

Pediatric asthma and development of atopy

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Introduction

Throughout the developed countries of the world, the prevalence of asthma appears to have been steadily increasing over the past 4 decades [1–5]. At the start of this period, asthma was thought of primarily as a disease caused by spasm of the smooth muscles that surround the airways. Oral aminophylline and theophylline were the primary drugs used for outpatient care. Emergency treatment was dominated by injectable epinephrine (adrenaline). Over the decades asthma has been increasingly recognized as an inflammatory disease, and treatment paradigms have been shifted toward regular use of anti-inflammatory agents [6,7].

Rapid advances in immunology have dramatically advanced our understanding of the many different mechanisms that underlie lung inflammation in asthma. As our understanding has improved, it has been possible to probe the many possible explanations for the increasing prevalence of asthma, but many questions must still be answered. Questions regarding the development of asthma now center around the concept of an altered balance in the immune system. T-helper (Th) cells that initiate immune responses are classified as Th1 and Th2. The participation of Th1 cells leads to cell-mediated immunity, whereas the activation of Th2 cells leads to antibody formation, especially IgE antibodies, which increases the risk of asthma. Critical to our understanding of why children develop asthma is improving our understanding of the forces that affect the development both of the lung and of the immune system.

In the present issue of *Current Opinion in Allergy and Clinical Immunology*, the authors review critical areas in our understanding of pediatric asthma and its increasing prevalence.

Growth and development of the lung

Is the lung an innocent bystander that is caught up by an overly active Th2-biased immune system, or is there something intrinsically different about the lung in an infant who will develop asthma? Le Souef (pp. 127–131) reviews the current knowledge of the growth and development of the lung in relation to the risk of asthma, including new findings reported during the past year concerning the pressure of fluid in the developing lung and the development of the pulmonary vasculature.

Exposure and allergic sensitization in children

For many years there has been little doubt that allergic sensitization only occurs after allergen exposure. The critical questions pertain to whether there is a critical period in development during which allergen exposure is more likely to cause asthma, and whether there are other environmental influences that increase or decrease the risk of sensitization after exposure. In their review, Custovic and Woodcock (pp. 133–138) explore the relationships between allergen exposure at different times in fetal and neonatal development, and the risk of allergic sensitization, along with the apparent modifying effects of exposure to other environmental agents.

Effects of tobacco smoke exposure

The growth of infants *in utero* can be affected by maternal smoking, and most infants that were exposed *in utero* are also exposed after birth. This makes it very difficult to separate the effects of in-utero exposure from those of neonatal exposure to tobacco smoke [8]. Similarly, it is difficult to separate the potential direct effects of tobacco smoke on the growth and development of the lung from the effects that tobacco smoke may have on the development of allergic sensitivity. Carlsen and Carlsen (pp. 139–143) critically examine the medical literature published during the past year that examined the role of tobacco smoke exposure on the development of airway hyperreactivity and asthma. One provocative new idea is that nicotine exposure may alter the developing neuroendocrine cells in the lungs of infants.

Food allergy and atopy in asthma

The final article in this series, that by Baena-Cagnani and Teijeiro (pp. 145–149), examines the complex issues

that interrelate food allergy, atopy and asthma. One prospective study [9] estimated that the prevalence of true food allergy is 8% from birth to 3 years of age. Another study [10] suggested that Asian children in families that adopt a 'Western'-style diet had a greater risk of developing asthma than did those who retained their previous dietary habits. As explained by Professor Baena-Cagnani, this area deserves more research.

Conclusion

Asthma remains a major cause of illness in children from many countries. Although our understanding of this disease has improved over the recent past, there is still much we need to learn both about caring for children with this disease and, more importantly, about how to prevent asthma from developing.

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