

# On the Control of Heart Disease in Childhood



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One of the most serious issues presented to practical medicine today is the problem of cardiac disease in the young. By the estimate of Dr. Carey Coombs the onset of two-thirds of our adult cardiac morbidity occurs during the period of life from 5 to 15 years of age. Dr Askins states that we are losing 18,962 lives per annum from this cause alone, and there must not be forgotten in this connexion “long periods of illness, the misery of repeated breakdowns, and the immense industrial loss, involved during the years which elapse between the time when the patient develops the disease and when he is ultimately killed by it,” if we are to gain an idea of the magnitude of the problem involved.

It is now generally admitted that carditis in childhood is for all practical purposes a rheumatic manifestation; the problem of carditis is thus synonymous with the problem of rheumatism, and in practice the control of heart disease in childhood means the control of the rheumatic child. For this outlook on the question the British Medical Association is in no small measure responsible, and from the illuminating discussions of the whole question arranged by its Sections of Medicine, Diseases of Children, and Public Health in 1923 and 1925, a very considerable body of information has emerged relating to the manifestations of the disease itself and the available agencies for coping with it. A consideration of these discussions brings out clearly that rheumatism is an exceedingly long-drawn-out and chronic infection, which in all its forms should be considered as passing through three stages—the acute, the convalescent, and the quiescent. To be effective, therefore, any attempt at control of the disease must take cognizance of each of these, and be directed along three definite lines/

## 1. The Acute Stage.

That a very significant diminution in the incidence of carditis can apparently result from efficient handling of this stage has recently been brought out by Dr. Bertram in a survey of the after-history of cases treated at the Royal Hospital for Sick Children, Glasgow. She showed that whereas only 24 per cent of those treated in hospital for their first attack of acute rheumatism or chorea subsequently developed carditis, this sequel occurred in 88 per cent of those who were treated at home. This is the stage most easily reached by our present organization, and there seems no valid reason why the children’s hospitals and the children’s departments of the general hospitals at present existent could not satisfactorily cope with it so long as provision run he made to ensure a sufficient length of residence.

## 2. The Convalescent Stage

Upon a satisfactory convalescence depends the child's change of recovery from rheumatic fever or chorea without damage to his heart. The two essentials are: an adequate period of rest and a graduated return to ordinary conditions of living treatment of this stage of the disease, therefore, entails the adequate provision of convalescent homes or rest hospitals in sunny and dry areas, where children can receive medical supervision, graduated exercise, and suitable education.

### 3. The Quiescent Stage.

After the acute and convalescent stages have passed there is a further phase of the disease, extending over many years, and during which the possibilities of recurrences are always present. The very essence of the rheumatic infection is its chronicity and great tendency to relapse, and this third stage, which may be called the "quiescent stage" since no active manifestations are present, is of the greatest significance in any scheme for prevention. It will be readily understood that it is neither feasible nor desirable that this period should be passed in hospital, yet it is during this time that need for watchfulness is greatest if the tendency to relapse is to be controlled.

It is here that the failure of our machinery is most apparent. While exhaustive and skilful care is expended upon the acute cases in our wards, and while public opinion is waking to the need for further facilities for convalescents, no adequate provision exists for the vaguely rheumatic child, the child in the pre-rheumatic stage, and the child between his definite acute attacks.

In America a serious attempt has been made to tackle this side of the problem, and through the initiative of the Society for the Prevention and Relief of Heart Disease special classes (called cardiac clinics) have been created for the purpose. These provide continuous supervision for the rheumatic child during the whole of his pre-puberty life. American results show that by means of this kind of supervision the work of hospitals and convalescent homes can be conserved and so supplemented that a very large number of children and young persons can be rescued from the ranks of invalidism and returned to normal life.

An organised attempt to carry out such a scheme was inaugurated by William St. Lawrence of St. Luke's Hospital, New York, in 1915. Stimulated by his record of the results obtained, an experimental clinic on the same lines was instituted at the Royal Hospital for Sick Children, Glasgow, as part of the medical department, in December, 1923. The aim of the clinic was to find out how far such supervision was practicable under British conditions, to what degree and by what means carditis in the children supervised could be prevented, and to devise a system of registration, which should provide material for further study of the disease. The children attending the clinic had all been at one time resident in the Royal Hospital for Sick Children for attacks of acute rheumatic fever, chorea, or carditis, and formed part of the material used for an etiological and sociological survey carried out by Dr. Sutherland and myself, under the auspices of the Medical Research Council, in 1923-24.

## Classification of Cases

For the proper conduct of such a clinic a satisfactory and practicable classification of the children supervised is a fundamental requirement. St. Lawrence classified his cases according to their cardiac efficiency, which he held could be satisfactorily estimated by means of the child's tolerance to exercise, and in his description of the clinic he details the special exercises adopted. Such a method of measuring cardiac efficiency we found, at least in the children coming under our care, not to be practicable, and we entertain grave doubts if any exercise can be performed by every child with sufficient concentration and uniformity to render it an adequate basis for classification. Before deciding, however, to abandon St. Lawrence's procedure a number of experiments were carried out, not only with the "Lewis class exercises" recommended by St. Lawrence, and with other similar tests, but also by means of an ergograph and the spirometer. In the case of the latter two methods, the reactions of both normal and cardiac children were investigated. The results of these demonstrated to us the inadvisability of placing reliance upon any such tests for general use with young children. We therefore devised in its stead the following simpler classification embracing seven groups, based on the past histories of the children and the present cardiac findings by ordinary clinical methods. Upon this classification the whole work of the clinic depends. It is as follows:

Class P. Potential heart cases that is, cases with definite rheumatic history who have never had cardiac involvement and are now well.

Class A. Cases with a history of definite rheumatism with cardiac involvement, which has now disappeared.

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

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

Class D 1. Cases with a definite rheumatic history, present signs and symptoms of cardiac involvement, and definite disability for ordinary life.

Class D 2. Cases without a rheumatic history, but showing signs of a cardiac lesion, and with some definite disability for ordinary life (fainting, dyspnoea, precordial pain, etc.).

Miscellaneous. Cardiac irregularities, effort syndrome, erythema nodosum, and cutaneous eruptions supposed to be of rheumatic origin.

The actual carrying out of the work is as follows. The clinic meets once a week, at a time, which does not interfere with the children's school attendance, in an ordinary room of the hospital. No special apparatus beyond a weighing scale is used. Upon the arrival of a new child at the clinic he, is stripped and his weight, temperature, and pulse are taken; these are entered on a slip of paper, with which, still undressed, he approaches the doctor. For each child there is a complete clinical sheet, on which an abstract of his previous health and his hospital record have already been entered with due note taken of the method by which he was treated in the wards.

Complementary to this is a social record kept by the lady almoner, which deals with the whole of the social side of the case. For convenience of reference these two are printed in different colours but filed together.

A complete examination of the child follows, with special attention to teeth, tonsils, stance, presence or absence of anaemia, state of the bowels, and general health. The mother is then interviewed, and points with regard to habits, etc., considered. Consultation with the almoner disposes of such matters as efficiency of clothing, holidays, trouble with school teachers, etc. The child is now graded, the degree for the present provisional, and treatment is begun. This is directed towards the clearing up of all septic foci in the body, the establishing of satisfactory and regular bowel actions, and where possible the rectification of unsatisfactory habits. Arrangements with the throat department make possible the prompt care of all suspect throats, and every throat not entirely normal is passed to this department for examination. All carious teeth, irrespective of dentition, are attended to, and no child of whatever age is allowed to retain a spot of caries in its mouth. All bowel irregularities are supervised and the child kept under observation until action has become satisfactory. If desirable and possible a holiday in the country is arranged for. Clothing is inspected, particularly boots, and where possible rectified. Home conditions are uncontrollable, but what modifications are possible are attempted, and pressure brought to bear with regard to regular meals, sleep, exposure, etc. Relations with school teachers are inquired into and where—as for example, in the case of those children suffering from chorea these are unfortunate, co-operation with the school board can often bring about an improvement in affairs.

As regards drugs, a consideration of the relative efficiency of the different remedies from the standpoint of carditis has already been made by Dr. Bertram, and the superiority of salicylates, in our opinion, definitely shown. Sodium salicylate, therefore, forms the basis of all medicinal treatment in the clinic, and upon the reappearance of any rheumatic manifestations whatever a course of sodium salicylate is instituted. Even young children, it is found, can bear courses of 60 grains per diem with ease, provided it is combined with double the amount of sodium bicarbonate and precautions are taken against constipation. The mother of any child on sodium salicylate is advised as to the appearance of symptoms of intolerance, and instructed to suspend the drug for forty-eight hours on their occurrence. During the carrying out of all these procedures the child attends at the clinic when necessary. As soon as everything has been done that can be done, a further careful cardiac examination is made and a definite class assigned to the child. Under this letter he is registered and on this his future attendance at the clinic depends. The intervals at which children attend the clinic are as follows:

Class P children at intervals of 4 months  
Class A children at intervals of 3 months  
Class B children at intervals of 6 weeks  
Class C children at intervals of 4 weeks  
Class D1 and D2 children at intervals of 2 weeks

Attendance of Classes C, D1, and D2 vary greatly according to their condition, but upon a uniform basis of four and two weeks. Having once been graded the child attends according to his class, and at each subsequent attendance the same procedure obtains. To facilitate the routine a rubber stamp has been prepared, giving the essential headings under which examination of the child is made. The use of this outline standardizes the record and ensures no point being forgotten.

It is the work of the almoner attached to the clinic to keep the attendance record in order and to notify the mothers, since the whole basis of the work rests upon systematic and regular attendance. No effort is spared to impress this fact upon the mothers and to secure their co-operation. A careful explanation of the importance of this point is always given at the clinic to each mother and the reasons for the exact interval of attendance required for her particular child explained to her. Any mother has the right to bring her child to the clinic, whether in or out of her turn, if she fears the recurrence of trouble. After a time it has been found possible with nearly all mothers to gain their warm co-operations. Specially marked is the effect of this upon the general welfare of the children. Feeling that an interest is being taken in the child, as a rule the mother responds with an all-round improvement in care, as much in the points which have not been commented on as in those that have, and it is to this that a good deal of the results of the clinic can be attributed. In cases where prolonged effort has failed to secure the co-operation of the mother, either in the matter of attendance or in any of the procedures recommended by the clinic, the child's name is erased from the list.

To carry out the work of the clinic the staff for 1923 to 1924 consisted of one doctor, a lady almoner delegated to the clinic from the almoner's department, and a nurse. An assistant doctor and a voluntary visitor have since been added.

### Results of the Clinics

As the clinic has only been in existence for two years it is impossible to draw any far-reaching conclusions, but the following brief analysis of the first year's work is of interest and shows the value of such a department.

Total number of cases dealt with (57 girls, 36 boys) 93  
Number discharged through lack of co-operation 9  
Number discharged as being too old 3\*  
Number transferred to home for chronic cases (since recovered) 1  
Number transferred to other clinics 1  
Number remaining on register 79  
Number of meetings of clinic 48  
Average attendance at clinic 8.2

\*No children over 15 years are admitted to the Royal Hospital for Sick Children, Glasgow.

The cardiac condition of the children according to the above classification on their admission to the clinic was as follows: P, 26; A, 30; B, 23; C, 9; D1 1; D2, 2; Miscellaneous, 2.

The fate of these children during the period under review was as follows:

Recovered 5, improved 1, developed cardiac lesion 2 (moved to Class B), disabled 1 (since recovered), in status quo 70. These changes in classification of the children are shown in detail in the following table.

Improved.

Cases moved from Class C to A 1  
 Cases moved from Class B to A 4  
 Cases moved from Class C to B 1

Worse.

Cases moved from Class P to B 1  
 Cases moved from Class A to B 1

Rheumatic Recurrences	Class of Child						
	P	A	B	C	D1	D2	Misc.
Acute Arthritis	-	3	-	-	-	-	-
Chorea	-	5	3	-	-	-	-
Indefinite rheumatism	1	-	-	-	-	-	-
Erythema Nodosum	-	1	-	-	-	-	-

It is interesting to compare these facts with the figures for rheumatic recurrences, which are as follows: Arthritis 3, chorea 8, indefinite manifestations (myalgia and erythema nodosum) 2. The distribution of these recurrences among the children is shown in the following table.

It is worthy of note that 70 per cent. of the recurrences took place among Class A. In only one of these did a subsequent cardiac lesion occur, a result that can most probably be attributed to the thorough care and treatment accorded while in hospital.

During the second year of the clinic the fate of the same group of children was as follows: Died 2, disabled completely 1, developed cardiac

signs 5, improved 1, and recovered 2. The changes in classification were as follows:

Improved.

Cases moved from Class D2 to B: 1

Cases moved from Class C to A: 1

Cases moved from Class B to A: 1

Worse.

Rheumatic Recurrences	Class of Child						
	P.	A.	B.	C.	D1.	D2.	Misc.
Acute Arthritis	-	-	-	-	1	-	-
Subacute Arthritis	1	-	2	-	-	-	-
Chorea	3	2	5	-	-	-	-
Chorea and Arthritis	-	1	-	-	-	-	-
Indefinite Rheumatism	1	2	-	-	-	-	-

Cases moved from Class P to B: 1

Cases moved from Class A to B: 2

The incidence of rheumatic recurrence during this year was as follows: Arthritis 4 (1 acute, 3 subacute), chorea 10 (6 severe, 4 slight), chorea and arthritis 1. Indefinite rheumatism 5. All these cases of acute arthritis were treated at home. The distribution of these recurrences according to the classification of the children is as follows:

A summary of the two years' work of the clinic is contained in the following table.

Class of Case	Total	First Year		Second Year		Improved		Apparently Recovered	
		Died of Disabled	Worse	Died of Disabled	Worse	First Year	Second Year	First Year	Second Year
P. RH.-Carditis	26	-	1	3	1	-	-	-	-

A. (Rh. Old + Card.) - Card	30	-	1	-	2	-	-	-	-
B. Rh.+Card.- Symps	23	-	-	-	-	-	-	4	1
C. Rh.+ Card.+ Symps	9	-	-	-	-	1	-	1	1
D1. Rh+ Card+Symps+Disability	1	-	-	-	-	-	-	-	-
D2. Card.- R.h+ Symps	2	-	1	-	1	-	1	-	-
Miscellaneous	2	-	-	-	-	-	-	-	-

In the first year 70 patients remained in statu quo, and in the second year 62.

\*Since the work covers only two years, nothing final can be said as to this class of child.

With regard to the two fatal cases and the one child disabled during the second year, it should be recorded that in each instance hospital treatment had been prematurely terminated owing to ward infection, and that subsequent co-operation with the clinic had been most unsatisfactory. On the other hand, among those cases in which it was possible to carry out the full regime, no death has occurred, no permanent disablement, and no child has deteriorated to a point necessitating removal into Class C, while two children have been substantially improved and seven have recovered complete health.

## Conclusions

1. Any attempt to control the rheumatic infection in childhood must include provision for the acute, the convalescent, and the quiescent stages of the disease.
2. That by the establishment of a clinic of the kind described rheumatism in the children supervised can be controlled, and the incidence of carditis reduced to a minimum.
3. That in it an instrument of research is provided for increasing our knowledge of the heart of the child and its response to the rheumatic toxin, and that the correlation of records obtained in such clinics would throw very valuable light upon the nature of the disease.
4. Finally, that the cardiac classification proposed offers a suitable basis for such correlation.

It is a special pleasure to record our indebtedness to Miss Watson, almoner, for her invaluable assistance in the organisation of the clinic, since the success of the department has been in a largest due to her efforts. To Professor Leonard Findlay, to whose initiative the inauguration of the clinic was due, and under whose care it continues, I wish to express my sincere gratitude for his unfailing help and encouragement in the development and correlation of the work and the supervision of its details.

## *References.*

1. *British Medical Journal*, October 31<sup>st</sup>, 1925, P.791, March 14<sup>th</sup>, 1925, p.496.  
4 *Hospital Service Series*, May 1920, 151-181