

High-altitude sojourn: a treatment option in allergic asthma

In a recently published paper, Dr L. Rijssenbeek et al. showed a strong beneficial effect of a high-altitude sojourn on both severe nonatopic and severe atopic asthma [1]. This finding is of great importance for physicians treating patients with severe asthma.

However, it is my perception that the value of allergen avoidance in allergic asthma, and not only in the severe phenotype, is often neglected. Owing to the well-known paper of Göttsche [2], encasings to reduce the indoor mite allergen level are not covered anymore by Swiss health insurance. Consequently, many GPs do not anymore recognise allergen avoidance as an important objective in the treatment of allergic asthma.

Allergists in Davos/Switzerland, Missurina/Italy, Briançon/France and elsewhere have always been impressed by the dramatic improvement of symptoms, especially in early-onset asthma, within the first days of a sojourn at high-altitude, due to allergen avoidance. Decades ago, Platts-Mills was able to reproduce this beneficial effect in a hospital setting in London, where rooms were specially prepared to reduce the mite allergen content [3].

Bearing this in mind, how can the observation that the response of patients with severe asthma to a high-altitude treatment with a consequent reduction of allergen exposure did not differ between those with atopic and those with nonatopic asthma be explained? The following factors may answer to this discrepancy:

The finding of atopy in asthma does not prove the asthmatic inflammation of the airways to be IgE-mediated and secondary to exposure to exogenous allergens. The Swiss SAPALDIA study showed that about 30% of the Swiss population was atopic, with at least one positive reaction to a routine prick-test panel. About half of the demonstrable sensitisations were, however, clinically latent [4]. Sally Wenzel pleaded in 2006 for a more careful definition of allergic asthma [5]: it should not be based on the proof of sensitisation alone.

Miranda et al. described four different subtypes of severe asthma. In only one of them was allergy considered to be a causal factor [6]. The two important studies in severe asthma, ENFUMOSA [7] and SARP [8], found allergy to be significantly less prevalent in severe disease.

Le Souëf argued in a Pro/Con debate that, even in allergic asthma, allergy is often not the sole factor leading to exacerbation [9]. In severe asthma, factors other than allergy may be responsible for the severity of the disease, such as steroid resistance [10], neutrophilic airway inflammation [11], persistence of infection with *Chlamydia* and *Myco-*

plasma pneumoniae [12], viral infection [13], and others. Here, “diagnostic allergen avoidance” during a high-altitude sojourn may help to reveal the importance of exogenous allergens in severe atopic asthma [14].

In conclusion, it seems obvious that, even in severe atopic asthma, the activity of the disease often is not triggered by allergen-specific IgE-antibodies to exogenous allergens, and factors other than allergy may be responsible when asthma becomes refractory to treatment. This may explain the lack of difference in the response to high-altitude treatment between severe atopic and nonatopic asthma in the study of Rijssenbeek et al.

But how can the observation that patients with severe nonatopic asthma also benefit from a high altitude sojourn be explained? Answers are given by the authors of the study itself in another paper [15]:

The first of three possible explanations is not restricted to high altitude: psychological stress is associated with difficult-to-treat asthma [16]. Patients in the Dutch clinic in Davos with the most severe asthma usually stay around 3 months in this unique environment far away from home. This intervention may reduce the level of psychological stress leading to a positive effect on the course of the disease [17].

Vitamin D deficiency may play a role in asthma [18], especially in steroid resistance [19]. UV exposure and vitamin D production is more intense at high altitude.

Active and passive smoking is considered to be a risk factor in asthma development [20]. A sojourn in less polluted air leads to a rapid reduction in airway inflammation in asthma [21]. In contrast to urban regions, air quality is much better in alpine resorts [22].

In severe asthma, apart from allergen avoidance, the above mentioned nonspecific effects may explain the positive influence of a high-altitude sojourn.

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