

The role of delayed-type hypersensitivity in allergic patients with birch pollen sensitization, revealed by atopy patch testing with rBet v 1 and hypoallergenic rBet v 1 fragments

Smolnikov E.¹, Litovkina A.¹, Zhernov Y.¹, Elisyutina O.¹, Fedenko E.¹, Khaitov M.¹, Valenta R^{1,2}

¹ NRC Institute of Immunology FMBA of Russia, Moscow, Russian Federation, 24, Kashirskoe shosse, Moscow, 115522

² Medical University of Vienna, Vienna, Austria, Department of Pathophysiology, Spitalgasse 23, 1090 Vienna, Austria

Background:

Immunopathogenesis of allergic disease suggests different types of immune responses, such as IgE-dependent and delayed-type hypersensitivity (cell-mediated). Most diagnostic methods of birch pollen sensitization are directed to detect IgE-dependent mechanisms, excluding cell-mediated type hypersensitivity. It is known that the atopy patch test (APT) with birch pollen allergens can help to detect cell-mediated reaction in birch sensitized patients. However, the question of the advisability of its application still remains unresolved.

Aim:

To investigate the features of cell-mediated mechanism in patients with birch pollen allergy, atopic dermatitis (AD) and with or without asthma, allergic rhinoconjunctivitis (ARC) by APT with recombinant birch pollen allergen Bet v 1 and recombinant hypoallergenic T-cell epitope-containing Bet v 1 fragments.

Materials and methods:

A clinical study was conducted in 20 patients aged 18 to 50 years [Me=25; Q1=22,25; Q3=32,75] with birch pollen allergy, AD and with or without asthma, ARC. All patients had clinical history of birch pollen allergy, mild AD (14/20), moderate AD (6/20), mild persistent asthma (4/20), moderate ARC (10/20). Specific IgE to recombinant Bet v 1 was measured by ImmunoCAP system (Phadia, Uppsala, Sweden); APTs were performed with rBet v 1 and hypoallergenic rBet v 1 fragments. The results of APT reactions were estimated using European Task Force of Atopic Dermatitis scale. Clinical severity of ARC, asthma and AD was estimated by total nasal symptoms score (TNSS); results of forced expiratory volume in one second (FEV1) and SCORAD in 2 time points (before birch pollen season and during birch pollen season).

Results:

In first time point (before birch season) patients didn't have ARC and asthma symptoms (TNSS, Me [Q₁;Q₃] = 0,5 [0; 1]; FEV1,%, Me [Q₁;Q₃] = 84,5 [82,5; 87]). All patients had mild to moderate AD (SCORAD, Me [Q₁;Q₃] = 17,5 [15,25; 21,25]). rBet v 1 and hypoallergenic rBet v 1 fragments induced APT reactions in 20% patients with birch pollen allergy and clinical symptoms of ARC, asthma and AD. In second time point (during birch pollen season), 4 patients with birch pollen allergy had worsening of ARC, asthma and AD: average TNSS was 9 points; average FEV1 decreased until 75% of due values; average SCORAD index was 27 points.

Conclusion:

It was shown that delayed-type of hypersensitivity plays role in exacerbations of ARC, asthma and AD during the birch pollen season in some sensitized patients.