Keratoacanthomas as a Complication of Dermal Filler Injections

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Keratoacanthomas (KAs) are common squamous neoplasms that originate in the pilosebaceous glands. KAs are considered by some physicians to be well-differentiated squamous cell carcinomas. The exact cause of KAs is unknown; however, they are associated with sun exposure, genetic factors, immunosuppression, carcinogens, viruses, and trauma.

Histologically, a KA is characterized by deep, bulbous lobules of keratinizing, well-differentiated squamous epithelium with a keratin-filled central crater. There is marked acanthosis with hyperkeratosis and little or no parakeratosis.

Multiple KAs may be classified as the Ferguson-Smith type, the Grzybowski type, and the Witten and Zak type. KAs grow rapidly and, in most cases, resolve spontaneously. Although KAs rarely progress to metastatic carcinoma, early diagnosis and treatment are recommended.

In this article, we describe a patient who developed multiple facial KAs after receiving dermal filler injections. The patient responded favorably to treatment with acitretin 50 mg once daily for 1 month. This is a rare presentation of KAs occurring after dermal filler injections.

Keratoacanthomas (KAs) are common squamous neoplasms that originate in the pilosebaceous glands. KAs are considered by some physicians to be well-differentiated squamous cell carcinomas. KAs commonly form on the face, arms, and hands. The exact cause of KAs is unknown; however, they are associated with sun exposure, genetic factors, immunosuppression, carcinogens, viruses, and trauma.[1] Histologically, a KA is characterized by deep, bulbous lobules of keratinizing, well-differentiated squamous epithelium with a central keratin-filled crater. There is marked acanthosis with hyperkeratosis and little or no parakeratosis.

There are different clinical types of multiple KAs: the Ferguson-Smith type (characterized by multiple self-healing KAs that occur in adolescence and tend to heal spontaneously with atrophic scars), the Grzybowski type (characterized by multiple eruptive KAs), and the Witten and Zak type (characterized by multiple familial KAs).[2] The Grzybowski type is generally associated with severe pruritus and is most common in adults.[3] Multiple KAs may be associated with internal cancer, such as the Muir-Torre syndrome, which is characterized by multiple KAs and cancer of the gastrointestinal tract.[4]

KAs greater than 2 cm in diameter are known as *giant KAs*. Rare variants include KA centrifugum marginatum

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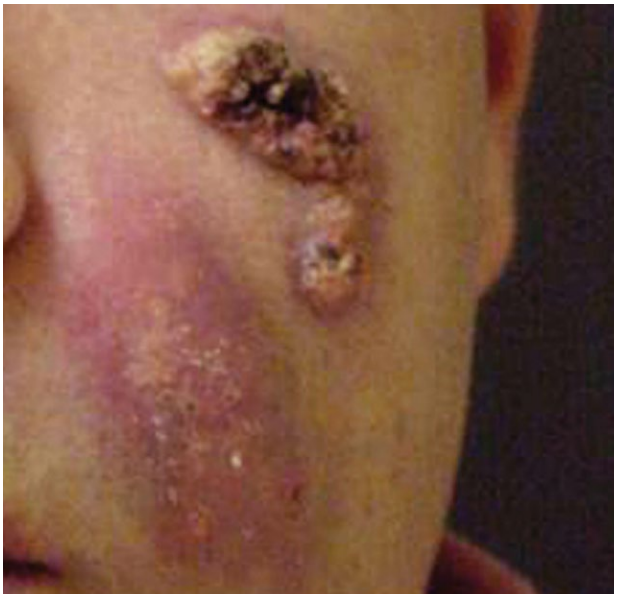

Figure 1. Verrucous ulcerating nodules and plaque on the left cheek 2 months after receiving dermal filler injections.

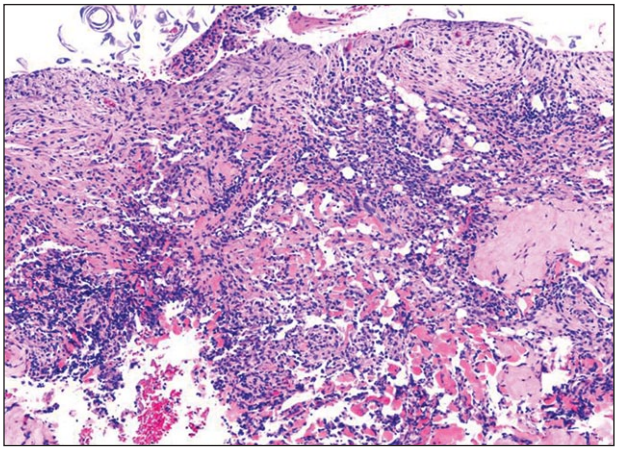

Figure 2. Histology slide (H&E, original magnification 40) showing epidermal proliferation filled with keratin, epidermal acanthosis, and dermal granulomatous reaction.

and KA dyskeratoticum and segregans.[5,6] KA centrifugum marginatum is characterized by KAs that grow peripherally, have central healing, and measure at least 20 cm in diameter; KA dyskeratoticum and segregans is a plaque-like variant.

Patients have been reported to develop KAs after psoralen and long-wavelength UV light therapy or radiation therapy and after cosmetic procedures such as laser resurfacing and chemical peels.[7] Typically, a KA grows rapidly and, in most cases, resolves spontaneously. Although KAs rarely progress to metastatic carcinoma, early diagnosis and treatment are recommended. We report a rare case of a patient developing KAs after receiving dermal filler injections to the face.

CASE REPORT

A 27-year-old man was referred to our center. The patient reported that 2 months earlier he had consulted a plastic surgeon and received collagen injections to his face. Approximately 10 days after the injections, the patient developed areas of erythema and induration at the injection sites. Three weeks after the injections, the patient returned to the plastic surgeon, presenting with 4 verrucous, ulcerating nodules on his face. There was 1 lesion under each infraorbital area, 1 on the right cheek, and another on the left nasolabial fold area.

Initially, the patient received 40 mg of intralesional kenalog and was started on oral prednisone 40 mg once daily. A biopsy of the lesion on the right cheek was performed by the plastic surgeon. The biopsy report was suggestive of a KA. The patient continued to have follow-up treatments, but no improvement was seen; the lesions became larger. An intralesional injection of methotrexate 10 mg was administered because the patient did not improve on initial treatment. On follow-up visits, the patient continued to show no improvement.

The patient was seen at our center 2 months after the initial presentation of lesions. Medical history was unremarkable. On physical examination, the patient presented with verrucous ulcerated nodules on his face (Figure 1). A repeat biopsy was performed, as well as cultures for mycobacteria and fungi (Figure 2). The pathology report was highly suggestive of a KA with an underlying silicone reaction. Silicone material was appreciated in the biopsy. The culture result was negative for mycobacteria and fungi.

The patient was started on oral acitretin 50 mg once daily. Improvement was noted 3 weeks after the patient started treatment. Unfortunately, the patient discontinued treatment with acitretin after 1 month and was then lost to follow-up. However, the patient returned to the clinic 3 months later, at which time he had 75% improvement of his lesions (Figure 3).

COMMENT

Dermal filler complications are usually temporary and resolve within hours postinjection. The most common complications are erythema, pain, and tenderness at the injection site. More serious complications include granuloma formation, which rarely occurs.

KAs are frequently seen in areas of previous trauma. There are several reports in the literature of KAs developing at sites of mild to severe trauma, including mosquito bites, burns, and herpes zoster lesions.[8,9] KAs have also been reported following cosmetic procedures. Gewirtzman et al[3] were the first to report eruptive KAs following CO_2 laser resurfacing. Cox[7] reported the unusual

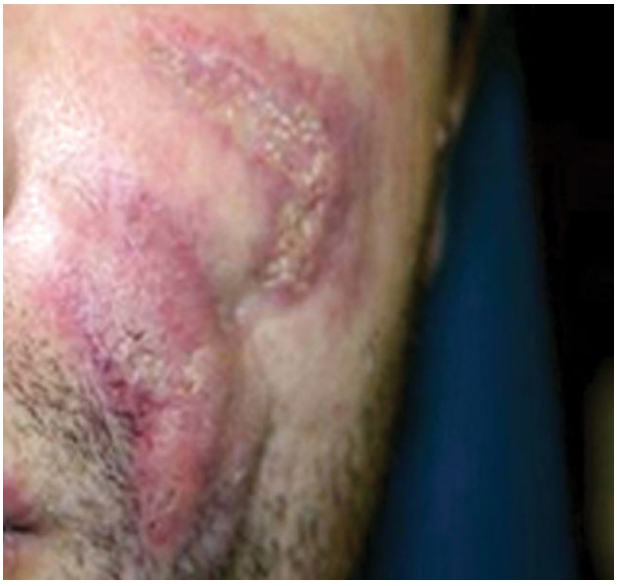

Figure 3. Clinical improvement of verrucous nodules and plaque on the left cheek following 3 weeks of treatment with oral acitretin 50 mg once daily.

development of KAs after a body peel. We believe that it was the trauma of the injections that caused the KAs in our patient.

Once the diagnosis of KAs is made both clinically and histologically, treatment options must be considered. Although KAs are known to self-resolve, treatment may be necessary depending on their size and location, since large KAs may metastasize to draining lymph nodes. Common treatment options for solitary lesions consist of cryosurgery, curettage and desiccation, intralesional injections of 5-fluorouracil, topical applications of 5-fluorouracil, intramuscular injections of methotrexate, and intralesional injections of methotrexate. Intralesional injections of interferon alfa-2a and bleomycin sulfate have also been reported. Surgical excision is recommended if 3 consecutive treatments 1 week apart have failed or if no improvement is noted within 3 weeks of topical therapy. Podophyllin has been useful for treating giant KAs. Radiation therapy is used for treating giant KAs when surgical excision is not possible.

Oral retinoids may be used to treat KAs, especially in recalcitrant lesions, such as in the case presented in this article. Because of their antikeratinizing effects, oral retinoids can be considered in the treatment of patients with multiple KAs. Another benefit of using oral retinoids is that they increase interleukin 2 production, as well as mitogen-induced lymphocyte proliferation. Interleukin 2 has been postulated to be reduced in KAs.[10]

CONCLUSION

Dermal fillers have increased in popularity in recent years. There are more than 20 different dermal fillers available. Dermal fillers are used to treat acne scars, rhytides, and nasolabial folds and for lip augmentation. As with any cosmetic procedure, complications may occur. Collagen tests should be performed in all patients before they receive first-time bovine collagen injections. The case of KAs occurring at the site of facial dermal filler injections that is presented in this article is a rare one.

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