

“Dental Metal Allergy” - A Review

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ABSTRACT

Dental metal allergies are very rare to occur, and many times are left undiagnosed and left in the hands of dermatologists. This article reviews about the signs and symptoms of dental metal allergies which help to diagnose the condition, weather it may be local or systematic.

Keywords: Allergic Contact Dermatitis, Lichen Planus, Glossodynia

I. INTRODUCTION

Allergic contact dermatitis (ACD) is defined as an inflammatory process of the skin caused by contact with exogenous substances, generally having a low molecular weight [1]. It is the most common occupational and environmental skin disease. ACD manifests for about 10% [2] of all the dermatological disorders, and about 50% of all occupational dermatosis depending on geographical areas, industries, sex, age and patient distribution etc.[3]

The allergic diseases caused by reaction of dental metal materials are termed as dental metal allergy. While as dental material allergy is described to the allergic symptoms due to other dental material like organic compounds. Cytotoxicity and /orallergization are the various factors which are to be taken in consideration while performing safety evaluations involving biomaterials [4],[5]. The first clinical case of dental metal allergy was documented by Fleishmann [6] in 1928, which was due to the intra oral amalgam restorations. The symptoms wherestomatitis and dermatitis around the anus. Hubler and Hubler⁵ in 1983, Lundstorm[7] in 1984 Magnusson et al[8] in 1982 and wisenfeld et al [9] in 1984 where the various authors from different countries who reported variety of symptoms which occurred with use of different metals. Nickel, palladium, mercury, chromium and cobalt are the most common metals used in dentistry and were seen

associated with allergic reactions not only intra orally but also in skin of hand, feet or sometimes entire body was seen to be involved. [10],[11],[12]

II. EPIDEMIOLOGY

The prevalence rates of Ni, Cr and Co Allergic Contact Dermatitis in Europe are 20% for Ni, 4% for Cr and 7% for Co[13], while as in US the prevalence for Ni is 14%, for Cr is 4% and for Co it is 9%[14],[15]. Due to ear piercing and jewellery females are more affected by Ni and Co than that of males, while as males are more affected to Cr allergy due to occupational exposure [16]. Of all the metals the most allergens are present in Ni, Cr, Co and mercury. Gold, Platinum group elements are called as emerging allergens. While as Aluminium and Titanium are said to be rare allergens.[17]

Pathogenic Mechanism

Fisher [18] in 1973 classified the metal allergy as type IV allergic reaction, which is equal to that of ordinal contact dermatitis. Few cases have been reported where the removal of intraoral dental material resulted in the relieve from the symptoms of asthma or atopic dermatitis. It means that metal allergies may contain the pathogenic mechanism of type I allergic reaction [19], [20]. A chemically stable metallic material does not cause allergic reaction. It is always an ionized metal where from an electron is removed from its external

shell and becomes allergen. This ionized metal binds with the protein and forms a complex. This complex when recognized by T-cells results in the allergic reaction [21],[22]. The metallic restoration is always surrounded by the electrolytic solution i.e. saliva where pH regularly fluctuates according to the type of diet taken. Hence it is difficult to prevent the changes of dental metal material which causes allergic.

Pathology

Symptoms :- The symptoms of the metal allergies show a varied appearance. The symptoms can present on a limited area of body like on oral mucosa, palm hands, neck or back or it can see over the entire skin surface. Symptoms are not specific with any specific metal and no correlation has been seen with a class of metal and clinical symptoms. The following symptoms are seen with the allergies due to dental metals.

1. Pustulosis Palmaris Etplantaris and Dyshidrotic eczema

It presents in the form of erythematic, blisters with pustules, crust and scales on the palm and planter. Itching, heat and painful sensations can be seen along with sterile pustules, Osteoarthritis can also be found in some occasions. Lymphocytic infiltration in epidermis and also the spongy degeneration is seen on histological examination in the early stages of disease. Once the blisters are formed and when these blisters reach the horny cell layer, pustules start developing and also neutrophils appear.

2. Lichen planus

Dyskeratosis of skin, oral and external genitalia mucosa can occur as chronic inflammatory disease. On oral mucosa it presents as lace or stitch pattern keratinizations and is also accompanied by ulceration and erosions. When it appears on skin it is in form of red and purple red papules. These papules are present at the internal area of joint extremities and trunk. Few of the papules are painless while some may have pain, burning sensation or itching. Lichen planus is most commonly seen on buccal mucosa. But with time this keratinization pattern can spread to entire oral mucosa. When it is due to the dental metal allergy it is usually seen attached to

the metal restoration that contains allergy positive metal. Parakeratosis and liquefaction degeneration of basal cells is seen on histological examination. T-Lymphocyte infiltration is also seen under the epithelial cells. Etiopathology of lichen planus is not still clear but the suspected predisposing factors are metal allergy. Mechanical stimulation and hepatitis C virus (HCV). 30% of these patients have been reported to have HCV antibody. Liver function test and HCV antibody tests should be performed in all the inveterate cases of lichen planus.

3. Stomatitis, Glossitis, Cheilitis

The chemical and histological findings of these symptoms are same as that of ordinary oral inflammation. These symptoms can be seen in approximation with any dental prosthesis containing any allergy positive metal elements. It may present as red halo glossitis or cheilitis. It can also be seen in the areas away from the prosthesis. Such cases also show the recurrence of the inflammatory conditions.

4. Glossodynia

Pain, Twitching and burning sensation of tongue are the main symptoms which a patient comes across in glossodynia. Sometimes there may not be any organic change. It may represent in the form of tongue flare or atrophic filiform papilla as is observed in geographic tongue. Galvanic shock, Psychological factors, mechanical stimulation, dental metal allergy from any prosthesis or nutritional deficiency may be the possible predisposing factor.

5. Generalized eczema and pseudo atopic dermatitis

It represents as intractable itching dermatitis usually seen all over the skin. First case of pseudoatopic dermatitis was reported by Shannon [23] in 1965. It was a chronic allergy due to shoe leather and cement and the clinical appearance was general eczematoid dermatitis. This type of dermatitis is clinically same as that of atopic dermatitis, but without atopic diathesis. And also the radioimmunosorbent test shows low value of immunoglobulin (IgE). Once the allergen is absorbed in the body it spreads through blood circulation resulting in

generalized eczema and urticaria. Some times it is associated with heat, itching and painful sensation.

6. Atopic dermatitis

Chronic eczema with itching sensation is the typical symptom of atopic dermatitis these patients show increased serum Ig E. Positive reaction to the metal reagent is observed in patch test in intractable cases. Remission of symptoms taken place after removing the metal restoration containing allergy positive metal. In atopic dermatitis the skin barrier function is compromised and is not able to prevent sensitization and infection, hence metal allergy in such case can be complicated.

III. CONCLUSION

All the dental treatments that involve the use of material or a metal are associated with risk of developing allergies. All the preventive measures should be taken before starting the treatment, history of the patient should be properly taken and if any such condition is encountered proper investigations should be done and the treatment should be planed accordingly.

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