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ON

ASTHMA IN CHILDHOOD.

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BY

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ASTHMA is always an interesting disease, but it is specially interesting in childhood, not only because we meet it then in its earliest and simplest forms, but also because it is then that we have the best chance of curing it. Relatively, too, it is commoner in the child than in the adult, for about one-third of all cases begin below the age of 10 and many start during infancy. Like all the diseases of childhood in which nervous influences play a large part, it is more frequently met with amongst boys than amongst girls.

There are four varieties or types of "asthma" in childhood:

1. The *Spasmodic* type, which presents the classical picture of recurring episodes of the characteristic asthmatic dyspnoea. This type is commonest in older children.

2. The *Hay Fever* type, in which nasal catarrh is the most prominent feature. Such cases are apt to be regarded as simply recurrent "colds in the head."

3. *Bronchial Asthma*, in which there is, at the outset, a good deal of bronchitis, to which spasm of the tubes becomes superadded. Cases of this type are very common, and the attacks are often prolonged.

4. The *Bronchitic* type, which is peculiar to children, especially babies, and in which the asthma masquerades as a pure bronchitis, so that the real nature of the condition is often overlooked. It is distinguished from a simple bronchitis by the suddenness of the onset and subsidence, by the fact that dyspnoea precedes the appearance of physical signs in the lungs, by the comparative absence of fever, and by the presence of an eosinophilia.

Thymic Asthma.—In infancy asthma may be simulated by the rare condition called "thymic asthma," or "para-asthma," as some term it, a spasmodic form of dyspnoea brought about by the pressure on the trachea of a hypertrophied thymus or enlarged bronchial glands. Thymic asthma always begins before the age of 18 months, and is distinguished by the presence of the physical signs of enlargement of the thymus or of the bronchial glands. A screen examination is of great help in the diagnosis.

THE NATURE OF ASTHMA.

The dyspnoea of asthma is attributed, as is well known, to obstruction of the bronchi either from spasm of the muscle or from swelling of the mucous membrane, or from both these acting together. The obstruction, whichever form it takes, may be brought about either (1) through the respiratory centre, or (2) by direct action on the bronchial mucous membrane. We must consider each of these modes separately.

1. The respiratory centre may be affected (a) psychologically, (b) reflexly, (c) by the blood.

(a) Amongst psychological influences may be mentioned fright and excitement (both of which are specially potent in determining an attack in children), and suggestion, the part played by which in early life is difficult to determine.

(b) The chief sites of peripheral irritation which may affect the respiratory centre reflexly in children are the nose and throat and the alimentary canal. Phimosi would also appear to be an occasional cause.

(c) The centre may be affected directly by the blood circulating through it in the way to be described immediately.

2. The changes in the bronchi which lead to obstruction may also be brought about directly and without the intervention of the respiratory centre by the presence in the blood of a specific substance which acts as an irritant. The substance in question is believed to be of the nature of a foreign protein or "allergen" to which the asthmatic subject is "sensitive." Some seem to be born with this sensitiveness, others acquire it, others have it "thrust upon them" by disease or accident.

It may be a constitutional peculiarity, often inherited. Such an inborn metabolic irritability may reveal itself by producing, not asthma alone, but other episodic disturbances such as migraine and cyclical vomiting, as well as skin disorders like eczema and urticaria. Such patients are usually sensitive to several proteins, but the degree and character of the sensitiveness may vary from time to time and may come and go suddenly. Sensitiveness may be acquired as the result of an overdose of a foreign protein. It is said, for instance, that an infant may sometimes become sensitive to egg in consequence of being given large quantities of albumin water, and sensitization after the injection of serum is, of course, well known. Sensitiveness may also be "thrust upon" a patient by an acute illness—whooping-cough seems specially prone to act in this way in children—or by an operation, particularly, perhaps, an operation on the throat.

An asthmatic child, therefore, may be born with an unstable metabolism, or it may have been thrown off its metabolic balance in one of the ways described. Our experience at the Hospital for Sick Children (Great Ormond Street), however, has been that sensitiveness is a factor in less than half of all cases of asthma in childhood, and that even when it is present it is only in a small number that the specific excitant of the asthma can be determined. It would seem, indeed, as if sensitiveness is more often a predisposing condition as regards asthma in children than the actual cause of it.

Where sensitiveness is the cause the protein to which the patient reacts may reach the blood in various ways.

Ingestion.—First, it may be ingested in the form of food. Almost any food may produce a reaction, even—perhaps especially—such common ones as the proteins of eggs and milk. Sensitiveness to food protein is usually inborn, and tends to disappear with time. It is therefore more likely to be a cause of asthma in early childhood than in the later years.

Inhalation.—Secondly, the protein may be inhaled in the form of dust of various kinds—pollen and so forth. This form of sensitiveness is oftener acquired than inborn—though even when acquired there has probably been an inborn tendency to metabolic instability—and is more persistent than sensitiveness to food protein, having less tendency to disappear of itself. It is of more importance in the causation of asthma than sensitiveness to the protein of foods.

Bacteria.—Thirdly, there is some reason to believe that the protein to which an asthmatic patient is sensitized may be of bacterial origin and derived from organisms growing at some seat of chronic infection, of which the commonest is probably the nasopharynx. So-called bronchial asthma is the form of the disease most likely to arise in this way.

The fact that a patient is "sensitized" can often be inferred from his history. Thus one of my patients had attacks only when living on a farm in close contact with animals, whilst another was only asthmatic when living in the neighbourhood of trees. Sensitization to common articles of food or to dust is more difficult to detect, but by the use of the cutaneous test with watery extracts of different proteins the question whether and to what the patient is sensitive can be definitely determined. I think it is advisable to use such tests in all asthmatic children, but at the same time I am bound to say that I have been disappointed in the results of treatment based upon them. This matter, however, will be referred to immediately.

TREATMENT.

Treatment of the Attack.

Treatment of the attack of asthma is much the same as in the adult. Subcutaneous injection of adrenaline (2 to 3 minims) is the best remedy, and acts by antagonizing the action of the vagus and stimulating that of the sympathetic. Morphine, though effective, has to be used cautiously in childhood, and children do not like "fumes."

Treatment of the Tendency.

More important is the treatment of the asthmatic tendency. Here the chief thing to realize is that "asthma" is not a disease of the respiratory system only, but one of the child as a whole, and that treatment must aim at breaking the asthmatic habit, for, as someone has put it, "the best cure for asthma is not to have it."

In the general management, therefore, the patient's whole life must be regulated, and nervous excitement and overstrain particularly guarded against. At the outset the question of "coddling" *versus* "hardening" will obtrude itself, and is not always easy to answer. Whilst we must carefully avoid making the asthmatic child a "hot-house plant" invalid, it must also be admitted that needless exposure to weather, especially fog and damp, is injurious, particularly in the bronchial type, and we must not make a fetish of fresh air. The question of climate also arises at this stage, and we shall be asked whether a permanent change is desirable. As to this it is unwise to be too dogmatic. All we can say is that a warm dry climate is theoretically the best—again especially in the bronchial type—but such a climate is not to be had in these islands. Mere change of locality is highly speculative, and is apt to be only an escape from the frying-pan into the fire. It is true that some patients seem to be much freer from attacks in one place than another, but this may be due to some factor other than the climate—removal, for example, from the immediate neighbourhood of animals. Certainly we should never advise the parents to change their place of residence unless they have satisfied themselves by a prolonged trial that the child is free from the disease in the place to which they propose to move. My usual advice is that they should endure the evils they know rather than fly to others that they know not of. Immunity from attacks is usually obtained at an altitude of 5,000 feet, but this is impracticable as a permanent place of abode, and the attacks recur so soon as the patient returns to a lower level.

Diet is of importance, for experience has shown that improvement often results from the avoidance of "indigestible" things, and the provision of small dry meals with no supper. Carbohydrates should be avoided rather than fats. In children, however, it is not wise to cut down the diet so rigidly as can often be done with advantage in the adult, for the needs of growth have to be provided for, and the child must not be sacrificed to the disease. If tests have shown that the child is "sensitive" to any particular article this should, of course, be banished from the diet, but my experience has been that it is only in exceptional cases that this has much effect on the disease.

Drugs.—The drugs which might be expected to be of use in asthma are those which lessen vagus action and those which diminish the excitability of the respiratory centre. Belladonna and its allies act in the former way, arsenic is said to act in the latter, and there is no doubt at all of the great benefit often derived from them in cases of asthma in childhood. I am in the habit of giving small doses of potassium iodide (especially where there is a bronchial element) along with full doses of belladonna or stramonium and arsenic as a routine. The mixture should be given regularly after meals for prolonged periods, and, so used, often effects great improvement. I have seen this happen too often to have any doubts of the real curative value of such a combination, and, indeed, I regard it as on the whole the best treatment for asthma in children. For the purpose of warding off a threatened attack a full dose of a sedative such as chloral at bedtime is often very helpful. Antipyrine sometimes acts equally well.

Operations.—The question of removing enlarged tonsils and adenoids in asthmatic children will often arise, and if the enlargement is causing obstruction, or if the tonsils are infected, it is best to operate. It is unwise, however, to make any promise as to the effect on the asthma, but benefit is most likely in cases of the bronchial type. On the other hand, I have, like everyone, known several cases in which asthma appeared for the first time after the removal of tonsils and adenoids. Of the effects of cauterization of the nose for asthma in children I have had very little experience.

Vaccines.—A course of vaccines is worth trying in cases of the bronchial type, using for choice an autogenous vaccine prepared (if possible) from sputum obtained during an attack. The results, however, are extremely uncertain, though at least it may be said that the treatment can do no harm. When it is successful—and I have seen cases where it certainly seemed to be—it is always doubtful whether the benefit obtained is due to a raising of the resistance to infection or whether the vaccine has really acted as a desensitizing agent. That, however, is an academic question.

Specific Treatment.

If the child is known to be a "sensitive," removal of the offending agent from his environment is, when possible, always to be advised, though here again definite cure should not be promised. In all such cases, too, it is wise to forbid the use of feather pillows, hair mattresses, fur coats, as well as horse-riding and the keeping of pets, for even if the patient is not "sensitive" to any of these already he may easily become so. These, however, are elementary precautions, and the ideal to be aimed at is a general desensitization which would, so to speak, cut the ground from under the feet of the asthmatic process. Unfortunately, however, the technique of desensitization is still only in the experimental stage, and so far I am bound to confess that I have been disappointed with the results in those cases—admittedly few in number—in which I have tried it. Various substances have been suggested as desensitizing agents—peptone, milk, some of the child's own blood, tuberculin, and cultures of organisms prepared from the nasopharynx or from the bowel. Of these I have had most experience with peptone, usually given intravenously. It is necessary to proceed cautiously, and it is difficult to regulate the dose, for when an asthmatic child is admitted to hospital the asthma usually disappears for a time at least, and so there is nothing by which to gauge the effect of the treatment. On the whole, I think I may say that our experience at the Hospital for Sick Children has not borne out the high opinion of the treatment which has sometimes been expressed. It is quite possible, nevertheless, that when the technique of the method has been more elaborated it may prove to be of great value in those asthmatics in whom sensitiveness exists. It must be remembered, however, as has already been pointed out, that these constitute a minority. Of general *radiation*, a method of treatment recently advocated by Dr. Gilbert Scott,¹ I have had no experience. It seems possible that it acts by general desensitization.

PROGNOSIS.

Finally, a word as to the outlook for the asthmatic child. The immediate attack is, of course, rarely dangerous except in young or delicate infants. Assuming that preventive treatment fails, what chance is there of the attacks being "outgrown"? A very fair chance indeed. I have been agreeably surprised, when following up cases of asthma, seen often several years ago, to find in how large a proportion the attacks have either ceased altogether or have become few and slight, although where the disease has lasted for several years there may be some resulting emphysema and some stunting of growth and development. On the whole, however, the outlook for the asthmatic child is much brighter than the inexperienced would suppose.

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, June 5th, 1926, p. 939.