A British Medical Association Lecture

ON

THE EARLY DETECTION AND SUPERVISION OF
RHEUMATIC INFECTION IN CHILDREN.DELIVERED BEFORE THE KENT BRANCH AT BROMLEY ON
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BY

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It is now over four years since the Section of Medicine at the Annual Meeting of the British Medical Association at Portsmouth, after a discussion on the etiology and treatment of heart disease in early life, sent a recommendation to the Council to appoint a special committee to investigate this grave menace to the community, with a view to its prevention. A few months later such a subcommittee was appointed by the Science Committee to inquire into the subject of cardiac disease in children, and later to advise the parent committee on the rheumatic problem generally.

As you are doubtless aware, that Committee has published two reports—one in 1926¹ and one in 1927²—and the interest these have awakened augurs well for the future, although it must be remembered that many years' work will be required if any impression is to be made on the disease throughout the country.

It is not my intention by the presentation of figures to try and impress you with the size of the problem. I understand from the wording of the invitation I received that you wish to come to grips with practical things and to see in what way you yourselves can help. Your secretary spoke of "rheumatic heart disease"—I have intentionally altered the words to "rheumatic infection." One principle which has guided the subcommittee in all its deliberations has been that to prevent rheumatic heart disease the whole problem of the rheumatic infection in children must be tackled. This is not to say that until the question of rheumatism is solved nothing can be done to avoid much of the cardiac crippling that exists. But when aiming at the prevention of cardiac disease we may, with proper vision and perspective, help towards solving the larger problem.

EARLY DETECTION.

What we have to aim at as an ideal is not the early detection of the manifestations of the rheumatic infection, but the ability to detect and circumvent the conditions—diathesis, environment, or infection—which in combination produce the manifestations. That is the true preventive ideal. It involves a knowledge of certain factors about which our information is still limited.

What do we know in a true sense about the rheumatic diathesis? There is a tendency to ascribe it to "a certain imbalance of the production of hormones by the thyroid, adrenals, and pituitary." (I am quoting from a book recently published.) A consequent want of adaptation to environment would lay the child open to infection, and active rheumatism might result. It is, if anything, an inborn predisposition to a special type of infection. But not all with that predisposition develop the disease, and the problem is not materially altered for these children, though there may be need for greater care along preventive lines generally. The difference is one of the quantity rather than the quality of the steps to be undertaken.

When we turn to the question of the environment and the factors which generally predispose to rheumatism we are again in the field of unsettled speculation. The subcommittee has made an attempt, I think with a certain measure of success, to verify some of the points about which there has for long hung a curtain of doubt. It is impressed by the importance of the housing factor and the relation of dampness in dwellings to the rheumatic infection, and with the greater liability to the infection of the poorer classes, though not of the very

poorest. One might say that it afflicts the poor rather than the rich; those who live in damp rather than those who live in dry houses; the young rather than the old; and children with enlarged tonsils more frequently than those with healthy tonsils.

When we come to the question of the infection we can only say that there is no view which has been so widely accepted as that it is due to a streptococcus, and that many believe that the tonsil is the commonest portal of entry. That the intestines may harbour it, and that, when once it gains entrance, many parts may afford it a resting place where it is ready to light up on slight provocation, there are sufficient grounds to suggest. More positive knowledge regarding these points—diathesis, environment, and infection—has to be acquired if prevention is to be more than a slogan.

EARLY MANIFESTATIONS.

In the meantime, while laying our plans and working for the prevention of the disease, our next best line of attack is to recognize it early, treat it efficiently, and prevent relapses.

What, then, may be the earliest manifestations of the rheumatic infection for the discovery of which we should ever be on the alert?

The Heart.

It is well to remember that the heart itself may present the first recognized manifestation. In quite a large number of cases of rheumatic heart disease there is no history of antecedent illness. Thus, in a series of 112 consecutive cases of mitral stenosis, and after making allowance for growing pains, muscular rheumatism, and other infections in addition to typical rheumatic fever, there still remained a balance of 18 per cent. in which no history of previous illness could be obtained. In some the heart had been quietly infected and the invasion unrecognized, as no special symptom called for treatment till the heart began to fail. Only repeated, systematic examination of apparently healthy children would have detected these cases early. In others, the attack on the heart is primary, acute, and abrupt.

It is often extremely difficult to be certain whether a heart has been definitely attacked in the early stage of the disease. While mitral stenosis may be taken as the valvular lesion most constantly rheumatic, this lesion must not be expected in the early stage. Before the characteristic murmur and thrill have fully developed probably several years have elapsed. A systolic murmur developing at the apex may be the earliest sign, but, on the other hand, such a murmur may appear quite apart from valvular damage, and cannot alone be taken as positive evidence. Some enlargement of the heart is a better guide, but, again, one must be prepared to find variations in the position of the apex beat in perfectly healthy children. Definite enlargement and a systolic murmur would be presumptive evidence of heart involvement. In some cases the aortic valve is affected early, and the diastolic aortic murmur provides definite evidence of heart invasion. If to those is added an unduly rapid pulse the inference is that a lesion is not only present, but active. It must be remembered also that while valve lesions may speak more clearly in physical signs, myocardial lesions are, though more silent, also more important. Pericardial friction is, of course, absolute evidence of heart involvement, and it is certain to be accompanied by damage to the muscle.

Pains.

Pains in the child, whether recognized as rheumatic fever, growing pains, or muscular rheumatism, call for special care. There are still those who need to be reminded that rheumatic fever in children is not necessarily a very painful affection. There are still many people who have got to be made to recognize that rheumatic fever is pre-eminently a disease of childhood. The term "growing pains" I am convinced has been the cause of much neglect. I recollect five consecutive cases of active heart disease in young people admitted to hospital two years ago. In no case had frank rheumatic fever been the primary manifestation. In the first and second it was "growing

pains"; in the third it was "rheumatics" in the feet, cured after one visit to a doctor's surgery; in the fourth it was a septic throat; and in the fifth it was breathlessness with no antecedent history. Those having the care of children, whether in the capacity of parents, teachers, school medical officers, or general practitioners, must have these facts prominently in their minds.

Chorea.

Chorea should be accepted, in the absence of any definite evidence to the contrary (for example, lethargic encephalitis), as a rheumatic manifestation in every case. A fright, or the strain of school, may be the exciting factor, but is seldom if ever the only one. In two of the cases already referred to chorea was recognized before heart symptoms. Poynton's figures, published some years ago, are worth repeating. In 217 cases of chorea there was definite heart disease (with other rheumatic manifestations) in 122; arthritis in 28; dilatation of the heart in 22; in 20 there was no history, but in two rheumatism developed later; and in 15 the chorea was ascribed to fright, and two of these later were rheumatic.

Classical Sydenham's chorea should not be waited for. Restlessness, fidgetiness, or change in nature should be investigated early. One wonders how many children with unrecognized chorea are punished when they ought to be medically treated. This must also be preached in the proper quarter, and teachers would often be able to recognize symptoms which at least call for medical examination before classical symptoms of chorea appear.

Tonsillitis.

There can be no doubt about the close association of recurrent sore throats, or tonsillitis, with rheumatic fever and heart disease. The frequency of enlarged tonsils in children with rheumatic infection is greater than in other children of the same age group. Tonsillitis, not necessarily very serious, may be the first indication of ill health in these cases, and may also usher in a relapse. In a case recently seen with enlarged heart and systolic apical murmur there was a history of recurrent tonsillitis for five winters, and in the last attack, and for the first time, the patient had some pains about the ankles. The sore throat of scarlet fever also seems to be the fact that determines rheumatic and heart infection in that disease. Antecedent tonsillitis appears to be less common in the choreic than in other types. Whether the tonsil is the portal of entry for the infection, or a coincident manifestation, we need not pause to consider. We do, unfortunately, know that with the removal of tonsils freedom from relapse in rheumatic cases cannot be guaranteed, though it appears to help more in the cardiac and arthritic than in the choreic type.

The only practical conclusion at present seems to be that diseased tonsils are a potential source of danger, and if they are proved to be diseased enucleation by an expert should be advised.

Nodules.

The painless rheumatic nodules found on the extensor aspects of joints or tendons, and on the scalp, are, when present, valuable for diagnosis, prognosis, and treatment. They are not present in every case, and will often be overlooked unless specially sought for. Their painlessness contrasts with the painful and tender fibrous nodules of so-called muscular rheumatism or fibrositis. They tend to come out in crops, and are best seen by flexing the joints. In doubtful cases their presence clears the diagnosis; in prognosis they help by indicating a severe and usually visceral type of infection; in treatment they indicate activity of the infection, even though fever has ceased, and call for prolongation of treatment.

Other Early Features.

Other features may be even earlier, but are less certainly rheumatic. Anaemia in a child always indicates the need for careful investigation. Primary anaemias are less common in the child than anaemia associated with other diseases. One of these latter is rheumatic heart disease, and it should always be looked for. Pleurisy is

a condition which is occasionally rheumatic, though, of course, it is more often tuberculous. Restlessness and nervousness have already been indicated in their relation to chorea. In atypical febrile illnesses the infectious fevers, stomach affections, and chest and throat complaints are often thought of. How often is a search made for some rheumatic manifestation?

SUPERVISION.

The time has passed when the treatment of rheumatism can be dismissed after some details about the dosage of salicylates, the best kind of local application, and some trite remarks about a suitable fever diet, a blanket bed, and some laxative.

Present-day treatment presupposes an acquaintance with the natural history of the disease so far as it is known, with the environmental conditions of the patient, with the factors that will best promote recovery and prevent collapse, and with the facilities available for special treatment when home conditions are unsatisfactory.

Surveying the treatment in its broader aspects I would suggest that our guiding principle should be to destroy the infecting agent while removing the causes that encourage its operation, and to restore function while protecting against relapse.

To Destroy the Infecting Agent.—We do not yet know of any bactericide or specific serum that has a direct action on the organism. Till we know of something better the salicylates are our main hope. Administered in large doses, with double the amount of sodium bicarbonate, while ensuring a daily evacuation of the bowels they are well tolerated by children. This treatment should be continued for a week or two after all signs of activity have passed.

Remove the Causes.—This heading implies a knowledge which we only partly possess, but if housing conditions, defective nutrition, throat, dental, and intestinal infections play a part even in a general lowering of resistance, then these should be combated. As some of these cannot be dealt with at home the logical conclusion is that the child should be removed to a more suitable place, and this means hospital for the majority. There, under more hygienic conditions, the actual treatment of the infection, of dental and of intestinal sepsis, and specialist treatment of diseased tonsils, can be carried out with greater hope of success. Whether the general part of this can be under the supervision of the family doctor will depend on the resources of the patient, the nature of the hospital, and its administrative rules.

Restore Function.—Rest in bed, and later regulated exercise, are the most potent therapeutic agents at our disposal for this purpose. With even any suspicion of cardiac involvement rest should be prolonged for a few weeks after all evidence of activity of the disease has vanished. Pain, which is often slight, readily passes with salicylic treatment. Actual fever likewise soon disappears, but a subfebrile temperature, rising perhaps only to 99° (skin) at some part of the day, and only on some days, often persists. It may only be recognized if four-hourly records are made, and not infrequently it indicates activity of the heart lesion. Nodules likewise must be looked on as evidence that the disease is not fully arrested. Lastly, elevation of pulse rate should warn the attendant that the heart is still in the grip of an active lesion.

It may be asked how long this is going to take. No figure of weeks or months can be stated. In a recent case whose treatment I was occasionally called on to supervise in private it took nine months. In many cases it may be shorter, but it may be longer. It can hardly be contested that if the heart is unduly exercised during the stage of activity dilatation and permanent damage will ensue.

Following this period there usually remains much to be done. Iron, cod-liver oil, and glucose have a useful place in restoring vigour to the cardiac muscle. Regulated exercise is also of value. But experience points to the fact that these will operate more efficiently if convalescence can be prolonged under the best hygienic conditions, and with fresh air, and especially sunshine.

From these remarks it will be seen that we have overreached the limit of ordinary hospital treatment, and I will return to this point.

Prevention of Relapses.—The steps suggested under the last heading help in preventing relapses. Many of these children, however, pass back to school, and ought to be under constant supervision during the quiescent stage, so that the first indication of ill health or advance in cardiac lesion can be recognized. Others are unfit for the rush of ordinary schools, and for them the hospital school provides the most suitable treatment and supervision, while schools for physically defective children may afford a refuge for some.

GENERAL CONSIDERATIONS AS TO TREATMENT.

If we survey the points I have raised in the management of the acute case of rheumatic infection difficulties at once emerge. For the well-to-do private cases, which after all only constitute a minority of the total, all that has been suggested can be carried out by the family doctor, and the results usually justify the care expended.

When we consider the class that supplies the vast majority of the cases we are met with difficulties at many stages. The causal factors, such as damp housing conditions and faulty nourishment; the inability of many parents to recognize the need for prolonged rest; operative intervention for diseased tonsils and teeth, alike cry out for the removal of the child to a more suitable environment. At this stage the general hospital seems the most suitable place. But the voluntary hospitals call out for more beds, or a reduction in the waiting lists, and the rheumatic child has to be dismissed too soon. The more fortunate spend a week or two at the hospital's convalescent home, and then they return to the conditions under which the infection previously arose. A relapse or a reinfection takes place, a further short period in hospital follows, with the heart a little more damaged, and soon we have to deal with a cardiac cripple. The results are more satisfactory than those obtained by home treatment, but the hospitals cannot face the time question and the after-care.

You in Kent cannot be unacquainted with the work that is done in this connexion at Broadstairs. Dr. Raven will not misunderstand me when I say that his efforts, however, merely touch a fringe of the problem. There are only a few such places in the country where the rheumatic child can be cared for over a sufficiently long period. The largest, I think, is the home outside Birmingham, with accommodation for 100 cases. These are residential hospital schools or rest homes. Education, exercise, rest, and nutrition are all medically supervised from the point of view of this special class of case. It will be said that to provide those homes will cost money. Of course it will. Sanatoriums for tuberculosis cost money, but rheumatism kills as surely as tuberculosis; it incapacitates during early life like tuberculosis. If by means of hospital schools for rheumatic cases the disease can be arrested, these cases have as great a demand on the country's money as the tuberculous case, in so far as sanatoriums are treatment centres and not isolation hospitals. Obviously all cases will not be considered suitable for hospital school treatment, even if accommodation were available. Home conditions may be the determining factor calling for admission of certain cases. Patients who have just passed through an attack of rheumatism with arthritis, carditis, or chorea would be considered suitable. Mild or potential cases, or doubtful cases, could be carefully observed and treated. Patients in whom the disease is quiescent but who are unable to bear the strain of school would be much benefited. Advanced cases would not be suitable, and would be better treated in hospitals.

Until such homes become available children unfit for the ordinary schools might be found fit for the more sheltered life of the schools for the physically defective, and should be so disposed of. Of the remainder, some will be unfit for school life at all, and must remain at home. For those who go to ordinary schools special facilities should be provided to prevent their having to sit in damp clothes or boots, and, if they have to remain in school during lunch time, to ensure that they get a suitable warm meal. Further, in inclement weather, a certain latitude regarding

attendance should be allowed. Physical training and play should also be regulated so as to suit the individual case.

For all the potential cardiac cases and for all the quiescent cases, whether suffering from the graver or milder types of heart defect (the active cases being presumably under active treatment), there should be facilities for regular medical supervision. The rheumatic child must be looked after when he or she is apparently well, so that the slightest departure from health may be recognized and appropriately dealt with. If this is to be done there must be lists of all these cases, so that they can be notified for re-examination. Some will have been under medical care, the subjects of acute rheumatic infection; others will have had some of the milder or only suspicious manifestations, while some will have been found during investigations of some other illness, or on routine examination in schools. Who, then, will have seen these cases in the first instance? Naturally the family doctor will have the first opportunity in many cases. Some, however, will go direct to the out-patient department of the hospital, or be seen by doctors acting under the Poor Law medical service, and in either case may, if necessary, pass directly into the hospital or infirmary. Some, again, will first be recognized at the routine school medical examination, because of a defect the result of some previously treated or untreated illness.

The School Medical Service.

Routine examinations are made, as a rule, three times in the ordinary school period of from 6 to 14 years of age—that is, on entry, a few years later, and on leaving. Re-examinations are, of course, made oftener if deemed necessary, while certain cases are referred to the family doctor if there is one, or to a school clinic. So far so good. But what of the child who has rheumatism, called "growing pains," say during the year following the school medical examination? It is seen about three years later with cardiac disease but attending school, perhaps in the interval having had some throat affection which had been treated and got well after a few days. The interval is much too long. The subcommittee's view is that, for the detection of such cases, special examination at least twice a year would need to be undertaken. The school medical officer has an opportunity of detecting cases that would otherwise be missed, but he is handicapped by the exigencies of the service otherwise. Then there is the question of treatment of the cases when detected. Two points to which I have already briefly alluded are important in this connexion. These are stated as fundamental principles in the second report of the subcommittee.

First, the problem of rheumatic heart disease in children is the problem of a systemic infection, not of a static disease of an important organ; in other words, every case of rheumatic heart disease in a child is primarily a rheumatic rather than a cardiac problem, and is, therefore, one for consideration on the broadest principles of medicine.

Secondly, this being so, the medical care of such children should be left to those who have immediately at hand the means of treatment for any and every rheumatic condition or emergency—that is to say, to practitioners (where means permit) or to hospitals, rather than to any *ad hoc* institutions or clinics which are divorced from facilities for dealing with the serious infective problems that may arise at any moment in rheumatic children.

The subcommittee therefore would regard the treatment of rheumatic children as outside the scope of the school medical service, school clinics, or minor ailment centres. To transfer these children to a clinic for minor ailments is to misinterpret the nature of the disease. The manifestations at any time may appear trifling, but they are always fraught with grave potential danger.

For the school medical service to be of most value, even under existing conditions, notice should be sent on its return to school regarding every child who is treated for any rheumatic condition, so that it may be put on a list for special examination, while cases detected by the school medical officer should be referred to the family doctor or the hospital for suitable treatment or supervision. This implies co-operation of the school service, practitioners, hospitals, and parents.

The General Practitioner.

The general practitioner can supervise the case arising in his own practice if the parents are willing to have this

done at sufficiently short intervals to make it of value. It cannot be done haphazard; a list must be kept and cases noted to attend at suitable intervals.

The Hospitals.

When we consider children who have come under the purview of the hospitals or infirmaries directly, we find that they have been dismissed to their homes and gone back to school or chronic invalidism. A hospital register would require to be kept of all such cases, and a method evolved for their periodic examination. Unless someone accepts responsibility for these, any re-examination is apt to be perfunctory. Advice sent to the school would, of course, allow of a certain control, but, as we have seen, this is apt to be unsatisfactory.

We have now various groups of children whose treatment is being supervised by different people in the same area, and if complications arise these children will mostly gravitate to the hospitals for indoor treatment.

If we could ensure co-operation between the school service, general practitioners, and hospital authorities, a supervisory centre run in conjunction with a hospital would appear to be the most appropriate solution. One such centre has been in operation for a year and has received the blessing and some support from the Rheumatic Heart Disease Subcommittee. I refer to the one at Paddington Green Children's Hospital, under the charge of the secretary of the subcommittee, Dr. Reginald Miller. In the official report of this centre (*BRITISH MEDICAL JOURNAL*, SUPPLEMENT, December 10th, 1927, p. 223) certain facts should be noted. It is a supervisory, not a treatment, centre; it works in close association with the hospital, the school medical service, the public health service, and the general practitioner, and it does not interfere with the work of the general practitioner. The value of such a centre is seen in the numbers who have been found requiring, and who have been recommended for, treatment. About a quarter of the cases had active infection and about the same number required tonsillectomy, and all these were referred to hospital or to their family doctor. Others have been referred to heart homes or to schools for physically defective children, and of course a large number are still under regular supervision.

Another benefit from such a centre is that it affords an opportunity of educating the parents in the significance of certain signs of ill health. On the reverse of the patient's card are printed the following suggestions on the care of rheumatic children:

ON THE CARE OF RHEUMATIC CHILDREN.

1. Rheumatism is caused by infection by a germ, and is a common disease of children, in whom it often attacks the heart. This is the great danger of the disease. Rheumatism is the commonest cause of heart disease in children.

2. Rheumatic attacks of all sorts often start with a sore throat. A sore throat in a rheumatic child is always a dangerous symptom.

3. Common symptoms of rheumatism in children are:

Sore throat.
Pains in muscles.
Painful joints.
Paleness.
Shortness of breath.
Fidgetiness or nervousness.

4. Chorea, or St. Vitus's dance, is rheumatism attacking the brain. Its chief danger is the tendency for the heart to be injured at the same time. Unusual nervousness, disturbed sleep, fidgety movements, or a tendency to drop things may be warnings of St. Vitus's dance.

5. Rheumatic heart disease is often painless and may only be discoverable by a doctor's examination.

6. If the heart has been injured by rheumatism, its recovery is very slow, and permanent harm may be done by letting the child resume an ordinary life before recovery is satisfactory.

7. An occupation in life for a child with heart disease requires very careful choice.

8. Rest is very necessary for rheumatic children. They should always be put to bed early, and they should be made to lie down during the day if they seem at all tired or if there is any aching of the limbs.

9. Damp is bad for rheumatism; basements are dangerous. Rheumatic children should sleep in the sunniest and driest room available. If they get wet, their clothes should be taken off and dried at once. Watertight boots are especially important.

10. Rheumatism tends to recur, especially in the winter months. Similar suggestions have been printed in other parts of the country for the information of teachers and parents, and have proved useful.

It will be obvious that local conditions regarding density of population must determine to a certain extent the best method to be adopted in any locality. Further, any scheme to be efficient implies the presence in the locality of some public-spirited medical men. In certain parts it might be found most suitable to staff such a centre from a roster of practitioners. In others a hospital physician might take charge. By the class most attacked by the disease payment is not going to be made. The public have not yet been educated to the standard of individual payment for professional attendance when they think they are well. There is, however, much to commend the work, and if local hospitals would provide the facilities no doubt each town could provide one or more who would be willing to give the time necessary to this supervision.

Then the goodwill and co-operation of the school medical service and the general practitioners in the district ought to be secured. If the Branch could stimulate interest so as to honeycomb the county with enthusiastic investigators, in addition to the immediate good of the children much useful information would be accumulated if *uniform records* were employed. Such a scheme is at present under consideration in the West of England, and a scheme of voluntary notification of rheumatic heart disease has been suggested.

Possible Immediate Action.

Before closing these remarks, I should like to emphasize two lines along which I think immediate practical good will follow. One is the education of all those coming in contact with children in the special liability of children to this infection, in the conditions which as far as we know predispose to it, and the indications of ill health which warrant medical attention. The other is the need for prolonged after-care and the provision of suitable residential hospital schools or rest homes—call them what you will—where a healthful environment, modified recreation, and general education can be provided for more or less indefinite periods.

The report of the Medical Research Council on "Social Conditions and Acute Rheumatism," published this year, while not agreeing in all details with the report of the Association's subcommittee, closes its preface with this sentence, which has our cordial support: "The plain need for organized after-care offers an urgent but soluble problem of preventive medicine, too long neglected, and every motive of humanity and wise economy should impel the community to provide the after-care as rapidly as possible."

REFERENCES.

¹ *BRITISH MEDICAL JOURNAL*, SUPPLEMENT, July 3rd, 1926. ² *Ibid*, April 16th, 1927.

FIELD VISION AND NEAR VISION.*

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THE Royal Philosophical Society of Glasgow in 1895 gave me an opportunity of publishing my views on the testing of the eyesight of seamen. The subject was discussed at that time chiefly from two points of view—namely, the testing of the colour sense and the testing of the light sense. The communication was largely a criticism of a report by a departmental committee of the Board of Trade; the net result of that discussion was that new regulations for the testing of eyesight which were about to be issued were withdrawn after the paper which I contributed to this society was, in great part, published in the *Liverpool Journal of Commerce*.

I have no intention of going back on that controversy further than to say that, so far as I am aware, the testing of the light sense has not yet been introduced in the examination of seamen. As a result of that controversy coloured lights are now largely used in examining the eyesight of seamen, as is also Edridge-Green's colour testing apparatus, and that notwithstanding the strenuous advocacy of Holmgren's wools by the late Sir W. de W. Abney

* An address given to the Royal Philosophical Society of Glasgow.