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The modern management of asthma

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ABSTRACT Asthma is among the most common of all chronic disorders at all ages. Despite increased understanding of cell biology and access to numerous drugs and inhaler, asthma is not under control. One in six people requiring emergency treatment for asthma will require emergency treatment again within two weeks and, sadly, in the UK one person dies of asthma every seven hours.

Modern management of asthma is supported by the rigorously evidence-based BTS/SIGN guidelines which are now are updated annually. There is increasing emphasis on starting inhaled steroid for milder cases and using lower doses, the usual starting adult dose is now 400 ug BDP or equivalent. Education using a written personalised Asthma Action Plan is central to good management and should be reinforced at every opportunity. For adults and older children with more troublesome symptoms a LABA is the most effective add-on therapy. Those not controlled at Step 3 should be considered for referral to a specialist hospital clinic.

KEYWORDS Asthma, Asthma Action Plan, inhaled steroid, long-acting beta-agonists, patient education

LIST OF ABBREVIATIONS Beclomethasone dipropronate (BDP), British Thoracic Society (BTS), long-acting beta-agonist (LABA), pressurised metered dose inhaler (pMDI), Scottish Intercollegiate Guideline Network (SIGN)

DECLARATION OF INTERESTS Dr Douglas is co-chair of the BTS/SIGN British Guidelines on the Management of Asthma.

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Around 100 million (7·2%) of the world population have asthma, including 6% of adults and 10% of children. In the UK, approximately 5·2 million people (1·1 million children and 4·1 million adults) are currently receiving treatment for asthma, and 8 million have been diagnosed with asthma at some stage in their lives. People in one in five UK households are affected and it is more common in urban than rural areas. Asthma, therefore, is among the most common of all chronic disorders at all ages.

Although there is an increasing understanding of the triggers and cell biology of asthma, and a multitude of effective drugs and inhalers, asthma is not under control. In the UK, 80 million working days are lost and 69,000 hospital admissions occur each year for asthma. Remarkably, one in six people receiving emergency treatment for asthma will need emergency treatment again within two weeks and, sadly, on average, one person dies of asthma every seven hours in the UK. The reasons for this continuing morbidity and mortality are complex, but may involve low patient expectation leading to an acceptance of continuing symptoms, and a belief among patients and some doctors that asthma only requires treatment when there are symptoms.

BRITISH GUIDELINES ON THE MANAGEMENT OF ASTHMA

The first British guidelines on asthma management in adults were published in the *British Medical Journal* in 1990. Since 1999, the BTS and SIGN have collaborated to produce guidelines on the management of asthma that are available on the BTS and SIGN websites.[1] These guidelines use rigorous evidence-based methodology covering all aspects of asthma care and contain graded recommendations supported by evidence tables. These BTS/SIGN guidelines are now updated with new recommendations every year. They are becoming increasingly recognised across the world and are accepted for use in Finland, Germany, Australia and New Zealand. They advise a step-wise approach to drug therapy.

STEP ONE: MILD INTERMITTENT ASTHMA

All patients should be prescribed an inhaled short-acting beta-agonist (e.g. Salbutamol) for symptomatic relief delivered by an inhaler they can use effectively.

INHALERS

Inhalers deliver bronchodilator or anti-inflammatory therapy to the airways. The most common device is a

pMDI, but up to 50% of patients are unable to use this correctly. Even with good inhaler technique, only 10% of the pMDI drug dose reaches the lungs. This can be improved with the addition of a spacer, which reduces the problem of co-ordination involved in activating the device and inhalation. Dry powder devices such as the Accuhaler and Turbohaler have become very popular, but they are more expensive and are no more effective than a pMDI and spacer.

PATIENT SELF-MANAGEMENT

All patients should understand that they have asthma, which medication they should take regularly and which occasionally, and what they should do if their symptoms worsen. Good patient education including a written personalised asthma action plan is highly effective in achieving good asthma control.[2, 3] A consultation for an upper respiratory tract infection or other known trigger is an opportunity to rehearse self-management with the patient in the event of asthma deterioration.

STEP TWO: INTRODUCTION OF REGULAR PREVENTATIVE THERAPY

Inhaled cortico-steroid has an anti-inflammatory effect on the airways and is the drug of choice for prevention of asthma symptoms. Over the past ten years, there has been emphasis on starting inhaled steroids for patients with milder symptoms, and nowadays they should be considered for patients with any of the following:[4]

- Exacerbation of asthma requiring oral steroids in the last two years.
- Using inhaled short-acting beta-agonists three times per week or more.
- Waking one night a week or more with respiratory symptoms.

Although more patients are being given inhaled steroid, the advised dose to control asthma is considerably less than in previous years. In most adults, the starting dose of inhaled steroid is 400 mcg BDP/day in two divided doses or the equivalent dose of an alternative inhaled steroid. The starting dose for children aged 5–12 years is 200 mcg BDP/day. There is very little evidence to guide management in children under five years, and if there are concerns the patient should be referred to a local paediatric respiratory service. At all ages the dose of inhaled steroids should be titrated to the lowest at which effective control of asthma is maintained.

COMPARISON OF INHALED STEROIDS

Beclomethasone dipropronate and budesonide are approximately equivalent, although there may be variations with different delivery devices. Fluticasone provides equal clinical activity to BDP and budesonide at half the dosage. Ciclesonide is a new inhaled steroid probably equivalent in activity to BDP but appears effective in a single daily dosage.

SAFETY OF INHALED STEROIDS

The safety of inhaled steroids is of crucial importance, and a balance between benefits and risks for each individual should to be assessed. For adults, there is little evidence that doses below 800 mcg BDP or equivalent/day cause any short-term detrimental effects, apart from occasional local side effects of hoarse voice and oral thrush. However, the possibility of long-term effects on bone has been raised. One recent systematic review reported no effect on bone mineral density at doses up to 800 mcg BDP/day.

In children, inhaled steroids at or above 400 mcg BDP/day or equivalent may be associated with systemic side effects. These may include reduction in growth and adrenal suppression. Clinical adrenal insufficiency has recently been identified in a small number of children who have become acutely unwell at the time of intercurrent infection. Therefore, the smallest dose of inhaled steroid compatible with maintaining disease control should always be used. At higher doses, add-on agents, for example, a long-acting beta-agonist, should be considered. The height of any child on inhaled steroids for asthma should be monitored on a regular basis.

STEP THREE: ADD-ON THERAPY

If symptoms are not controlled with regular inhaled steroids and relief beta-agonists, then adherence to treatment and inhaled technique should be rechecked. The most effective add-on therapy to inhaled steroid in adults and children over five years, is an inhaled LABA,[5] i.e. Salmeterol or Formoterol. Inhaled steroid and LABA are available in combination inhalers. If there is no improvement, LABA should be discontinued and inhaled steroid increased to 800 mcg BDP or equivalent in adults or 400 mcg BDP or equivalent in children aged 5–12 years. The anti-inflammatory effect of inhaled steroid is not linear and increasing the dose of inhaled steroid beyond these levels is much less effective in controlling asthma symptoms.

STEP FOUR: ADDITION OF A FOURTH DRUG

Most patients will gain good control of their symptoms at Steps 1–3. For the minority with more severe asthma, addition of high-dose inhaled short-acting beta agonists delivered by nebuliser, leukotriene receptor antagonists (Montelukast and Zafirlukast are both available in the UK) or oral theophyllines may be of benefit. However, there is generally a lack of evidence as to which drug is most effective in this group of patients with more difficult asthma.

STEP FIVE: CONTINUOUS STEROID TABLETS

In a diminishing minority of patients with severe and brittle asthma, daily low-dose steroid tablets should be considered.

REGULAR REVIEW

While many younger children will 'grow out' of their symptoms, for adults, asthma is a lifelong and variable disorder. All patients with asthma should be reviewed regularly by their general practitioner or trained practice nurse, even at times when they have few symptoms. Those patients not controlled on Step 4 or above should be referred for supervision at a specialist hospital clinic. While symptoms and lung function are the current mainstay of assessment, in the future, biomarkers such as exhaled nitric oxide and sputum eosinophil count, may be increasingly used to ensure that asthma is under control.

KEYPOINTS

- Asthma is one of the most common chronic diseases at all ages.
- British Thoracic Society and SIGN guidelines recommend a stepwise approach to treatment.
- Short-acting beta-agonist therapy (Salbutamol) by inhaler is first line treatment.
- Inhaled corticosteroid is the drug of choice for prevention of symptoms.
- In children, growth reduction and adrenal suppression may occur at doses at or above 400 mcg/day of Beclomethasone dipropronate.
- Inhaled long-acting beta-agonists are the most effective add-on therapies if regular inhaled steroids and relief beta-agonists do not control symptoms.
- In more severe asthma, nebulised beta-agonists, leukotriene receptor antagonists or oral theophylines may be considered.
- Low dose oral steroids may be needed for severe brittle asthma.

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