

# A RHEUMATIC-FEVER CLINIC — A CONTRIBUTION TO THE SOLUTION OF A HEALTH PROBLEM IN PREVENTIVE MEDICINE\*

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Rheumatic fever has been regarded as always being a serious disease, especially in childhood and, because of its complications, an important cause of morbidity and mortality. Although the incidence and severity of the disease has decreased appreciably in several countries overseas during the last 20 years, the position in South Africa is obscure. The extensive epidemiological surveys conducted in other countries have not been paralleled here. The incidence and effect of the disease in this country can only be guessed at. According to some authorities it remains one of the most crippling diseases of childhood, while others believe it is becoming less severe.

## IS THERE A PROBLEM IN SOUTH AFRICA?

At a recent conference in South Africa, figures were quoted to substantiate the view that rheumatic fever is an important cause of morbidity and mortality,<sup>1</sup> as indicated in Table I.

There is further evidence of the importance of the disease in the statistics (Table II) comparing the mortality from rheumatic fever, typhoid fever, diphtheria and poliomyelitis, supplied by the Union Department of Census and Statistics. (It is to be noted that statistics for Whites are *de jure*, i.e. adjusted for in- and out-transfers, while those

TABLE I. DEATHS FROM ACUTE RHEUMATIC FEVER AND RHEUMATIC HEART DISEASE IN THE PRINCIPAL URBAN AREAS OF THE UNION OF SOUTH AFRICA: 1949-1958

Race	Acute rheumatic fever	Chronic rheumatic heart disease
White .. .. .	56	706
Coloured .. .. .	56	526
Asian .. .. .	48	276
Bantu .. .. .	188	1,973
Total .. .. .	348	3,481

Grand total: 3,829

TABLE II. DEATHS FROM VARIOUS CAUSES IN THE PRINCIPAL URBAN AREAS OF SOUTH AFRICA: 1949-1958

Race	Cause of death				
	Acute rheumatic fever	Chronic rheumatic heart disease	Typhoid fever	Diphtheria	Poliomyelitis
White	50	702	26	334	205
Bantu	179	1,872	1,153	1,729	132

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for the Bantu are *de facto*, i.e. no adjustment has been made for place of occurrence). Tables III and IV show interesting mortality and morbidity figures for Brakpan for comparison with Table II.

#### IS THE PROBLEM ASSOCIATED WITH PREVENTIVE MEDICINE?

The quoted statistics definitely indicate that a problem exists. The American Heart Association's Council on

TABLE III. MORTALITY FIGURES FOR THE SAME DISEASES AS IN TABLE II, FOR THE MUNICIPAL AREA OF BRAKPAN: 1949-1958

Race	Cause of death				
	Acute rheumatic fever	Chronic rheumatic heart disease	Typhoid fever	Diphtheria	Polio-myelitis
White	2	18	3	17	6
Bantu	5	38	6	11	1

Rheumatic Fever and Congenital Heart Disease stated in 1955 that about 3% of untreated streptococcal infections are followed by rheumatic fever.<sup>2</sup> While the incidence of streptococcal infection in the general population in South

TABLE IV. NUMBER OF CASES OF RHEUMATIC FEVER AND CERTAIN OTHER NOTIFIABLE DISEASES IN BRAKPAN, 1956-1960

Disease	Whites				
	1956	1957	1958	1959	1960
Rheumatic fever ..	27	13	20	24	15
Polio-myelitis ..	21	19	5	4	8
Diphtheria ..	6	13	12	4	2
Typhoid fever ..	2	3	1	12	—
Pulmonary tuberculosis ..	13	26	23	14	2

  

Disease	Bantu				
	1956	1957	1958	1959	1960
Rheumatic fever ..	15	14	12	4	3
Polio-myelitis ..	18	5	3	8	3
Diphtheria ..	26	16	8	10	16
Typhoid fever ..	2	2	4	13	4
Pulmonary tuberculosis ..	202	320	335	276	401

Africa, or parts of it, is unknown, and probably difficult to ascertain, the incidence of rheumatic fever could be obtained more easily by arranging to have it declared a notifiable disease in terms of Section 18 (2) (d) of the Public Health Act.

The Town Council of Brakpan agreed to this procedure of notification for its municipal area. After due application, this was achieved by an official notice in the Government Gazette of 25 November 1955, declaring rheumatic fever a notifiable disease in Brakpan; the first time this was done anywhere in South Africa. This was followed about 2 years later by a similar declaration for Germiston.

The relationship between rheumatic fever and Lancefield's group-A beta-haemolytic streptococcus has been well established. It would appear that acute rheumatic fever, once it is completely quiescent, rarely shows exacerbations if subsequent streptococcal infection can be

prevented. Nevertheless, other factors, such as predisposition, age, nutritional state, etc., probably also play a part in favouring or preventing the manifestations of rheumatic fever.

All public health personnel have been engaged for many years in the prevention of certain diseases, including active immunization programmes against the common infectious diseases. The delayed recognition of rheumatic fever as another such common infectious disease, capable of being prevented (especially the recurrent episodes), seems strange.

Overseas authorities have stated unequivocally that prompt and adequate treatment of streptococcal pharyngitis in the general population would reduce the incidence of first attacks of rheumatic fever. Because of inadequate knowledge of what constitutes streptococcal pharyngitis, or of what is adequate treatment when it is diagnosed, prevention of this initial attack of rheumatic fever is difficult, but this is not true of a second or subsequent attack. About two-thirds of the patients recover from the initial attack without cardiac involvement, and could be permanently prevented from suffering a second or subsequent attack. The probability of preventing recurring episodes of the disease by chemoprophylaxis is well supported.

#### IF IT IS A PROBLEM OF PREVENTIVE MEDICINE, IS THERE A SOLUTION?

As with other infectious diseases the solution lies in notification, isolation and prophylaxis. Notification is essential, while isolation is not easy, but with chemoprophylaxis prevention is possible.

Doctors practising in Brakpan were informed on several occasions, verbally and in writing, of the fact that rheumatic fever had been declared a notifiable disease, and of the reasons underlying the action taken. They were provided with copies of a statement by the American Heart Association's Council on Rheumatic Fever and Congenital Heart Disease,<sup>2</sup> outlining the diagnosis and treatment of streptococcal infections, and the criteria for the diagnosis of rheumatic fever (see schedules A, B and C). Response by practitioners was varied, some notifying regularly and meticulously, some not at all.

Routine visits to the medical wards of the Far East Rand Hospital which serves Brakpan, examination of hospital records, references from municipal clinics, etc., increased the number of rheumatic-fever patients brought to the attention of the Public Health Department.

Table V shows the number of known cases since the date of promulgation of rheumatic fever as a notifiable disease

TABLE V. CASES OF RHEUMATIC FEVER IN BRAKPAN: 1956-1960

Year	Whites	Bantu
1956 .. ..	27 (6)*	15 (10)
1957 .. ..	13 (2)	14 (5)
1958 .. ..	20 (2)	12 (5)
1959 .. ..	24 (2)	4 (—)
1960 .. ..	15 (4)	3 (—)

\* Numbers in brackets are the cases notified by doctors.

in Brakpan. The actual cases notified by doctors are in parenthesis.

## HOW CAN THE SOLUTION BE IMPLEMENTED?

As with prophylaxis in other infectious diseases, organized prevention could be best carried out through the establishment of clinics. The rheumatic-fever clinic started functioning officially on 1 January 1960, after confirmation that the number of cases notified warranted it. We did not know a great deal about the organization and conduct of such a clinic and its work is thus presented within the limits of this lack of knowledge and experience.

Doctors were advised of the establishment of the clinic, and their authority was sought to contact patients who were not receiving prophylactic therapy. Those who were receiving this prophylaxis were also invited to attend the clinic for purposes of observation (see schedule D). The cooperation of doctors was good and in return the clinic informed them of the results of tests and progress made by their patients, when requested to do so.

The European clinic is held on one afternoon a week, by appointment. Appointments are made well in advance, and patients receive a reminder notice during the week before the clinic. A complete history is taken, including factors such as housing, diet and family history (possible infection with group-A haemolytic streptococcus), since these are factors which may play a part in favouring or preventing the manifestations of rheumatic fever.

A full clinical examination is undertaken, together with laboratory procedures, when necessary — throat swab for haemolytic streptococcus, sedimentation rate, blood count, anti-streptolysin O titre, C-reactive protein estimations, etc. Of the blood tests, the ESR and blood count are performed at the clinic, while the others are carried out by the South African Institute for Medical Research on a commuted-payment system. Arrangements have been made with the Far East Rand Hospital for electrocardiographic and X-ray examinations when necessary.

Return visits to the clinic are made by appointment when indicated. If the patient is seen shortly after recovery from the acute attack (and sometimes, where necessary, in other cases), return visits may be weekly or monthly, with the intervals being gradually extended. No recurrence of rheumatic fever has occurred yet in patients attending the clinic.

Treatment consists of advice about activity and the prophylactic administration of oral penicillin or sulphonamide. Only one patient is getting a long-acting sulphonamide ('madribon', 0.5 G.), one tablet per day, because of penicillin sensitivity. The remainder receive oral penicillin, either as benzathine penicillin, 200,000 units once daily, or phenoxymethyl penicillin (as potassium salt), equivalent to 400,000 units of penicillin V once daily. Where necessary, patients are referred to the Cardiac Clinic in Johannesburg.

Reviews of the literature have not shown a proved instance of penicillin-resistant group-A streptococci associated with human infection.

The use of antibiotics in the prophylaxis of rheumatic fever does not appear to be an ideal solution of the problem. Pending more knowledge and a better approach, however, the incidence and morbidity of the disease can be reduced significantly by appreciation on the part of physicians and the general public of the importance of early diagnosis and adequate treatment of streptococcal

infections, and of protection of rheumatic-fever subjects from streptococcal infection by chemoprophylaxis.<sup>3</sup>

## SUMMARY

1. The incidence of rheumatic fever and rheumatic heart disease in South Africa, its consideration as an infectious disease, and its relationship to certain other infectious diseases, are discussed.

2. As an infectious disease, prophylactic measures are indicated for rheumatic fever. Among these are the use of prophylactic penicillin (with details appended), and the establishment of a rheumatic-fever clinic under municipal control.

3. Details of the method of establishment of such a clinic, and its conduct are presented.

4. Schedules appertaining to the diagnosis and treatment of streptococcal infections in general, and rheumatic fever in particular, are included.

## REFERENCES

1. Braudo, J. L. (1960): Paper presented at the 18th Annual Congress of the Institute of Public Health, Bloemfontein.
2. American Heart Association's Council on Rheumatic Fever and Congenital Heart Disease (1955): *The Public Health Reports of the US Department of Health*, vol. 70, no. 4. Washington, D.C.: Government Printing Office.
3. Stollerman, G. H. (1954): *Amer. J. Med.*, 17, 757.

## SCHEDULE A

## DIAGNOSIS OF STREPTOCOCCAL INFECTION

In many instances streptococcal infections can be recognized by their clinical manifestations. In some patients, however, it is difficult or impossible to determine the streptococcal nature of a respiratory infection without obtaining throat cultures. The following section on diagnosis has been included in order to reduce diagnostic errors and to assist physicians in avoiding unnecessary therapy.

The accurate recognition of individual streptococcal infections, their adequate treatment, and the control of epidemics in the community, presently offer the best means of preventing initial and recurrent rheumatic fever.

*Common Symptoms*

*Sore throat* — sudden onset, pain on swallowing.

*Headache* — common.

*Fever* — variable, but generally from 101° to 104°F.

*Abdominal pain* — common, especially in children.

*Common Signs*

*Red throat.*

*Exudate* usually present.

*Glands* — swollen, tender lymph nodes at angle of jaw.

*Rash* — scarlatiniform.

*Acute otitis media* } frequently caused by the streptococcus.  
*Acute sinusitis* }

In the absence of the common symptoms and signs, occurrence of any of the following symptoms is usually not associated with a streptococcal infection: simple coryza, hoarseness, cough.

*Laboratory Findings*

*White-blood-cell count* — generally over 12,000 per c.mm.

*Throat culture* — positive culture for haemolytic streptococci is almost always diagnostic.

## SCHEDULE B

## TREATMENT OF STREPTOCOCCAL INFECTIONS

When streptococcal infection is suspected, treatment should be started immediately. Penicillin is the drug of choice. Effective blood levels should be maintained for a period of 10 days to prevent rheumatic fever by eradicating the streptococci from the throat.

Penicillin may be administered by either the intramuscular or the oral route. Intramuscular administration is recommended as the method of choice since it ensures adequate treatment. Oral therapy, by contrast, is dependent upon the cooperation of the patient. On the other hand, some physicians and patients prefer repeated oral medication and object to injections.

The recommended treatment schedule is as follows:

#### *Intramuscular Penicillin*

##### 1. Benzathine penicillin G:

*Children*—one intramuscular injection of 600,000 units.  
*Adults*—one intramuscular injection of 600,000-900,000 units.

##### 2. Procaine penicillin (with aluminum monostearate in oil):

*Children*—one intramuscular injection of 300,000 units every third day for 3 doses.  
*Adults*—one intramuscular injection of 600,000 units every third day for 3 doses.

#### *Oral Penicillin*

*Children and adults*—250,000 units 3 times a day for a full 10 days.

To prevent rheumatic fever by eradicating streptococci, therapy must be continued for the entire 10 days, even though the temperature returns to normal and the patient is asymptomatic.

#### *Other Medication*

It has not been established that the broad-spectrum antibiotics are as effective as penicillin in preventing rheumatic fever. They should be used only if the patient is sensitive to penicillin. As with penicillin, the regime of full therapeutic dosage for a full 10 days should be followed.

The following therapy is not effective in preventing rheumatic fever when used as treatment for streptococcal infections: sulphonamide drugs, penicillin troches or lozenges.

(*Author's note:* Salicylate, ACTH and steroids have been used extensively in the treatment of rheumatic fever, but are not mentioned in the above schedule; the relative value of these therapeutic agents, compared with penicillin, is still the subject of great controversy.)

### SCHEDULE C

#### CRITERIA FOR GUIDANCE IN THE DIAGNOSIS OF RHEUMATIC FEVER

It is suggested that the following constitute reasonably certain diagnostic criteria:

1. Any combination of the major manifestations (carditis, arthralgia, chorea, nodules, and a verified history of previous rheumatic fever).

2. The combination of at least 1 of the major manifestations with 2 of the minor manifestations (fever, abdominal or precordial pain, erythema marginatum, epistaxis, pulmonary changes and laboratory abnormalities).

3. The presence of rheumatic heart disease increases the diagnostic significance of the minor manifestations, when no other cause for these manifestations exists.

Small, though probably insignificant, errors may be found with these criteria. Many clinical entities may be confused with rheumatic fever, but clinical observation with, when necessary, specific diagnostic tests, should be applied in any diagnostic problem. Clinical diagnosis is still probably the more important.

### SCHEDULE D

#### PREVENTION OF STREPTOCOCCAL INFECTIONS IN RHEUMATIC INDIVIDUALS

Many streptococcal infections occur without producing clinical manifestations. For this reason, prevention of recurrent rheumatic fever must depend on continuous prophylaxis rather than solely on treatment of acute attacks of streptococcal diseases.

The following constitute *general rules for prophylaxis:*

#### *Who should be Treated?*

All individuals who have a well-established history of a previous attack of rheumatic fever or chorea, or who show definite evidence of rheumatic heart disease, should be placed on continuous prophylaxis.

#### *When should Prophylactic Treatment be Initiated?*

*Active rheumatic fever*—as soon as the diagnosis of rheumatic fever is made or any time thereafter when the patient is first seen. The streptococcus should be eradicated with penicillin (see treatment schedules), following which the prophylactic regime is instituted.

*Inactive rheumatic fever*—prophylaxis should be instituted when the patient is first seen.

#### *How Long should Prophylaxis be Continued?*

Probably throughout life, or until new knowledge makes this recommendation invalid.

#### *What are the Exceptions to Continuous Prophylaxis?*

Uncertainty about the validity of a history of a previous attack of rheumatic fever or chorea.

Heart disease of questionable aetiology.

In rare circumstances, where exposure of the adult patient to streptococcal infection is unlikely.