Editorial

Improving Asthma Outcomes: Strategies for the Future

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Introduction

Despite accelerated research and major advances in the treatment of asthma in recent years, the disease burden remains high even in well resourced countries where up to 50% of patients may experience poor control of clinical disease. This is a global challenge which calls for a robust collective response.[1,2] Thus, establishing future strategies to improve asthma outcomes is an important responsibility for both physicians and policy makers.

Primary Prevention

During early life, priming of our immune system in response to microbes and allergens in the environment appears to be pivotal in the development of allergic diseases. Changes in the profile of this microbiota is probably the main cause of the dramatic rise in asthma prevalence associated with the transition from rural to urban lifestyles. Exposure to complex traditional farm dust protects children from developing asthma.[3] This protective effect appears to be mediated by a negative feedback loop following the activation of innate immunity.[4] Thus, manipulation of microbiota and allergen compositions in the environment which prime the immune system during early life may be an effective strategy for the primary prevention of asthma in high-risk families. This prospect, however, remains in a more distant future.

Behaviour Change

The most prevalent yet preventable barrier to better asthma outcomes is poor adherence to current guideline-based best practice by both patients and their doctors. This is best seen in the study of a tip-of-the-iceberg situation like the UK National Review of Asthma Deaths which concluded that complacency with respect to asthma care was an important potentially preventable factor in asthma deaths.[5] We need to design and test more effective treatment adherence interventions based more firmly on the theory of behaviour change.[6,7] These will certainly need to be augmented by mobile information technology (IT) support tools.[8-11] IT support for behaviour change requires careful detailing in designs which encourage regular use and minimise burden to patients and physicians. They will also need to be adaptive in relation to local patient culture and practice settings. Improving basic adherence to current asthma treatment is an urgent priority and probably the most cost-effective strategy to improve overall asthma outcomes and reduce preventable asthma deaths.

Oral Immunotherapy

Until recently immunotherapy in asthma requires regular injections, has modest effects, is inconvenient, potentially risky and not popular with either patients or physicians. However, immunotherapy with sublingual house dust mite allergens is a notable advance.[12] It appears to reduce asthma exacerbations safely in adults.[13] This is a promising development but it requires further development and evaluation.

More Mileage for Old Strategies

The cornerstone of conventional treatment for persistent asthma is inhaled corticosteroids (ICS) followed by, in non-responding cases, adding on long-acting bronchodilators. Recent advances in this approach include potent ICS with minimal effects on the hypothalamic-pituitary axis, ultra-long active beta agonist (LABA), ultra-long acting muscarinic antagonist (LAMA) and more convenient, patient-preferred devices.[14] Some of these ultra-long acting bronchodilators may also possess rapid onset action and so they serve as quick relievers during asthma exacerbations.[15] Thus, in future, the basic maintenance inhalational therapy for asthma may consist of all 3 drugs in a single devise to be taken once per day for prevention and acute flare-ups.

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Targeted Treatment

The novel strategy of targeted or personalised treatment arose from research on asthma which is refractory to conventional treatment. The era of targeted treatment commenced with the discovery of a series of new drugs which inhibit different immunopathogenic pathways, or endotypes, in type 2 immunity (TH2).[16] Effective treatments which block TH2 pathways include omalizumab (anti-IgE) for severe persistent allergic IgE-mediated asthma and mepolizumab (anti-IL5) for severe eosinophilic asthma.[17,18] These treatment options are already recommended at step 5 of the practice guidelines promulgated by the Global Initiative for Asthma.[2] A large and growing number of similar drugs are currently under investigation. But all these new asthma treatments have been designed to target different aspects of TH2 inflammation. Thus, this targeted approach is not yet possible for the minority of patients with non-TH2-mediated asthma. However, other treatment options for these patients may also be effective. They include macrolides and bronchial thermoplasty.[19,20] Further research is needed on the most reliable diagnostic tests which will differentiate between asthma endotypes for appropriately customised treatment. We anticipate the advent of novel endotypes and new treatments in this rapidly expanding field.

Conclusion

The future appears propitious for patients with asthma. However, before patients can enjoy real benefits, the disparate advances in many different fields ranging from molecular biology to IT, delivery devices and the social sciences need to be coordinated and translated into comprehensive treatment strategies. Areas of potential improvement include primary prevention of asthma, enhanced convention treatment and targeted customised treatment according to precisely defined asthma endotypes. Improving asthma outcomes is a priority and an eminently attainable goal.

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