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ASTHMA IN CHILDHOOD*

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BY

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"I have suffered under the Tyranny of the Asthma, at least, Thirty years; and therefore I think myself to be fully informed in the History of that Disease; And since I have practised Physick, I have made many Trials for the Relieving and Preventing of the Fits; and out of Compassion to those Miserable Patients, I design to relate what I have found useful both to my self and others." Thus wrote Sir John Floyer in his *Treatise on Asthma* in 1698. Floyer's patient, Dr. Johnson, relates how he "panted on" till his death at the age of 83, thirty-six years later. Though my experience of asthma extends over only forty-eight years, compared with Floyer's total of sixty-six, it is perhaps this rather extensive experience which prompted your President to invite me to open to-day's discussion.

The Asthma Diathesis

Many years ago I defined asthma as the reaction of an over-excitabile bronchial system, including the medullary centre, the vagal nerve-endings, and the bronchial musculature and mucosa, to blood-borne irritants and to reflex and psychological stimuli, and I see no reason for altering that definition. The irritable bronchial system, which constitutes the asthma diathesis, is a congenital and often inherited constitutional abnormality. It results in the vagal constituent of the bronchial nervous system being predominant over its sympathetic partner. In the presence of this diathesis certain allergens and reflex and psychological stimuli, which have no effect on normal individuals, give rise to spasm of the bronchial muscles, often associated with hypersecretion of the bronchial mucous glands, together with congestion of the bronchi, which is the natural accompaniment of their excessive functional activity. Associated with the physical side of the asthma diathesis there is probably a psychological side, which manifests itself in a special type of personality. It is extremely difficult to decide how much of the "asthma personality" is a result of over-protection by too anxious parents—the great importance of which I first learnt from Dr. H. C. Cameron—and how much is constitutional. Rogerson (1937) has, however, given good reasons for believing that there is a constitutional element, which manifests itself in intelligence above the average, over-anxiety, and lack of self-confidence. At the same time the asthmatic child is often aggressive and dominating.

The constitutional factor in asthma shows remarkable variations at different times. A patient may be almost constantly asthmatic for weeks together and then have a period of complete freedom, when he can expose himself with impunity to all the allergens to which he is usually sensitive, eat big meals just before bedtime, take unlimited exercise, and face psychological difficulties which on other occasions would cause

severe attacks. It is often impossible to recognize what leads to these periods in which the bronchial system appears to have lost its irritability. But there is no doubt that the more completely attacks are prevented by removing all known exciting causes the less irritable does the bronchial system become. One might be tempted to believe that the cure of asthma is not to have it; but unfortunately this is not true, as even after long periods of freedom the diathesis is still present and the asthma may recur. It is, however, a fact that if a child can be kept completely free from asthma for a couple of years he is quite likely to remain free for the rest of his life.

Biochemical Causes: Allergy

In recent years so much attention has been directed to the question of hypersensitiveness to proteins and other chemical substances in asthma that there has been a tendency to regard "allergy" as the one essential factor. The truth is, however, that an individual who is hypersensitive to one or more proteins does not suffer from asthma unless he has the asthma diathesis. In its absence he may have hay-fever, various cutaneous disorders, or gastro-intestinal attacks if his nose, skin, or alimentary canal respectively is hypersensitive, or he may have no resulting symptoms of any kind. There is no doubt, too, that many asthmatics are not allergic at all, their attacks being caused only by reflex and psychological stimuli. It is none the less of the greatest importance to give every asthmatic an exhaustive cross-examination with the object of discovering whether any or all of his attacks are due to his being allergic to some food, animal emanation, pollen, dust in his home or working place, or orris-root powder. Hyde Salter described in the second edition of his admirable monograph on asthma, published in 1868, how his detective work had demonstrated the asthma-producing influence of cats, horses, feathers, guinea-pigs, rabbits, sheep, deer, hares, and cattle in some of his patients.

When I was in America in 1919 I visited Chandler Walker, as I had been told that he had devised a method of recognizing the allergens to which an asthmatic was sensitive by means of skin reactions, and it was hoped that this would revolutionize the treatment of asthma. (The method was, however, not really new, as Blackley had applied pollen to the forearm "after the skin was abraded as in the ordinary mode of vaccination" in cases of hay-fever and hay-asthma in 1865, and it had also been tried in hay-fever by Noon and Freeman.) Walker demonstrated his methods and gave me a collection of allergen solutions, most of which were the first of the kind to be used in England. In the last twenty-three years I have had an extensive experience of the skin tests, which have been applied by various experts but never by myself. The results have been profoundly disappointing, as with two or three exceptions they have never revealed an allergen responsible for a patient's asthma that had not already been recognized by careful cross-examination. On the other hand, on several occasions I have been told that a positive reaction was obtained with a food

* The opening address in a discussion in the Section for the Study of Disease in Children at the Royal Society of Medicine, Nov. 27, 1942.

which the patient rarely or never ate or with the emanation of an animal or a pollen with which he never came into contact, and in other cases no reaction was obtained with an allergen to which the patient was proved to be sensitive.

Reflex Causes

The respiratory tract is the main reflex source of asthma. When a child with a narrow nasal airway lies down at night the passive congestion of the cavernous tissue of his turbinates may be sufficient to bring them into contact with the irritable mucosa of the septum and thus give rise to reflex bronchial spasm. The narrow airway may be congenital, or the result of an injury or of chronic infection which leads to permanent congestion of the mucous membrane and the development of polypi. Intermittent congestion is also a common reaction to the inhalation of allergens. Suitable treatment, with a minimum of surgery, may prove very beneficial, and no asthmatic child should be allowed to remain a mouth-breather.

In many cases the first attack of asthma in a child is the direct sequel of an acute bronchial infection, and subsequently all or the majority of attacks may follow a cold or bronchitis, to which some asthmatic children are especially liable. The infection may act in two ways. It may lead to a temporary increased permeability of the nasal or bronchial mucous membrane, which allows access to the blood of an effective dose of an allergen, such as that in feathers, with which the child can come into contact at ordinary times with impunity. The extremely irritable condition of the inflamed bronchial mucosa in acute bronchitis may also lead to bronchial spasm by a short or long vagal reflex. There is no evidence that a patient is ever allergic to the toxins of the infecting organism. It is consequently not surprising that by using adequate controls Knott demonstrated that autogenous vaccination has no direct effect on asthma. When, however, asthma is secondary to chronic respiratory tract infections in patients over 35, short courses of prophylactic inoculations in the spring and autumn often appear to reduce the liability to infection and to the resulting asthma.

A distended stomach and a distended rectum may both produce reflex attacks of asthma, which is never caused by alimentary toxæmia. Evacuation of the stomach by vomiting and of the rectum by a well-conditioned defaecation reflex without the use of drugs or enemas gives immediate relief, which could not have happened if the asthma had been the result of alimentary toxæmia—the so-called, but mythical, "asthma toxicosis," about which several monographs have been written.

Psychological Causes

The most common psychological exciting cause in asthma is expectation, the effect of which Bree recognized in his own case as long ago as 1797. An asthmatic who has been accustomed to having attacks in certain places or under certain conditions is very likely to continue to do so when the original allergic or reflex causes have ceased to be operative. Frequent repetitions result in a well-established conditioned reflex. Thus an attack caused by pollen or food during a visit to a certain town may produce reflex asthma conditioned to the town even at a time when neither the pollen nor the food is in season. Certain emotions may also give rise to attacks, as Floyer pointed out 200 years ago. Of these, annoyance—often manifested as outbursts of temper—excitement, and anxiety are the most common. A frequent cause of temper is the strict diet imposed upon a child on account of positive skin reactions to certain foods. It is too much to expect a small boy not to feel resentful on being forbidden to eat a favourite food when he sees his brother and sister and friends enjoying it. It is far better to send him away from home to surroundings in which he can eat everything with impunity than to remain at home, where he comes to regard himself as differing in some strange way from other boys and girls. Laennec told how fright led to an attack in a patient of his when his night-light went out, corresponding with the patient of to-day who becomes severely asthmatic if he breaks his syringe or finds that he has left his adrenaline at home.

The bad influence of the home on many asthmatic children is to a great extent a reflection of their parents' anxiety. It is the psychological rather than the allergic atmosphere from

which they need to be removed. Confirmation of this is provided by the frequency with which an attack follows the first visit of his parents to a child who has been moved to new surroundings. Except for encouragement and simple explanatory talks for older children direct psychotherapy is rarely required, but it is always important to teach the parents of asthmatic children the proper attitude they should adopt towards them. The first essential is to hide completely any anxiety they may feel. A spirit of optimism should be instilled into both the patient and his parents, and they should be made to realize that improvement is likely to occur before long and that conditions which have hitherto given rise to asthma may at any time cease to do so. The child should not be pampered, but be encouraged to lead as normal a life as possible. He should be kept in bed for bronchitis but not for asthma. He should be sent to a boarding school at as early an age as possible.

Asthma Treatments*

In 1902 a specialist from over-seas, having cured 347 of his 402 asthmatic patients by cauterizing what he regarded as an asthmagenic point on their nasal septa, settled in London. He was at first successful with the 80% of his cases with normal-looking noses, the remaining 20% being the unhappy people with abnormal noses, often in part the result of surgery. Forty years have passed since then, and this method of treatment is almost forgotten, having given place in succession to at least a dozen other specific treatments, each with its 70 or 80% of cures. The inventor of one of these—inoculation with an albumose isolated from the urine—told the secretary of the Asthma Research Council that it was unnecessary to collect any more funds, as the asthma problem had at last been solved! A Leyden professor cured 80% of 800 patients by putting them in air-conditioned rooms, in which cacti were the only plants that could live and in which cut flowers faded within an hour. "The efficient treatment of asthma is impossible," he wrote, "without employing an allergen-proof chamber." I arrived at an Amsterdam hotel the same day as another asthmatic from England entered his clinic. I lost my asthma the same night after a good dinner and a visit to a music-hall, whilst he took several days to lose his in a stuffy but air-conditioned bedroom. A couple of years after the inventor's death the tall chimneys of the allergen-free houses, which had given the distant view of Leyden a unique appearance, had all disappeared.

A few years ago many rooms in England were adapted at considerable cost for a new form of inhalation therapy, which was introduced by an unqualified practitioner and boosted by a film star and a number of medical men. Later the inventor had to leave the country, and so far as I know all the installations are now derelict.

Treatment by specific desensitization has had a more widespread and lasting popularity than any of the earlier forms of specific treatment. Investigations, begun by E. T. Conybeare and Witts (1935) and continued by Boland and Lintott (Boland 1938; Boland and Lintott, 1939) at the Guy's Asthma Clinic, have shown that *improvement occurred in the same percentage of cases treated with injections of normal saline solution as with injections of specific allergens*. In a later series, in which paroxysmal rhinorrhoea was the most prominent symptom, Boland and Lintott found that desensitization with inhalant protein had no greater beneficial effect than normal saline solution given with the same ceremony.

Non-specific protein injections in the form of peptone, tuberculin, sanocrysin, or the patient's own blood gave equally good results in the hands of those who believed in them, no doubt because the suggestive effect is the same whatever the nature of the injection.

With an experience of 2,000 cases spread over a period of forty years James Adam of Glasgow claimed to get excellent results from a special diet combined with nasal treatment. The diet, which he described in great detail in his monographs on asthma (1913, 1939), was one which he believed prevented "toxicosis" and did not depend in any way upon the avoidance of foods to which the patient might be found to be allergic.

Before the war every good Frenchman who suffered from asthma took his annual holiday at Mont Dore, *le providence*

des asthmatiques, and every good German asthmatic took his at Bad Reichenhall. My own experience at these resorts convinced me that they acted entirely by suggestion. At Mont Dore one drank the water, inhaled its vapour, and, to make doubly sure, had a daily foot-bath in it. My first visit I enjoyed, and it did me good. My second visit I went without my wife and I hated it; it made me worse, but I got quickly well when I joined her in Paris. The psychological atmosphere at Bad Reichenhall was so unpleasant that I did not cease being asthmatic till I left for Pontresina, where I was at once able to walk and climb all day with complete comfort.

All these forms of treatment produce approximately the same percentage of temporary "cures." They are so diverse in nature that the only thing they have in common is the faith their exponents have in them, a faith which is transferred by suggestion to the patient with sufficient strength to be successful in about 75% of cases. Unfortunately the asthma diathesis remains unaffected, so that recurrence is just as frequent as after spontaneous remissions.

Treatment

The Asthmatic Thorax and Expiratory Exercises.—In an attack of asthma the obstruction caused by the spasm of the bronchioles is diminished by the rise in the negative pressure in the thorax caused by the forced inspiration and increased during the forced expiration by the conversion of the negative into a positive pressure. This explains why asthma differs from all other forms of dyspnoea in being mainly expiratory. The lungs at once become distended to the utmost, and only very limited deflation is possible. Swift relates how a farmer of his friend Anthony Henley, "suffering of an asthma, said, 'Well, if I can get this Breath once out, I'll take care it shall never get in again.'" If the attacks are frequently repeated or prolonged the thoracic muscles assume a new postural tone, so that even when the attack has passed the lungs remain over-distended and the characteristic big chest, hunched shoulders, and wide epigastric angle of the chronic asthmatic persist. The respiratory excursion is much reduced and the child is unable to take exercise without dyspnoea. This condition is often mistaken for emphysema, but in contrast with true emphysema it can be rapidly and completely cured by expiratory exercises, an excellent illustrated description of which has been edited by Dr. Livingstone for the Asthma Research Council. These exercises restore the normal postural tone of the thoracic muscles, so that the chest resumes its natural shape and the lungs their normal size, the respiratory excursion returns to normal, and the child is able to take vigorous exercise without distress. So long as any tendency to asthma persists, simple expiratory exercises should be carried out every morning and evening unless an attack is actually present, and any postural errors, especially habitual shrugging of the shoulders, should be corrected.

Exercise, Clothing, and Baths.—Expiratory exercises should not be regarded as a substitute for walking and open-air games but as a form of training. Nothing is more undesirable than prohibiting games. An asthmatic child should be taught to regard his asthma as an inconvenience and not a disease. It is almost always possible to find a school where he is free enough from attacks to be able to join in every kind of sport. Swimming is particularly beneficial. In peacetime, whenever possible, the Christmas holidays should be devoted to winter sports, and especially ski-ing. If exercise is found to cause shortness of breath, this can often be prevented by taking a small dose of ephedrine or theophylline half an hour earlier. The modern reforms in children's clothing are most welcome, and no boy or girl with an asthmatic tendency should be sent to a school where the ancient and unhealthy fashions are retained. Asthmatic children should be encouraged to have a cold bath every morning all the year round or at least a cold douche after a hot bath of very short duration. Bed is the worst place for an asthmatic in the daytime unless bronchitis is present, and even after a disturbed night it is best to have a cold bath and get up for breakfast, if necessary after a preliminary dose of ephedrine or theophylline.

The Allergic Factor.—In many cases it is possible to discover by a carefully taken history one or more allergens to which a patient is sensitive. These should be avoided as completely

as possible, and it is probably always wise to substitute kapok for feather pillows and to use face-powders which do not contain orris-root. I regard an attempt at specific desensitization as justifiable only when a patient is sensitive to an allergen which it is impossible for him to avoid without grave inconvenience, and even then it is doubtful whether any good effect it may appear to have is not the result of suggestion. It is essential that this allergen should be used alone, even if, as is commonly the case, the patient is also sensitive to others. If it is only one ingredient of one of the pernicious mixed brews on the market it is impossible to increase the dose of the specific allergen sufficiently without causing an excessive reaction from the dust extract which they contain and which is poisonous for everybody.

Iodide.—Many asthmatic attacks end with the expectoration of tenacious mucus, but coughing always aggravates the dyspnoea. A small dose of iodide taken at night or night and morning makes the sputum more watery and much easier to expel. The patient should be taught to control his desire to cough; he will then be able to expectorate the mucus a few minutes later quietly and without effort. Stramonium is often prescribed with iodide, but the harm it does by counteracting the good effect of the iodide by drying the secretion and by upsetting the digestion more than outweighs any slight benefit which might follow its feeble antispasmodic action.

Caffeine and Theophylline.—Strong coffee has long been a popular remedy for mild asthmatic attacks, and for nearly forty years I have known how useful caffeine is in helping asthmatic patients to take exercise which would otherwise have been impossible. I have recently found theophylline monoethanolamine still more effective, and I regard its introduction by Lamson and Bacon (1941) of Los Angeles as one of the greatest boons to chronic asthmatics since the discovery of the effect of adrenaline in 1910 by Brian Melland of Bowdon. It is supplied in capsules under the trade name of theamin. The usual dose for adults is one or two 3-grain capsules, but in children 1 or 2 gr. is often sufficient. It is more effective than ephedrine and less likely to cause unpleasant symptoms. It often prevents the development of dyspnoea if taken before exercise, and prevents nocturnal attacks if taken on going to bed. Mild attacks in the daytime can be aborted if it is taken early enough, but, like ephedrine, it is useless for attacks of any severity.

Adrenaline.—With a good "adrenaline technique" it is always possible for a patient, however frequent and severe his attacks, to control them sufficiently to enable him to lead a life of moderate activity and to avoid becoming a hypochondriacal invalid. In exceptionally severe cases in adults it may even be necessary to give a dozen or more injections a day for long periods. But the patient is still able to carry on his business or profession, and if his technique is good enough he can continue to appear before the world as a fit man. I once taught the adrenaline technique to a surgeon who had decided to retire on account of severe asthma. The new regime made it possible for him to remain in full activity for nearly twenty years, when he died from an acute abdominal disorder. When old enough, the patient should be taught to inject the adrenaline himself at the first sign that an attack is developing: 1 to 4 minims is generally sufficient to abort it, though 5 minims or more would have been required to arrest it if he had waited for somebody to give him the injection when it was fully developed. The small dose produces none of the unpleasant symptoms often caused by large doses injected too rapidly; it leads to no rise of pulse rate or blood pressure. The frequency of injection is immaterial, as there is no cumulative action, but it is of course most important that the patient should not get into the habit of injecting adrenaline when it is not really required, or for mild dyspnoea in the daytime which could be controlled by ephedrine or theophylline. No asthmatic need ever have a bad night; he should sleep eight or nine hours even if he wakes four or five times with asthma, as prompt treatment will send him to sleep within five minutes.

The rare condition of status asthmaticus, in which severe asthma continues uninterruptedly for days or weeks and may end in fatal exhaustion, can almost invariably be arrested by the method of continuous adrenaline injection, which I introduced 18 years ago. The needle is kept in position, and after

an initial injection of a dose which is known to cause no unpleasant symptoms, 1 minim is injected every 15, 30, or 60 seconds, according to the patient's reaction, the rate being adjusted so as to cause no unpleasant symptoms and no acceleration of the pulse. The injections are continued, if necessary, even for half an hour or more until relief occurs.

Conclusion

It may perhaps be thought that I have been too pessimistic about the treatment of asthma. But though I am no believer in "asthma cures," and though I regard most of the popular treatment to-day, like that of ten, twenty, and thirty years ago, as nothing more than gross suggestion, yet I know that every asthmatic can derive much benefit from good advice. He can be taught a way of life and, among other things, how to avoid the exciting causes of his particular brand of asthma, how to control attacks which he is unable to prevent, and above all how to be happy in spite of the bad luck of having been born with the asthma diathesis.

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PSYCHOLOGICAL FACTORS IN ASTHMA*

BY

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For some years, and especially at Guy's Hospital between 1933 and 1937, it was my privilege to study in considerable detail a series of children suffering from asthma. Many of these cases have presented in addition other manifestations of what has been termed the asthma-eczema prurigo complex. I have not been able to satisfy myself that any significant distinction could be made between children suffering from asthma alone and those showing skin symptoms; but to avoid any misapprehension I would like to make it clear that my cases included a rather high proportion of sufferers from eczema prurigo—many of them, indeed, came originally from the skin department.

Upon the basis of my work I wish to make certain observations concerning the causation and treatment of asthma. It has been a common experience of mine to find that in a case in which psychological factors were obviously prominent all physical measures had been exhausted before the patient was handed over to the psychiatrist as a last resort. No psychiatrist who had any experience of asthma would claim that physical treatment should be laid aside in favour of psychological treatment. He would, however, in every case feel strongly that psychological treatment should supplement physical treatment at the time when the latter treatment was being given and not as an afterthought. In the great majority of cases the psychological treatment ought not to be given by the psychiatrist at all, but by the physician in charge of the case, and should consist of an assessment of the total situation in which the illness is occurring, having regard to certain principles which I propose to lay down, followed by an attempt to bring correction to bear on those points where it is needed. In a minority of cases technical psychotherapy is required, and should be given along with the physical treatment.

Influence of the Parental Attitude

I will deal first with the psychological factors in the causation of asthma. There is in this disease among children one observation which we must all have made, and which stands out clearly in case after case—namely, that there is an unusual quality in the relations between the child and one or both of his parents. I shall here quote from observations of my own made in 1934 upon one of the earlier cases I was able to study intensively.

The patient, a boy aged 7, was referred to me because he suffered from the fully developed asthma-eczema prurigo

* A paper read on Nov. 27, 1942, at a meeting of the Section for the Study of Disease in Children, Royal Society of Medicine.

complex. My notes contain the following description: "The child came into the out-patient department clinging to his mother and afraid to leave her side. He was pale and thin, with bright eyes and an anxious countenance. During the course of the interview he wheezed continually and scratched himself surreptitiously. When now and again his mother observed him in this latter practice, she appeared greatly distressed and stopped him momentarily. After numerous fruitless attempts to make him leave off she broke down and wept in a hopeless fashion. There was an air of tension in all her dealings with him, as if she was expecting that at any moment something unforeseen but altogether terrifying might happen to him. The child reflected perfectly the maternal over-anxiety. He described his symptoms in an adult manner, speaking in terms of irritation of his skin and a tightness in his chest."

It is merely necessary for me to add that he was an only son of good and conscientious parents, who regarded him as better than the other children in the neighbourhood, with whom he was not allowed to play.

This case must be typical of hundreds, and one's first reaction is to blame the mother for her over-protection and over-anxiety, and to demand that the child be given greater freedom and be allowed to play with other children. The results of such action often seem to justify the belief that parental over-anxiety is the chief psychological factor in the production of symptoms. In this particular case the line of treatment I have described was followed, in conjunction, of course, with such physical treatment as was deemed necessary. The result was remarkable: the timid over-anxious child became bold and aggressive; his asthma and his skin condition both died away.

Such a formulation as this, however, necessarily leaves one dissatisfied. We know that not every over-protected child develops asthma. Is the special parental attitude in these cases, then, of no particular significance—no more, in fact, than one would expect to observe in any sickly child? Or is there, on the contrary, some fundamental connecting link between the personality of the asthmatic child and the anxiety of his parents? These are questions to which I believe I can give a definite answer which also goes a long way towards correlating the psychological side of the asthma problem with the various physical facts known about it. For the sake of clarity I shall give my answer and then proceed to adduce the facts upon which it is based.

The Asthmatic Personality

In my experience the asthmatic child tends to be of a special personality type characterized in its purest form by the following features: (1) he has an intelligence much above the average; (2) he is irritable and aggressive, quick to respond; (3) he is over-anxious, insecure, un-selfconfident. As a result of his insecurity he often appears at first sight repressed and submissive, but even then there is generally an air of subdued tension about him, and, given an opportunity for freer and more confident self-expression, he becomes aggressive and domineering. He is, in fact, the type of child who makes more demands upon his parents, particularly his mother, than almost any other. He is an intelligent individual who twists her round his finger, aggressive enough to get his own way and anxious enough to demand her continual attention. Again and again I have seen children who subsequently developed asthma showing in their earlier years all these characteristics and developing with their distracted parents a relation exactly like that seen in the case of the full-blown asthmatic. To fulfil their own personality needs they both dominate and demand protection from their parents. The fulfilment of these exaggerated needs, however, leads them, as we all know, ultimately into a state of frustration which they cannot either tolerate or get away from; thus the typical relationship development—aided, of course, in many cases by maternal over-anxiety.

Now for the facts upon which I base my assertions concerning the asthmatic personality.

Intelligence.—I have records of the measurement of intelligence by trained psychologists of more than 50 of these children who attended the department of psychological medicine at Guy's Hospital. The average intelligence quotient was 108.8, as contrasted with an average of 90 for a comparable sample of the population attending the same department suffering from other conditions. This very great discrepancy is of course statistically significant and indicates a marked intellectual