Current Practice

RESPIRATORY TRACT DISEASE

Diagnosis and Management of Asthma

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Asthma can be defined as a condition characterized by recurrent bouts of wheezing, which occur mainly or entirely during expiration. In some cases the wheeze becomes almost continuous, but a variability in the degree of airways obstruction can usually be observed. Cough and sputum may be present, particularly when wheeze is severe, and the differentiation from wheezing chronic bronchitis may be difficult ; in clinical practice this is often not important. For research purposes, on the other hand, it may be essential to lay down differentiating criteria.

The distinction between bronchial and cardiac asthma due to left ventricular failure is of great importance ; wheeze may be the dominant symptom in both conditions. In cardiac asthma clinical examination of the cardiovascular system may reveal tachycardia, gallop rhythm, and pulsus alternans, and sometimes signs of additional right heart failure ; hypertension or signs of mitral or aortic valve disease may be present. The correct diagnosis is imperative, as the treatment of the two conditions is entirely different. Less commonly, obstructive diseases of the airways such as bronchial carcinoma, retrosternal goitre, or bronchial or tracheal stenosis may present as asthma, and very occasionally wheeze may be the first symptom in polyarteritis nodosa or carcinoid syndrome.

Two important aspects to be considered in the management of the asthmatic patient are, firstly, the immediate treatment of the wheezy and breathless patient, and, secondly, the prevention of asthma through an understanding of possible precipitating factors.

Treatment of Intermittent Attacks of Asthma

Intermittent attacks of asthma commonly occur in children and young adults, and can usually be relieved by sympathomimetic drugs. Rapid relief of mild attacks can be obtained using an aerosol of 1% isoprenaline. Administration by nebulizer, allowing penetration of isoprenaline to the small airways, is more likely to be effective than using the earlier type of glass "atomizer" where the isoprenaline droplets are deposited largely in the main air passages. Incorrect use of a nebulizer is a common cause of its apparent ineffectiveness, and the instructions should be followed carefully. The patient should understand that if no relief is obtained after two or three " puffs " taken correctly there is no object in taking more. If relief is obtained it can be repeated every hour or so for three to four hours. Aerosols containing isoprenaline and atropine, or orciprenaline (Alupent), are reported to have a more prolonged action—up to four hours in some patients.

Drugs by Mouth

Oral sympathomimetic drugs such as ephedrine have a bronchodilator action in about 30 minutes. They can be given at the beginning of an attack, and will become effective as the response to aerosol is waning. When attacks occur every day regular administration of ephedrine 15–30 mg.[1] twice or three times daily can be given. However, ephedrine taken at night may cause insomnia ; this can be overcome either by omitting the evening dose or combining it with phenergan 25–50 mg. It has been shown that if ephedrine is taken regularly for more than a few weeks its bronchodilator effect diminishes, and intermittent treatment is therefore rational. The side-effects of ephedrine, particularly tremor, irritability, and tachycardia, are often troublesome, especially in adults ; they can sometimes be overcome by using one of many proprietary compound tablets, which usually contain ephedrine, barbiturate, and aminophylline. The disadvantage of these compounds—besides their greater cost—is that the dose of ephedrine is frequently low and that the dosage of individual drugs cannot be adjusted independently.

Various oral preparations of aminophylline (theophylline and ethylenediamine) adapted to reduce gastric irritability may be helpful in mild asthmatics and may be preferable to ephedrine when this is causing difficulty of micturition, but they are seldom helpful in more severe cases. Patients with intermittent asthma are frequently hypersensitive to one or more specific external agents ; the investigation and treatment of this will be discussed later.

Management of Continuous Asthma

Asthma both in children and adults can become so severe that wheeze is continuously present. This situation is especially common in that type of asthma which develops for the first time in middle or late adult life, and which is unrelated to known external allergens. Treatment in the first instance is similar to that described above, but response to sympathomimetic drugs is often poor. In these cases dramatic relief is frequently obtained by using corticosteroids. The hazards of these are now well known, and a history of peptic ulceration, diabetes, hypertension, or mental disturbance should particularly caution their use. If there is a history of tuberculosis anti-tuberculous drugs are usually given concurrently. In practice, however, when treating severe intractable asthma there is no practical alternative form of therapy, and in spite of their potential dangers corticosteroids should not be withheld. It is usually advisable to start with a dose of prednisone or

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[1] Average adult doses are quoted throughout this paper.

prednisolone of 30–40 mg. daily, and after two or three days, when the asthma improves, to reduce the dose by 5 mg. every two or three days until symptoms are just controlled. A maintenance daily dose of 5–10 mg. is often sufficient; 1 mg. tablets are available and a fine adjustment to the exact dose required by individual patients can be achieved. There is evidence to show that sympathomimetic drugs may become effective when used in conjunction with corticosteroids in previously unresponsive patients, and combined therapy should therefore be continued. It is reasonable to attempt to withdraw corticosteroids gradually, but completely, in patients requiring these for the first time and intermittent courses of corticosteroids is rational treatment for infrequent but particularly severe attacks. It is important to remember that severe and even fatal asthma can be precipitated by steroid withdrawal, and it is probably better to stabilize the majority of patients responding only to corticosteroids rather than to risk repeated relapse. In general bethamethazone and dexamethazone given in equivalent dosage to the prednisone regimen suggested here have no particular advantage in asthmatic patients; triamcinolone should be avoided in view of the occasional complicating myopathy.

Management of Status Asthmaticus

The term status asthmaticus refers to the general clinical situation of a patient with acute severe asthma unresponsive to conventional treatment with bronchodilators.

Subcutaneous adrenaline can often give dramatic relief; an initial dose of 0.5 ml. of 1 : 1,000 solution by deep subcutaneous injection should be given, followed by a further 0.5 ml. if there is no excessive rise of pulse rate, so that 1 ml. is given over about five minutes. This may be repeated in an hour if necessary. Adrenaline deteriorates with time and exposure to the light, and this is a common reason for apparent adrenaline resistance. There is recent evidence to suggest that adrenaline should be used with caution if excessive amounts of isoprenaline aerosols have been taken within the past few hours, as is usually the case when progressive asthma develops. In such a situation it is wise to withhold the ineffective isoprenaline and delay the use of adrenaline for about three hours. In the meantime aminophylline 0.25 g. in 10 ml. of water slowly given intravenously may be valuable. This dose may be repeated hourly if necessary. Aminophylline is also the preferable drug in patients with known cardiovascular disease.

If immediate improvement is not obtained with adrenaline or aminophylline in severe asthma, corticosteroids should be given. An initial dose of 20 mg. prednisolone disodium phosphate can be given intramuscularly, together with hydrocortisone hemisuccinate 100 mg. intravenously. Oral prednisone may then be continued 10 mg. four-hourly, and as improvement occurs the daily dose can be reduced gradually. The response to corticosteroids usually occurs slowly over 24 to 48 hours, and occasionally additional relief can be obtained by intramuscular A.C.T.H. in a dose of 40 units eight-hourly for a day or two, decreasing thereafter.

It is important to remember that status asthmaticus can be fatal, and that with prolonged attacks the peripheral airways become progressively obstructed by tenacious mucous plugs. Intensive early drug treatment is imperative, and physiotherapy and supervised coughing help to prevent sputum retention. The value of mucolytic agents is uncertain; many are irritant and may increase the severity of the airways obstruction. In all severe cases supportive therapy with oxygen should be given.

It is common to find that a patient who is completely resistant to therapy at home responds immediately when removed to hospital, and such transfer should not be delayed.

Sedation should be given with caution, and morphine is dangerous; close supervision, preferably in hospital, is needed. It is wiser to avoid sedation with barbiturates. A single dose of paraldehyde 5 ml. intramuscularly can be given once only if really necessary. When anxiety is great chlorpromazine 25 mg. t.d.s. may be helpful.

Role of Infection in Asthma

Infection may precipitate asthma, especially in children, and if the sputum is yellow (due to polymorphs and not eosinophils) infection can be assumed. Specific pathogens are not usually present, and treatment with a broad spectrum antibiotic such as tetracycline, 250 mg. 6-hourly, or ampicillin, 500 mg. 6-hourly, is often valuable in rendering the sputum mucoid.

There is considerable difference of opinion on the place of antibiotics in status asthmaticus, but in my opinion any patient in status asthmaticus for more than 24 hours should be treated with an antibiotic.

Emotional Factors in Asthma

Many patients admit freely that their asthma is provoked by emotional upsets, and it can be an important factor in many who fail to realize it. An understanding of this aspect by the patient and doctor is clearly important; but in general, with a few notable exceptions, psychiatric treatment of asthma is most disappointing. The value of hypnosis has recently been assessed in a carefully controlled trial, and the results suggest that this form of treatment has a place for individual mild asthmatics who are good hypnotic subjects with dominant emotional features. It should be stressed that once severe asthma has developed, whatever the precipitating factors—be they emotion, infection, or allergy—the condition can be fatal, and intensive drug treatment as outlined above is essential.

Prevention and Control of Precipitating Factors

A detailed history should always be taken to elicit external agents provoking asthma, such as dust, pollens, feathers, animals, and foods, and when relevant hypersensitivity can be confirmed by skin testing and in special instances by inhalation tests. Appropriate environmental control of specific allergens can then be suggested. This is particularly relevant in dust and animal hypersensitivity. Desensitization is most successful in pollen asthma, particularly when hypersensitivity is restricted to pollens only; this form of treatment should be undertaken during the winter months so that it is completed by the beginning of the pollen season. The value of desensitization to house dust is less well established, and when multiple skin sensitivities are present desensitization is less successful. Several types of fungi (especially *Aspergillus fumigatus*) may be important allergens in some cases of asthma, and investigation by sputum culture, skin testing, and immunological methods to demonstrate circulating antibodies to specific fungi can be of practical value.

In the past too little attention has been paid to the role of industrial agents in asthma. "Monday morning" wheeze in cotton workers is well recognized, and recent reports have related asthma to specific exposure to various agents, including wheat grain, wood resins, toluene diisocyanate (used in some forms of paint), and emulcents such as gum tragacanth. Many further types of industrial exposure will probably be described in the future. Some agents may act as true allergens, while others may be non-specific irritants precipitating asthmatic attacks in hypersensitive subjects.

Health Centres and Group Practices.—This booklet, which is based on recent articles in the *B.M.J.*, has now been published, with an introduction by Lord Cohen of Birkenhead. It is available from the Publishing Manager, *British Medical Journal*, price 3s. 6d. (including postage)