The Clinical Manifestations of Rheumatism in Children.

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Introductory.

The term rheumatism has not carried one and the same meaning in all periods of medical history. Originally it seems to have indicated the presence of a "rheum" or mucous discharge; it was applied to conditions which are now described as catarrhal. Its application to diseases of the joints is attributed to Ballonius, who lived at the end of the sixteenth century. At first the term appears to have included all forms of joint disease. This position is now much changed. Sydenham (1624-1689) recognised gout as a variety of joint disease, and distinguished it from rheumatism, and in more recent times the joint affections due to various infections (e.g. tubercle, syphilis, gonorrhorea, scarlet fever, etc) and to nervous diseases (e.g. tabes dorsalis) have ceased to be classed as "rheumatic".

Many writers, too, hold that the forms of chronic joint disease known as rheumatoid arthritis, osteo-arthritis, and rheumatic gout, are not as was formerly believed forms of rheumatism but that they own quite a different aetiology. By these processes it has come about that as an exhibition of joint disease "rheumatism" has a less extensive application than was formerly the

case, it is now known that the disease has many manifestations other than those seen in the joints. This knowledge is largely due to a recognition of rheumatism as a frequent disease of early life. So long as rheumatism was studied in the adult, the joint conditions commanded the main attention of physicians, though the possibility of "metastasis" to the heart was generally allowed. During the last thirty years or so more consideration has been given to the manifestations of disease in childhood. One result of this has been the general conclusion that the disease which, in the adult, produces polyarthritis with fever and free sweating "rheumatic fever" exhibits itself in early years in less conspicuous and more varied forms. It is these forms which are to be considered in the present thesis. That the non-articular rheumatism of childhood is one and the same disease as the rheumatic fever of the adult need hardly be argued, seeing that this is nowadays generally accepted. It is sufficient to remark that in families with rheumatic tendencies it is frequent to find that while the older members may suffer from attacks of more or less acute polyarthritis, the younger are liable to such non-articular disturbances as tonsillitis, chorea, endocarditis, erythemas, growing pains and so on; that

an individual who has been the victim of one or more of these latter in childhood is not infrequently attacked with rheumatic fever in his later years; that in both instances there is a liability to cardiac complications (pericarditis, endocarditis, myocarditis); and that between cases of typical rheumatic fever and non-articular conditions regarded as rheumatic there are intermediate cases in which together with the latter there exist more or less conspicuous evidences of joint disturbance. By some authorities too, it is held that there is bacteriological proof of the relations between the two sets of conditions, though this contention has by no means secured general recognition. In the last place there is some value in the experience that remedies which act favourably in rheumatic fever are of value in some, though by no means in all, of the non-articular forms of rheumatism seen in early life.

Etiology & Avenues of Infection.

Etiology.

There is no certain knowledge of the agent or agents which excite an attack of rheumatism whether in the adult or the child. In accordance with the general tendencies of the day the disposition is to attribute the disease to the invasion and action of micro-organisms; and several observers have claimed the discovery of a specific variety. On the other hand, others while holding rheumatism to be a bacteriological disease, maintain that many different organisms may produce the symptoms: that in other words, there is not an identical infection in each individual case. In this country interest on this point has mainly been directed to the so-called diplococcus or streptococcus rheumaticus described by Triboulet in 1898, and afterwards (1900) investigated by Poynton & Payne. The latter observers claim to have found the organisms in a large number of cases of rheumatic fever. They have obtained it from the blood, pericardial fluid, granulations from diseased cardiac valves, from rheumatic nodules, also from the brain of children who have died after attacks of chorea, and from the tonsils of patients suffering from

rheumatic tonsillitis. They were able to cultivate the organism, and by inoculation of cultures to produce in susceptable animals, polyarthritis, valvulitis, pericarditis, myocarditis, and even choreic spasm.

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The results have been corroborated by Beaton, Ainly, Walker Beattie and others, and such authorities as Still and Robert Hutchison are disposed to adopt the views of Poynton & Payne and to regard the diplococcus rheumaticus as the causative organism both of rheumatic fever and of the non articular forms of rheumatism. On the other hand, these views have not received general assent, and indeed they have been authoritatively challenged. Thus: Bulloch in the last edition of Clifford Allbutts system of medicine writes: "It cannot be held as proved that the mocrococcus rheumaticus is the cause of rheumatic fever, as it does not fulfil all or indeed any of Koch's so-called postulates. It is not found in every case of the disease, and the effects which it produces experimentally do not differ essentially from those produced by cocci which have been isolated from cases having nothing to do with rheumatic fever, The chief interest in relation to the present thesis of such a doctrine as is announced by Poynton & Payne is that

if the conclusions are accepted they produce bacteriological proof of the unity of the disease as it is seen in its various forms in adults and in children: and they bear upon the possible transmission of the disease by contagion or infection. Both of these considerations have a manifest bearing on the question of rheumatism in childhood. Further, they help to establish the view that the proper place of rheumatism in the nosological classification of disease is with the acute infectious fevers, a contention which is strongly urged by Osler. He refers to the character of the fever, the mode of involvement of the joints, the tendency to relapse, the sweats, anaemia and leucocytosis, to the liability to endocarditis, and the involvement of serous membranes, and says "In all these it resembles pyaemia very closely and may indeed be taken as the very type of acute infectious disease. When all is said on this point it remains true that it is not possible to affirm with scientific confidence what is the exact nature of the poison immediately responsible for rheumatic fever or other forms of rheumatism. The older views that the poison was generated in the body, though still widely held, has little or no evidence in its favour, and on the other hand the claims of the bacterio-

Osler Principles & Pract. of Med. fifth Edition. P.168.

logists that the disease is due to a specific virus are, admittedly, not fully established. On the point of infection general experience forbids the view that the disease in any practical sense can be communicated from person to person. Personally I have seen in the last 20 years a very large number of cases of acute rheumatism as well as of other manifestations of the disease and in no single instance have I known any person in attendance on the patient develop symptoms which might reasonably be ascribed to infection. That several members in one and the same family may be affected, and perhaps at one and the same time, is no doubt true, but this does not prove direct infection; it is quite as easily explained by the suggestion of a family predisposition - a predisposition which may doubtless be inherited, Indeed, this is a much more plausible explanation in view of all the facts, for members of the same family often suffer from the disease when they are not living together and in circumstances in which no question of infection can possibly arise. Another statement often made on this point is that persons living in one and the same house, though unconnected by ties

of blood, are apt to suffer from the disease. But here again there is a possible explanation other than infection. It is sufficient to mention the influence of cold and damp in promoting a display of the disease. The belief in these agencies as "causes" is very widely spread, and my own experience goes strongly to support the popular creed. In a large practice amidst an industrial population who enjoy, whether at work or at home, but limited means of protecting themselves against the proverbial vagaries of the British climate, I see every year active manifestations of rheumatism both in adults and in children wherever temperatures are associated with wet weather. This recurs so invariably that it would be impossible for me to doubt that the combination of cold and damp, whatever other agency be involved, is responsible for rheumatic disease as this is seen among the poorer classes of the community. This consideration has a very practical bearing on rheumatism in childhood, for, if it is true, one of the factors upon which the welfare of children depends is adequate protection and more especially in bad weather.. More particularly has this force in relation to children in families

known to possess rheumatic tendencies. It ought to be a routine practice in such families to explain to the parents the special dangers to which their children are liable, and to point out how by attention to the clothing of the children and by other means of protection from the weather the risks of rheumatism may be reduced. It is on this point somewhat significant that the disease is rarely seen under about four years of age, whereas from this date onward it becomes a common experience. In other words, so long as children receive the maximum of maternal care and personal supervision they are rarely the subject of rheumatism, but as soon as they begin to enjoy a liberty which involves exposure to changing climatic conditions and to wet clothing the disease becomes increasingly frequent. There may of course be other influences concerned in this age distribution of rheumatism, but I am satisfied that damp and cold and exposure play their part in this connection and I desire to emphasise the practical measures which arise from this experience. The opportunity for putting these into operation for prophylactic purposes is all the greater in view of the

marked hereditary disposition which distinguishes rheumatic disease. For when one incident of a rheumatic nature occurs in a family - whether in parent or children - it may be concluded that the other members carry a similar liability; and with this in view the appropriate warnings may be given especially in relation to the younger members of the household.

The relationship of acute tonsillitis, especially of the lacunar type, to acute rheumatism has given rise to much discussion, and varying views are held in regard to it. Poynton is convinced that the avenue of infection is the tonsil; that the disease of the tonsil is caused by the rheumatic germ; and that the tonsillitis is the first evidence of the rheumatic attack. Others believe that the open or inflamed crypts of the tonsil form the channel by which the infection reaches the lymph and blood streams. Unhealthy tonsils are very common in rheumatic children. From investigations made in the examination of school children, the percentage of children definitely rheumatic out of a total of 2556 was 5.2 for children of all ages, or 6.83 for children in the senior departments, but of 133 children classed as rheumatic 115 showed some sign of cardiac disorder; and

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overgrowth of the tonsils or pharyngeal mucosa occurred in 43.6 per cent of the rheumatic children.

The usual proportion of school children requiring operation for tonsils and adenoids is from 7 to 8%. By a study of 75 cases of chorea W.P.S. Branson comes to much the same conclusion as to the route of infection. Of these 21.2% had already been operated on for the relief of tonsils and adenoids. Eighty three per cent showed evidence of nasal or pharyngeal inflammation. In 62 per cent the tonsils were enlarged or had been removed, in 65 per cent the tonsilar gland were enlarged and in 50% inflammation of the nasal passages existed. From these data he infers that the commonest avenue of rheumatic infection is the tonsil and next to this the nose.

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Bulloch in Allbutt's system says, that while in England affections of the throat preceeding or during the attack of rheumatic fever occur in 80 per cent of cases, in Pribrams cases (677 in number) there was a history of sore throat 1.7 per cent only.

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Semon & Watson Williams say that while the connection of the throat condition and rheumatic fever is widely recognised, it is well also to remember that a

large portion of acute and chronic pharyngitis and laryngitis is of rheumatic origin, and that success in their treatment will very much depend on their correct diagnosis. I am, myself positive from experience that some relation certainly exists between tonsillitis and rheumatism and that endocarditis even without fever sometimes follows tonsillitis. There is a risk of regarding tonsillitis and other forms of sore throat in children too lightly. It ought to be recognised that such affections involve the risk of heart disease, and that therefore complete rest is a necessary measure, of treatment both during the acute stage and for some time after the local symptoms have subsided. The heart ought to be systematically and carefully watched as is the practice in rheumatic fever.

Tonsillitis & Nose Bleeding.

Tonsillitis.

or inflammation of the tonsils, brought about presumably by the invasion of the diplococcus described by Poynton & Paine, has long been recognised as evidence of rheumatism.

The micro organisms find their entry by way of the tonsils and so set up the inflammation. The rheumatic diplococcus has been isolated from cultures made from the inflamed tonsils. Tonsillitis often precedes other acute rheumatic events. Clinically it cannot be said to have any decidedly characteristic appearance, that is as compared with other forms of tonsillitis, though usually in a purely rheumatic case the inflammation is not confined to the tonsils, but tends to involve the tendons of the muscles - tensor palati and levator palati, as it is the fibrous rather than the adenoid tissues which are affected. Rheumatism seems to be associated with quinsy more than with other forms of tonsillitis. It is more common in young adults than in children. The tonsils are red and swollen, but with less distension of the lacunae than is seen in follicular tonsillitis. Given that tonsillitis precedes a rheumatic attack, it also often precedes an attack of scarlet fever, and it is noteworthy that rheumatism and

cardiac affections supervene on the latter. But tonsillitis is set up by other causes as well as rheumatism, and in order to come to a correct diagnosis, a comprehensive survey of the patients life history and family predisposition and accompanying symptoms must be undertaken.

Nose bleeding.

This occurs more frequently in children with a rheumatic history than in others, and even haemorrhage either from the kidney or per rectum and otherwise unexplained should excite suspicion. Epistaxis may come on at the commencement of an attack of rheumatism or during the course of the illness or may appear simply as an incident in the rheumatic history. It may be severe, but as a rule is very moderate. As an illustration I may quote a family record in which one of the daughters has had rheumatic fever on eight occasions and in which the father and mother have both suffered from various rheumatic manifestations, while four of the sons, all free from other evidences of rheumatism, are frequently troubled with epistaxis. This is perhaps rather an extreme instance, but I am satisfied from many experiences that nose bleeding in children is an event specially prone to occur in rheumatic families. The nose bleeding is more common in males than females. Epistaxis may no doubt occur in the prodromal stages of any of the infectious fevers e.g. measles, varicella, scarlet fever, etc., but it is I think especially common in rheumatic fever.

Joint Manifestations

& Scarlatinal Rheumatism.

Joint Manifestations

In children the articular symptons of rheumatism are often so slight as altogether to escape observation. Even when distinct arthritis exists diagnostic errors may easily arise. Scurvy in infants is sometimes mistaken for the swollen joints and peri-articular oedema of rheumatism. Scurvy should be distinguished by the swelling being periosteal and muscular, and not affecting the joint itself though the joints may be extremely tender. It occurs also at an age when rheumatism is almost unknown in children. There are many other forms of arthritis which may make diagnosis difficult. Take for example tubercular disease of the joints. How impossible it often is to determine whether a child is suffering from early hip disease or a rheumatic affection of the joint. Sometimes the pain about the hip joint may be referred to the region above Pouparts ligament, which in the case of the right side may suggest appendicitis. Similar difficulties present themselves in the case of other joints, as the knee and ankle. Then again in hereditary syphilitic arthritis described as a "belated manifestation in children who have not been specifically treated" the condition may simulate rheumatism. More puzzling, unless one is alive to the

fact, are those cases in which the main stress of the rheumatic infection falls upon the fibrous and muscular tissues, and the complaint is disguised under the term "growing pains". Often for example a child may be brought to the surgery complaining of pains not in the joints, but in the muscles and tendons especially the ~~tire~~ tendons of the hamstring muscles, which are sometimes alone affected, causing stiffness and pain on movement, so that the case may present itself clinically, as an awkwardness of gait, and one may think there is some disease of the knee-joint, Or the pains may be chiefly in the side, caused by rheumatism affecting the intercostal muscles, and one may think of pleurisy. The pains in the limbs without being very bad may linger for a long time, disappearing perhaps for a few days, and then coming on again. As an illustration let me quote the case of a girl act. 12 years brought to me with a history that four months previously she had had pains in the right leg, which had lasted a few weeks, then disappeared; two months later pains came on in the left leg, which were not very bad except on exertion. On examination the tempt. was slightly raised 99.6 pulse 120, and the stethescope revealed an obviously organic systolic murmur of mitral re-gurgitation with accentuated pulmonic second sound. There were no cardiac

symptoms at the time and nothing to draw attention to the heart except one's knowledge that these indefinite pains in the limbs in childhood are so often associated with a cardiac lesion.

Another set of muscles to be involved are those at the back of the neck and the case may appear as one of "stiff neck", so that it is now pretty generally recognised that stiff neck may be a sign of rheumatism. Even torticollis may have a rheumatic origin, but then it usually occurs acutely, and disappears spontaneously after a few days. In children the joints do not remain swollen so long as they do in adults; the little people are not so long disabled, nor are serious after consequences often found in the articulations.

Scarlatinal rheumatism : so far as my experience goes I cannot distinguish scarlatinal rheumatism from acute rheumatism. I am of opinion that genuine acute rheumatism does occur in the course of scarlatina. If a child can at one and the same time be the victim of both measles and scarlet fever (I have two undoubted cases at present) why also may not rheumatic fever and scarlet fever occur simultaneously. Girls show a peculiar liability to

rheumatic fever, and they are specially prone to rheumatic manifestations in the course of scarlet fever, the scarlet fever, as I conclude, arousing the rheumatic tendencies into activity. Moreover the rheumatism which occurs in scarlet fever sometimes develops early, and this goes to support the opinion just expressed. It is not necessarily associated with septic condition of the throat, as outlined by some authors, although septicaemia does very rarely occur in the course of a scarlet fever.

Scarlatinal rheumatism carries in its wake the same complications - chorea: nodules: endo and pericarditis, and erythema nodosum - as are prone to occur in the rheumatism which occurs apart from scarlatinal attacks.

More difficult perhaps are the joint pains which sometimes occur late in the history of a scarlatinal attack. It is not easy to say whether these are manifestations of true rheumatism, or whether they are results of the irritation of the scarlatinal poison.

Heart Manifestations

& General Pathology.

absence of these does not always prove that the heart muscle has completely escaped. In childhood the earliest sign of rheumatic endocarditis is generally a slight roughening of the first sound, which gradually becomes more impure and finally tails off into a definite systolic murmur at the apex, with perhaps later on accentuation of the pulmonic second sound. This murmur however does not always mean endocarditis. It may mean nothing more than a temporary dilation of the left ventricle. The discovery of a murmur however is always a ground for anxiety, for time alone can tell whether the murmur is due to a definite endocarditis or is the result of ventricular dilatation under the stress of fever. In every child who has a fibrile attack in a family with known rheumatic tendencies the condition of the heart should be periodically ascertained by systematic examination. Rheumatic heart disease in a child is even a more serious thing than in an adult, because it attacks the heart when growth is not yet complete. Again pericarditis with resulting adhesions is a common consequence and this puts a great strain on the work of the heart muscle and further there seems reason to believe that the heart muscle is specially prone to suffer from the rheumatic poison in early life (myocarditis).

As symptoms suggestive of heart implication the child may suffer from some distress or discomfort located more or less definitely in the epigastric or praccordial region; the pulse frequently may perhaps be raised; there may be displacement of the apex beat to the left combined with an increase in the extent of the cardiac dulness. The first sound may be blurred, roughened or reduplicated; the pulmonic second sound may be accentuated; and a systolic murmur may be audible at the pulmonary base, and in the region of the apex. The difficulty lies in the fact that at this stage none of these signs is distinctive of an organic lesion, as any one or all of them may, as already explained, be produced by a loss of cardiac tone with temporary dilatation of the heart chambers. These events may occur in the course of any acute infective process and are certainly not uncommon in acute rheumatism. The only criterion of diagnosis, in these cases is the course of events.

The mischief due to rheumatic heart disease in children is apt to be progressive; and it is often aggravated by subsequent attacks. When once the heart has been damaged, sub-acute attacks of endo and pericarditis and also of myocarditis are very prone to occur,

often in the most insidious fashion and quite independently of any obvious joint inflammation. In children hereditary tendencies are marked, and the stronger the family influence in this direction the greater the liability to serious heart trouble. In a case that I have under treatment at present there have been eight rheumatic attacks; the heart is in a hopeless condition and the patient has nearly died on more than one occasion. There is a strong family history and in the same household a child of 2 years old has had an attack of rheumatic fever.

Functional dilatation due to want of tone is a temporary condition and with improvement in the general health the heart returns to its normal state. On the other hand, signs attributable to an organic lesion do not disappear; the mitral valve remains incompetent, and the accompanying murmur is persistent. In many cases there is no long interval before a second murmur of early diastolic or pre-systolic rhythm becomes added to the bruit. This event leaves no room for doubt as to the structural and permanent nature of the lesion for while murmurs of systolic rhythm are capable of explanation on other grounds, a diastolic or pre-systolic murmur always

means organic valvular disease.

Endocarditis in childhood

The history may include one or more attacks recognised as "rheumatic" or may be limited to a story of growing pains, or sore throat or chorea, or indefinite febrile disturbance perhaps with stiffness and tenderness of one or more joints.

Examination shows evidences of mitral disease, for endocarditis is usually limited to the left side of the heart, and mitral obstruction is, I find, the commonest early lesion. In some children it may precede the articular trouble, which appears after a while and proves the rheumatic nature of the disease. In yet others I believe, it may be the only local evidence of rheumatism plus cachexia, the diagnosis being confirmed perhaps by the family history. I find that the younger the child the more likely is it that the disease will fasten upon the heart to the exclusion of the articulation, and I am of opinion that rheumatism is the cause of all endocarditis in children. It may be said that

endocarditis not infrequently follows scarlet fever. True, but scarlet fever predisposes with peculiar force to acute rheumatism and on searching enquiry it will generally be elicited that the attack of scarlet fever was associated with pains in the limbs and joints. With regard to chorea as a cause of endocarditis, I must remark that I hold strongly to the view that chorea is a manifestation of the rheumatic state, and evidence is accumulating everywhere in support of this view. I find that the older the child with chorea the more frequently can the history of previous arthritis be obtained. I have under treatment now a girl of sixteen years of age for chorea (very severe) following three successive attacks of rheumatic fever. The following is an example of the association of chorea and endocarditis. A Girl act. 19 years a factory worker complained of sore throat with slight stiffness of the joints. Bacteriological examination of the throat was negative and there was no swelling of any of the joints, no tempt. and the pulse rate was normal. In the course of 6 weeks chorea developed and was somewhat severe. Before its onset there was no endocarditis, but during its course well marked evidences of mitral disease appeared. The sore throat,

the joint stiffness, the chorea, the endocarditis were all, it cannot be doubted, incidents in one and the same disease, viz. rheumatism.

Pericarditis

The involvement of the pericardium is frequent in childhood, and is nearly always associated with endocarditis, being usually a later manifestation. The onset is generally insidious and is sometimes marked by vomiting. The friction sounds which indicate the occurrence of pericarditis may be limited to a small area or may be widely spread. They are usually first heard at the base, but may appear at any point in the praecordial region. Their persistence when the breathing is suspended at once distinguished them from pleural friction. They are heard better during expiration than when the lungs are expanded and they do not follow the rules which regulate the transmission of heart murmurs. The most usual manifestations of pericarditis is that of fibrinous exudation, but occasionally there is much serious effusion and rarely pus is formed. So far as

clinical evidence goes a fibrinous pericarditis may be completely resolved, but often it leads to adhesions, and even to obliteration of the pericardial cavity. The last mentioned means severe injury to the heart action. This may be met for a time by hypertrophy of the heart muscle but sooner or later it brings in its train all the evidence of cardiac failure.

Endocarditis, myocarditis and peri-carditis should not be looked upon as complications of the rheumatic state, but should be regarded as much a part of the disease as is the affection of the joints. Were this generally realised the prolonged rest in bed which is so essential in these cases would not be delayed. It is stated by some authors that rheumatic nodules are associated with rheumatic carditis but I have never seen them with a primary acute attack; they seem to be associated with the recurrent and relapsing cases only.

If the child has any joint pains the heart should be examined at once. If there is any increasing pallor, any rise of tempt. in the evening all these considerations should at once lead to the heart examination

General Pathology

That the rheumatic poison is bacterial, recent observations tend to prove. Its effect is always to bring about a condition of acute inflammation of the part involved. The heart owing to its incessant activity and the absence of rest is often left with some abiding deformity. But with prolonged rest I have frequently noted that the signs of involvement of a heart valve may disappear and the same is true of the myocarditis which is usually associated with endocardial disease. In an attack of endocarditis the valve becomes swollen and inflamed, the delicate endocardium gives way and little beads of fibrine from the circulating blood are deposited on the "ulcerated" areas. These are the pinkish-red "vegetations" of acute endocarditis. They are seen on the proximal surface of the valves, usually at a little distance from the free margin. The later healing by fibrosis of these inflamed areas results in deformity of the valves and thus permanent valvular incompetence or stenosis ensues. It is in the ventricular muscle of the heart that the cause of the incompetence must be sought for. Researches during the last few years have shown that the myocardium suffers

quite as much if not more from rheumatism than the endocardium and the peri-cardium. The rheumatic poison may weaken the muscle by its direct toxic action upon the fibres, or it may give rise to a definite myocarditis which may include the formation of nodules similar to the subcutaneous ones with which we are now so familiar. (Carey Coombs Journal of Medicine Vol. 2 No. 5, 7, 26.) I think it is certain that these myocardial lesions are the cause of the initial mitral regurgitation, because they must certainly weaken the sphincter muscle surrounding the left auriculo ventricular orifice, which is just as much essential for the complete closing of the opening as the valvular curtains themselves. If anaemia be present the muscle is of course further weakened. From clinical and pathological evidence available, the conclusion one comes to is that when the damage to the myocardium in a rheumatic attack is sufficient to give rise to mitral incompetence in the manner just described the valve itself is in all probability inflamed also, so that the murmer, although not actually due to mitral endocarditis, is none the less nearly always indicative of its presence. Given a case which has just developed a systolic murmer at the apex, thorough effective treatment at the earliest possible moment is essential

as we have to deal not only with endocarditis but with myocardial disease as well.

No constant morbid change has yet been established, but I am of opinion that in many cases of rheumatic infection the organism persists in the infected tissue, after all obviously inflammatory signs and symptoms have disappeared. It remains it may be assumed in a comparatively harmless state, capable of re-exaltation of virulence in favourable circumstances. In this connection I might draw attention to the many infections which are capable and often convicted of latency: tuberculosis with its quiescent foci ready to flare up at a favourable opportunity; the persistence of bacillus typhosus in bone lesions; of bacillus coli in the liver, gall bladder and if all these organisms may remain latent for a time more or less prolonged and may re-assert themselves as soon as they get the chance - why should the micrococcus rheumaticus be held to differ from them in this respect.

Skin Manifestations.

(Erythemas:-
(Purpura.
(
(Nodules
(
(Anaemia

Skin manifestations:-

There are two conditions of the skin in which valuable evidence is given that the little patient is suffering from rheumatism. One is the presence of erythema in its many forms; the other is the appearance of purpura, or as it has been called peliosis rheumatica of Schönlein. The various forms of erythema are erythema palpulatum, annulaire, marginatum or nodosum and of these erythema margination is the most suggestive of rheumatic poisoning. Sometimes these erythemata are very difficult to distinguish from scarlet fever, but the desquamation occurs early and is brawny in character. Some children are more prone to these rashes than others and they may, as Poynton has pointed out, show not only at different times, but also simultaneously rashes of different types. In this way you may have combinations of erythema and purpura and erythema purpura & psoriasis. The eruption may be the only manifestation other than cardiac involvement, and when the marginate eruption is present it is best to be prepared for severe cardiac lesions.

The papulate eruption is most commonly found on the back of the wrists, the hands, and the feet when it occurs as a rheumatic sign. Erythema nodosum I find is

more commonly situated on the front aspect of the legs or the extensor surfaces of the arms, and while these forms of erythema may be distributed anywhere over the body, in rheumatism they become more specially diagnostic if limited to the areas named. Whether purpuric eruptions are truly diagnostic of rheumatism has been much discussed but I believe that purpura is at least, often a sympton of rheumatism, and is especially significant when near the joints: it often appearing before evidence of articular trouble exists. As an illustration of this I may quote a record of a girl act. 12 years under my care, who developed a well marked purpura round ankles and on dorsum of foot, followed in two days by pain and swelling of ankle joint and later the wrist, both her parents have strong rheumatic history. Poynton records 40 cases of purpura in 600 children.

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With regard to erythema nodosum Gossé has investigated anew the supposed relation between it and rheumatism. He concludes that the evidence for any connection between these affections is extremely scanty. He bases his arguments on the careful study of 100 cases

of erythema nodosum occurring at St. Mary's Hospital in the last twelve years. He also rejects the now more prevalent view that erythema nodosum is a form of erythema multiformae and with Trousseau, Lendon, and others regards the disease as sui generes, "an infective disease of separate entity". In one group of his cases there was apparent infectivity, the incubation period being a fortnight and he claims that this event is not of rare occurrence. But no specific germ has yet been discovered. An interesting pendant to this paper is found in a contribution by Meara & Goodridge[2] who espouse the view that tuberculosis may be one of the many causes of erythema nodosum. The authors describe in detail a remarkable case of erythema multiformae and erythema nodosum occuring together in a young woman, apparently as an early manifestation of tuberculosis and terminating in death from meningitis. I myself have never seen erythema nodosum accompanying rheumatic fever, but it is commonly present without any other symptoms, except slight pain and tenderness on pressure and is most frequent in females who have some heart lesions due to a manifestation of rheumatism in childhood. This I think is at least presumptive proof that erythema nodosum may be

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rheumatic in nature. Also I am of opinion that any erythema in a given case is indicative of the existence of some irritant matter which is in circulation acting either directly or reflexly upon the skin. Such irritant may be the rheumatic virus.

Subcutaneous Nodules

The rheumatic nodule is not very common, hardly occurring in more than 10 per cent of rheumatic cases, but it is extremely important as an evidence of rheumatism. It is almost confined to childhood and is usually an indication of severe heart disease. The nodules are at first bright red in colour, but gradually becomes pale. They are little fibrinous masses which in course of time may become fibrous and are often so small as to escape notice. They occur mainly in the neighbourhood of joints, and are to be found especially about the olecranon, patella malleoli and along the extensor tendons of the fingers and toes and also close to the spine of the vertebrae. They are painless and movable under the skin, very often they are not discovered until the skin is freely moved over them. On the other hand they may attain to a large size. Then they are painful and tender remain longer and are associated with high temperature and frequently determine the diagnosis appearing very often before the severe symptoms.

Attention to subcutaneous fibrous nodules in rheumatism dates from a paper read by Barlow & Warner

at the International Congress, in 1881. These authors concluded that such nodules are in themselves "indicative of rheumatism even in the absence of pain" and that though unimportant in themselves they are nevertheless of serious import because in several cases the associated heart disease has been found actively progressive.

"Transactions" Vol IV P.116

These authors also remarked on the occurrence of the nodules in children, their spontaneous tendency to subsidence, and their proness to relapse.

Cheadle in his work "The Rheumatic state in Childhood" confirms the above positions. He regards the nodules as "absolutely and solely rheumatic" having as far as he can judge "no other origin or connection" (P. 73). Though usually small, and often felt rather than seen, they may in extreme instances attain to the size of half a walnut. The time occupied by their evolution varies from a few days to several months, and the large ones may have an existence of several months. As regards their prognostic value, they are "signs serious apparently in proportion to their size and number (P. 74); when large and numerous they mean persistent cardiac disease, generally uncontrollable, and

marching almost infallibly to a fatal ending (P.75) though even when "few and small" they must be regarded as serious signs (P.108). They practically disappear with the advent of puberty" (P.8)

A.E. Garrod in his "Treatise on Rheumatism" concludes that subcutaneous nodules formation is very likely pathognominic of the Rheumatic state" (P.32)

Hilton Fagge speaks of the "rheumatic nodules" as having both pathological and diagnostic interest" (Op. Cit. Vol.11 p.692) & Osler considers that "their presence may be regarded as a positive indication of rheumatism" (Op. Cit. p.297)

Anaemia as a manifestation of rheumatism:-

How does rheumatism produce anaemia in children? Dr. Goodhart thinks that children of rheumatic parentage are often habitually anaemic, and others regard anaemia as a predisposing cause of rheumatism. My experience in a working-class practice goes to prove that the anaemia is there primarily, and is due to the conditions in which the poorer children are brought up. The pre-existing anaemic condition is aggravated by the rheumatic attack involving as this does a prolonged confinement to the house, and the absence of fresh air and exercise. Many of the houses of the working class are hardly fit for human beings, only too often one finds a whole family herded together in a living room which acts as kitchen, dining room, bath room and nursery, the total space perhaps being only about 9 ft by 7 ft and correspondingly deficient loftiness. To say under such conditions how far anaemia in a child attacked with rheumatism is due to the disease and how far to unhealthy surroundings is obviously difficult, but my own view as stated above, is that each factor plays some part in the result. I doubt however whether there is a rheumatic anaemia apart from other manifestations of the disease.

Nervous Manifestations

Nervous manifestations

Nervous manifestations the result of rheumatism are mainly confined to children, and are in my opinion secondary only in importance to those connected with the heart. Perhaps there is one exception to this statement namely; hyperpyrexia - a well recognised complication of rheumatic fever in the adult, but almost unknown in the rheumatism of early life. Evidences of the effects of rheumatism on the nervous system of the child may be seen in such general conditions as excitement and emotional disturbances. Evidences of the same order is seen in chorea. I regard every case of chorea as a manifestation of rheumatism, for almost invariably careful examination and enquiry elicits either in the individual or in the family a history of some form of rheumatic incident. Doubtless the determining factor of an attack of chorea, is often a shock, fright or other emotional disturbance, but the underlying influence is I am persuaded, rheumatic. This supposition does not contradict the view that rheumatism in all its forms is dependent on the presence of micro-organism; all that is necessary is to suppose that the micro organisms are present in a latent condition in the nervous system & that they are

roused

into activity by the functional conditions produced by fright or other mental upset. I also regard children who are nervous and present such phenomena as walking or talking during sleep to be probably rheumatic and to need the care which this diagnosis implies.

Chorea is one of the commonest manifestations of rheumatism. It may occur during or after an ordinary rheumatic attack, or may appear apart from other rheumatic events. Organic cardiac affections may develop as complications; and though for the most part these are not extreme there are instances in which pericarditis and endocarditis and myocarditis become serious features and even lead to a fatal issue, arising as it were directly out of the chorea. In my experience these complications including chorea, are more severe in children (and especially girls) at or approaching puberty than in younger children. On this point I may quote the case of a patient whom I have watched for several years. She has had three attacks of acute rheumatism and now at 16 years of age is the victim of a severe attack of chorea. Fortunately she illustrates another point namely, that some children suffer from rheumatism in many attacks and in many forms and yet the heart escapes altogether.

Chorea is sometimes described as developing after scarlet fever, measles, pneumonia and other febrile diseases. This I am satisfied is occasionally true, but in such cases as I have seen the patient has belonged to a rheumatic family; and personally I am disposed to say that when diseases such as those above mentioned are associated with chorea, the association is either a mere coincidence, or more probably, the feverish disturbance provides the opportunity for the rheumatic influence to become active.

Night Terrors

Often the child is brought to the surgery by the mother with the complaint that it is wakeful at night, or that it talks in an excited fashion while asleep and then wakes up in a fright. I nearly always find that these children have been overworked at school or have got over excited and have a rheumatic family history. These children also often suffer from incontenence of urine, due to hyper acid urine irritating the bladder, and this too, may be classed as at least, at times a rheumatic manifestation.

Prognosis.

Prognosis.

In an acute or sub-acute attack of rheumatism the younger the child, the more rapid the development of the symptoms and the more likely is the heart to become affected. Weakly and debilitated children with a distinct rheumatic history, especially if this is present in both parents, I find are very liable to heart complications. In such children too, chorea is apt to supervene and in a severe and even a fatal form. Another risk is that of cardiac failure as shown by the appearance of ascites and other dropsies. Rheumatism in the individual is so apt to recur that the existence of a mild attack is no guarantee that later manifestations may not be severe; hence an ultimate prognosis is made more difficult. Subcutaneous nodules were originally considered of evil omen in relation to the cardiac condition if they appear, but in my experience this is an over statement. That abundant nodules are often associated with severe cardiac complications is certain, but even this is not invariably true, and nodules may be present even when the heart altogether escapes.

The difficulty of prognosis in regard to the heart condition in any individual case is considerable.

A systolic murmur may be heard at the apex during the acute stage or perhaps shortly after this has passed. Yet it is not certain that this means endocarditis. It may quite possibly depend on mitral regurgitation due not to structural changes in the valve, but to a temporary dilatation consequent on the febrile and toxic state. Between these two possibilities there is no certain judgment other than time. Hence there is need for caution before concluding that the detection of a cardiac murmur necessarily means endocarditis. On the other hand it is possible that the acute stage may appear to be safely passed, and that no alarm arises even during convalescence, and yet when the patient leaves his bed and indulges in small activities, auscultation detects evidences, which cannot be questioned, of organic valvular disease. Here doubtless the explanation is that in the recumbent posture, and with a subdued state of the circulation, the muscular contractions of the heart walls are such that no murmur is produced in spite of organic change: while with greater activity, and increased cardiac rigour the proofs of valvular flaw appear.

Thus there is a double danger in attempting confident prognosis - the danger on the one hand of

concluding that a cardiac murmur always means structural disease, the danger on the other, of accepting the absence of such a murmur as a proof that the heart is intact. Still further on the last point there is the risk that myocardial as distinct from endocardial disease may lead at a later stage to fibrotic changes which are very apt to interfere with effective cardiac action even though the valvular structures have escaped all damage.

In reference to pericarditis, announced by characteristic friction sounds, this in rheumatism hardly increases the immediate gravity of the case. It is often very transitory and may completely disappear. Effusion in any marked degree is not common and rarely causes trouble. Yet there is ever the danger that pericarditis may lead to adhesions which sooner or later and particularly when extensive, will seriously compromise the ability of the heart to carry on the circulation.

Tonsillitis, erythemas, chorea and other of the "minor" manifestations of rheumatism appear relatively slight affairs and usually are so, though chorea in adolescents sometimes assumes serious proportions. But, however free from local anxiety, every display of rheumatic activity carries the risk of endocarditis and other cardiac complications.

From this there follow two conclusions:-

First that all such conditions should be treated seriously, and especially that complete rest for the patient should be insisted on; and second that the outlook must be spoken of with some anxiety in reference to the heart until time and the establishment of convalescence show that the issue is a happy one.

Treatment.

Treatment.

This must be considered under two heads

(1) Measures calculated to prevent the development of rheumatic disease more particularly in children who inherit rheumatic tendencies.

(2) Measures to be adopted when active evidences of rheumatism are present; in addition the treatment of various complications has to be discussed.

Preventive Treatment:-

Personally and as a preventive measure I would "enucleate the tonsils" in every child who has enlarged tonsils, or who, with a distinctly rheumatic history, fails to develop properly and displays the general evidences of feeble or depressed health. By this means the child's health I am convinced is considerably improved and the likelihood of the child ever having an attack of rheumatism is considerably diminished. In addition to removal of

the tonsils I would see that the upper air passages are perfectly clear, and in a healthy condition. Further, as an anti-rheumatic remedy a daily douching of the nasal cavities and pharynx with some antiseptic solution is advisable, particularly when a member of the family is laid aside with rheumatism. I cannot say that I have ever seen direct infection from patient to patient, but in view of what is known of the bacteriology of the disease, no precaution ought to be omitted. Particularly is this reasonable in the case of children who have to sleep in the same room, and even in the same bed as a rheumatic invalid. The incidence of rheumatism upon the children of the poor is so marked that one cannot help thinking that much of it is preventable and that there is a risk of the poison being communicated directly possibly through the avenue of the tonsils.

The influence of damp and crowded and ill ventilated houses has already been referred to in considering the etiology of the disease. I believe that as the housing of the poorer classes improves, as indeed, it is improving, we shall have fewer cases of rheumatic fever. In cases where there is a strong rheumatic tendency, residence in some dry, warm climate is undoubtedly to be

recommended. Short of this something can be done by guarding against chills and the use of suitable clothing. Particular care should be taken in the spring and autumn, which are the favorite seasons for the onset of the disease. Even when the child is in comparative good health it is important that it should be warmly clad. The rheumatic child should have the school hours reduced and not be allowed to do any home work and there should be an hour of rest during the middle of the day. I am of opinion that the medical inspection of school children is the first step in dealing seriously with the problem of rheumatism and heart disease in children. I would impress upon each school medical officer the importance of the different manifestations of the disease and of the relation of these to cardiac complications.

In the same fashion school examinations should pay particular attention to unhealthy conditions of the throat, and to rectification of these, seeing that there is good reason to believe such conditions to be the opportunity for the entrance of the rheumatic poison. Moreover I am of opinion that it is the duty of the medical practitioner to warn the parents in rheumatic families of the special risks which even the apparently

slight illness of their children may involve, and to impress upon them the importance of rest during these illnesses as the best protection from the danger of heart disease. In this way we may perhaps arrive at some diminution in the incidence of organic heart disease, at least in early life. Such a practice if generally adopted, would at least give to rheumatic children, in illnesses not generally recognised to be rheumatic, the protective influence of rest, and with this it is reasonable to hope the opportunity for cardiac complications would be lowered.

Food

In reference to diet there seems no reason to beleive that this has any special bearing on rheumatic disease. Various popular creeds accuse proteids, fats and perhaps other food substances, but there is no valid scientific evidence to support such accusations. Doubtless it is wise to say that a liberal supply of good food will render a child less liable to rheumatic disease but beyond this it does not seem possible to go. Personally I am disposed to insist on the importance of fats and to advise that the children of rheumatic families and more especially during cold weather, receive a liberal supply of these in the shape of cream, butter, bacon-fat, dripping etc., and it may be well in individual cases to supplement these by Cod Liver Oil either alone or in combination with Malt extract.

Treatment of active rheumatism.

Rest in bed from the very outset of the first symptoms is the most essential feature in the treatment of the various manifestations of rheumatic disease. The night clothes should be of some warm absorbable material and made in such a way that the heart and chest can be easily examined without disturbing the patient. Here if anywhere is to be found the chance for the prevention of cardiac complications. The rest should not only be early it should also be absolute and prolonged.

The diet must vary with the individual, and the case. In a working-class practice there is very often no choice. While the temperature is raised the food given should be entirely fluid, beginning with small quantities of milk, given either alone or with barley water. This in time becomes monotonous and to vary the monotony small quantities of vegetable broth may be given. I have seen no ill effects from the administration of the latter. The return to normal diet should be undertaken with the greatest care.

Treatment

Medicines

For the ordinary rheumatic attack, acute or sub-acute, with general febrile disturbance and more or less evidence of polyarthritis, there is one practically certain remedy, namely sodium salicylate; and the same proportion holds good in attcks of rheumatic tonsillitis. It is noteworthy that the salicylate has little or no effect in other febrile diseases or in joint inflammations which are non-rheumatic. There is here an obvious suggestion that in rheumatism the salicylate excercises a specific influence. The salt should be given early in large doses, and in combination with an alkali such as Bicarbonate of Potassium. For a child five years of age ten grain doses of salicylate as a maximum with same quantity of potass. bicarb. given every 2-3 hours until pain is releived, and then every four hours. Even after the acute symptoms have subsided it is well to continue both drugs for some days or even weeks.

In place of sodium salicylate a number of allied drugs such as salicin, salicylic acid, aspirin etc., have enjoyed a fair amount of celebrity, but none of them in my experience equals the sodium salicylate in efficacy.

Aspirin possesses no advantage over the salicylates and is relatively slower in action. On the other hand, salicin given in the form of cachets combined with Quinine Sulph. seems to be particularly helpful when the disease runs a prolonged course, and the temperature persists at a level somewhat above the normal.

The salicylates have a specific effect also on rheumatic sore throat, but it is very doubtful if they influence favourably other rheumatic manifestations. Possibly there is an exception in the case of chorea, where large doses given at the outset seem on the whole to shorten the course of the disease.

Local treatment of joints.

In an acute attack absolute rest to the joints is essential. They should be wrapped in wool and in lint which has been soaked in a lotion made up of Liquor Plumbi and Glyc. Bellad, or Liq. Plumbi $\overline{o}$ opio with or without a macintosh over and covered with wool. This should be done frequently during the day or as often as can be borne by the patient. After the acute condition has abated gentle massage with a liniment of Belladonna Camph. Co. & Saponis equal parts should be begun to counteract any tendency to stiffness.

Local Treatment of Throat

Where the child is old enough to gargle, some antiseptic should be employed or tablets of formamint used. The teeth should be attended to and washes for the mouth applied freely.

Treatment complications.

In cardiac complications if pain is not relieved by salicylates I never hesitate to use Opium. I have never found it produce any unfortunate effect. Indeed by soothing nervousness and restlessness and by easing pain its action is most beneficial.

I usually order Liq. Opii Sedativ in m ~~iii~~ doses to a child of 5 years; and I think it an advantage to combine it with calomel in small doses.

Another method of relieving cardiac or respiratory distress or pain is leeches applied over the praecordium. These are extremely useful and often give very prompt relief. It may be difficult to explain the rationale of their action but their efficacy is beyond question. Even in quite a young child, three, six or even more may be safely ordered and if necessary the loss of blood may be encouraged by hot fomentations. Should the loss become excessive, the haemorrhage can be checked by Collodion perhaps in combination with some astringent as tannic acid.

In pericarditis blisters seem to be of value both for checking inflammation and promoting absorption. They have been advocated to prevent or even to remove endocarditis, but it is difficult to see how they can be effective here and the teaching has not received much support.

Chorea

The majority of mild cases get well under quiet and rest, and drug treatment is of doubtful value. As already mentioned large doses of sodium salicylate given at the outset may perhaps shorten the attack. Arsenic I have not found satisfactory. It often produces ill effects on the digestive organs and sometimes causes skin eruptions: if unduly prolonged it may lead to a brown pigmentation of the skin and to peripheral neuritis. In severe cases of chorea Chloral hydrate & Bromides especially when the patient does not sleep, combined with warm packs I have found to be invaluable.

It is said that treatment by massage and re educative excercises are important, but personally I have had no case requiring such treatment.

The most important method of procedure is feeding and quiet, with in the winter months free administrations of malt and Cod liver oil.

Vaccine treatment

I have tried vaccines of various kinds in the treatment of rheumatism in children, but with very indifferent results. In some cases there has been a response, say in the reduction of tempt. after an acute exacerbation, but as to relieving the essential progress of the disease, vaccines in my experience are an absolute failure. This at least is true of their employment in cases where the disease is well established. Possibly were conditions different vaccines might have their value. But this would mean early diagnosis, and the extraction of a sufficient amount of blood to permit culture of the bacteria concerned, and the preparation of an autogenous vaccine. Such conditions are impossible at least in poorer class patients. Were rheumatism certainly due to an individual specific micro-organism the use of stock vaccines might be attempted, but there is much uncertainty on this point; and on the strictly practical question no authority seems to claim any considerable value for vaccine treatment in rheumatic disease.