

T H E S I S
FOR THE DEGREE OF M.D.

**"The Supervision of the Rheumatic
Child."**

—————oOo—————

By

James W. Macfarlane, M.C., M.B., Ch.B.

—————oOo—————

April 1930.

ProQuest Number: 13905312

All rights reserved

INFORMATION TO ALL USERS

The quality of this reproduction is dependent upon the quality of the copy submitted.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if material had to be removed, a note will indicate the deletion.



ProQuest 13905312

Published by ProQuest LLC (2019). Copyright of the Dissertation is held by the Author.

All rights reserved.

This work is protected against unauthorized copying under Title 17, United States Code
Microform Edition © ProQuest LLC.

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 – 1346

THE SUPERVISION OF THE RHEUMATIC CHILD.

In the past four years I have been acting as Assistant at the Cardiac Clinic at The Royal Hospital for Sick Children, Glasgow, and in the present Thesis I desire (1) to record the life history of Rheumatic Infection from my own personal observations, and (2) to review the results of this method of supervising the child already infected.

Much interest has been taken in recent years in the care of the rheumatic child, and a very abundant literature has grown around it. Much is being claimed by those who supervise the rheumatic child, and much money has been expended in work to hinder, if possible, the severe disability arising through cardiac involvement.

When one appreciates that something like 50% of the cases of arthritis, and between 40% and 50% of the cases of chorea develop heart disease, the seriousness of the question becomes apparent. Discordant results, however, are reported, and it is difficult from a summary of the literature alone to form any reliable conclusion. Hence, some years ago, a Rheumatic and Cardiac Clinic was instituted at The Royal Hospital for Sick Children, Glasgow, and the following communication is a record of the results obtained.

Rheumatism, and by this is meant the rheumatic infection, embracing arthritis, chorea and carditis, is regarded as bacterial in origin. Isolation of the causative organism of rheumatic infection has been claimed, but this has not been definitely established. How the infection gains entrance to the body is not certain. Some writers believe that the path of infection is via the tonsils, while others believe that the causative factor is

a rheumatic diathesis, is due to environment, or to heredity. If the causative factor or the path of entry were known, the control of the rheumatic infection would be greatly simplified. As recurrences are common, due to relapse or reinfection, it becomes apparent that it may be worth while to supervise the child already infected, in order to find out, if possible, some means of controlling the disease. The hospital class of patient is the one chiefly affected, and the supervision can be easily carried out by regular visits to the Cardiac Clinic. The parents, as a rule, co-operate willingly, without which the working of the Cardiac Clinic would be impossible.

The after care of the rheumatic child was originated by St. Lawrence⁽¹⁾, of New York, in 1915. Since then many other workers have become interested, and Cardiac Clinics have been formed in most big cities, both in this country and in America. In 1923 a Cardiac Clinic was inaugurated at the Royal Hospital for Sick Children, Glasgow, and the cases used in this analysis are those who first came under observation during the years 1922-1924 inclusive. These cases were traced up to the end of 1928, so that they have been under observation from four to six years. The vast majority of the children have been resident at one time in the R.H.S.C., Glasgow, for treatment of some kind of rheumatic infection. A few cases were admitted from the outpatient department.

The routine in the treatment of the rheumatic child in the R.H.S.C., Glasgow, is to keep the child in bed until all signs of active infection have passed away. The average time for this is three months. Salicylate of soda is given in doses of 60 to 180 grains per day, and this is continued all the time the patient is in hospital/

hospital. Any septic teeth are removed, and the tonsils are enucleated when there is any suspicion of disease. On dismissal from hospital, the child is sent to the Convalescent Home, where he remains for two to four weeks. On the first Saturday after dismissal from the Home, the child reports to the Cardiac Clinic, where he is thoroughly examined and his condition noted. He is given a course of salicylate of soda every alternate two months, the dose for the first week being 15 grains, T.I.D., and for the next seven weeks 22½ grs. T.I.D. The mother is advised as to the welfare of the child with special reference to the regulation of the bowels, exercise, etc. The child attends the Clinic every two months, when he is examined, and a record kept of the size of his heart, the presence of any bruit, or any other abnormality. The Lady Almoner, or one of her assistants, visits the child's home to enquire into the social conditions, and where necessary help and advice is given. If the house is damp or otherwise unsuitable, influence is brought to bear on the authorities to help in finding more suitable accommodation.

In event of the child having a marked disability, he is not allowed to attend school. When carditis is present the child is usually sent to a special school, where he is allowed to rest, and, if necessary, it is arranged for him to have his Salicylate there. By the foregoing practice a very careful record is able to be kept of the history of the rheumatic child after dismissal from hospital.

Since the inception of the Clinic, the classification has been based entirely on the child's cardiac condition. This has been found to be satisfactory, as in the first place it is simple and straight forward, and in the second place the attention is concentrated on the real rheumatic disability/

disability, namely, the cardiac condition.

The classification is as follows:-

P. - Potential cardiac cases - cases with a definite rheumatic history, who have never had any cardiac involvement and are now well.

A. - Cases with a definite rheumatic history, who had a cardiac involvement, which has now disappeared.

B. - Cases with a definite rheumatic history and present signs of cardiac involvement, but no signs referable to the heart.

C. - Cases with a definite rheumatic history, and present signs and symptoms of cardiac involvement, but with no disability for ordinary life.

D. - Cases with a definite rheumatic history and present signs and symptoms of cardiac involvement and serious disability for ordinary life.

In the course of analysis some facts regarding the life history of rheumatic infection have been noted, and it may not be without interest to detail these.

The total number of cases in this analysis is 156. The following lesions have been considered as indicating rheumatic infection.

1. Arthritis and growing pains. 2. Chorea. 3. Carditis.
4. Subcutaneous Nodules. 5. Tonsillitis and cutaneous lesions, when accompanying some other rheumatic manifestation.

Of these 156 cases what was the first manifestation of rheumatic infection? As it is impossible to tell except by physical examination whether carditis is present or not, it cannot be said how often it was present as a first manifestation. In Table No.1 only those cases of carditis where there was no history of rheumatic infection, and where there was no evidence of it on admission, have been included as a first manifestation.

Table No.1

<u>First Manifestation</u>	<u>No.</u>
1. Arthritis and Growing Pains	96
2. Chorea	45
3. Tonsillitis	6
4. Carditis	<u>9</u>
Total	<u>156</u>

Arthritis and Growing Pains.

By arthritis is meant pain and swelling of joints or joint, accompanied by fever. Arthritis is the commonest manifestation of the rheumatic infection. In 96 cases it was the first manifestation. In 18 of these 96 cases chorea appeared at a later stage of the disease. Of the 78 cases of pure arthritis the number of recurrences were as follows:-

Of the 78 cases 58 had one attack.
 " " " " 11 " two attacks.
 " " " " 7 " three "
 " " " " 2 " four "

(2)
 Dr. Bertram, in an analysis made from the records of 141 cases of rheumatic infection which had been admitted to the Royal Hospital for Sick Children, Glasgow, between the years 1916 and 1921 inclusive, found that of 103 cases of arthritis, 41% had four or more attacks, 6% had three attacks, and 20% had two attacks. In only 33% of her cases was there no recurrence.

After which attack of arthritis did carditis appear? In a certain number of cases it was impossible to say when carditis appeared, as they were not seen during the first or subsequent attacks. However, of those cases where the history/

history was definitely known, and who were seen during the first attack, or where the heart was undamaged after the first attack, there were 56. The time of occurrence of carditis in those 56 cases is shown in Table No.2.

Table No.2

<u>Group.</u>	<u>No. of cases.</u>	<u>No. developed Carditis.</u>
1st attack	56	24 = 43%
2nd "	2	2 = 100%

It is thus seen that carditis is likely to result after the first or second attacks of arthritis.

Age of Onset of Arthritis.

Arthritis occurs more often under 6 years than is generally supposed. Poynton⁽³⁾ showed that the maximum number of his cases of rheumatism occurred at 7 years. Ingerman and Wilson⁽⁴⁾ found that the number reached its maximum at 5 years. In this series the youngest case was three years of age; 22 cases were under 6 years, 34 were between 6 and 10 years, while 22 cases were over 10 years.

Sex Incidence.

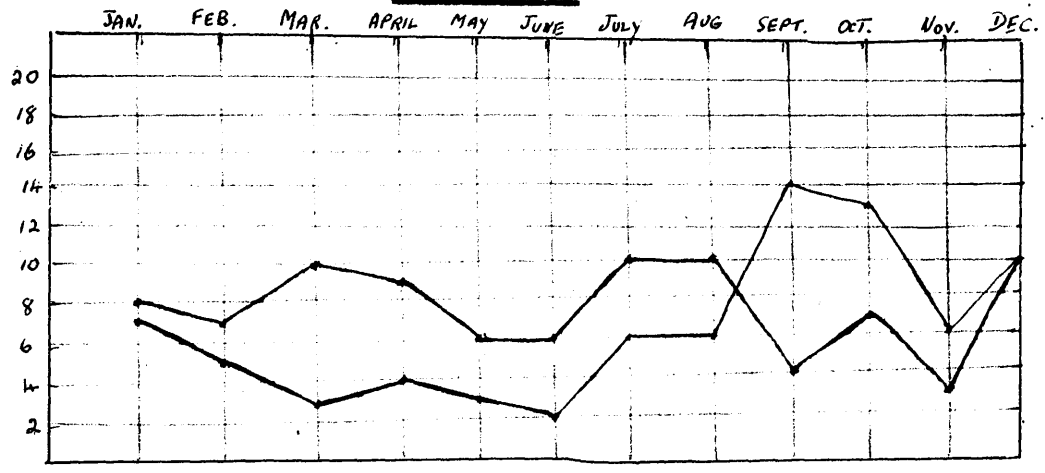
Ingerman and Wilson⁽⁴⁾ found that girls are more than twice as subject to rheumatism as boys. In this series the girls are in the majority to the extent of 42 to 36.

Seasonal Incidence.

Epidemiological studies have tended to support the view that cold and damp weather is an important factor in predisposing to a high incidence of rheumatic infection. In London the number of cases reaches its maximum in September and October,⁽⁵⁾ and according to Bell's statistics, the largest number of cases in Montreal were admitted during February, March and April, which is the cold and damp season there/

there. In Table No.3 the seasonal incidence of the arthritis cases in this series is shown.

Table No.3.



Arthritis: — ; Chorea: - - - , included for comparison.

It will be seen that September and October are the months when arthritis is most prevalent, and this corresponds with our cold and damp season.

Lesions associated with Arthritis.

Arthritis alone	9 cases.
" associated with carditis	66 "
" " " chorea	26 "
" " " nodules	13 "
" " " sore throat	12 "
" " " enlarged tonsils	44 "

Carditis.

Cardiac disease is the all important factor in rheumatic infection. By carditis is meant disease of the heart, whether of the pericardium, endocardium or myocardium. Carditis usually follows some rheumatic manifestation, but in some cases it is the only manifestation of rheumatism. This is of interest as the condition is often not suspected until the child is examined by the school Medical Officer, or the mother takes the child to hospital as he is complaining/

complaining of praecordial pain or shortness of breath, etc.
 (6) Sutton has shown that among 253 girls with rheumatic heart disease, 21% did not give any history of chorea, acute arthritis or growing pains previous to the discovery of heart disease. He also found that among 174 boys, 14% gave no such history.

Of the 156 cases in this analysis, 118 had carditis, and of this number 9 gave no definite rheumatic history prior to heart disease being detected. Of the 9 cases 5 gave a history of influenza or chill, but the four remaining cases gave a completely negative history.

In following up these cases it was found that the mortality rate was high, five of the 9 having died by 1928, equal to 55%. As regards the cardiac lesion, five had mitral stenosis and incompetence, and of these three died, while four had mitral incompetence, and of these two died. Carditis developed in 66 cases of arthritis. This included 20 cases of myocarditis where the bruit ultimately disappeared. Carditis also developed in 43 cases of chorea.

Age of Onset and Sex Incidence.

(7) Poynton describes a case where a child of two days old, whose mother had rheumatic fever in pregnancy, showed definite cardiac disease on post mortem examination. The youngest in this series was two years and eleven months old. Of the total 118 cases, 24 were under 6 years, 56 were between 6 and 10 years, and 48 cases were over 10 years. It will be seen that about 20% of the children with rheumatic cardiac disease are under 6 years of age. According to Poynton the highest incidence is around 10 years of age.

Sex Incidence.

The number of girls affected was 76, and the number of boys/

boys 42, giving a ratio of almost two to one.

Of the total number of cases of carditis Table No.4 shows the relative frequency of the various lesions or combinations of lesions.

Table No.4

<u>Lesion.</u>	<u>No</u>	<u>%</u>
Mitral Incompetence	84	71.
Mitral Incompetence & Stenosis	20	17.
Mitral Stenosis	1	1.
Pericarditis, Mitral Incompetence & Stenosis	2	1.7
Aortic Incompetence & Mitral Incompetence	3	2.5
Pericarditis, Mitral Incomp. & Stenosis & Aortic Incomp	2	1.7
Pericarditis & Mitral Incompetence	5	4.2
Pericarditis ;.....	<u>1</u>	1.
	<u>118</u>	

The mitral valve was involved in 117 cases; the aortic in 6 cases; the pericardium in 10 cases. In all cases where the aortic valve was affected, the Wassermann was negative. In only one case was the pericardium only affected. This child made an uneventful recovery, and when last heard of was in Canada. ⁽⁸⁾ Marshall reported a similar case.

In Table No.5 is shown the degree of disability resulting from involvement of the various valves.

Table No.5

Lesion	No.	Died		Marked Disability		Slight Disability		No Disability	
		No.	%	No.	%	No.	%	No.	%
Mitral Alone	202	14	13.7	-	-	8	8	80	78.4
Aortic	6	4	66	1	17			1	17
Pericarditis	10	4	40	1	10	4	40	1	10

Of the 118 cases of carditis 22 had died by the time of the/

the review of the cases in 1928. Of the remaining 96 cases, only two had a marked disability, 12 had a slight disability, while 82 had no disability for ordinary life. All the cases, except one, of pericarditis showed some disability for ordinary life. The most serious type of case was the one with an aortic lesion; the mortality rate was 66%; all had a negative Wassermann.

In 22 cases the patients died. It has been observed by previous writers that in cases which ended fatally, the duration of the disease is short. Bertram⁽²⁾ found that of 28 patients who died, the fatal issue ensued within three months of the onset of the symptoms in 7 = 25%; within one year in 16 = 57%, and within 2 years, in 21 = 75%.

In this series of 22 cases, 10 died within one year = 45%. within 2 years 12 cases = 54%, and within 3 years 18 cases = 81%.

The cardiac lesion in these 22 cases was as follows:-
Mitral incompetence in 8 cases, mitral stenosis and incompetence in 7 cases, mitral and aortic incompetence in 3 cases, pericarditis and mitral incompetence in one case, pericarditis, mitral stenosis and incompetence in 2 cases, and pericarditis, mitral stenosis and incompetence and aortic incompetence in one.

Carditis was associated with arthritis in 66 cases.

"	"	"	"	chorea	* 43 cases.
"	"	"	"	rheumatic nodules in	13 cases.
"	"	"	"	tonsillitis in	13 cases.
"	"	"	"	skin lesions in	7 cases.

Chorea.

All the cases of chorea included in this analysis are regarded as definitely rheumatic. The total number is 66. On admission to hospital 45 of the 66 cases presented or gave a/

a history of some other manifestation of rheumatic infection in addition to chorea. Of the 21 cases who were therefore at first without any other manifestation, it was found on re-examination in 1928, that 9 had developed some other manifestation of rheumatism.

The 9 cases who developed other rheumatic manifestations did so as follows. Carditis alone in 6 cases, arthritis and carditis in one case, subacute rheumatism in one case, and tonsillitis and subacute rheumatism in one case. Of the 21 cases 7 had further attacks of chorea while one was lost sight of.

Since chorea, then, in the majority of cases proved to be an incident in a long standing rheumatic history, it is interesting to note its chronological place in that history. In 41 cases chorea was the first manifestation. In 18 cases chorea followed arthritis. In 8 cases arthritis followed chorea.

If we exclude arthritis plus chorea there were 40 cases. How many of those cases had recurrences of chorea?

18 had one attack, 10 had two attacks, 2 had three attacks, 4 had four attacks, and 6 had five or more attacks.

Chorea and arthritis were associated in 26 cases. In no case did they appear simultaneously, but arthritis has frequently preceded an attack of chorea.

After which attack of chorea did carditis appear?

Only those cases of chorea whose history is definitely known are included. The figures are shown in Table No.6

Table No.6/

Table No.6

<u>Attack</u>	<u>No.</u>	<u>No Developing Carditis</u>
1st	36	11 = 30.5%
2nd	13	6 = 46%
3rd	3	0
4th	2	0
5th	2	0

In Table No.7 those cases with both arthritis and chorea are analysed and the time of occurrence of carditis is shown.

Table No.7

<u>Attack</u>	<u>No.</u>	<u>No. Developing Carditis</u>
1st	16	10 = 62%
2nd	6	1 = 16%
3rd	1	0
4th	1	0
5th	1	0

It will be seen that there was a greater incidence of carditis during the second attack than during the first in chorea, while the opposite was the case where arthritis and chorea had both been present. It is seen also that in no case in which the time of appearance of the cardiac involvement was known did this complication develop after the second attack. The conclusion to be drawn is that if carditis is to develop it will do so during the first or second attack of chorea.

Seasonal Incidence.

This is shown in Table No.3. March, July and August and September were the months when chorea was most prevalent.

Age of Onset and Sex Incidence.

The youngest case was three years of age. There were 11 cases/

11 cases under 6 years; 40 were between 6 and 10 years; while 15 were over 10 years. Girls predominated over boys very markedly, there being 52 girls and 14 boys, a ratio of three to one.

Chorea was associated with carditis in 43 cases, with arthritis in 26 cases, and with tonsillitis in 6 cases.

Rheumatic Nodules.

Rheumatic nodules are pathognomonic of rheumatism. They are most commonly found in the region of the elbows, knees, spines of the vertebrae, and the scalp. They appear in crops. The similar nature of the rheumatic nodule to the Aschoff Body ⁽⁹⁾ has been noted, and they are regarded as a reaction towards the causative agent or agents. Various opinions have been expressed as to the severity of the infection when rheumatic nodules are present. Thus Ingerman and Wilson ⁽⁴⁾ noted nodules in 21 of their cases, and 5 of them were potential cardiac cases. ⁽¹⁰⁾ Swift states that nodules may be present alone, to be followed later by chorea. ⁽¹¹⁾ Poynton states that nodules may occur in cases which run a benign course, and even in patients free from heart disease.

In this series there were 13 cases with nodules, and in each carditis was present. Nodules were not found in any case of chorea, the manifestation in each instance being arthritis.

They developed during the 1st attack of arthritis in 7 cases.

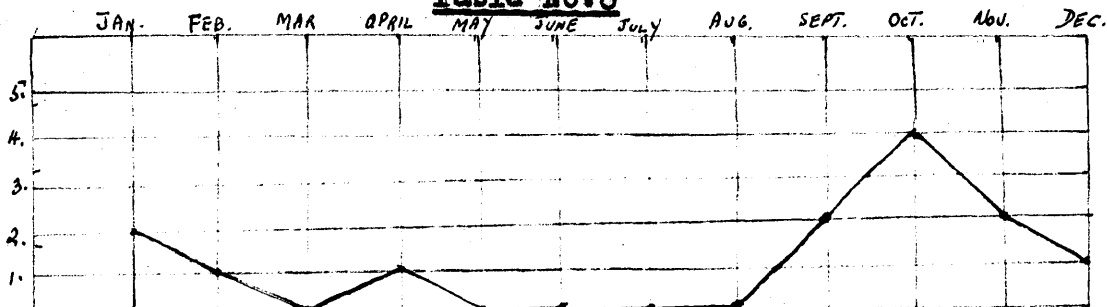
"	"	"	"	2nd	"	"	"	"	2	"
"	"	"	"	3rd	"	"	"	"	3	"
"	"	"	"	Growing Pains in one case.						

Age of Onset.

The youngest case was 3 years of age; three cases were under 6 years, 5 were between 6 and 10 years, and 5 were over 10years/

10 years. The Seasonal Incidence is shown in Table No.8.

Table No.8



The seasonal incidence corresponds with that of arthritis, the maximum incidence being in the Autumn.

Sex Incidence.

The number of girls affected was 9; the number of boys 4. The mortality rate was high, 10 of the 13 cases being fatal, a rate of 77%. Of the 3 survivors, one is in Australia, and the other 2 belong to class B.

Nature of the Cardiac Lesion.

Six had mitral incompetence and stenosis, 3 had mitral incompetence, 2 had pericarditis and mitral incompetence, 1 had pericarditis, mitral incompetence and stenosis, and 1 had mitral incompetence and aortic incompetence. It is thus seen that the presence of rheumatic nodules indicated a very severe infection with a mortality rate of 77%.

Skin Eruptions.

Skin eruptions occurred in several instances in this series during an attack of rheumatic infection. They were not regarded as having any significance.

The type of skin lesion was as follows:

Urticaria	occurred	in	2	cases.
Psoriasis	"	"	2	"
Purpura	"	"	3	"
Erythema	"	"	4	"

Tonsillitis.

There/

Tonsillitis.

There is no doubt that there is a definite relationship between Tonsillitis and Rheumatic Infection. A certain proportion of the cases of rheumatism give a history of recurrent attacks of sore throat, and sometimes an attack of rheumatic infection is accompanied by tonsillitis. In this series of cases tonsillitis preceded an attack of rheumatic infection in 6 cases. In 14 cases it occurred simultaneously with some other rheumatic manifestation. The tonsils were found to be unhealthy in 19 cases of chorea, and in 44 cases of arthritis.

Heredity as a factor in the production of Rheumatism.

Cheadle found that 70% of his patients with rheumatic fever in private practice showed more than one case in the same family. St. Lawrence, in the study of 100 families with rheumatic fever, showed that practically one half of the families had 2 or more cases per each family. The B.M.A. (14) report gives the view that perhaps the hereditary influence aids and abets the environmental influence. The M.R.C. (19) report states that no sufficient evidence of heredity was forthcoming.

In this analysis, of the total 156 cases, only 36 had a history of rheumatism in the family = 25%, and of these 36 cases, 10 died, almost 28%. Of the 120 cases with no family history of rheumatism, 12 died = 10%. It will thus be seen that the presence of a rheumatic family history is not so prevalent in this series as in those of other writers. The mortality rate, however, in those cases with a rheumatic history is considerably higher than in those without, which would seem to indicate a more suitable for the infection to flourish in.

Results/

Results obtained at the Cardiac Clinic.

Having detailed some facts regarding the life history of rheumatic infection, it may be of interest now to consider the results obtained by the supervision of the rheumatic child at the Cardiac Clinic.

The cases have been under observation for a period of from 4 to 7 years, and as a result it has been possible to obtain fairly definite findings. The total number of cases available for this analysis is 132.

On dismissal from hospital a certain number of the children did not attend the Clinic. This, in a way, was convenient, as it provided the opportunity to compare them with those children who did attend. The cases who did not attend have been called non-clinic cases. They number 52, and at the end of 1928 they were traced and their condition noted. The clinic cases numbered 80.

It has now to be shown if supervision of the rheumatic child at the Cardiac Clinic (1) lessened the number of subsequent attacks of rheumatic infection, (2) prevented the onset of carditis or lessened the severity of the cardiac condition. The effect of tonsillectomy on the rheumatic infection has also been considered.

Has supervision at the Cardiac Clinic lessened the number of subsequent attacks of rheumatic infection?

In Table No.15 a comparison is shown between the clinic and non-clinic cases as regards the recurrence of rheumatism.

Table No.15.

Group	Total Number	Attacks before Admission to Hospital	Average Attacks per Person.	Attacks after Dismissal	Average Attacks per Person.	Total No. of Attacks	Average Attacks per Person.
Non-Clinic	52	74	1.42	22	.41	96	1.8
Clinic	80	121	1.53	42	.60	163	2.03

It is seen that the number of recurrences is less among the non-clinic children.

Of the clinic children the regularity of their attendance was not consistent, some being good and others poor. The group has thus been subdivided into good, fair and bad, according to their attendance, and in Table No.16 the results are seen.

Table No.16

Group	No. of Cases	Attacks before admission to Clinic	Attacks after admission to Clinic
Good Attendance	45	71 = 1.58 per case	30 = .66 per case
Fair *	12	17 = 1.4 per case	3 = .25 per case
Bad *	23	34 = 1.48 per case	8 = .34 per case

It will be seen that the greatest number of recurrences occurred among the good attenders. It may be reasoned, however, that the bad attenders were so, because they were keeping so well that the parents did not think it necessary to attend. The results, however, suggest that attendance at a Cardiac Clinic does not lessen the number of attacks of Rheumatic Infection.

Carditis is the all important condition, the prevention, if possible, of which is the main object of the Cardiac Clinic. Whether this object has been attained will be seen in the following results. Once more the clinic child is contrasted with the non-clinic, the former being subdivided into good, fair and bad.

Table No.17 shows the development of cardiac disease.

Table No.17

Group	No. of Cases	Condition of heart on dismissal from Hospital	Condition on admission to Clinic	Condition in 1928	Remarks
Clinic Children	80	40- 40+	40- 40+	35-; 5+ 27+; 11- (2 died)	12% developed cardiac disease during attendance at Clinic: 27% lost murmurs
Non-Clinic Children	48	23- 25+		19-; 4+ 17+; 5- (3 died)	21% developed cardiac disease. 20% lost murmurs

+ Evidence of cardiac disease.

- No evidence of cardiac disease.

These results show a definite advantage in favour of the clinic cases. Only 12% developed murmurs, while 21% of the non-clinic cases developed murmurs. On the other hand 27% of the clinic cases lost murmurs while only 20% of the non-clinic cases did so. However, when the regularity of attendance of the clinic children is taken into account, the results are not so good, as the worst attenders showed the highest proportion of cases which improved, while the best attenders showed the highest proportion of cases which deteriorated. This is shown in Table No.18.

Table No.18.

Group	No. of Cases	Progress
Good Attendance	45	Improved 4 = 9%
		I.S.Q. 35 = 78%
		Deteriorated 6 = 13%
Fair Attendance	12	Improved 3 = 25%
		I.S.Q. 8 = 66%
		Deteriorated 1 = 9%
Bad Attendance	23	Improved 4 = 17%
		I.S.Q. 18 = 78%
		Deteriorated 1 = 4%

From the foregoing results it will be seen that attendance
at/

at the Cardiac Clinic did not prevent the recurrences of rheumatism. As regards carditis, a certain amount of improvement was noted in the clinic cases, but this was rather negatived by the fact that the most improvement was noted in those cases where the attendance was not satisfactory. It would appear from a survey of the results obtained at the Cardiac Clinic that the supervision of the rheumatic child does not in any marked way lessen the ravages of the rheumatic infection.

The Effect of Tonsillectomy on the Rheumatic Infection.

Removal of the tonsils is believed by some authorities to be a decided factor in preventing the recurrence of the rheumatic infection. According to St. Lawrence, ⁽¹²⁾ the removal of the tonsils would seem to be the most important measure at present available for the prevention of rheumatic fever and allied rheumatic conditions. According to his figures tonsils were removed in 42 cases who had one or more attacks of rheumatic fever, and of this number 35 had no recurrence = 84%. ⁽¹³⁾ Ingerman and Wilson showed that 76% of their 88 cases were followed by a recurrence of rheumatic infection in from one to 11 years after tonsillectomy. The British Medical Association Report ⁽¹⁴⁾ of Inquiry into Rheumatic Heart Disease in Children suggests that in the child whose tonsils have been completely removed, a milder type of rheumatic infection in which the cardiac lesions are relatively light, is likely to be seen. ⁽¹⁵⁾ N.Gray Hill found that tonsillectomy even when carried out in a satisfactory manner during the early stages of the disease, does not appear to have any great influence on the behaviour of rheumatism, and is no safeguard against carditis and chorea. Wilfred ⁽¹⁶⁾ Vining found that the alleged association between sore throats and enlarged tonsils and acute rheumatism has not been borne out. ⁽¹⁷⁾ A.P.Thomson holds that the value of early and complete tonsillectomy/

tonsillectomy in the prevention of rheumatic heart disease is definitely established. There is no doubt that a great number of otherwise healthy children have unhealthy tonsils. In a recent survey in London the incidence of diseased tonsils in rheumatic children was said to be roughly 60%, as against 50% in non-rheumatic children. Reginald Miller⁽¹⁸⁾ is of the opinion that tonsillectomy is of great value in preventing arthritis and all forms of carditis, but it leaves chorea totally uncontrolled. The Medical Research Council⁽¹⁹⁾ supports this view. It says, 'it is curious to note the preponderance of attack by chorea over other forms of rheumatic manifestation in those 60 cases whose tonsils had been removed; 66.7% of those who developed a first attack of rheumatism some time after removal of the tonsils had it in the form of chorea, and of all these all but 4 had no other manifestation of the disease.'

In this analysis a differentiation between chorea and arthritis has been made. The number of attacks include both initial and recurrences. The patients have all been under observation from 5 to 8 years. Table No.9 shows effect of tonsillectomy on arthritis and chorea.

Table No.9

Group	Arthritis			Chorea		
	No. of Cases	No. of Attacks	No. per Person	No. of Cases	No. of Attacks	No. per Person
Tonsillectomised before 1st attack	3	5	1.7	7	21	3
Non Tonsillectomised						
a. Requiring Tonsillectomy	36	49	1.3	16	12	.7
B. Not " "	32	51	1.6	19	34	1.8
Total	68	100	1.5	35	46	1.3
Tonsillectomised during observation						
Before	27	32	1.2	24	33	1.3
After		7	.2		6	.66
			1.4			1.96

It would appear that tonsillectomy before the first attack has a greater prophylactic effect in arthritis than in chorea, thus supporting Miller's contention, but when the non-tonsillectomised cases are considered it is seen that the attacks of both arthritis and chorea were more frequent in the cases not requiring tonsillectomy.

In Table No.10 the cases are grouped together and it is again seen that there is a greater number of attacks per person in the tonsillectomised than in the non-tonsillectomised and in the latter a greater incidence in those not requiring than in those who did.

Table No.10

	No. of Cases	No. of Attacks	No. per Person
Tonsillectomised before 1st attack	8	21	2.6
Non Tonsillectomised			
(a) Requiring Tonsillectomy	45	82	1.8
(b) Not " "	42	82	1.9
Total	87	164	1.8

It is thus seen that tonsillectomy does not have any effect on the recurrence of chorea, and only a slightly beneficial effect on the recurrence of arthritis.

The effect of tonsillectomy on the development of carditis. In Table No.11 the cases of arthritis and chorea tonsillectomised before the first attack, or before the second attack when the heart is still intact are contrasted with the non-tonsillectomised cases.

Table No.11/

Table No.11

		No. of Cases	No. with Cardiac Disease	% with Cardiac Disease
Cases with Chorea alone	Non Tonsillectomised			
	a. Requiring Tonsillectomy	9	3	33
	b. Not " " "	10	2	20
	Total	19	5	26
	Tonsillectomised before Infection	6	1	16.6
" " " 2nd attack	6	3	50	
Cases with Arthritis alone	Non Tonsillectomised			
	a. Requiring Tonsillectomy	30	16	53
	b. Not " " "	25	16	64
	Total	55	32	58
	Tonsillectomised before Infection	1	0	0
" " " 2nd attack	8	1	12	
Cases with Chorea and Arthritis	Non Tonsillectomised			
	a. Requiring Tonsillectomy	7	4	57
	b. Not " " "	9	5	55
	Total	16	9	56
	Tonsillectomised before Infection	1	1	100
" " " 2nd attack	3	2	66	
All cases	Non Tonsillectomised			
	a. Requiring Tonsillectomy	52	28	53.8
	b. Not " " "	46	25	54
	Total	98	53	54
	Tonsillectomised before Infection	8	3	37
" " " 2nd attack	15	5	33	

From the above results it is noted that in cases of chorea alone, the incidence of cardiac disease was least in those who had a preliminary tonsillectomy done, while a greater incidence of carditis occurred in those tonsillectomised early in the course of the disease than in those never tonsillectomised. In the arthritis group the main conclusion to be drawn is that the highest incidence of carditis occurred in those not requiring tonsillectomy. In the arthritis plus chorea group the incidence of carditis was greater in the tonsillectomised group, while in the non-tonsillectomised group the incidence was much the same whether the throats were normal or not.

In grouping all cases together it is seen that tonsillectomy lessened the incidence of carditis, but in the non-tonsillectomised the condition of the tonsils did not make/

make any appreciable difference.

The effect of tonsillectomy on the progress of the cardiac condition.

As tonsillectomy does not appear to have any marked influence on the development of cardiac disease, it is of interest to know whether it has any influence on the progress of cardiac disease.

In Table No.12 cases of chorea alone are taken and the tonsillectomised are contrasted with the non-tonsillectomised. In Table No.13 cases of arthritis alone are taken while in Table No.14 cases of arthritis plus chorea are taken.

Table No.12

Cases of Chorea alone.

Class of Case	No. of Cases	Classification in 1924	Change of Class	Classification in 1928	% Improved	% Deteriorated
a. Non Tonsillectomised						
1. Requiring Tonsillectomy	9	4P 5B	3P, 1B 3A, 2B	3P 3A 3B	33	11
2. Not requiring Tonsillectomy	10	8P 2B	8P 1A, 1D	8P 1A 1D	10	10
3. Total	19	12P 7B	11P, 1B 3B, 3A, 1 died	11P 3A 4B 1 dead	15.7	10.5
b. Tonsillectomised before Rheumatic Infection.	6	5P 1A	4P, 1B 1A	4P 1A 1B	0	16
c. Tonsillectomised before 2nd Attack	10	6P 4B	3P, 3B 3B, 1 died	3P 6B 1 dead	0	40

Table No.13/

Table No.13

Cases of Arthritis alone.

Class of Case	No. of Cases	Classification in 1924	Change of Class	Classification in 1928	% improved	% deteriorated
a. Non Tonsillectomised 1. Requiring Tonsillectomy	30	6P 5A 12B 1C 6D	5P, 1B 5A 7B, 4A, 1 died 1 died 6 died	5P 9A 8B 8 dead	13	30
2. Not requiring Tonsillectomy	25	5P 5A 6B 3C 6D	5P 4A, 1B 6B 1B, 1C, 1 dead 4 died, 2B	5P 4A 10B 1C 5 dead	12	25
3. Total	55	11P 10A 18B 4C 12D	10P, 1B 9A, 1B 4A, 13B, 1 died 1C, 1B, 2 died 10D, 2B	10P 13A 18B 1C 13 dead	13	25
b. Tonsillectomised before infection	1	1P	1P	1P	0	0
a. Tonsillectomised before 2nd attack	14	3P 4A 6B 1C	3P 3A, 1B 5B, 1A 1B	3P 4A 7B	14	7

Table No.14

Cases of Arthritis & Chorea

Class of Case	No. of Cases	Classification in 1924	Change of Class	Classification in 1928	% improved	% Deteriorated
a. Non Tonsillectomised	13	5P 8B	4P, 1B 3A, 3B 1C, 1 died	4P 3A 4B 1C 1 died	23	23
b. Tonsillectomised before Rheumatic Infection	1	P	B	B	0	100
c. Tonsillectomised before 2nd attack	7	3P 4B	1P, 2B 2A, 1B 1C	1P 2A 3B 1C	28	43

From/

From the above analysis it is seen that in the cases of chorea alone, the greatest number improved, and the smallest number deteriorated in the non-tonsillectomised cases, and the improvement was chiefly marked among the ones requiring tonsillectomy. Of arthritis alone, the cases tonsillectomised showed most improvement and least deterioration.

Of the cases with both arthritis and chorea, those tonsillectomised showed the greatest deterioration.

From those results it would seem that any improvement as the result of tonsillectomy is to be only seen in the cases where arthritis is the manifestation. This is of importance when it is remembered that arthritis is the commonest manifestation of rheumatism, and that it causes a greater proportion of cardiac disease. In chorea tonsillectomy does not seem to have any effect at all, that is, it does not lessen the number of recurrences, and also does not render the heart less liable to be attacked.

The conclusion to be drawn from the above figures is that if tonsillectomy is to be of any avail it must be performed early in the course of the disease, certainly before the second attack. This applies to arthritis but not to chorea where tonsillectomy does not appear to have any effect.

In so far as carditis is concerned, tonsillectomy has a slight beneficial effect on carditis following arthritis, but has no effect on carditis following chorea.

The Importance of Early Hospital Treatment in
Rheumatic Infection.

It has been observed that with each attack of rheumatism the heart is more likely to be damaged, and that in no case did the heart survive a third attack. If it is impossible to control the disease once it has developed, would it not be possible by getting the cases early enough, that is, when the first attack develops, and treating them in hospital, to diminish the incidence of carditis? That this can be done was brought out by Dr. Bertram, who found that only 24% of those cases treated in hospital for their first attack of acute rheumatism or chorea developed carditis, while of those treated at home for the first attack 88% developed carditis. In Table No.19 the cases in this series treated at home for the first attack of arthritis are compared with those treated in hospital for the first attack.

Table No.19

Group	No.	No.who developed Carditis	No.of Recurrences.
1st Attack treated at Home	19	13 = 68%	3 had 1 recurrence 6 " 2 " 1 " 5 " 9 " 0 "
1st Attack treated at Hospital	49	21 = 43%	6 " 1 " 1 " 2 " 42 " 0 "

From the above figures it would appear that thorough treatment in a hospital during the first attack lessens the number of recurrences, and, what is more important still, lessens the incidence of carditis. Does it not suggest that it would be advisable to set aside one or two wards in each Children's Hospital for the treatment of rheumatism alone? When the family doctor diagnosed rheumatism he would be able to send the child straight away to hospital knowing that there/

there would be no difficulty about admission and that the child would not be put on the waiting list. It is recognised that rheumatism is most rife among the poorer working classes. The home conditions are not good, and as often as not, the dwelling is damp and badly ventilated. As supervision at a Cardiac Clinic does not appear to stop the ravages of the rheumatic infection, it would appear that the first step to be taken in the battle against rheumatic infection is improvement in the home conditions of these children.

—ooo—

Conclusions.

1. 156 cases of Rheumatic Infection have been analysed.
2. Cases were examined up to 10 years after first attack.
3. The routine method of examination and the classification used at the Cardiac Clinic have been described.
4. Arthritis was the commonest manifestation of rheumatism.
5. 51% of the cases of rheumatism were between 6 and 10 years of age, and 23% were under 6 years.
6. Girls were more commonly affected than boys. This was most marked in chorea where the ratio was 3 to 1.
7. Arthritis was most common in September and October, chorea in March, July, August and September.
8. Of the lesions considered in this paper, 75% had carditis, 50% had arthritis, 17% had arthritis and chorea, and 6% had carditis as the only manifestation.
9. Rheumatic Nodules indicated a severe type of infection. The mortality rate was 77%.
10. Where the aortic valve was affected, or pericarditis was present, the resulting disability was most marked.
11. Preliminary tonsillectomy may render a child less susceptible to an attack of arthritis, and if arthritis does develop it may afford a certain amount of protection to the heart. When chorea is the manifestation it has no effect.
12. In carditis following arthritis tonsillectomy seems to have a beneficial effect on the progress of the disease, but it has no effect in carditis following chorea.
13. Tonsillectomy, however, does not seem to have any marked influence on the occurrence or course of the rheumatic infection.
14. Supervision of the rheumatic child at a Cardiac Clinic does not seem to have any beneficial effect on the number of recurrences of rheumatic infection.
15. Supervision of the rheumatic child at a Cardiac Clinic does not seem to influence beneficially the course of rheumatic heart disease.
16. It would appear that to control rheumatic infection, our efforts should be concentrated on improving the home conditions.
17. Cases treated in hospital for a first attack of arthritis showed fewer recurrences of rheumatic infection, and a lessened incidence of cardiac disease.

References.

*

1. St. Lawrence, W.P. Hospital Social Service, May 1920,
pp.151 to 181.
2. Bertram, Mary. Some Features of the Rheumatic Infection,
B.M.J., March 14th 1925.
3. Poynton, F.J. Acute Rheumatism in Children, Lancet, 1086,
Nov.27th 1920.
4. Ingerman, Eugenia, & Wilson, May G. Jour.Amer.Med.Assoc.
March 1924, Vol.82, pp.759-764.
5. The Principles and Practice of Medicine, Osler, New York,
1925, pp.358.
6. Sutton, L.P. Observations on the Nature and Symptoms of
Cardiac Infection in Childhood, B.M.J., 1.8. March 2nd.
1928.
7. Poynton, F.J., Lancet, September 22, 1928, pp.585.
8. Marshall, R. Archives of Disease in Childhood, Vol.13,
No.13 Feb. 1928.
9. Swift, H.F. Rheum.Fever, Journ.Amer.Med.Assoc. June 22,
1929, Vol.92, pp.2071-2083.
10. Swift, H.F. Rheu.Fever, Amer.Jour.Med.Sci. Nov.1925, No.5
Vol.170, p.631.
11. Poynton, F.J. Observations on the Nature and Symptoms of
Cardiac Infection in Childhood, B.M.J. 1.8.March 2nd 1918.
12. St. Lawrence, W.P. Effect of Tonsillectomy on the
Recurrence of Acute Rheum. Fever and Chorea. 1920.
13. Ingerman & Wilson, Jour.Amer.Med.Assoc. March 8, 1922, Vol.82
pp.759-764.
14. The Brit.Med.Assoc.Report, B.M.J., 1926, 11, Supplement,P.1.
15. Hill, N.Gray, Lancet, Sept.14th, 1929, p.571.
16. Vining, Wilfred, B.M.J., 1929, 1. 629.
17. Thomson, A.P. Birmingham Med.Review, Aug.1926, p.225.
18. Miller, P. Supplement to the B.M.J., 1926, 11, Suppl.p.16.
19. Medical Research Council, Special Report Series No.114, p.40