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Case Report

Psoriasiform Dermatitis Induced by Dupilumab in a Pediatric Patient: A Case Report

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Abstract

Dupilumab, an interleukin-4 (IL-4) receptor subunit blocking the function of T-helper 2 (Th2)-mediated cytokines is the first FDA biologic approved for the treatment of moderate-to-severe atopic dermatitis (AD). Several adverse effects have been associated with dupilumab with the emergence of case reports describing psoriasis and psoriasiform dermatitis as a potential side effect. Theories proposed in the pathogenesis of dupilumab induced psoriasis include a Th-1 overdrive based mechanism. Here, we report an additional case of psoriasiform dermatitis following dupilumab therapy in a young Middle Eastern male with a long-standing history of atopic nummular dermatitis.

Keywords: Dupilumab Psoriasiform Dermatitis Pediatric Patient.

CASE REPORT

A 12-year-old Emirati male with a long-standing history of atopic nummular dermatitis on the extremities, frequently presenting to the clinic with recurrent flare-ups of his eczema. His body surface area involved was 16 %, he had an Eczema Area and Severity Index score of 30 and a 5-point Investigator's Global Assessment score of 4. The patient failed various therapies, including topical steroids and intermittent courses of prednisone.

Ultimately dupilumab was started, eventually with complete clearance of his lesions on a maintenance dose of 200 mg every other week. Fourteen months into the treatment with dupilumab, our patient developed new lesions, different in morphology from his chronic eczema lesions. He had several well-demarcated erythematous hyperkeratotic plaques with a silvery scale on his lower extremities (shown in Fig. 1). There was no history of preceding upper respiratory tract infection or recent drug intake; neither did he have a personal or family history of psoriasis.

Punch biopsy revealed psoriasiform epidermal hyperplasia with diffuse parakeratosis and granular cell layer attenuation. A superficial perivascular lymphohistiocytic infiltrate admixed with few eosinophils were also noted (shown in Fig. 2). GMS and PAS were negative.

Based on the clinico-pathological findings, dupilumab induced psoriasiform dermatitis was diagnosed.

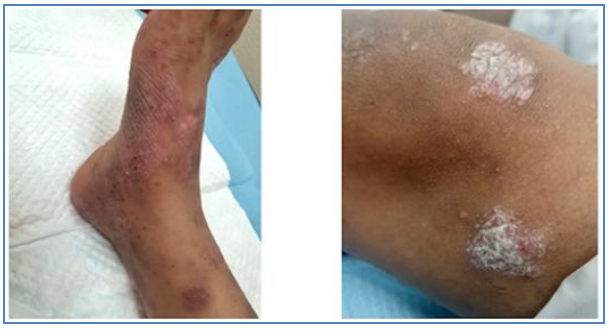

Fig-1

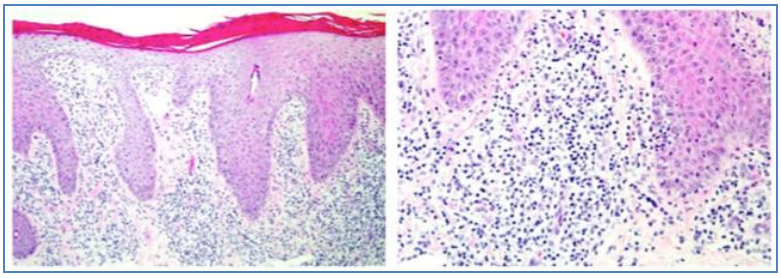

Fig-2

DISCUSSION

Dupilumab is a fully human monoclonal antibody that binds to IL-4R alpha subunit and inhibits IL-4 and IL-13 signaling; it's approved by the Food and Drug Administration to treat moderate to severe atopic dermatitis (AD) [1]. Its efficacy and safety has been studied repeatedly. However due to its relative infancy, the long-term safety profile of dupilumab is lacking [1].

The most frequently reported side effects include injection site reactions, nasopharyngitis, upper respiratory infections, and conjunctivitis [1]. Recently, there has been an emergence in case reports describing psoriasis and psoriasiform dermatitis as a potential side effect; with lesions commonly appearing within the first year of dupilumab therapy (2–18 months) [2] in individuals with no prior personal or family history of psoriasis.

Both psoriasis and atopic dermatitis (AD) are systemic T-helper (Th) cellular-driven inflammatory skin disorders marked by different cytokine pathways, with psoriasis being driven by Th-1 and Th- 17 pathways with increased levels of related interleukins (IL)-17A, IL-22, and IL-23. In contrast, AD is a Th-2 mediated disease with a predominance of IL-4 and IL-13 [3].

The association between dupilumab's Th-2 inhibition and its implication on psoriasis pathogenesis has not been fully elucidated [4]. Several studies have supported the theory that introducing cytokine imbalance with consequent immune shift can result in alterations of disease phenotype (shown in Fig. 3) But only be clinically relevant in predisposed individuals. Based on this theory, blockage of IL-4, and IL-13 signaling results in inhibition of the Th2 pathway and inducing a shift toward the Th1 inflammatory pathway, which may be responsible for developing psoriasis phenotype [5]. Further studies are needed to clarify the subset of patients who are predisposed to this novel side effect.

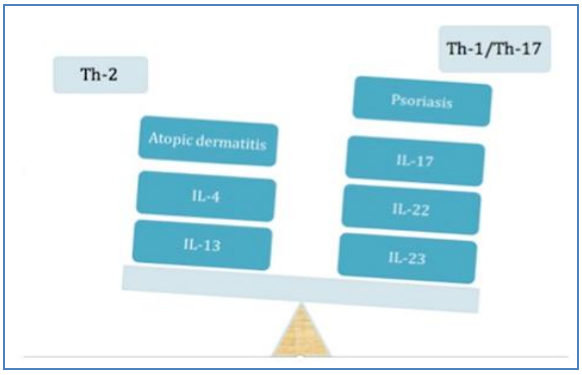

Fig-3

Interestingly, other published dupilumab induced cutaneous side effects include allergic contact dermatitis, rosacea, seborrhoeic dermatitis, Sebo-psoriasis, erythrodermic psoriasis, guttate psoriasis [6] and paradoxical erythema in a head and neck distribution.

The majority of the psoriasiform reported cases were confirmed by biopsy. Regarding the management of dupilumab induced psoriasis, clearance is achieved with drug withdrawal and sometimes recur with drug re-challenge. The severity of the presentation determined the continuation of dupilumab. Mild cases were successfully treated with classical topical treatments with the continuation of dupilumab. However, dupilumab was discontinued in several severe and treatment-resistant cases. In our patient's case, his psoriatic-like plaques were successfully treated with topical calcipotriol-betamethasone ointment (Daivobet ®).

To our knowledge, few cases of dupilumab induced psoriasis and psoriasiform dermatitis are published in pediatric patients and in the Middle East. Reporting such cases, serve to raise awareness among physicians to closely monitor patients on dupilumab for this novel side effect.

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