliminated in 1976 because of its potential carcinogenicity. However, some organic colorants (azo compounds) that were classified as carcinogenic remain in current ink products.

Approximately 50 skin cancers in tattoos have been reported in the past 40 years, 23 of which presented as SCC and KA. In the past few years there has been an increase in the incidence of isolated and eruptive KAs within tattoos. Potential mechanisms of induction have been proposed and include trauma from the tattoo procedure, introduction of potential carcinogenic compounds, and sun-exposure. However, with such a low number of reported skin cancers arising in tattoos some consider the association between tattoos and skin cancer coincidental. Despite the elusive pathogenesis of this phenomenon, the presence of intracorneal red tattoo pigment within the squamous proliferations in our specimens raises the possibility that the lesions could represent a reactive form of transepidermal elimination of the tattoo pigment.

Primary management of these lesions includes complete surgical excision. Careful long-term follow-up is recommended to monitor for recurrence or presence of new lesions. Though larger studies are needed to determine the actual causation of skin cancer within tattoos, patient education on the potential health effects of tattooing and implementation of regulations regarding ink manufacturing is necessary in the meantime.

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