

Dermatitis Secondary to Exposure to Nickel and Fragrance at Workplace: A Case Report

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ABSTRACT: Allergic contact dermatitis may be caused by exposure to chemicals. The skin usually develops type IV sensitivity where the initial sensitization may occur a few days but it may take years to develop in low grade exposure to these allergens. In the present study, the patient sustained the disorder through exposure to nickel sulfate, balsam of Peru and a fragrance mix which was confirmed by conducting a Patch test. The initial patient's Investigator's Global Assessment, Eczema Area and Severity Index, Dermatology Life Quality Index and Patient-oriented Eczema Measure scores were 3, 9.6, 6 and 14, respectively and improved to 1, 0.6, 1 and 1, respectively after two months of intervention. Good occupational hygiene is vital such as wearing polyvinyl chloride gloves to avoid nickel contact and effective handwashing practices to prevent nickel buildup on the hands. Avoidance of contact of fragrances in cleaning products averts contact dermatitis.

KEYWORDS: Allergic contact dermatitis, Eczema, Fragrance, Nickel, Patch test

INTRODUCTION

Allergic contact dermatitis is a consequent of allergen cutaneous contact developing delayed type IV sensitivity. The dendritic cells in the skin are activated and migrate to nearby lymph nodes. The T cells are activated from the peptides of haptened proteins releasing proinflammatory cytokines such as interferon- γ resulting in an inflammation rash [1].

CASE REPORT

A 46 years old man first presented himself to a skin clinic in Malaysia with symptoms of rashes, i.e., reddish skin and itching on his left arm and both the anterior parts of legs for the past two years. The lesions worsened recently especially during work. The patient's primary duty is maintaining and repairing automotive electrical systems. He is also exposed to fragrances that are used to clean the windows before placing the tinted material.

During a clinical examination, he was noted to have erythematous maculopapular rashes on his left arm, knees and both anterior parts of legs as shown in Figure 1, Figure 2 and Figure 3, respectively. Intense pruritus leading to excoriation was seen over the legs. The patient's

Investigator's Global Assessment (IGA) score was 3 signifying moderate disease with moderate erythema and moderate papulation [2]. His initial Eczema Area and Severity Index (EASI) showed a total score of 9.6. His Dermatology Life Quality Index (DLQI) score was 6 which has a moderate effect on the patient's life. He scored 14 on the Patient-oriented Eczema Measure (POEM) indicating moderate eczema.



Figure 1. Erythematous macular rash on left arm upper dorsum of forearm



Figure 2. Erythematous macular rash on both knees



Figure 3. Erythematous maculopapular rash on both legs

A patch test was conducted after two weeks of clinical examinations and he was found to be allergic to nickel sulfate, balsam of Peru and the fragrance mix as shown in Figure 4. The patient was given antihistamine, topical corticosteroid (betamethasone valerate cream 0.05%) and emollient cream (aqueous cream).



Figure 4. Patch test

He was advised to work outside of the workshop temporarily to prevent contact with fragrances and counselled to wear long sleeved shirts and pants made from cotton. Good occupational hygiene is essential, such as wearing gloves made of polyvinyl chloride or cotton to prevent nickel contact and effective handwashing practices to prevent nickel buildup on the hands. He was also advised to follow a low-nickel diet by avoiding oats, soybeans, nuts and chocolates. He was informed that nickel sensitization is a life-long condition and the prognosis is good if he can avoid contact with nickel.

After two months his lesions were disappearing and he had no more itchiness as shown in Figure 5 and Figure 6. The patient's IGA has improved to 1, EASI showed a total score of 0.6 and DLQI has improved to 1 with no effect at on the patient's life. He has scored 1 on POEM indicating clear or being clear from eczema.



Figure 5. Mild erythematous rash on left arm



Figure 6. No rash on legs

DISCUSSION

Around 20% of general population in Europe suffers from contact allergies. Occupational contact dermatitis occurred in only around 0.5 to 1.9% [3] of the population annually, probably due to under-reporting. In the US, the prevalence of occupational contact dermatitis was around 1700 per 100,000 workers a year according to a National Health Interview Survey. The prevalence of occupational hand contact dermatitis in one of the hospitals in Malaysia was around 26% [4]. If the individual persists in being exposed to the allergen, the duration to resolve the condition takes longer. Mortality is rare except if the contact dermatitis is due to the weed wild feverfew.

The risk of allergic contact dermatitis is higher among those having preexisting skin diseases such as stasis dermatitis where topicals such as bacitracin are applied. The strong association of atopic dermatitis with contact dermatitis is also seen among those sensitive to fragrances, topical drugs and also metals [5], but reduce association after exposure to allergenic chemicals. The duration is much shortened on subsequent exposure. Hobbies involving chemicals may also increase the risk of contact dermatitis [6].

Individuals with allergic contact dermatitis present with erythema, papules, vesiculation, weeping and crusting [7]. Pruritus is one of the most common symptoms in this contact dermatitis. Acneiform eruption, hypopigmentation or hyperpigmentation, lichenification and fissuring may occur in prolonged contact dermatitis. Airborne allergic contact dermatitis occurs when chemicals are present in the air. The Patch test remains a valuable method to detect allergic contact dermatitis. The antigens involved in allergic contact dermatitis are mostly small molecular weight molecules.

The etiologic agent of allergic contact dermatitis is identified using a Patch test. The adhesive tapes are used to hold the chambers to avoid false negative results [8]. The test is read 15 minutes after removal of the tapes, after 48 hours of application of the chambers containing allergens. It is read again after 96 hours. The patient was found to be allergic to nickel sulfate, balsam of Peru and the fragrance mix.

Genetics plays a role in nickel allergies as it is seen commonly among those with loss-of-function mutations in the filaggrin gene and those with a higher prevalence of HLA-B35 and BW22 antigens [9]. The sensitivity to nickel is due to skin contact or endogenous such as oral intake. The metallic items containing nickel are corroded by sweat to release free nickel ions acting as haptens causing



sensitization. The contact dermatitis due to nickel ingestion is commonly reported and therefore the sensitized individuals need to reduce dietary items containing nickel [10].

Around 4% of the general population is sensitive to fragrance mixes. There are many fragrance ingredients in perfumes, cosmetics, shampoos, soaps, moisturizers and deodorants. Balsam of Peru which is a naturally occurring sticky substance cross-reacts with a number of synthetic fragrances in perfumes and cleaning products. The patient in the car accessory shop is exposed to fragrances in cleaning products used for car windows.

Good occupational hygiene is required to avert nickel buildup on the hands by wearing polyvinyl chloride gloves and effective handwashing practice. Avoiding contact of fragrances in cleaning products would prevent contact dermatitis.

DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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