Sublingual immunotherapy to house dust mite as an immunological intervention in refractory atopic dermatitis

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ABSTRACT

Sublingual immunotherapy (SLIT) with house dust mite (HDM) preparation has been shown to reduce disease severity in patients with atopic dermatitis (AD). A 5-year-old girl with severe Atopic Dermatitis refractive to all possible pharmacotherapy was put on SLIT for dust mite and followed up for a period of one year. SLIT to dust mite proved highly effective in reducing the disease severity score as well as prevention of exacerbations in this patient.

Key words: *Atopic dermatitis; House dust mites; Sublingual immunotherapy.*

Aeroallergens, especially house dust mite (HDM) or food allergens, play a relevant role in aggravating the eczematous skin lesions and may contribute to the flare-ups of eczema in those patients [1,2,3,4]. About 80% of the patients with atopic dermatitis (AD) have an IgE sensitization toward foods or environmental allergens. Among the most important etiological factors in AD development are allergens of house dust mites and their waste products (HDMA). Due to high enzymatic activity, HDMA are able to penetrate through the damaged epidermal skin barrier of patients with AD to get the access to immune cells.

HDMA cause allergic response both of immediate and delayed types that lead to worsening of AD [5]. Double-blind controlled research has proved the role of HDMA in children and adults' AD initiation [6]. The complexity of AD warrants the use of several different therapeutic approaches although a truly curative therapy still does not exist [7]. It is well known that specific immunotherapy (SIT) is highly effective in IgE mediated allergic diseases [8]. SIT modifies at the earliest steps the immune response to allergens [9]; thereby validating the role of SIT in the management of atopic dermatitis.

CASE REPORT

A 5-year-old girl childpresented at the Allergic Clinic, Department of Immunology, Srinagar with complaints of severe refractory atopic dermatitis with multiple lesions all over her body especially hands, feet, scalp and trunk. The young girl had been on full-fledged pharmacotherapy since 3 years; which included local steroids, moisturizers, emollients and antibiotics as well as systemic steroids, antihistamines, immunosuppressants (Methotrexate, cyclosporine, etc). The patient had been seen by multiple specialities and was referred to us by a dermatologist.

On general examination, her weight was 20 kg and height was 106 cm, with a puffy face and was nervous, ill-appearing and fidgety.Her vitals like temperature, heart rate, respiratory rate and blood pressure were within normal limits.The patient was found to have profusely oozing lesions all over the body, especially scalp, upper limbs, feet and lower back. The SCORAD (SCORing Atopic Dermatitis) score of the patient was calculated to be 98.3 (Fig.1). The patient had developed cushingoid features probably because of 3 years of unabated steroid use.

Her total IgE level was 3500 IU/ml and eosinophil count was 12.5%. Swab culture showed *Methicillin-Resistant Staphylococcus aureus* (MRSA), sensitive to Linezolid and Vancomycin. Skin Prick Test, to identify sensitization to various allergens was not possible because of her eczematous lesions; instead *In vitro* testing for specific IgEs to eczema panel was done, which showed highly sensitive to dust mite (> 100 IU), moderate/mild sensitivity to cockroach and some foods and negative to all other aeroallergens, indicating sensitization to HDM as a trigger for Atopic Dermatitis exacerbations.

Our line of treatment began with the withdrawal of high dose systemic steroids as well as immunosuppressants while continuing the patient on antihistaminics. Subsequently, an endocrinology consultation was made for where she was put on minimum dose hydrocortisone, in view of the suppressed hypothalamic pituitary adrenal (HPA) axis. Oral Linezolid was prescribed for MRSA infection.Topical pharmacotherapy, which includedantibiotics, steroids and calcineurin inhibitors were continued. The use of wet wraps and other hydration therapies was also well explained to her attendants.

Allergen avoidance measures for dust mite were instituted which included dust mite free bedding, upholstery and furnishing. Other lifestyle modifications(avoiding humid and high-

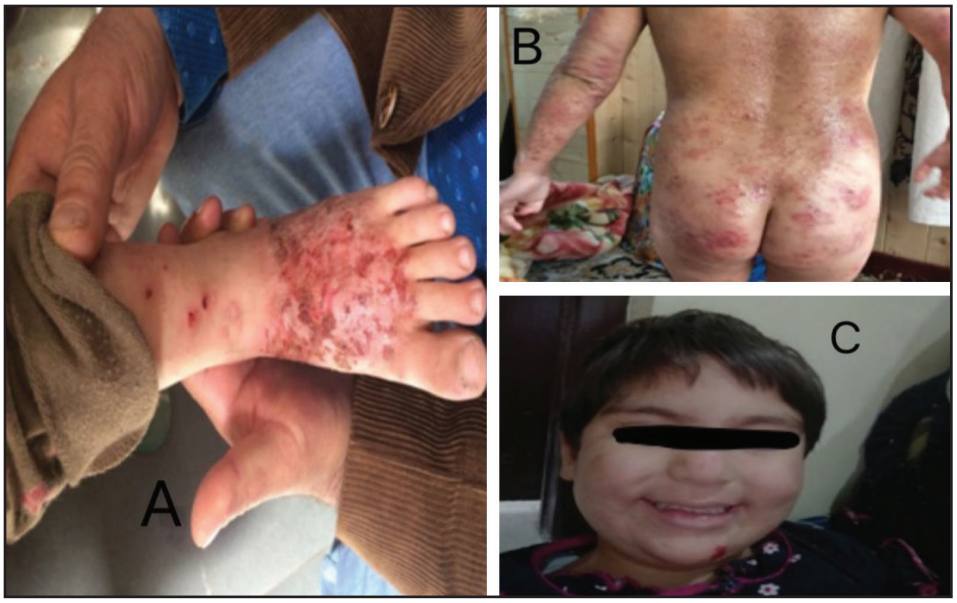

Figure1: (a and b) Lesions before immunotherapy; (c) Cushingoid features due to prolonged steroid use.

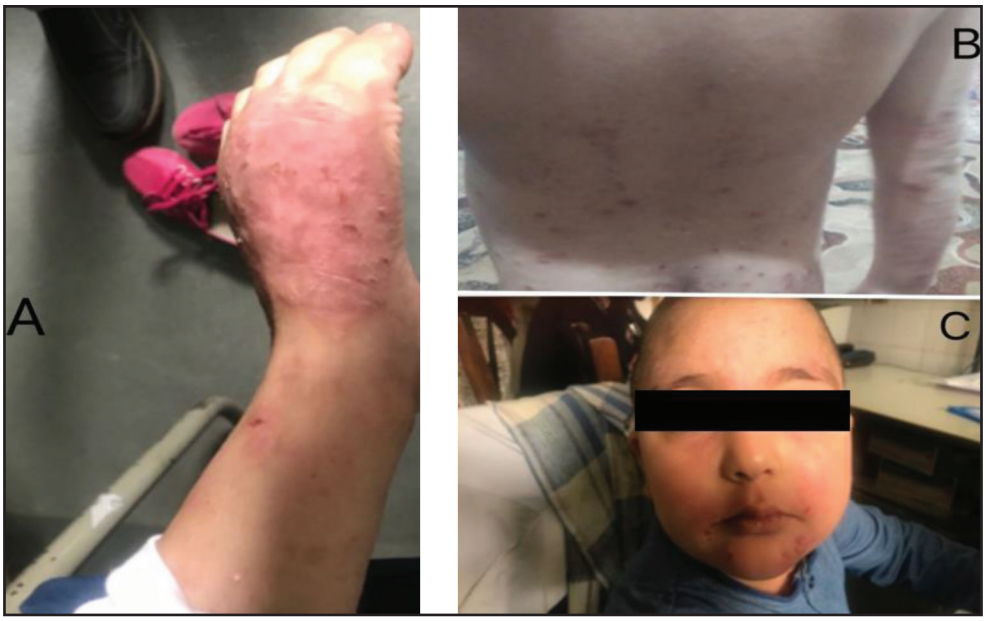

Figure 2:(a and b) Improvement in lesions after 6 months of immunotherapy; (c) Regression of Cushingoid features after 6 months of immunotherapy.

temperature environment) were also explained to prevent flare-ups. Sublingual Immunotherapy (SLIT) to dust mite for sustained recovery was started. The SLIT consisted of 43 µg of allergen extract per tablet (2800 Biological Active Units) administered twice a day for a period of one year, to be continued for a period of three years.

We observed a significant improvement in the eczematous lesions after completing one year of Sublingual Immunotherapy (SLIT). SCORAD Score decreased significantly from 98.3 to 32.4 at 6 months and further decreased to 18.5 at the end of one year of immunotherapy. We also observed a significant regression of Cushingoid features one year after starting immunotherapy and reducing the steroids to a minimal possible level (Figure 2 and 3).

DISCUSSION

AD is frequently the first clinical manifestation of atopic disease in infancy [10]. Although basic management includes optimal skin care, emollient creams, topical corticosteroids and/or topical calcineurin inhibitors, SIT is the only disease-specific treatment modality that suppresses allergic responses for a long period of time. *Dermatophagoides farina* (Der f), *Dermatophagoides pteronyssinus* (Der p) and *Blomia* are the most common types of HDM. The antigenically active particles contain high enzymatic activity which destroys tight junction of the epidermis, enhancing penetration of allergens deep into the skin [11]. One of these HDM enzymes is serine cysteine proteinase which is able to activate proteinase-activated receptors (PARs). These PARs are known to be most populated in

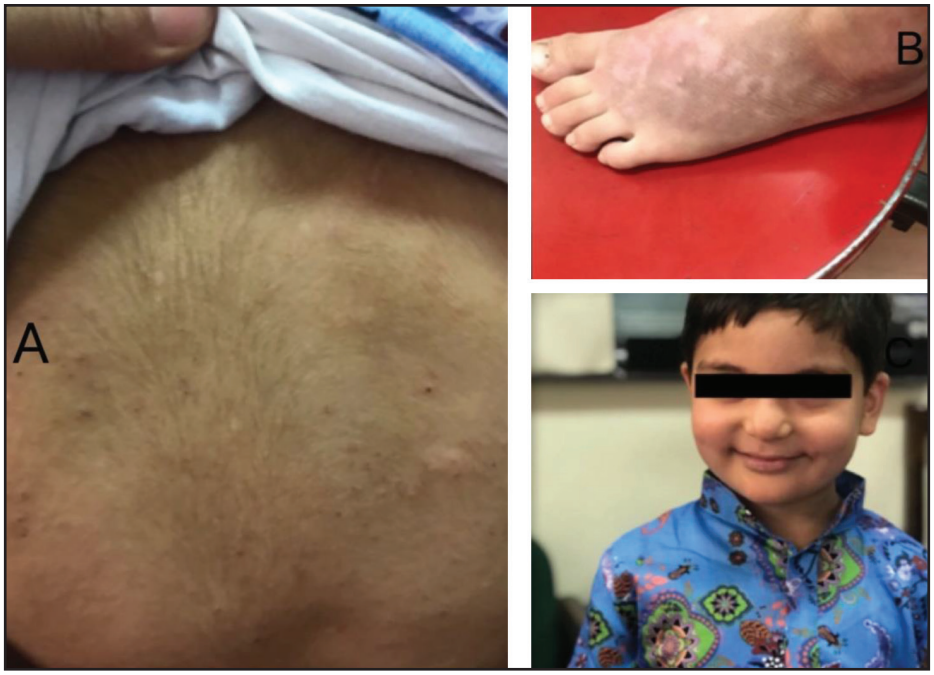

Figure 3: (a and b) Complete resolution of lesions after 1 year of immunotherapy; (c) Complete regression of Cushingoid features.

respiratory, gastrointestinal systems and skin [12]. When PAR is activated, various inflammatory mediators such as IL-6 and IL-8 are secreted, leading to increase in vascular permeability, infiltration of leukocytes, increased airway hypersensitivity, and other effects by HDM that preceded clinical symptoms of allergic diseases [13]. SIT aims to induce allergen-specific tolerance through acquiring immune tolerance with induction of allergen-specific regulatory T cells (Tregs)[14]. These observations have been validated by a recent study which has shown that SCIT with HDM allergen is effective in reducing the SCORAD index and reducing the need for topical corticosteroids [15].

CONCLUSION

The use of sublingual immunotherapy in this patient ensured 100% compliance with minimal side effects or adverse reactions. There were only mild flares during this first year, which were effectively managed by topical steroids. The quality of life improved very significantly in this patient and complete regression of all the symptoms is expected to occur after the patient completes three years of immunotherapy.These results suggest that allergen-specific immunotherapy could be a relevant therapeutic option in the management of AD.

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