THE MANAGEMENT OF CHRONIC PAEDIATRIC ASTHMA

Asthma is the commonest chronic disease in children[1]. Limited South African studies indicate a prevalence of between 3,5-6%[3]. Paediatric asthma is unfortunately frequently misdiagnosed. Correct management is important — not only to the individual child, but also to the family, community and to the medical aid society. It is therefore necessary to have a clear understanding on the diagnostic criteria and correct management protocols for children with asthma.

The doctor should understand the important differences between paediatric and adult asthma. Childhood asthma is often triggered by environmental factors and allergens. It is therefore worth identifying these triggers in order to limit exposure. Objective measures of airway obstruction, like peak expiratory flow rate (PEFR) and the forced vital capacity in one second (FEV1) is not always viable in children — especially in the pre-school group. The diagnosis and monitoring of childhood asthma is therefore to a large extent a clinical exercise. Different age groups have specific needs regarding the choice of the most effective drug delivery system. The clinician should therefore have a good working knowledge of the various options in order to prescribe the most appropriate system in each individual situation.

The goal in asthma management is that of effective control. The asthmatic should lead a normal and active life. Emphasis must not only be placed on diagnosis and medications, but also on other aspects, including compliance, trigger avoidance, inhaler system technique and education of involved parties. A positive and motivational approach will benefit these patients.

Diagnosis

Asthma is a clinical diagnosis that should be made in any child with recurrent (three or more) episodes of wheezing and/or cough and dyspnoea that responds to a bronchodilator[1,3]. Look for supporting features. These would include a family or personal history of atopy, night cough (especially in the early morning hours) as well as exercise-induced and seasonal variations in symptoms[1]. In children older than 5 years a 15%[3] improvement in the PEFR or FEV1 (before and 10 minutes after B2 agonist administration) would be an objective supporting feature to the diagnosis. A therapeutic trial with a bronchodilator could also be used in cases of doubt.

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Management

Assessment of severity and control

The South African Childhood Asthma Working Group (SACAWG)[1] proposed a useful scale on the assessment of severity and control in childhood asthma. This scale (summarised in Table I) refers to the child with regular or intermittent symptoms and not to the acute situation. After assignment to a specific category (mild, moderate or severe, utilising the parameters in Table I) on the severity scale, the most appropriate drug choice can be made according to the guidelines summarised in Table II. The severity category should be re-assessed and re-assigned during regular follow-up visits (at least every three months). Step-up guidelines should be followed according to Table II. In well-controlled patients (stable for at least three months), stepping-down on the anti-asthma drugs (decreasing anti-inflammatories by 25-50% at a time) should be considered. This must not be attempted during the patient's worst season[1].

Bronchodilators

The intermittent use of short-acting B2 agonists is the preferred mode of bronchodilatation in children. Parents should be encouraged to use B2 agonists only on an as-required basis[2]. Controversy still exists regarding the use of theophyllines and it should be reserved as add-on therapy in children with severe asthma without proper control on optimal inhaled steroids and B2 agonists. The long-acting B2 agonists (formoterol and salmeterol) can be used in resistant nocturnal and in exercise-induced asthma[1]. They can also be used as steroid sparing drugs (in severe asthma cases with problems on high dose inhaled steroids or in cases not controlled on high dose inhaled steroids)[2]. A recent international consensus statement advised on the consideration of long acting B2 agonists, or slow release theophylline, for a trial period before stepping-up to high dose inhaled steroids[6].

Antimuscarinic agents (eg. ipratropium bromide) are used in combination with B2 agonists during acute asthma attacks. It may also be a useful adjunct to regular B2 agonist therapy in children younger than one year with cough and/or wheeze as major symptoms[1], or as regular maintenance bronchodilator therapy in uncontrolled patients already requiring high-dose inhaled steroids[2].

Anti-inflammatory drugs

Inflammation plays a central role in asthma. Preventative anti-inflammatory drugs are used in all moderate and severe cases.

The cromolyns are indicated for the prevention of moderate asthma and exercise-induced asthma. The use of lower dose inhaled steroids in this group, is increasing around the globe[3]. Their long-term side-effects are undetermined and there is no hard evidence to suggest dangerous side effects when used in reasonable dosages[4]. The more modern steroids, such as budesonide and fluticasone, are also less likely to have adverse effects[4]. It is important to give the lowest dose of inhaled steroids compatible with asthma control[1,2,4]. The efficacy and safety of inhaled steroids can be improved by a large volume spacer attachment to the MDI. Children (of any age) on inhaled steroids should therefore receive a spacer device. Mouth rinsing, after administration of steroids, should also be promoted. The stature of these patients must be documented at follow-up visits. Impaired growth is both a potential side-effect of steroid therapy and of uncontrolled asthma. All patients with severe asthma must receive inhaled steroids.

Short courses (±14 days) of oral prednisone (1-2mg/kg/d) should only be given during exacerbations. Frequent short courses should be avoided by increasing inhaled therapy. Oral maintenance therapy is very seldom needed and should be done under specialist supervision.

Ketotifen, in combination with a bronchodilator, may be useful in some children younger than three years of age. These would include highly allergic children who also have atopic eczema or hay fever in addition to their asthma[1].

Other drugs

Anti-histamines are not indicated for asthma *per se*, but can be useful in asthmatics with hay fever. Antibiotics, cough syrups and mucolitics should be regarded as unnecessary therapy[1].

The antileukotriene agents are the first new class of asthma medication introduced in almost two decades. They have been shown to have a range of potentially beneficial pharmacological properties[2]. There are few data available and more studies are needed to provide comparative data to established therapies in children. Their paediatric long-term safety and effectiveness also remains to be determined[5].

Drug delivery devices — the practical aspects

Inhaled therapy is preferred in all age groups. Pre-school children should receive metered dose inhalers (MDIs) for use in combination with a spacer device. In this age group the spacer must be equipped with a soft and tight-fitting face mask (eg. Aerochamber, Babyhaler or Nebuchamber). In school-going children a spacer device with a mouthpiece is usually suffi-

cient (eg. Inflammide spacer or Volumatic spacer). Powder devices could also be used in this group. Products like the Accuhaler and Turbuhaler are user-friendly and effective in children familiar with the user technique.

Spacers should be washed on a weekly basis. Wet spacers must be left to air dry (and not wiped dry) in order to prevent electrostatic charging which reduces drug delivery. Inhalation should take place immediately after dispensing the drug into the spacer. (The half-life of drug aerosol within the spacer is often less than 10 seconds[2].) Single-puff-at-a-time actuation is recommended. Spacers and valve components should be checked on a regular basis for possible malfunction. It is usually necessary to replace spacers at 6-12 month intervals.

Older children with proven co-ordination skills could take B2 agonists without a spacer. All children receiving inhaled steroids should do so by means of an attached spacer.

Home nebulisers are expensive and they vary greatly in terms of the droplet size and the efficacy between different drugs dispensed. The advances in MDI and spacer delivery systems may obviate the clinical use of nebulisers in many situations[2]. They remain useful in the management of acute asthma,[3] but are not O_2 driven and may cause a false sense of control with parents. Their random use in non-selected asthma cases cannot be supported.

Lung function testing

A number of laboratory studies may be useful in the confirmation and follow-up of asthmatic cases. Some of them (like bronchial provocation tests) should rather be left to trained hands. The general practitioner must train all children older than five years in the correct use of the hand-held PEFR devices (like Assess or Mini-Wright) and in the technique of forced spirometry. These could be used, during follow-up visits, as objective evidence of the degree of airway obstruction and reversibility on therapy. Good patient co-operation is necessary for consistent results, and the success of efforts must be borne in mind on interpretation of results. The measurement of only PEFR or FEV1 may fail in the identification of small airway obstruction — especially in the mild cases.

In this situation the FEF25-75% is a more sensitive indicator of obstruction and should be interpreted as part of the forced spirometry results[5].

	Category		
	Mild	**Moderate**	**Severe**
Frequency of attacks of cough and/or wheeze	≤1/month	≤1/week	≥1/week
Night time cough and/or wheeze	No	≤1/week	frequent
Prior hospital admissions for asthma	No	once	>one admission or one ICU admission
PEFR % of predicted	>80%	60 - 80%	<60%

Note: One or more features may be present to assign a severity category. Assign patients to the most severe category in which any feature occurs.

Table I: Assessment of severity and control

Environmental control measures

A detailed history, to identify possible asthma triggers, should be obtained from every asthmatic patient. Factors precipitating hyperactive airway responses include allergen exposure (IgE mediated), viral respiratory infections, irritants (smoke, sulphur dioxide etc.), exercise, climate changes and emotions. Where indicated, specific IgE — against suspected allergens — should be sought. Once a trigger or offending allergen is identified, parents should limit exposure. The case for specific immunotherapy is not strong in paediatric asthma and it might be associated with adverse reactions[4].

There is clear evidence that passive smoking is harmful to asthmatics. Removal from exposure leads to improved outcomes[2]. No smoking should be allowed near or in closed environments (house, car) shared with asthmatics. Children should be encouraged not to smoke.

Asthma education — an investment

The thorough education of parents, caregivers and patients, in all aspects of their illness, is an investment towards better compliance and better control. A wide range of helpful educational material is available from institutions like Allsa and The National Asthma Education Program.

Referral to a specialist

If the goals of management are not met, referral to a specialist should take place. The SACAWG[1] proposed the following as indications for referral:

- Diagnosis in doubt
- Unstable asthma
- Asthma interferes with normal life despite treatment
- Parents or practitioner need further support
- If oral steroids are required regularly
- After a life-threatening episode

	Category		
	Mild	**Moderate**	**Severe**
(Reliever Therapy) An intermittent inhaled B_2 agonist on a prn basis Metered Dose Inhaler (MDI) ± Spacer or Powder Device	fenoterol 200mcg salbutamol 200mcg or terbutaline 250mcg	fenoterol 200mcg salbutamol 200mcg or terbutaline 250mcg	fenoterol 200mcg salbutamol 200mcg or terbutaline 250mcg **In uncontrolled cases also consider** long acting B2 (formoterol/salmeterol) or slow release theophyllines
(Preventer Therapy) Daily inhaled anti-inflammatory agents Metered Dose Inhaler (MDI) ± Spacer or Powder Device		sodium cromoglycate 10-20mg 3-4 times daily or nedocromil **if insufficient response** Low dose inhaled steroids e.g. beclomethasone/budesonide 100-400-mcg/day or fluticasone 50-200mcg/day	Higher dose inhaled steroids e.g. beclomethasone/ budesonide 400-1 600mcg/day or fluticasone 400-1 000 mcg/day

Note: • B_2 agonists should be given on a pm basis. Do not exceed 3-4 dosages per day. If B_2 agonists are needed more than three times per week, the anti-inflammatory drugs should be stepped up.

• The new International Consensus Statement proposes the consideration of long acting B_2 agonists or slow release theophyllines even before high dose inhaled steroids are use.[6]

Table II: Treatment according to severity

Differential diagnosis of asthma in infants and children[3]

Foreign bodies in the airway
- *Supraglottic causes*
  Retropharyngeal abscess
  Tonsillar abscess
  Epiglottitis
- *Laryngeal causes*
  Croup
  Stenosis
  Tetany
  Vocal cord paralysis
  Angioedema of the larynx
- *Tracheal causes*
  Tracheomalacia
  Tracheitis
  Vascular rings
  Lymph node compression
- *Bronchial causes*
  Bronchiolitis
  Bronchitis
  Bronchiectasis
  Lymph node compression (tuberculosis)
- *Pulmonary causes*
  Pneumonia
  Cystic fibrosis
  Tuberculosis
  Pertussis
  Atelectasis
  Congenital lobar emphysema
  Hypersensitivity pneumonitis
  Loeffler's syndrome
- *Other causes*
  Congestive cardiac failure
  Gastro-oesophageal reflux
  Hyperventilation

Summary

Managing a child with asthma is challenging. The differences between paediatric and adult asthma should be appreciated. A good working knowledge of available asthma drugs and their delivery devices is necessary. The correct use of lung function tests, avoidance of triggers and an investment in education should be part of a holistic approach to asthmatic patients. The goal for each attending doctor should be that of normal, symptom-free and active asthmatic children, while not over-treating them with potentially expensive means. If a patient does not respond to optimal management, the diagnosis must be reconsidered. ●

References

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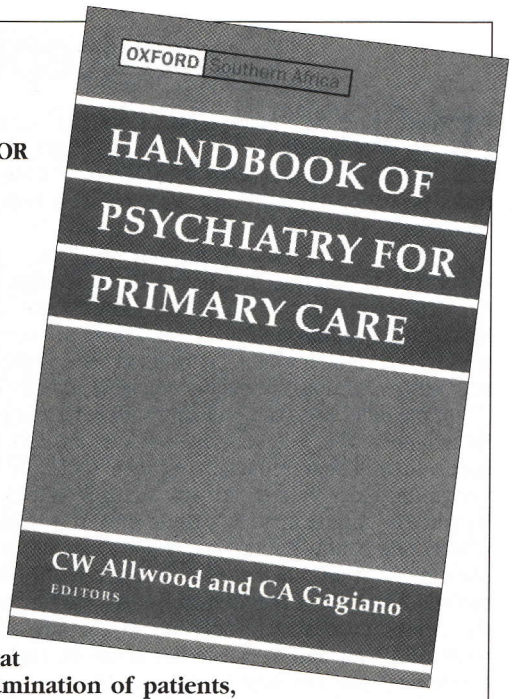
Book review

by Dr Bev Schweitzer



HANDBOOK OF PSYCHIATRY FOR PRIMARY CARE
edited by CW Allwood and CA Gagiano

Oxford University Press, South Africa, Cape Town, 1997

This locally-produced handbook is a welcome addition to my "desk library". I spent time on the weekend paging through it and feel as though I've attended a refresher course in psychiatry from the comfort of my own home.

Part One gives an introduction to various concepts in psychiatry, Part Two looks at approaches to history and examination of patients, Part Three looks at common psychiatric diagnoses in PHC and Part Four discusses therapeutic modalities, including brief outlines of behaviour and cognitive and family therapy. This is followed by a glossary of psychiatric terms.

Local flavour is evident in the chapters on "African concepts of mental health and mental illness" and "Cultural syndromes". The latter gives lists of features of *Amafufunyane* and *Thwasa* and some practical guidelines. The chapter on legal intervention was also especially useful as it related to South African law.

There are two excellent chapters on history-taking and the mental status examination written as a patient study and then summarised at the end of the chapter for rapid reference. Undergraduate students, especially, will find this helpful.

The book whets the appetite by its interesting chapter headings, but provides just an appetiser in terms of information. I feel that a list of further recommended reading at the end of some of the chapters would be very useful.

There was some encouraging advice and stimulating ideas. In the chapter on promoting mental health the author writes: "There must be a preparedness to challenge repressive systems; make telephone calls, write letters and fax them to make things happen for the patient, that is advocacy. This willingness to 'go the extra mile' with a dependant and frustrated patient outdoes pills and injections."

In the chapter on community psychiatric care the author proposes the establishment of therapeutic groups as "the most important healing tools that PHC workers have at their disposal" to keep patients relapse-free in the community. This left me with some ideas. The only problem with this chapter was the author's style of repeating the word "should" too often, giving it a rather directive, authoritarian tone.

I was surprised to note that the chapter on "difficult patients" focused entirely on personality disorders rather than addressing the difficult doctor-patient relationship and transference and counter-transference issues. Are personality-disordered patients the only patients with whom doctors have difficulty, or do we just label all difficult patients as being personality-disordered?

I found the chapter on dementia very useful as it gave practical reminders about the need to decide about revoking driver's and gun licences, how to apply for *curator bonis* and advice on the doctor's role in helping the family to decide whether to admit the patient to an old age home. References are given for locally available books for family members. I was also pleased that there was a separate chapter on ageing that was more health-oriented.

Eating disorders and child psychiatry are not mentioned in this book — that is because they are dealt with in another Oxford handbook for primary care on child psychiatry which has also recently come out.

The book is a practical size, well set-out for quick searching and reading and has quality binding. It costs R130. ●