ALLERGY VACCINE IMMUNOTHERAPY IN MANAGING ASTHMA

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ABSTRACT

Current pharmacological treatment of asthma is effective at controlling many disease parameters but has not been shown to have an impact on the basic pathological mechanisms. Allergy plays a major role in asthma and allergy vaccine immunotherapy is a treatment that can modify allergic disease. The basis for using allergy vaccine immunotherapy in asthma is explored.

Key Words: Immunotherapy, asthma treatment, allergic asthma, allergy vaccine

Asthma is an inflammatory disease and current best management aims to reduce the inflammation already present and curtail exposure to pro-inflammatory agents. Some examples include the use of corticosteroids and antileukotrienes, avoiding cats and reducing exposure to dust mites. There is ongoing research to establish the evidence base for these recommendations.

The cause of asthma inflammation is in most cases allergy; an inappropriate immunological reaction. Therapy aimed to normalize the immunology is likely to actively alter the natural course of this and other allergic disorders. The World Health Organization very recently defined allergen immunotherapy (IT), known at various times as desensitization or hyposensitization, as 'therapeutic vaccines for allergic diseases'.[1] Why then is there such reluctance to use allergy vaccine immunotherapy in the treatment of asthma? The recommendations of professional bodies and individual doctors in Canada have ranged from very cautious acceptance to outright dismissal.

Allergy vaccine immunotherapy is clinically effective.[2, 3] Use of insect venoms has saved lives. Improvement has been demonstrated in clinical symptoms, skin reactivity and medication scores for allergy induced by grass, ragweed and tree pollen, animal hair and dander, house dust mite and mould. Allergy vaccine immunotherapy inhibits new sensitization in monosensitized children and prevents or decreases the rate of the natural progress of allergic rhinitis to asthma.[4] IT provides the potential to down-regulate this inflammatory cascade, reduce IgE antibody production, and attenuate symptoms.[5,6] Conceptually, early intervention for allergic disease holds the most promise as therapeutic intervention capable of arresting the progression of the disease, altering the severity of the disease, and/or preventing the evolution of allergic upper respiratory disease into asthma.[7]

Ross, Nelson and Feingold reviewed all English language studies of IT in asthma between 1966 and 1998.[8] All prospective, randomized, double-blind, placebo-controlled studies of IT were included in this meta-analysis. Immunotherapy was judged effective in 71% and ineffective in 17% (P=0.0005). IT was more likely to improve symptoms (OR 2.76, 95% CI 2.22 to 3.42), reduce the need for medications (OR 2.00, 95% CI 1.46 to 2.72), improve pulmonary function (OR 2.87, 95% CI 1.82 to 4.52), and protect against bronchial challenge (OR 1.81, 95% CI 1.32 to 2.49). Most studies were able to demonstrate a significant positive treatment effect even though the studies were heterogeneous with respect to the selection of subjects, the underlying populations, the main treatment protocol, the quality and amount of extracts used, the concomitant treatments and the duration of treatment and follow-up.

Sigman and Mazer reviewed the 12 studies on IT in childhood asthma performed between

1966 and 1994.[9] Eight were double-blinded and most studies were 1 year or longer in duration. Seventy five percent of the studies utilized symptom recording. Changes in bronchial hypereactivity were measured in 50% and medication usage in 25%. The antigens used varied widely. Two studies showed significant improvement in bronchial hyper-responsiveness. In one study there was a decrease in symptom scores ($P<0.05$) and drug scores in the first year ($P= 0.007$), in another there was a loss of the late asthmatic response upon bronchial provocation to house dust mite (D. pteronyssinus) after 1 year of active treatment ($P<0.05$). In a third study there was a loss of late asthmatic response to D. pteronyssinus after 1 year which was maintained in the group that continued treatment.

In the most recent update of the Cochrane review (August 2003) Abramson MJ, Puy RM, and Weiner JM concluded allergy vaccine immunotherapy can significantly reduce asthma symptoms and the requirement for asthma medications. Both specific and nonspecific bronchial hyper-responsiveness decrease, but improvement as measured by lung function tests was inconsistent.

Immunotherapy is the only currently available immunologic treatment that controls and prevents allergic illness. Recent studies indicate immunotherapy is effective, its risk can be minimized and it is cost-efficient.[10,11,12,13] In an era of expensive poly drug therapy, some degree of untoward reactions and little proof of long-term impact, immunotherapy can be beneficial in asthmatic patients and have a long lasting effect.[14] It is the only treatment that can potentially modify the natural history of asthma. Upper airway disease is now recognized as critical in asthma care, and IT treats both upper and lower airway disease simultaneously. Immunotherapy should be considered very early when planning asthma treatment because of the preventative and potentially long-lasting clinical and immunological improvement.[15]

Improvements in immunotherapy in the later portion of the twentieth century have been dramatic and occurred because of enhanced understanding of immunotherapy's mechanism of action, proper selection of patients, recognition of the dose effect, and improved quality, consistency and standardization of allergen vaccines.[16] The two reasons allergy vaccine immunotherapy is not being used more today are: 1) that the art and science have been forgotten and are not being taught widely enough; and that 2) the application of evidence based medicine[17,18] is weaker than the inherited bias against allergy vaccine immunotherapy in general, and for asthma specifically.

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