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(Bronchial Asthma)

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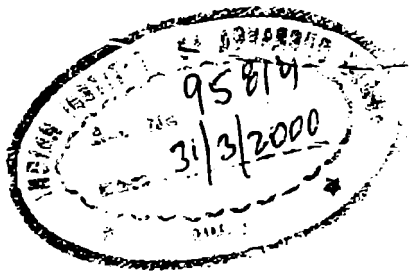

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Contents

1
Introduction

The word "Asthma" means, a pauling, a gasping for breathe. The term Bronchial asthma is employed to describe recurrent, generalised airways obstruction which at least in proxysmal and reversible. It must, however, be differentiated from 'Cardiac Asthma' which is associated with left heart failure and renal asthma which occurs in terminal stages of chronic Bright's disease. Clinical manifestations are dyspnea, and wheeze although in severe asthma the obstruction may be so great that there is no audible wheeze. In some cases especially among children and the middle aged, it is difficult to decide whether 'asthma' or bronchitis is the most appropriate diagnosic term. In these patients cough and sputum as well as wheeze are important manifestations, yet the airways obstruction can be reversed to a large extent by drugs such as adrenaline and cortico steroids.

2
Prevalence

Asthma is a world-wide, being neither confined to any geographical area nor restricted to any particular race. It occurs in the primitive as well as the civilized communities in either sex and at all ages. It is estimated that there are about two million people or 1 in 75 in the United States who suffer from asthma. In a 15 years period of general practice at Kent, U.K. Fry found an incidence rate of 2.5% and an annual prevalence of 1.25%. In a study of 4,500 university students at Wales in England 3.7% gave a past history of asthma and 1.0% were still having attacks.

Data for incidence of asthma in India are meagre. In a recent survey of Central Government servants and their families in Delhi, asthma was found in 1.8% (ICMR). A more recent survey carried out in a semi-urban area in Bihar gave an incidence in 1.7% (Vishwanath). Generally, therefore, the incidence of

asthma in any population appears to vary between 1-2%.

Social Status

The ICMR survey showed a higher incidence of asthma in the better-paid government employees than in the lower income group, the rate being 3.17% and 1.08% respectively.

Age at Onset

Studies at V.P. Chest Institute (Delhi) revealed that the disease started in childhood (0-4 yrs) in 23.2%. In 53.8% it began between the ages of 15 and 34 yrs and in remaining it began thereafter. Thus in 8 out of 10, it occurred below the age of 35 while in 2 out of 10 it started after 35.

The overall prevalence in women seems to be slightly higher than in men. There is marked difference between the sexes in ages of onset. Williams found that in males asthma started before the age of 35 in 90% and before the age of 15 in 80%. In females, on the other hand, it started before the age of 35 in 75% and in only 40% before the age of 15. In no less than 25% of women asthma began after the age of 35, compared to 10% in men.

There is after a clinical impression that asthmatics are more intelligent but the evidence is not conclusive.

3
Mortality

The mortality of asthma is relatively low compared to the morbildity. Figure 1 shows the marked intitial fall in mortality in England, Wales after the introduction of corticosteroids drugs, but the disturbing rise since 1960. The overall increase has been 42% upto 1965. In the 5-34 age group it has been 16.5% and in the 5-14 group 33%. A similar overall rise has occurred in Scotland as well as in New Zealand.

Some of the rise may be due to the postponement of death by corticosteroid drugs but there is a possibility that the cardiac effects of inhaled Bronchodilator drugs may play a part.

The death rates by age in 1965 are shown in Fig.2.

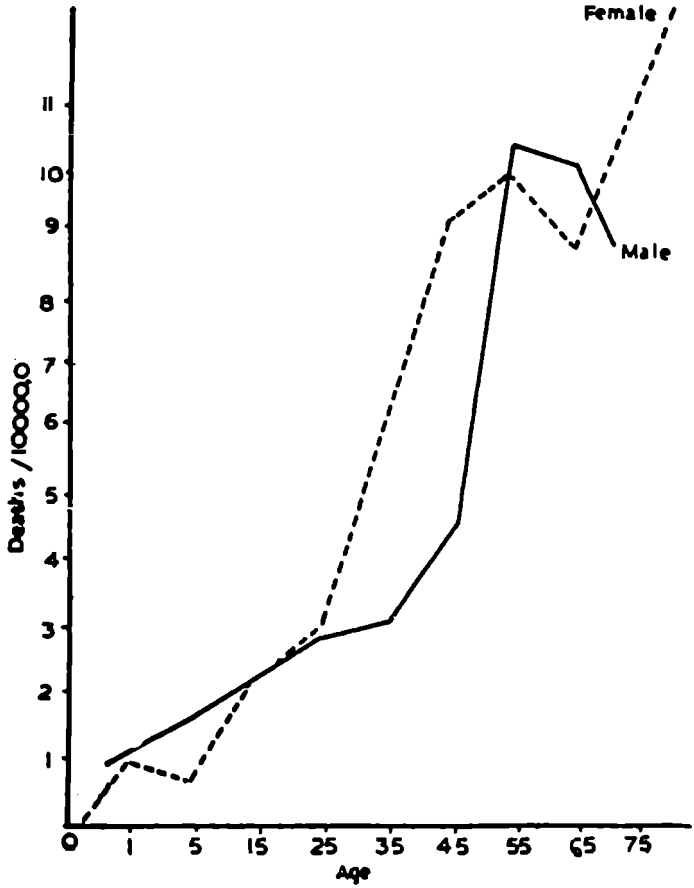


FIG. 1

ASTHMA MORTALITY BY AGE & SEX

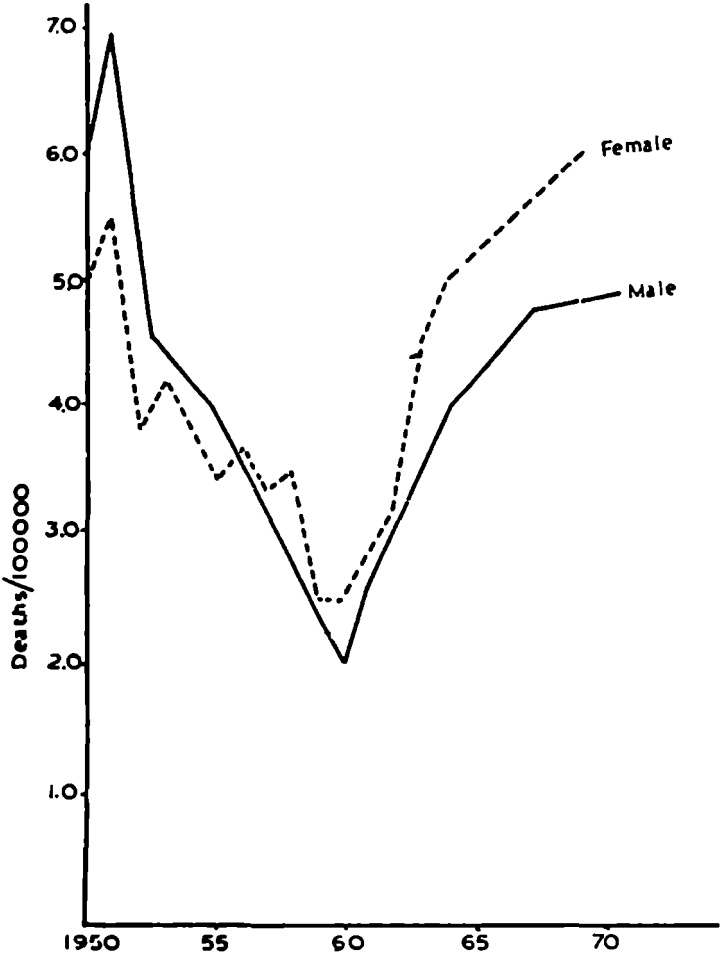


FIG. 2

DEATH RATES PER 100000 POPULATION FOR ASTHMA

4
Pathogenesis

1. BRONCHIAL OBSTRUCTION

Asthma in some cases is due to spasm of the bronchial tubes, in others too sudden swelling of the mucous membranes lining these tubes while in some other cases both these factors operate. Thus three main factors probably contribute to the bronchial obstruction which characterize asthma.

(i) Contraction of Bronchial Muscle or True Bronchospasm

Contraction of bronchial muscle in response to a specific allergens has been shown experimently in human lungs rejected from patients with allergic asthma. The bronchial muscle is found to be hypertrophied in patients dying from severe asthma. Crofton and Douglas have demonstrated hyperactivity of bronchial muscle, by measuring the 'squeeze' pressure

exerted by the bronchi on expiration by means of a balloon in a segmental bronchus.

(ii) Swelling of the Mucus Membrane

The importance of this is uncertain. At autopsy much of the bronchial epithelium is shed, though the basement membrane is thickened.

(iii) Plugging with Viscid Mucous

In cases dying in status asthmatics the characteristic findings at autopsy are an increase in mucous glands and goblet cells with plugging of the peripheral bronchi by viscid mucous. It may be that the plugging occurs because the bronchial muscle is unable to relax and the bronchi can not be cleared or replacement of ciliated cells by goblet cells may also interfere with the cleaning mechanism.

2. HYPERSENSITIVITY

It is generally accepted that the bronchi of patients with asthma are hypersensitive i.e., they react to certain stimuli some specific and some non-specific, differently from the other people—causes of asthma have been divided into two main groups.

(i) Intrinsic Asthma

In this the external allergens can not be demonstrated, hence seasonal or environmental factors are absent. Skin and inhalation tests are negative and circulating levels of reaginic antibody are normal.

(ii) Extrinsic Asthma

In this the external allergen can be demonstrated.

3. GENETIC FACTORS

There is often a family history of asthma or of other manifestations of hypersensitivity. Williams & Williams found that about 50% of patients gave a history of allergy in close, relatives, compared to about 12% of individual without asthma. However, the evidence for a genetic factor in allergy is uncertain.

4. MENSTRUATION AND PREGNANCY

A few women, who develop asthma for the first time at puberty, may tend to have exacerbations during the 7-10 days before their periods. Such patients tend to be better during pregnancy, as do patients with demonstrable allergic asthma.

5. ADRENOCORTICAL DEFICIENCY

In view of the often good response of asthma to corticosteroid drugs, it is possible that there might be an element of adreno-cortical deficiency, in pathogenesis of asthma but there is no theory to support it.

6. STIMULI CAUSING ATTACKS OF ASTHMA

The stimuli responsible for attacks of asthma may be classified as follows:

(i) Allergic Factors

Allergic factors are particularly important in children with a history of infantile eczema and asthma. Allergic factors are often prominent in patients whose asthma starts in later childhood. Very many different types of allergens have been identified in individual patients:

Pollens: Hypersensitivity to pollens is relatively common and many asthmatics may have a history of hay fever.

Foods: Sensitivity to food allergens such as eggs, wheat, cow's milk, chocolate or fish is said to be particularly common in children.

Dust: Allergy to house dusts and to fungi and their spores is common in older individuals. House dust asthma tends to be at its worst between July and November.

Mites: The relevant allergens form the part of the mites of the Dermatophagoides species but may also be produced in external secretion. It may contaminate kapok, wool and feathers.

Drugs: About 1% of asthmatics are said to be sensitive to aspirin, penicillin, sulphonamides and iodide compounds.

(ii) Infection

It is not possible to demonstrate an allergic reaction to any specific infecting agent but it may be that in these patients inflammation of bronchi from the

infection starts off a chain of reaction resulting in asthma. The sensitizing antibodies tend to accumulate in inflammed tissues and it may be that such antibodies are responsible for asthamatic attacks.

(iii) Psychological

In general surveys in Britain it was found that psychiatric disturbances was common in asthmatic children than in controls. Families of asthmatics seemed to have a higher prevalence of neurosis and other psychiatric illnesses. Scientists found evidence of major psycho-social stress, of a wide variety of types, immediately preceding the onset of asthma in 35% of 800 asthmatics.

Some scientists have demonstrated impairment of vital capacity developing in asthmatic subjects when presented with objects associated with their emotional problems. In one individual who had had a series of severe emotional cries as a child when her mother threw away a goldfish to which she was greatly attacked, severe impairment of vital capacity was demonstrated when she was presented with a toy goldfish in the bowl or even the bowl only, but also in even worse attack occurred when the doctor dropped the bowl on the floor and it smashed. In view of somatic components of anxiety and other emotional upsets, it is not surprising that, in patients with an asthmatic tendency, emotional episodes are liable to aggravate asthma. Parents of asthmatic children are often accused of being over-protective, a very understandable reaction.

It must be emphasised that multiple factors operate in asthma. Williams and his colleagues in a review of 487 cases considered that there was an infective factor in 88%, psychological in 70% and allergic in 64%. All three played a part in 38%.

(iv) Exercise

Exercise quite frequently induces asthma, though there is some variation between individual. In a few the asthma is relieved.

(v) Air Pollution and Local Asthma

Patients with asthma tolerate atmosphere pollution or cigarette smoke badly. Evidence is incomplete nevertheless these asthmatics are often worse in foggy weather.

(vi) Other Non-specific Factors

Most asthmatics are unable to smoke, because find tobacco smoking irritating. Other smokes may have a similar effect, as may such things as smell of fresh paint, strong perfume or cold air. 15 seconds inhalation of 1, 3, 10, 30 and 100 mcg of aceylcholine resulting in cough in asthmatics. Similar responses may be evoked by histamine inhalation, the bronchi of asthmatics being more sensitive than those of normal people.

5

Substances Responsible for the Asthmatic Reaction

Histamine

Histamine release is brought about by an intracellular calcium requiring enzyme system which gets activated by the allergen- reagin union.

Cell fixed antibody + antigen

+

Enzyme precursor + Ca^{+P}

Active Enzyme (short-lived)

+

Bound Histamine (mast cell granules)

Free Histamine

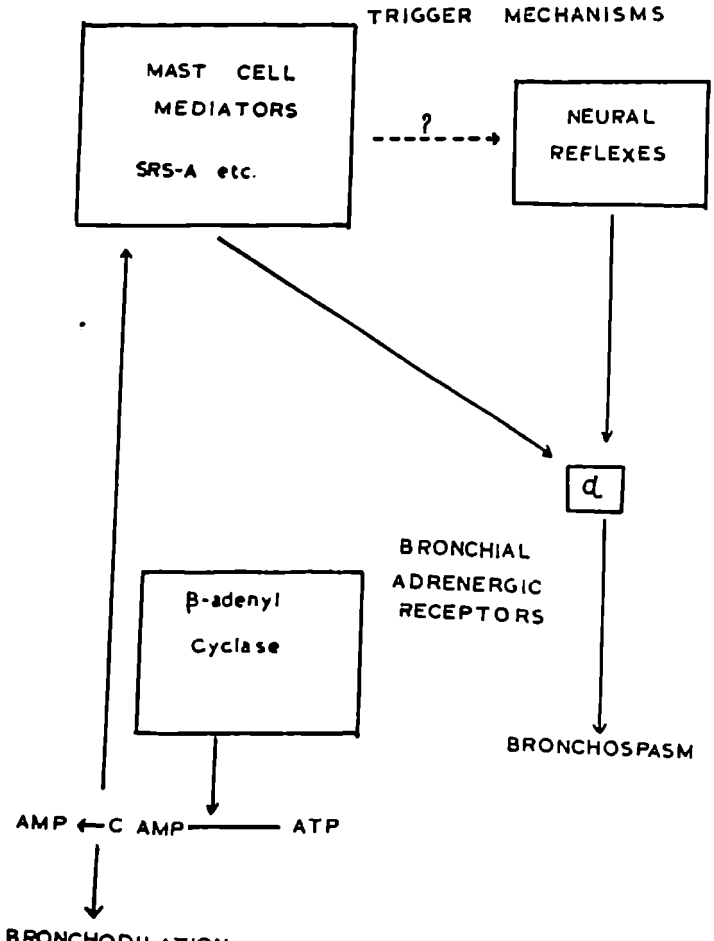


FIG. 1
RELATIONSHIP OF PATHOPHYSIOLOGIC MECHANISMS IN ASTHMA

Histamine causes contraction of smooth muscles (bronchaspasm) Vasoditation (fall of blood pressure) and increase in the capillary permeability (mucosal oedema and transudate in the bronchial lumen).

Histamine is not the only mediator of allergic reactions. Evidence for the existence of other chemical mediators has existed since 1940, so far three other substances have been recognised as chemical mediators of allergic reaction besides histamine—slow reacting substances of anaphylaxis (SRS-A) serotonin and bradykinin.

SRS-A

This substance is clearly important in causing bronchial muscular centraction in man. It is 10 times more active in humans than in guinea pig muscle. It is an extremely potent substance and is usually found in a loosely attached state with other molecules e.g. leathium. It causes a slow but substantial contraction of human bronchiole and was released from the human asthmatic lung during an allergic reaction.

Serotonin

Serotonin is chemically 5-hydroxy tryptomines—a base derived by decarboxylation of the amine acid tryptophen. Serotonin causes contraction of smooth muscles and increases capillary permeability but, unlike histamine it causes vasoconstriction of larger blood vessels.

Bradykinin

Bradykinin is a peptide having pharmacological activity similar to that of histamine. It is formed from the precursor bradykiniogen (an X-globulin) present in the plasma by the action of enzyme liberated from tissue cells as a result of damage caused by antigen-antibody reaction. Though present in blood during unaphylaxis in several species of animal, no importance has been described to it in man.

6

Physiologic Changes or Functional Abnormality

The main abnormality in asthma is airways obstruction. As the airways are normally narrower on expiration, obstruction is particularly severe during this phase. F.E.C. (forced expired volume in 1.0 sec) and F.V.C. (forced vital capacity) are reduced. During an attack the FEV/FVC ratio will be well below 70%. Evidence of airways obstruction is usually present between clinically obvious attacks of bronchspasm. The data collected for this during 1967 can be reviewed with particular reference to the site of airways, obstruction, the effect on lung volumes and effect on blood gases.

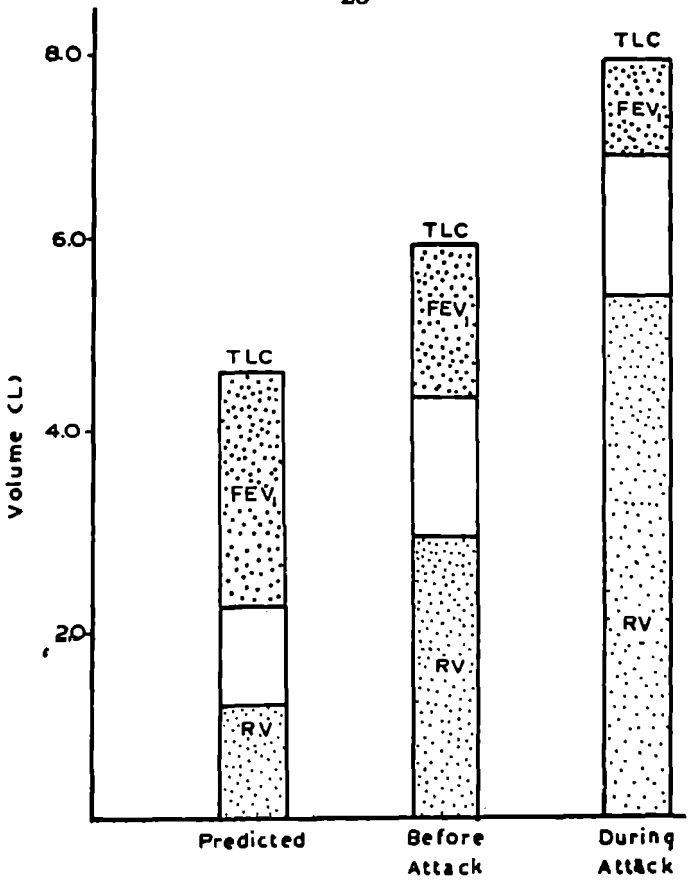
Site of Airways Obstruction

It may appear self-evident that since airways obstruction is due to smooth muscles contraction, *secretions* and mucosal swelling, the increased resistance to air flow in asthma will occur where bronchial smooth muscle and secretory cells are present. These elements extend to the terminal bronchioles. In fatal status asthmaticus the principal obstruction is in the small airways, 1-5 mm in diameter and is due to plugs of mucus, mucosal swelling and shed epithelium.

Lung Volumes

The two most striking features of severe asthmatic attack are the apparent distension of the chest and the prolonged noisy expiration. Both are due to the narrowing of the air passages and which, both in health and in disease, vary in length and calibre with the lungs, increasing in all dimensions. On inspiration and similarly decreasing on expiration. These changes can easily be observed in *vivo* during bronchoscopy.

In bronchospasm smaller airways may collapse completely at the end of a normal non-maximal expiration. This is the basis of the common "value-like-effect" in asthma. Total lung capacity (TLC) measured during bronchospasm may be several litres above the patient's usual TLC, accounting for the hyperinflated chest. Similarly the residual volume (RV) may be increased by several litres. The entire vital capacity may be shifted to a range above the patient's normal TLC is shown in Fig 6.1. During an



FEV_1 – forced expired volume in 1st second

FIG. 6-1

LUNG VOLUMES IN AN ASTHMATIC PATIENT

exacerbation, the absolute FEV and FVC usually decrease and the FEV/FVC ratio changes little but the FEV and the FVC may not appear to change at all.

Blood Gases, Oxygen Transport and Acid Base Changes

The first significant series of blood gas determinations in asthmatic exacerbations were presented only recently. They clearly indicate that arterial hypoxia is almost variable. If bronchospasm is severe or prolonged, or both, more serious physiologic resistance and decreased compliance result in alvestar hypoventilation, arterial hypoxia increases and hypercapnia occurs. Retention of Co_2 causes a respiratory acidosis to arterial hypoxia may produce an additional metabolic audosis, poor tissue perfusion and oxygenation result in the incomplete oxidation of the products of glycolysis and the production of lactic acid by the tissues. Administration of O_2 prevents many of these secondary changes in acid base balance.

7
Asthmatic Personality

Leigh & Marley found in a survey that feelings of inadequacy, tension and anxiety were much more common in the asthmatics than in controls. Basic core of the asthmatic personality has been described in detail by Basbans and Groen as follows:

1. A marked emotional hypersensitivity.
2. A diminished capability or failure of adaptation to difficult and unfavourable situations.
3. Strong tendency for impatient, impulsive behaviour.
4. Ego centricity with an inclination for psychic isolation.
5. An infantile stubbornness which leads to conflict with an authoritative figure in the family or environments towards whom he has an ambivalent feeling of both dependence and hostility.

6. A marked difficulty in resolving inter-personal conflicts and thereby discharging the inner mental tensions by "taking it over."

8
Clinical Syndromes

Asthmatic Attacks

The asthmatic attacks can vary from a mild sense of tightness or oppression in the chest felt only on deep breathing or exertion to a severe experience of choking and suffocation with furious respiratory movements and expiratory wheeze.

During a severe attack, the patient sits upright in the bed with his head thrust forward and downward or leans forward over a table, the mouth is open. The chest is elevated, shoulders are raised, chest expansion is minimal even though its vertical movements are maximal. There is usually tachycardic and the blood pressure may be normal or elevated.

The asthmatic attack may come up at any time during the day or but is common in the early morning (2-4 A.M.). Attacks are also precipatated by physical

exertion, mental excitement and by a heavy meal, fumes from chemicals such as petrol, kerosene, cooking gas and insecticides, exposure to cold breeze or getting wet in the rain, change in season etc. The mechanism in case of chemical fumes appears to be exaggeration of a normal response to irritants.

There is evidence of chronic respiratory infection such as repeated colds, chronic, sinusitis or chronic bronchitis which shows the onset of asthmatic symptoms by months or years. Cough with mucoid is usually a constant feature in addition to be wheezing. The wheezing is more or less continuous i.e. present every day. In this case the response to antibiotics and bronchodilators is unsatisfactory because of the permanent damage caused to the lungs by recurrent infections, and corticosteroid are mandatory.

It is to be noted that psychological factors and climatic variations in temperatures, humidity and air pollution affect the intrinsic type as much as the extrinsic. Quite often, the clinician has to deal with a mixed type, the extrinsic young adult merging into the intrinsic middle aged asthmatic. This is particularly seen in those who had outgrown a childhood asthma or a related allergic disorder.

Status asthmatics is a state of continuous wheezing and dyspnoea which has become resistant to routine bronchodilator therapy. It is a serious medical emergency. The patient is extremely distressed by breathing hard and sitting forward in the bed continuously for hours together. There is considerable anxiety because of failure of the routine therapy in

relieving the dyspnoea. The pulse rate and blood pressure are raised. If medical management is ineffective or is considerably delayed, a stage comes when the physical effort of breathing hard to maintain ventilation fails. The patient is unable to sit upright to cough or to utter a few words. There is a fall in pH and standard bicarbonate concentration of the arterial blood. The patient becomes increasingly restless, confused and finally unconscious. Cardio-respiratory collapse their supervenes, the blood pressure fells and the respiration become slow and shallow'till it fails.

Seasonal Asthma

Asthma occurring regularly during certain periods of the year or months strongly indicates an allergic or psychic basis e.g. asthma developing or deteriorating during early summer is strongly suggestive of pollen allergy. A seasonal asthma may develop in gardeners and farmers, either during the crop-cutting season or later when the store houses are opened, of allergy to fungi affecting fruits like tomatoes, cucumbers and cereals.

In women, the asthmatic spells often coincide with menstruation, though there is no evidence of a cause and effect relationship and menopause has frequently no influence on the malady. Many women are relieved of their trouble during pregnancy due to some unknown reason. Change in the daily habits and the environment, relief or aggravation of pschogenic stresses may all be operative. This history is very useful in determining the aetiology of periodic asthma.

9
Diagnosis

It is rightly said "All that wheezes is not asthma." Whereas the diagnosis is fairly clear in a vast majority of cases, an occasional case requires exclusion of the following conditions.

1. Acute Bronchitic

It is commonly seen in children and the clinical features are almost identical with those of asthma. The family history and child's past history for allergic disorders such as infantile eczema is a useful aid but ultimately the pattern of further attacks determines the diagnosis of asthma.

2. Tropical Eosinophilia

Dry hacking cough followed with expiratory dyspnea and wheezing are characteristics of this condition. In this case also the family and personal history and mode of onset are helpful in distinguishing it from asthma.

3. Cardiac Asthma

As mentioned earlier this condition can hardly be confused with bronchial asthma if carefully examined. Evidence of hypertension coronary or aortic disease and other signs of left ventricular failure may also be present in this.

4. Chronic Bronchitis

There is a history of cough of long duration, usually worse with change of weather and in winter and monsoon. However, intrinstic asthma often develop in such patients and the differentiation is sometimes difficult.

5. Acidotic Breathing

This is usually found in diabetic coma, uremia and in chronic respiratory failure with Co_2 retention. It is recognised by its hyperventilation without an expiratory dyspnea.

6. Hysterical Hyperventilation

This can be easily diagnosed by its rather shallow breathing with absence of prolonged expiration and foreign breath sounds. The history and examination often provide other evidence of hysteria.

7. Upper Respiratory Tract Obstruction

This is to be excluded specially in children. The history is suggestive, the onset is very sudden and the dyspnea is both inspiratory and expiratory often associated with a stricton.

8. Harmony Syndrome

This is the pulmonary manifestation of periartentis nodosa, and is usually preceded by involvement of other symptoms. There is dyspnea, cough and sometimes haemoptysis and peripheral neuritis. Blood examination shows marked oesinophilia.

10
Complications

1. Enphysema

Enphysema is the commonest and most important complication of asthma. Degeneration of the alneolar walls occurs from repeated spasmodic distension of the lung for sufficiently prolonged periods, and the alneole remain permanently distended. This causes a marked and permanent decrease in vital capacity and aggravates the dyspnoea. The chest assumes a barrel shape with hunched shoulders. During childhood the skeleton is soft and can lead to development of pigeon chest.

2. Spontaneous Pneumothorax

The symptoms and signs of this are often marked by those of the acute asthmatic seizure and pneumothorase is discovered on a routine examination of the asthmatic.

3. Chronic Bronchitis

Most patients with long standing asthma develop chronic bronchitis. The loss coliary epithelium and the comparatively stagnant bronchial secretins, which are difficult to expectorate, probably favour the development of infection.

4. Atelectosis

Collapse of a segment or even massive collapse of a lobe occasionally occur in asthma from bronchial destruction due to thick tenacious plugs of mucus.

5. Corpulmonale

Though not directly a complication of asthma, it is very common cause of mortality in asthmatics. It results from the chronic obstruction emphysema which most asthmatics develop in old age. It develops still more rapidly when chronic bronchtics is also present.

11

Prognosis
(Forecast of Course of Disease)

"Once asthma always asthma" though true for many, is not true here many more. The prognosis depends on sexual factors.

Asthma starting in childhood has a much better prognosis than that starting in adult life. Grant interviewed 4571 Cordiff University students, 37% of whom gave a past history of asthma. Out of these asthmatics, 40% were completely free from attacks by the time they reached the age of university education.

Asthma starting in childhood and adolescence has a large allergic basis, and besides the natural tendency "to grow out of it, it leaves scope to produce "clinical cures" by avoiding the allergens as much as possible or by producing desensitization if feasible.

Intrinsic asthma, arising in late adult life, has less favourable prognosis because the principal aetiological factor i.e. respiratory infection along with the rapidly developing emphysema, cause permanent pathological changes in the lungs, making significant recovery impossible. Long standing extrinsic asthma has also an unfavourable prognosis because of the same reason.

The natural history of asthma is characterised by intermittent periods of freedom from the disease. These remission may vary from a few weeks to a few years. These may be spontaneous or may be associated with changes in climate, occupation desensitization etc. In general people with strong allergic family background and those having other allergic manifestation have very little chance of becoming completely free from the trouble.

Repeated attacks of status asthmatics cost poor prognosis. Apart from the severity of asthma, the mortality rate for such patients is also high. Bruce Person recorded 16 deaths in a series of 100 patients who suffered from status asthmatics. Rackemann, in his survey of 68% asthmatics, found a mortality of 1.5% from status asthmatics.

12
Management

The treatment of bronchial asthma can be conveniently divided into three sections:

1. Preventive Treatment
2. Symptomatic Treatment
3. Specific Treatment

1. Preventive Treatment

(a) *Avoidance of allergens*: To eliminate the causative factors is often a problem in asthma, because one important aetiological factor is the inherited ability to get senstised 'the inherent asthmatic state'- which cannot be removed. The treatment therefore, is to concentrate on discovering and avoiding the allergens to the best of one's ability. Besides the known allergens, the patient should be instructed to avoid other non-specific irritants such as dust, paints, perfumes, irritants fumes, insecticide sprays etc.

Textile fibres when they are older and start disintegrating become more allergenic, so these should also be avoided. Bedroom should have nothing that can store dust, furniture should be bare minimum and door and window curtains should be washed frequently.

Infants of asthmatic patients should be breast-fed as cow or buffalo milk is a common cause of food allergy in children. Similarly addition of wheat, egg, fish and other cereals to their diet should be watched carefully to detect early an allergic development.

The patient should try his best to avoid factors precipitating a cold such as cold drinks, cold water baths, going out in a cold wind or a rainy day and visits to crowded and congested places like public gatherings and cinema houses.

(b) *Occupation*: In general, hard manual work, work encountering dust, fumes, or smoke and farm work are unsuitable for asthmatics. Distantly situated school or office requiring long journeys is undesirable.

(c) *Climate*: Individual smoky areas as well as cold and damp weather are bad for asthmatics. Dry, warm climated with moderate rainfall and equable temperature throughout the year suits the asthmatic best. The advice to change the residence should not be given light heartedly and without a sound reason because there is considerable psychic trauma in abandoning a house and the neighbours with whom the patient has lived for many years.

(d) *Drugs*: Drugs form the backbone of prevention treatment for the chronic asthmatics who gets his attacks day in and out. However, drugs like pencillin, iodides, aminopyrine, phenolphthalein and liver extracts should be avoided as far as possible to prevent sensitisation developing against them.

3. Specific Treatment

If the offending allergen for an asthmatic is discovered and yet if the same cannot be removed from the patient's environment e.g. pollens, a hyposensitization treatment may be attempted. After a series of gradually increasing doses of the extract of the allergens, clinical improvement occurs due to an altogether different variety of antibodies, the blocking antibodies. The success of this treatment therefore depends on two factors:

(i) the accuracy with which the diagnosis is made.

(ii) the ability of the individual to form blocking antibodies in sufficient amount to compact with the regions in the shock organ.

Pollens asthma responds extremely well to hyposensitization—more than 80%, are benefited. Hyposensitization is also equally successful in asthma resulting from airborne fungal or yeast spores and animal emanations, but the results are less encouraging in patients suffering from house dust sensitivities and are poor in case of food allergy.

In pollen sensitivity the treatment is best commenced about three months before the pollen

season. The patients are given about 50 subcutaneous injections of gradually increasing doses over a period of 80 days though it has been now claimed that the series of injections can be replaced by cautions use of depot of pollen extract in an oily base which is administered in one shot.

13
Treatment of Status Asthmaticus

A patient in status asthmaticus is suffering from continuous wheezing for a few hours and usually has already had injections of adrenaline and aminophyline, to which he has not responded. However, inadequate dosage and delayed use of these drugs is as harmful to these patients as their overdose. Adrenaline is given in doses of 0.5 - 1 ml every half hour if there is no alarming tachycardia upto a maximum of 2 ml. If adrenaline fails to produce relief intravenous aminophylline in doses of 0.5 gm is given. It is usually given by adding it to an intravenous drop of 5% glucose or glucose saline used for hydrating the patients.

Adrenaline fastness in status asthmaticus has been described to the concomitant respiratory acidosis, a condition which is unusual in an ordinary asthmatic attack.

Blumenthal *et al.* have demonstrated that the cardiovascular actions of adrenaline in human volunteers are diminished in acute respiratory acidosis and augmented in acute respiratory alkalosis. Mithoefoer *et. al.* have reported prompt relief of bronchospasm after correction of respiratory acidosis by bicarbonate infusion. Though acidosis should receive prompt treatment, status asthmaticus is characterised by a generalised drug resistence, so the bronchoconstriction cannot respond promptly to any antispasmodic alone.

Hydration is an important and yet neglected aspect of the management of status asthmaticus. Because of poor eating, limited quantity of fluid intake and vomiting and also free perspiration result in dehydration which cause inspissation of sputum, more coughing and more bronchospasm. Administration of 2.3 litres of intravenous fluid during 24 hours is given. If there is doubt of any cardiac pathology, the pushing of fluids is restricted or discontinued.

Severe continuous wheezing causes considerable exhaustion, loss of sleep and tremendous rise in mental tension, anxiety and fear. The need for sedation is therefore paramount. Meprobamate, chloral hydrate are quite suitable. Respiratory depressants like barbiturates, opium derivatives should not be used as these increase mortality and morbidity of asthma.

Status asthmaticus is an absolute indication for stemed therapy. 60- 80 mg of prednisone during first

24 hours is given which is then gradually reduced. Steroids are life-saving in status asthmaticus.

Oxygen inhalation is absolutely essential for a status asthmaticus.

Infection is a common precipitation of status asthmaticus and hence tetracycline is given for therapeutic purposes which is discontinued depending upon sputum examination and clinical response.

Hospitalisation is the best for status asthmaticus, it removes from patient's environment allergic infective and psychic offending stimuli and also always the anxiety of the patient as constant medical supervision is there.

14
General Hints and Household Remedies for Asthmatics

In fighting against asthma, the patient himself must be his own physician and a firm courageous undaunted soldier. He should necessarily have a knowledge of what things to accept and what to avoid.

1. The patient bedroom should be sparsely furnished, with no carpet, no covering on the chairs, with lightest of curtains to avoid dust (if the patient is allergic to room dust). Of course, the room should be well-ventilated.
2. The patient should sleep with his head and shoulders raised on pillows—the attacks are fewer in this position.
3. It is better for patients to live in the upper storey than on ground floor.

4. The general health of the patient should be attended to.
5. Constipation should be removed.
6. Improvement of asthma will follow after the diseased teeth are removed.
7. Take morning and evening walks.
8. Practise deep breathing.
9. Expose body to sunlight daily.
10. Fast every week or at least every fortnight.
11. Take figs and apples, oranges, mousambi, tomatoes, or lemon juice with honey. These are curative foods.
12. Avoid starch, sugar.
13. The subjects should avoid heavy meals before retiring to bed. Preferably take meals only once at mid day and in the evening take hot milk and fruits.
14. Pork, cheese, baked products and beer should be avoided.
15. Coffee is a popular and useful remedy. The decoction must be very strong and taken on an empty stomach.
16. Garlic is efficacious in asthma.
17. Fried foods act as poison to asthmatics.
18. Avoid excitement and fits of anger.

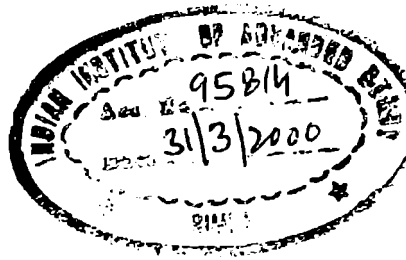
19. Asthma is often relieved by change of climate, than by medical treatment. Sometimes a moist climate affords most relief, sometimes town and very rarely a country side.

20. Sometimes a high altitude with absolutely pure dust-free air may give complete relief.

21. Severe asthmatic patients should not travel by air, because they get very little O_2 on account of rare heat atmosphere. They will get suffocation.

22. Placing the hand in very hot water (bearable) contained in a basin placed at the side of the bed is a useful household remedy.

BE CHEERFUL, BE BOLD, KEEP THE BOWLS FREE, CHOOSE THE DIET RIGHTLY AND ASTHMA CAN BE CURED TO A LARGE EXTENT.



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