Would we prevent asthma with potential therapeutic strategies?

Would we prevent asthma with potential therapeutic strategies?

Asthma is a common and debilitating disease that has substantially increased in prevalence in the last two decades. It is now considered to be an epidemic and results in a massive economic burden to communities.[1] Morbidity remains significant despite national and international treatment guidelines and the availability of very good controller medications.[2]

With regard to the spiralling treatment costs, it is important to debate that there should be a substantial realignment of drug development policy in the pharmaceutical industry and a parallel shift in the licensing policy by authorities to encourage the development of novel compounds and substance classes that are effective in halting the progression from acute to chronic forms, when the disease first manifests in early childhood.[3] But can we prevent it altogether? Although asthma is clearly recognised as an inflammatory condition, our understanding of the mechanisms of pathogenesis remains rudimentary.[1] And this is where we court controversy…

The relationship between early wheezing and subsequent development of asthma is controversial; and the relationship between early childhood viral infection and atopic sensitisation is equally controversial. Additionally, accumulating evidence suggests that susceptibility to viral infection and atopy may derive from a common set of transient developmental defects in cellular immune functions operative during early infancy, which further complicate considerations of causal versus consequential interactions between these disease processes and how they impact on asthma development.[4]

Kusel et al[4] have suggested that cycles of viral-induced and allergen-induced inflammation in the airways during the period of rapid lung growth and remodelling in infancy interacts synergistically to disrupt underlying tissue differentiation programmes. This interaction results in deleterious changes in ensuing respiratory functions, which may then manifest as persistent wheeze and/or asthma.[4]

Given the possibility that the viral and atopy-associated inflammation may interact synergistically to drive asthma pathogenesis, effective attenuation of either of these pathways in infants may be sufficient to achieve significant long-term clinical benefits.[4]

Respiratory syncytial virus (RSV) infections are strongly linked to both development and exacerbation of asthma. Early-life RSV infections, particularly those that induce severe disease, induce recurrent wheeze and bronchial obstruction and predispose to recurrent airway disease and potentially asthma that persists into later life.[1] However, there is strong epidemiological evidence that approximately two-thirds of all children who wheeze because of viral infections in early life (and are not atopic) have a transient condition that tends to disappear during early school years. All respiratory viruses may be implicated in the wheezing episodes, the commonest being RSV.[2]

Combination therapy with inhaled corticosteriods and long acting beta agonists effectively controls persistent symptoms and numbers of exacerbations. This is the current best treatment option but, alas, does not treat the cause of the disease and cannot be used to prevent the development of disease in the first instance.[1]

Despite the scope of the problem caused by respiratory viruses in asthma no specific vaccines or treatments exist that have been shown to modify the clinical outcome of viral infection. The optimal approach would be to develop safe and effective prevention strategies, such as efficacious vaccines, which induce immune responses that prevent viral infection.[1]

So, would we be able to prevent asthma with potential therapeutic strategies? Although *none* are yet part of clinical practice, many show much *promise* for the prevention of asthma.[1] Therefore, it is this *promise* upon which we wait with much enthusiasm, as the understanding of the mechanisms that induce asthma is slowly but surely being unravelled.

Lutchman D, MPharm

Product Manager: Neonatology – Speciality Care Division
Abbott Laboratories

Correspondence to: Dhamend Lutchman,
e-mail: dhamend.lutchman@abbott.com

References

1. Hansbro NG, Horvat JC, Wark PA, Hansbro PM. Understanding the mechanisms of viral induced asthma: New therapeutic directions. Pharmacol Ther. 2008 ;117(3):313-353.
2. Green R J. Understanding mild asthma/episodic asthma in children. SA Fam Pract 2007;49(3): 36-38.
3. Braun A, Tschernig T, Groneberg DA. Editorial: Experimental models of asthma. J Occup Med Toxicol. 2008 Feb 27;3 Suppl 1:S1.
4. Kusel MM, de Klerk NH, Kebadze T, et al. Early-life respiratory viral infections, atopic sensitization, and risk of subsequent development of persistent asthma. J Allergy Clin Immunol. 2007 May;119(5):1105-10.