

Aeroallergens and Childhood Asthma

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Asthma Epidemiology in Hong Kong

The prevalence of asthma has been increasing in children in western countries as well as in the Far East. In the Phase I survey using the International Study of Asthma and Allergy in Childhood (ISAAC) protocol, 11% of 4,665 schoolchildren in Hong Kong suffered from asthma. Phase II results published recently confirmed significant geographic variation in the prevalence rates of wheezing disorders in the Chinese population. The prevalence rate of "asthma ever" in our schoolchildren was 7.7%, which was higher than those of children living in two other cities – Beijing (6.4%) and Guangzhou (4.4%).

Roles of Aeroallergens in Childhood Asthma

Asthma is caused by a complex interaction between genetic and environmental factors. Among school-aged children, sensitization to indoor allergens is the dominant risk factor for asthma. In many humid countries, allergens derived from house dust mites (HDM) are the most important cause of this sensitization. The ISAAC Phase II results showed that asthma was associated with sensitization to HDM, cat and grass pollens. Our group showed in a case-control study of a hospital cohort of 230 children that up to 88% of asthmatics were sensitised to HDM. In the same study, sensitization to HDM (Odds ratio 4.42; 95% CI 2.12-9.25) and cat (Odds ratio 4.52; 95% CI 1.00-28.65) were significant risk factors for asthma. Our group also demonstrated that aeroallergen sensitization correlated with the clinical and spirometric indices of asthma severity in Hong Kong children. A number of clinical trials confirmed the therapeutic efficacy of allergen avoidance measures in alleviating asthmatic symptoms in children.

Several studies showed that the *in vivo* priming of T lymphocytes to inhalant allergens occurs as early as the second trimester of pregnancy. Exposure of infants to aeroallergens also increases their subsequent sensitization to the same allergens. These observations attracted allergists worldwide to conduct longitudinal cohort studies to test whether meticulous allergen avoidance measures could prevent the development of atopy and asthma in children. Although this approach reduces allergen sensitisation, most

studies published up to date cannot show a protective effect of allergen avoidance on the development of childhood asthma (i.e. primary prevention). These consistent findings suggest that other environmental factors also play crucial roles during the early phase of atopy development.

Farm Studies and Childhood Asthma

Recent studies reported that Caucasian children who lived in direct contact with farm animals since infancy had a significantly lower risk of allergic sensitization and asthma. It was later found that the levels of endotoxin (ET) in homes of farmers' children were higher than those from non-farming families. Laboratory studies confirm that ET skews T lymphocytes towards the production of anti-allergic type I T cell-related cytokines. A higher exposure to ET seems to be the protective factor against the development of childhood asthma.

Conclusion

Sensitization to aerollergens is an important risk factor for childhood asthma in Hong Kong. However, the aetiologic role of allergen exposure during infancy on the development of asthma later in childhood remains unclear.