

POSTERS

P1 - DEVELOPMENT OF A NEW BLOOD TEST FOR THE DIAGNOSIS OF THE ALLERGIES TO DENTAL METALS

M.Brognez¹, A.Ocmant², D.Parent³, F.Mascart², L.Evrard¹

¹Service de Stomatologie et de Chirurgie Maxillo-faciale, Hôpital Erasme – ULB – Bruxelles ²Laboratoire d'Immunologie expérimentale, Hôpital Erasme – ULB – Bruxelles ³Clinique de Pathologie des muqueuses, Hôpital Erasme – ULB – Bruxelles

KEY WORDS

Oral allergy, contact allergy, dental metals, interleukin-17, interleukin -22

INTRODUCTION

There is an increase in the prevalence of oral allergies to metals used in dental materials, but oral allergies remain underdiagnosed by dental health professionals. Most often, dental metals may cause a type IV (contact) allergy, but sometimes a type I or III. Patients with an oral allergy complain of various symptoms such as burning or tingling sensations, with or without oral dryness or loss of taste, or of more general symptoms such as headache, dyspepsia, asthenia, arthralgia, myalgia. The signs of oral allergy include erythema, labial oedema or purpuric patches on the palate, oral ulcers, gingivitis, geographical tongue, angular cheilitis, perioral eczematous eruption, or lichenoid reactions localized on the oral mucosa. In dentistry, metals such as nickel, chromium, cobalt, gold or mercury are found in prosthesis and dental fillings. Recently, titanium, used in orthopedic devices and oral implants, considered as an inert material has been shown to be able to elicit allergic type reactions. These reactions to titanium could be responsible for unexplained successive failure cases of dental implants in some patients, named "cluster phenomenon". The risk of an allergy to titanium is low in a general population (about 0.6%) but is increased in patients who are allergic to other metals (about 5%). In these patients, allergologic testing is recommended, before implant surgery, in order to exclude any problem with implants.

The diagnosis of a contact/type IV allergy is

typically based on the patient medical's record, clinical findings, and on the results of epicutaneous tests. There is a limitation in the utility of patch tests, giving their poor sensitivity, which has been shown to be about 75% for metal type IV allergy. Some authors report a lack of standardization in the patch tests, especially for allergens like titanium, thus, patch test may underestimate the real prevalence of a metal allergy. A blood test can help in the diagnosis of a type IV allergy. In vitro testing with the lymphocyte transformation test (LTT) measure lymphocyte proliferation following contact with an allergen, is based on the tritiated thymidine incorporation by lymphocytes. Some authors report that there could be that non relevant proliferation of lymphocytes happen in non sensitized patients, leading to some false-positive results.

It would be valuable, in the future to have a test that would respond with a good sensibility and a good specificity, allowing availability of better diagnostic tool.

Interleukine-17 and Interleukine-22 are produced by a subset of recently defined lineage of T cells, named Th-17. IL-17 has been associated with many inflammatory diseases in human, including rheumatoid arthritis, organ rejection, and asthma. It has been showed that the number of Th-17 and the expression of IL-17 was significantly increased in positive patch test biopsies, regardless of the nature of the antigen. IL-22 is a critical mediator in mucosal host defense, which has complex pro-inflammatory and anti-inflammatory and autoimmune effects. It has been shown that patients with contact dermatitis to nickel had a significant higher IL-22 blood level, compared

to control, indicating a possible involvement of IL-22 in the pathogenesis of human allergic contact dermatitis.

MATERIALS AND METHODS

Our team is currently trying to develop a technique, using flow cytometry, in the purpose to detect activation of lymphocytes stimulated by a metal tested, and to measure different mediators (cytokines, inflammatory mediators) released in response to the metal: IFN- gamma, IL-17, IL-22, TNF-alpha. Anti-inflammatory cytokine like IL-10 and cytotoxic mediator like perforin are also measured. Phenotype of CD25+ T reg lymphocytes is also studied.

RESULTS

Preliminary results show that production of IL-17 and IL-22 is significantly increased in response to a metal tested, in patient sensitized or allergic to the metal. These results are confronted with clinical datas and patch-tests results.

CONCLUSION

As it would be valuable to have a test that would respond with a good sensibility and a good specificity, our results suggest that the measurement of the production of IL-17 and/or IL-22 by lymphocytes seems to be a promising tool to diagnose with certainty, a sensitization or an allergy to a metal.

REFERENCES

1. Evrard L., Waroquier D. & Parent D. Allergies to dental metals. Titanium: a new allergen. Rev. Med. Brux. 2010, 31: 44-9
2. Evrard L. & Parent D. Oral allergies to dental materials. Review of the literature

and report of three cases. Bull. Group Int Rech Stomatol. Odontol., 2010; 49: 14-19

3. Forte G., Petrucci F. & Bocca B. Metal allergens of growing significance: epidemiology, immunotoxicology, strategies for testing and prevention. Inflammation and Allergy, 2008, 7: 1-18
4. Garhammer P., Schmalz G., Hiller K., Reitingner T. & Stolz W. Patients with local adverse effects from dental alloys: frequency, complaints, symptoms, allergy. Clin. Oral Invest. 2001;5:240-249.
5. Gawkrödger D J. Investigation of reactions to dental materials. Br. J. Dermatol. 2005; 153:479-485.
6. Hallab M., Mikecz K., Vermes C., Skipor A. & Jacobs J. Differential lymphocyte reactivity to serum-derived metal-protein complexes produced from cobalt-based and titanium-based implant alloy degradation. J. Biomed Mater. Res. 2001; 56: 427-36.
7. Larsen J., Bonefeld C., Poulsen S. & Geisler C. IL-23 and IL-17-mediated inflammation in human allergic contact dermatitis. J Allergy Clin Immunol. 2009; 123: 486-492
8. Müller K. & Valentine-Thon E. Hypersensitivity to titanium: clinical and laboratory evidence. Neuro Endocrinol Lett, 2006, 27: 31-35
9. Waroquier D., Evrard L., Nelis M. & Parent D. Allergic contact dermatitis presenting as geographical tongue with pruritus. Contact Dermatitis. 2009; 60: 106-119.