Asthma is an inflammatory condition of the airways. First-line therapy involves the use of inhaled corticosteroids as anti-inflammatory agents to control the underlying process. Bronchodilators are used for symptom relief. Short-acting β-agonists provide rapid relief of bronchoconstriction, whereas long-acting β-agonists control the symptoms and reduce the frequency of exacerbations when combined with inhaled corticosteroids. Anticholinergic bronchodilators have a minor role in acute exacerbations and in patients troubled by adverse effects from β-agonists. Theophylline has a bronchodilator action in asthma, but its role as an anti-inflammatory agent needs to be examined further. Because of their toxicity, corticosteroid-sparing agents have a limited role, being restricted to patients with severe uncontrolled asthma.

New selective phosphodiesterase IV inhibitors show both anti-inflammatory and bronchodilator characteristics with fewer adverse effects. Other new approaches to the control of inflammation come from the antileukotriene drugs, which improve pulmonary function in patients with chronic asthma. The antileukotrienes have shown promising results, especially in the treatment of asthma caused by aspirin (acetylsalicylic acid), exercise and cold air. Other new therapies being studied include anti–immunoglobulin E, antitryptase and anti-CD4 agents. These newer possibilities suggest that the range of available treatment options will expand significantly over the next decade.
for asthma control. Many patients can be maintained on a low dosage of inhaled corticosteroid, providing effective symptom control with no adverse effects. A variety of corticosteroids are available via the inhaled route. Systemic effects are limited because of the low dosage, poor absorption and first-pass metabolism in the liver, although some absorption occurs directly from the lung.

However, systemic effects can occur. These include bruising and, in children, growth retardation. There is concern about loss of bone mineral density after as little as 1 year of treatment with inhaled corticosteroids. Several studies have shown biochemical effects and, although they may not translate to clinical problems, these issues need to be addressed.[2,3] To this end, pharmaceutical companies continue to develop inhaled corticosteroids with maximal local effect, minimal systemic absorption and, therefore, minimal risk of adverse systemic effects.

Although further research is needed to fully understand the mechanisms of corticosteroid action, it is known that their anti-inflammatory effects are mainly due to direct inhibition of transcription factors that are normally activated by inflammation, and such studies have been valuable in determining the molecular mechanisms of corticosteroid action in asthma.[4]

In many patients, asthma can be controlled at low dosages of inhaled corticosteroids. The dose–response curve appears to be shallow as the dosage is increased, but there is good evidence of a benefit from higher dosages.[5]

Conventionally, inhaled corticosteroids are administered twice daily. The effectiveness of once-daily administration has been studied, initially with conflicting results.[6,7] However, a recent study with a large pool of patients found that once-daily administration of inhaled flunisolide was as effective as twice-daily administration.[8] The results of this prospective, double-blind, controlled trial should encourage more physicians to consider the possibility of controlling stable asthma with once-daily administration of inhaled corticosteroids.

The question of whether the dosage of inhaled corticosteroids should be increased during an upper respiratory tract infection has not been answered adequately. However, the current British Thoracic Society (BTS) guidelines on asthma[9] recommend continuing with this practice until the results of controlled trials are available.

Early control of symptoms is helpful in gaining the confidence of patients in the medication and in the physician. Inhaled corticosteroids should be started at a higher dosage until control is achieved, and then the dosage should be reduced in a stepwise fashion to the lowest dosage needed to control the symptoms.[9]

Oral corticosteroids remain useful in acute exacerbations and as continuous therapy for some patients with severe asthma. A few patients have asthma that is partially or completely corticosteroid-resistant. If treated with long-term high dosage corticosteroids they may demonstrate the unfortunate sequelae of such therapy with few of the beneficial effects.[10]

There is some preliminary evidence that early use of inhaled corticosteroids as anti-inflammatory agents in asthma may limit or prevent the evolution of irreversible obstruction secondary to structural changes from prolonged inflammation.[11] The epithelial disruption and inflow of inflammatory cells are reduced by corticosteroids, but there is less evidence of an effect on subepithelial fibrosis and airway remodelling. The effects of any treatment on the natural history of asthma are not adequately established and this is an area where further work is needed. Meanwhile, it is likely that newer corticosteroids with more selective effects will continue to be developed.

1.2 β-Agonists

β-Agonists are the most effective and convenient bronchodilators in asthma. Until recently, all available inhaled β-agonists had a short duration of action. The development of long-acting inhaled β-agonists has brought a valuable new approach to asthma control. Patients can be supplied with 12 hours of effective bronchodilation following a...