ASTHMA

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Asma word gedefinieer as omkeerbare lugweg obstruksie. Presipiterende faktore word genoem en die voorkoms by kinders en volwassenes beskryf. Die patrone en evaluering van asma, asook die behandeling in akute- en tussen-fases word bespreek. Die belang van fisioterapie in asma word genoem.

The word "asthma" is derived from the Greek word for short-drawn breath or panting. The condition has been referred to in the ancient writings of the Hebrews, Greeks and Egyptians, but the first clinical description of an asthmatic paroxysm was made by Aretaeus the Cappadocian in the second century A.D. Although Aretaeus, Thomas Willis (1678), Sir John Floyer (1698) Cullen (1784) and Laennec (1819) all recognised it as a distinct clinical entity, the term asthma has unfortunately been indiscriminately associated with many causes of dyspnoea through the years. Great advances have been made over the last 20 years in our understanding of many aspects of asthma but despite this we are still ignorant of the basic cause. Indeed the only satisfactory definition of asthma at present is "reversible airways obstruction" and this definition is not without its limitations. The basis of reversible airways obstruction is a hyper-reactive bronchial tree which responds initially by broncho-constriction but later with complicating mucosal oedema, secretions and inflammatory changes. The tendency to hyper-reactive bronchi is probably inherited and asthma may have its onset at any age and may also remit at any age. The mechanisms underlying this "switching on and off" of asthma are unknown. Asthma is not an "all or nothing" phenomenon and there is a range of bronchial reactivity within the population, with normal people at one end of the spectrum and severe asthmatics at the other. The degree of bronchial hyper-reactivity may also fluctuate in an individual over a period of time and the presence of clinical asthma requires a combination of hyper-reactive bronchi and some triggering factor.

Factors which may precipitate attacks of asthma in susceptible individuals include physical agents (cold air, exercise, laughing), allergens (foreign protein, organic dusts, fungi) infections (viral and bacterial), physical irritants (inorganic dusts, sulphur dioxide) and psychogenic factors. The importance of each of these factors varies in different individuals and perhaps even in the same individual at different stages of life. It is now widely accepted that psychogenic factors, however, play very much less of a role than believed in the past.

CHILDHOOD ASTHMA

The incidence of asthma in childhood is very variable in different communities but is approximately 5%. It is the most common chronic disease of childhood. Boys are affected twice as commonly as girls. The onset of asthma in childhood occurs under the age of 5 years in 80% of cases, and a troublesome cough (particularly at night) is a common mode of presentation. Most (75%) affected children have only mild symptoms and will usually "grow out" of their asthma in their early teens, although relapses may occur in later life in some. Symptomatic treatment with a bronchodilator may be all that is required to control these mildly affected children. Children with more severe asthma have a great tendency to associated flexural eczema and although the latter often tends to disappear in the teens, the asthma is less likely to remit than in mildly affected children. "Round-the-clock" regular therapy with bronchodilators plus sodium cromoglycate and/or corticosteroids is often needed to control asthma in these children. Of course, in all children, removal of aggravating environmental factors is essential. The development of sodium cromoglycate and inhaled steroid preparations (Beclomethasone) has made a very valuable contribution to the management of asthma in children as they have reduced the need for systemic steroids with all their attendant side-effects.

Because children often grow out of their asthma and because exercise is such a common precipitating factor in children, many are undertreated and deprived of normal childhood activities. Psychogenic factors have in the past also been overemphasized. The latter should never be invoked without some measure of respiratory function having been made, as quite severe airways obstruction may go unrecognised clinically. Appropriate treatment of the asthmatic child will usually allow him to lead a normal life. Control of symptoms and reversal of airways obstruction will often lead to disappearance of "psychological problems".

ADULT ASTHMA

Asthma with onset in adult life may also pass through phases of varying severity but the tendency to prolonged remission is less than in childhood. Presentation is usually with acute episodes of wheezing and dyspnoea in the young adult. In late adult life presentation may be less distinctive, with chronic cough and sputum production dominating. It is important to recognise that a chronic cough in the absence of marked wheezing may be due to asthma, otherwise the diagnosis may be missed and the patient inadequately treated. Factors precipitating attacks are much the same as in childhood although exercise plays a less prominent role. The importance of environmental and industrial agents is increasingly being recognised and bronchial challenge studies have shed much light on different patterns of response to such agents. The list of industrial products (which may play a dominant role in up to 2% of adult asthmatics) continues to grow. It includes complex salts of platinum, salts of chrome and nickel, antibiotics, enzymes, detergents, toluene di-isocyanate, grain dust, flower and vegetable dusts. The importance of recognising these external agents is that prevention of exposure to them is a more effective means of therapy than symptomatic use of drugs. However, in the large majority of asthmatics, individual environmental agents are only occasionally recognised and bronchodilators, cromoglycate and corticosteroids remain the mainstay of therapy.

PATTERNS OF ASTHMA

The commonly observed pattern of asthma is the occasional attack of varying severity, in relation to climatic changes or known precipitating agents, with intervening asymptomatic periods and a tendency to be slightly worse in the mornings. There are however, a

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few more unusual patterns which have been recently described. The "morning dipper" characteristically has severe airways obstruction in the early hours of the morning with return to almost complete normality later in the day. Patients who show the greatest degree of such diurnal variation may be at particular risk of sudden death. Extensive studies have failed to identify the exact mechanisms involved, but recent bronchial challenge studies have shown that recurrent episodes of morning asthma (for up to a week) may follow a single exposure to some allergens. "Brittle" asthma is characterised by intractable persistent asthma which fluctuates considerably during the course of days and weeks but never reverses completely during this period. Response to bronchodilators seems to be short-lived and these patients therefore tend to overuse their inhalers. They are often accused of being emotional asthmatics. Recognition of the severity of their airways obstruction and intensification of therapy with sodium cromoglycate or corticosteroids will improve many of these patients. Once their base-line pulmonary function has been improved, regular "round-the-clock" treatment will often achieve control where this was not previously possible. The "irreversible" asthmatic is a patient who responds poorly to all treatment including corticosteroids and may remain in a phase of persisting severe airways obstruction for prolonged periods before gradually improving. Reversal of airways obstruction is never complete in these patients who, even at their best, will have some degree of irreversible obstruction.

ASSESSMENT OF ASTHMA

The complete assessment of an asthmatic patient requires a full and careful history of the onset and pattern of asthma over the patient's life, with particular attention to precipitating factors, a full clinical examination, chest radiograph, skin prick-tests to a variety of common allergens, some measurement of the degree of airways obstruction, and an eosinophil count in the peripheral blood. In assessing the patient with an exacerbation of symptoms, the clinical classification of Sherwood-Jones is useful (Table I) and should be

TABLE I

Grading of Severity of Asthma
(Sherwood Jones)

Grade	
1a	Difficulty with job or housework, sleep occasionally disturbed.
1b	Great difficulty with job or housework, sleep frequently disturbed.
2a	Patient only able to get out of bed or chair with moderate difficulty. Minimal relief from inhaler. Sleep disturbed.
2b	Confined to chair or bed and only able to get up with great difficulty. No sleep. Pulse >120/minute.
3	Completely unable to move. No sleep. No relief from inhaler. Pulse >120/minute.
4	Complete exhaustion.

NB Admit to hospital when patient reaches 2a.

supplemented by three specific observations: (a) pulse rate, (b) pulsus paradoxus, (c) measurement of peak expiratory flow rate or FEV1/FVC, in addition to looking for the wellknown clinical features of severe asthma, such as inability to complete a sentence without taking a breath, use of accessory muscles, and intercostal recession. Tachycardia almost always implies severe asthma and this may take several days to return to complete normality after an acute severe attack. Pulsus paradoxus is the presence of a fall in systolic blood pressure during inspiration, and although up to 10 mm mercury fall may occur in normal people, a fall of more than 10 mm mercury indicates severe airways obstruction. Although simple to elicit, it is a physical sign neglected by many and needs to be advertised more widely so that it becomes a routine part of assessing asthmatic patients. Measurement of peak expiratory flow rate or FEV1/FVC should also be used routinely. These tests can be done with robust easily portable, relatively cheap instruments and because they add so much objective information to the clinical assessment of asthma, their use should be routine, not only in clinics and hospitals but also in domiciliary practice. The use of the peak flow meter is recommended in assessing the very severe asthma attack as only a short sharp forced expiration (after a full inspiration) is needed to record peak flow rate. This is easier for the patient to do and induces less bronchospasm than the prolonged forced expiration required to record FEV1/FVC. When the patient is a little better the peak flow meter can still be used, but the FEV1/FVC recorded on a Vitalograph provides more information. The use of such measurements enhances our ability to use bronchodilators and corticosteroids rationally.

TREATMENT OF ASTHMA

Acute Attack

The child with acute severe asthma who has not responded to his usual bronchodilator aerosol or syrup is probably best treated with subcutaneous adrenaline. This seems to be the drug of choice despite the development of newer and more specific agents. Experience with these newer drugs will clarify their role in acute childhood asthma. Intravenous aminophylline can be used but because of the narrow therapeutic range of blood levels and possible unpleasant side-effects, this should be used with caution and preferably with monitoring of blood levels. Wet aerosolised selective beta-2 adrenergic stimulant drugs (e.g. salbutamol, hexaprenaline, fenoterol, carbuterol) should also be used. Failure to show adequate response to such treatment is an indication for the administration of systemic steroids. Aerosolised steroids have no place in acute severe asthma.

In adults the initial therapy of choice is intravenous aminophylline, 5 mg/kg as a loading dose over 20 minutes and then 0,5 mg/kg per hour as a continuous infusion. An alternative is i.v. salbutamol 100 micrograms followed by 5 micrograms/minute. Wet aerosol inhalations of a selective beta-2 stimulant using a simple nebulizer is very effective and there is no additional benefit derived from using an expensive positive pressure apparatus (e.g. Bird ventilator) to deliver the wet aerosol. Again, as in the child, corticosteroids should be given if there is not a rapid response to the above treatment. Judicious use of oxygen and fluids must be included in management and the value of personal comfort and reassurance provided by the doctor, nurse, or physiotherapist must never be forgotten. Sedation is absolutely contra-indicated except under very special circumstances where pulmonary function is being carefully monitored and where resuscitation can be carried out expertly. More patients with severe asthma are harmed by sedation than helped. The agitation and distress of a patient with severe asthma is due to severe airways obstruction and hypoxia. The use of sedation is inappropriate in this setting and is only resorted to by those who lack understanding of severe

asthma and who have failed to assess the severity of asthma adequately.

Only a small percentage of patients presenting with acute severe asthma will fail to respond to all the measures outlined above and these patients may need intubation and ventilation as a life-saving procedure.

Although patients with severe attacks of asthma may be symptomatically better within minutes and hours of instituting appropriate treatment, it often takes many days of treatment to achieve complete reversibility of airways obstruction. Twice daily monitoring of peak flow rate or FEV1/FVC, and pulse rate during the recovery period will be the most accurate means of assessing progress.

Interval Therapy

The object of interval therapy of asthma is to keep the patient asymptomatic and to keep pulmonary function as close to normal as possible. This should be achieved with the least amount of drugs possible. In some patients regular use of a dry aerosol will be all that is required, whereas others may need more intensive "round-the-clock" drug therapy including inhaled and oral corticosteroids. As asthma is a fluctuating condition, therapy needs continual adjustment to cope with exacerbations and remissions. The use of a diary card kept by an intelligent patient, combined with serial measures of peak flow rate or FEV1/FVC, enable us to follow the pattern of asthma in any individual patient and to regulate his therapy accordingly. Precipitating factors must be avoided wherever possible. It must be emphasized that such optimum interval therapy requires full patient co-operation and this can only be achieved if the patient is educated about his disease, and is willing to cooperate.

Desensitization to allergens plays a little role in the overall management of most asthmatics but may be important in a few carefully selected patients with specific allergies.

PHYSIOTHERAPY

What is the role of the physiotherapist in asthma? She is, in my view, a vital person in the treatment of the asthmatic patient. Not only should she deliver wet aerosolized bronchodilators, and help the patient to cough and clear secretions, but she should have a place in helping to educate patients about their disease and the use of their various drugs, particularly bronchodilators. Her role in comforting and reassuring her patient with severe asthma in the hospital setting must not be underestimated and she can make a real contribution in this area. It is now wellknown that vigorous chest physiotherapy is dangerous during severe asthma and is seldom required between attacks. Gentle percussion and tipping may be of some value in patients with excessive secretions associated with complicating bronchiectasis. Breathing exercises in themselves are of limited value but provide a basis for inter-reaction between patient and therapist which leads to increased patient confidence. The physiotherapist should be familiar with the Wright's Peak Flow Meter and the Vitalograph and she should use these routinely to assess the results of the bronchodilator therapy she is administering to her patient.

DEATH FROM ASTHMA

Although death from asthma was thought to be uncommon at the turn of the century it is now widely accepted that not only does death occur from asthma, but that in many cases this may be preventable. One of the striking features which has been emphasized recently is how inadequate the assessment and treatment of asthma has been in many patients dying of asthma. Improvement in assessment and treatment of patients with acute asthma and improvement in interval management of the many asthmatics in our population will require education of doctors, physiotherapists and patients about the disease, and the provision of adequate staff and facilities.

CONCLUSIONS

Asthma is a common disorder. It produces a great deal of suffering and a not inconsiderable mortality. Our understanding of the condition has advanced greatly in the last decade, and the benefit of our improved knowledge now needs to be translated into patient care, not only in specialised units, but throughout all health care services.