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Case Report

Foreign body granulomatous reaction as bilateral ulcerated infraorbital plaques secondary to topical application of vitamin E

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Abstract Foreign body reaction, is an immune response of the body, usually to an extrinsic substance. This is generally a granulomatous reaction. It can occur as a consequence of direct penetration of the skin by the material itself, or iatrogenically during surgery or by injections.[1] Most commonly it presents as red to red-brown papules, nodules or plaques (with or without ulceration) due to its granulomatous nature. Lichenoid and pseudolymphomatous lesions and fistula formation are some of its unusual clinical presentations.[2] Vitamin E, a fat soluble vitamin, is an effective antioxidant. This property has empowered it, to establish its protective role in many diseases like atherosclerosis, malignancies, cataract as well as many dermatological conditions for instance scleroderma, atopic dermatitis, yellow nail syndrome, melasma are few to mention.[4,5] Its topical formulations are being used as antiaging creams and in the treatment of burns , scars and wounds.[5] We report a case of foreign body granulomatous reaction to topical application of vitamin E in a young male patient who developed bilateral symmetrical ulcerated plaques and oedema in infraorbital area after applying vitamin E following chemical burn.

Key words
Foreign body granuloma; Vitamin-E.

Introduction

Foreign body reaction, is an immune response of the body, usually to an extrinsic substance. This is generally a granulomatous reaction. It can occur as a consequence of direct penetration of the skin by the material itself, or iatrogenically during surgery or by injections.[1] Most commonly it presents as red to red-brown papules, nodules or plaques (with or without ulceration) due to its granulomatous nature. Lichenoid and pseudolymphomatous lesions and fistula formation are some of its unusual clinical presentations.[2]

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Introduction of foreign body into the tissue leads to an inflammatory response with accumulation of neutrophils. If not removed, it attracts macrophages and monocytes in the affected area which phagocytose the foreign material and become activated. Hence these activated macrophages secrete a variety of cytokines which ultimately lead to granuloma formation.[2]

Classical histopathology of a foreign body reaction shows foreign body granulomas, containing multinucleated giant cells, having scattered nuclei within the cytoplasm, along with some neutrophils and necrotic material.[1]

A long list of exogenous materials may breach the skin because of both, intentional and involuntary reasons. These are most commonly done through voluntary practices as in tattoos and cosmetic fillers. Whereas, minerals and metals can be introduced as a result of trauma or

in construction workers in an involuntary fashion.[3]

Vitamin E, a fat soluble vitamin, is an effective antioxidant. This property has empowered it, to establish its protective role in many diseases like atherosclerosis, malignancies, cataract as well as many dermatological conditions for instance scleroderma, atopic dermatitis, yellow nail syndrome, melasma are few to mention.[4,5] Its topical formulations are being used as antiaging creams and in the treatment of burns , scars and wounds.[5]

We report a case of foreign body granulomatous reaction to topical application of vitamin E in a young male patient who developed bilateral symmetrical ulcerated plaques and oedema in infraorbital area after applying vitamin E following chemical burn.

Case report

A 24 years old male presented to us with 3 months history of persistent, mildly itchy, erythematous and oedematous swelling with overlying ulceration involving both infraorbital areas. The lower eyelids and rest of the face was spared.

Initially, he developed erosions on these areas following chemical burn (sulphuric acid spray). He took vitamin E capsules, available for oral usage, and started applying vitamin E liquid on the affected sites after cutting open the capsules. After one month of application, the lesions became tender, erythematous and oedematous which developed ulceration. The lesions didn't resolve even after stopping the topical agents. Cutaneous examination showed bilateral symmetrical erythematous and oedematous plaques involving the infraorbital areas **(Figure 1)**. These were firm to hard in consistency. The plaque on left side was relatively larger measuring 3.5×3 cm, as compared to right which was 2.5×2cm in size. There were overlying ulcers but no discharge. Rest of the face and mucosa was uninvolved. Due to atypical clinical presentation, differentials of Morbihan disease, pseudo lymphoma, sarcoidosis and foreign body granuloma were considered. The baseline investigations FBC, LFTs, RFTs and serum electrolytes showed normal values. Serum and urinary calcium levels, serum ACE levels and chest radiographs were done to rule out sarcoidosis.

A 3mm punch biopsy was taken from the edge of left side of the lesion. Histopathological examination with Haematoxylin and Eosin staining revealed normal epidermis, dermal edema between collagen bundles and intense inflammatory reaction consisting of lymphocytes and few plasma cells. Some foreign body type of giant cells were also visible **(Figure 3)**.

Figure 1 pre-treatment.

Figure 2 After 2 weeks of treatment.

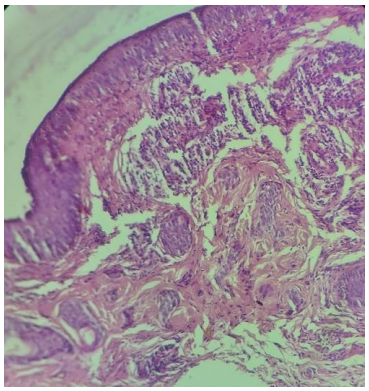

Figure 3 Tissue section showing multinucleated giant cells.

However no evidence of any sarcoidal type granulomas was found. The diagnosis of foreign body granulomatous reaction was made. A course of oral steroids, doxycycline and hydroxychloroquine along with topical steroids was commenced and patient was called for follow-up after 2 weeks. After 2 weeks of therapy, there was marked resolution in erythema, pain and the lesions converted to softer swellings. The ulceration also reduced **(Figure 2)**.

Discussion

The foreign body reactions are frequently encountered as a consequence of iatrogenic, intentional or accidental sources. It can occur in response to trauma like metals, glass, wood , cosmetic procedures like fillers, tattooing, paraffin or injectable drugs including vitamin k, insulin, intralesional steroids, and calcium salts.[1]

It can present as erythematous papules nodules plaques and fibrosis. These features can be associated with itching pain oedema or swelling. The morphological presentation of foreign body reaction can vary according to the causative agent as well as the mode of entry. It can masquerade as a number of other dermatosis and hence the diagnosis can be challenging.

The differential diagnosis can include erysipelas, allergic contact dermatitis, facial edema with eosinophilia, Ascher syndrome, orofacial granulomatosis, Melkersson-Rosenthal syndrome, sarcoidosis, cutaneous leishmaniasis, leprosy or tuberculosis.[6]

Histologically, it manifests as aggregates of epithelioid histiocytes along with multinucleated giant cells which can be of langhan type as well as foreign body type. These collections can be surrounded by few lymphocytes and plasma cells. These findings were comparable in our case.

In our patient, application of vitamin E lead to foreign body reaction. Vitamin E has established its role as a very effective antioxidant and has been recommended in many dermatosis. Topical vitamin E application has been used in burns and surgical wounds. However, it has been reported to rarely cause contact dermatitis, erythema multiforme and xanthomatous reactions.[4]

In a case series, use of vitamin E for lip augmentation led to formation of lipogranuloma and patients presented with erythema, painful oedema and induration which were successfully treated with systemic steroids and antibiotics.[7]

Similarly, in another case report by Bahareh Abtahi-Naeini *et al.* patient developed persistent erythema and induration on face following the use of vitamin E injection for facial rejuvenation.[8]

Removal of foreign body followed by systemic and local steroids have been used to treat many cases.

In a study done by JM Martín *et al*. Allopurinol was found effective in treatment for granulomatous reactions to foreign body particles.[9]

A case of mesotherapy -Induced cutaneous foreign body-type granulomatous reaction in the face reported by Qian Zhang *et al*. was successfully treated with minocycline.[10]

In another study, low dose methotrexate was found to be an effective option for treatment of foreign body granulomatous reaction to fillers.[11]

A number of treatments have been implicated in the management of foreign body reactions including surgical excision, retinoids, tacrolimus, Q switch laser etc.[3] However, results are variable and further studies are needed to find a better cure.

Conclusion

Contemplating the fact that foreign body reactions have diverse clinical presentations, it can pose substantial obstacles in making the accurate diagnosis. The delay in the diagnosis and in early management can lead to scarring and disfigurement. However, an in-depth history and clinical examination with scrupulous attention can help reach the precise diagnosis and the commencement of early treatment to achieve better clinical outcome.

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Conflict of interest Authors declared no conflict of interest.

Authors' contribution

AG,ZA,SA: Identification and management of the case, manuscript writing, has given final approval of the version of the manuscript to be published.

MU: Diagnosis and management of the case, critical review of the manuscript, has given final approval of the version of the manuscript to be published.

AK: Diagnosis and management of the case, manuscript writing, has given final approval of the version of the manuscript to be published.

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