FIVE-YEAR FOLLOW-UP ON PATIENTS WITH RHEUMATIC FEVER TREATED BY BED REST, STEROIDS, OR SALICYLATE

BY

G. T. THOMAS, M.B., M.R.C.P.

*Rheumatism Research Unit (M.R.C.), Canadian Red Cross
Memorial Hospital, Taplow, Bucks*

Many important studies on the cardiac sequelae in rheumatic fever have been published, notably by Ash (1948) and by Bland and Jones (1951). In both studies large numbers were followed for 10 years or more. Ash, in a study of 537 patients over 10 years, found that 59% had signs of heart disease after recovery from the initial illness and that the signs subsequently disappeared in 9% of them. The remaining 41% had no residual heart lesions, but signs developed later in a quarter, of whom 80% had had recurrences. Bland and Jones followed 1,000 patients for 20 years. As in Ash's series, over half had rheumatic heart disease at the beginning of the follow-up study; at 10 years 11% were normal and at 20 years 16%. A quarter of those without heart lesions at the start had developed cardiac damage by 10 years—"usually pure mitral stenosis"—and 44% at 20 years. Whereas Ash stressed the role of recurrences which had occurred in 80% of those that deteriorated, Bland and Jones did not always relate changes in cardiac status to recurrences or the total number of attacks.

The present study concerns 198 patients followed for a minimum period of five years and many for 6 to 10 years. All fulfilled the criteria for the diagnosis of rheumatic fever as defined by Duckett Jones (1944); 125 had been admitted in 1948-50, and comprised the bed-rest series, of whom 111 were treated in hospital with bed rest and analgesics such as codeine and the other 14 with A.C.T.H., cortisone, or salicylate for periods of 14 days or less without demonstrable effect. None of these 125 patients was given prophylactic penicillin or sulphonamide in hospital, though prophylaxis was instituted in any who subsequently had recurrences. The other 73 were admitted in 1950-1, and were treated with six-week courses of A.C.T.H., cortisone, or aspirin in the U.S.-U.K. trial (Co-operative Clinical Trial, 1955). All 73 were on prophylactic sulphonamide 1 g. daily in hospital, and the great majority continued to take the tablets regularly throughout the follow-up period.

Though the number of our cases is small, the cardiac findings have been considered in greater detail than in some of the earlier series, and due attention has been paid to the effect of recurrences and to the total number of attacks. The purpose is to describe any changes in cardiac status that occurred, to relate them to recurrences and the total number of attacks, and to show to what extent, if any, they were affected by treatment with hormone or salicylates, or by prophylaxis. Previously we had found that drug therapy was only occasionally of more benefit than bed rest alone in the acute phase of the disease (Bywaters and Thomas, 1961) and that prophylaxis was effective in reducing the number of recurrences in this country (Bywaters and Thomas, 1958), as had been the experience in the U.S.A. (Thomas and France, 1939).

Bed-rest Series (125 Cases)

All 125 patients were followed for five years and many for 6 to 10 years. At each follow-up examination (done at yearly intervals approximately two months from the date of admission), the patients were asked whether sore throats, rheumatism, or chorea had occurred during the preceding 12 months, and a note was made of their occupation and physical activities (games, cycling, dancing, etc.). In addition to a clinical examination, electrocardiograms (standard leads only unless cardiac enlargement known or suspected) and chest skiagrams for heart size were taken in all patients; many were also screened. Phonocardiograms were done on any that showed changes in heart signs. Weight, height, and temperature were recorded and blood was taken for sedimentation rate, packed cell volume, and antistreptolysin titre.

As has been stated, none were put on to prophylaxis while in hospital, and 19 out of the 125 had recurrences of rheumatic fever or chorea after discharge. Prophylaxis was instituted in those that had recurrences. The follow-up findings are considered in (a) the 106 that did not have recurrences, and (b) in the 19 that did.

106 Patients Without Recurrences

Of these 106 patients, 63 had no carditis or slight carditis during their original hospital stay: 22 had no abnormal clinical signs (P-R interval 0.18 second or more in five); and 41, soft (grade 1-2) diastolic murmurs (increased P-R interval in one-third). None had enlargement. The other 43 had more marked carditis—that is, grade 3 murmurs and often enlargement.

No Carditis or Slight Carditis (63 Cases)

All 22 patients with no abnormal clinical signs in the heart in hospital were normal at five years. Eight of them were seen for subsequent follow-ups at 6 to 10 years and remained normal.

Of the 41 patients with grade 1-2 diastolic murmurs, the murmurs were transitory in 32 and constant throughout the stay in hospital in 9. In 13 out of the 32 in the transitory group the murmurs were heard at the mitral area only, in 13 at the base only and in 6 at both areas. In some of them one or both murmurs were present only for the first few weeks after admission; in others they were heard on and off throughout the patients' stay in hospital; and in a few only towards the end of the illness when the patients were ambulatory. Adequate data on mitral systolic murmurs that might have accompanied transitory mitral diastolic murmurs were not available, for at that time little attention was paid to systolic murmurs unless they were maximal at the apex and of grade 3 or more intensity, and none of these patients had such murmurs. At five-year follow-up 4 of the 32 had signs of heart disease (a basal diastolic murmur of grade 1-2 intensity in each case) and 28 were normal. The four with murmurs were all followed subsequently: in two the murmurs persisted at six and eight years; in the other two they had disappeared at seven years. Of the 28 who were normal at five years, 20 were seen later and remained normal. Thus, of 24 patients with transitory murmurs in hospital who were followed for more than five years, 22 were normal and 2 had minimal carditis.

In the other nine patients with grade 1-2 murmurs the murmurs were present on admission or developed shortly afterwards and persisted; basal diastolic murmurs only in five, mitral diastolic murmurs in three, and both

murmurs in one. None had had previous rheumatic fever. At five-year follow-up there was evidence of carditis in six cases (basal diastolics in four and mitral systolics in two); the other three were normal. The six with carditis at five years were seen at subsequent follow-ups over periods of six to nine years, and the murmurs persisted in all of them. The three who were normal at five years were seen at eight and nine years and remained normal.

Thus none of these 41 cases with slight carditis in hospital evidenced by grade 1-2 diastolic murmurs developed serious heart disease during the period of follow-up, though 33 were seen at six to nine years. At five years only 10 out of 41 had carditis, usually evidenced by basal diastolic murmurs (in 8 out of 10 cases). The incidence of carditis was higher when the murmurs had been heard constantly in hospital (in six out of nine cases) than when they had been heard transitorily (in 4 out of 32 cases).

Conclusions.—Patients who have had rheumatic fever but no evidence of carditis or with a prolonged P-R interval only, and who do not have recurrences, have normal hearts when seen for follow-up at five years. Those who have had slight carditis evidenced by soft diastolic murmurs are usually normal at five years, but some still have soft murmurs, particularly if the murmurs were heard constantly in hospital. None developed serious heart disease.

More Marked Carditis (43 Cases)

These 43 patients had grade 3 murmurs (mitral systolic, mitral diastolic, or basal diastolic) on admission to hospital or developing shortly afterwards and persisting. Many also had enlargement. Eight had aortic incompetence only, 18 had mitral valve disease only, and 17 had both lesions. Twenty-four had been admitted in first attacks of rheumatic fever; the other 19 had had previous rheumatic fever or chorea. At five-year follow-up 30 were unchanged, 2 were normal, in 5 the signs were less, and in six they were more pronounced (Table I).

TABLE I.—Five-year Follow-up in 43 Patients with Marked Carditis in Hospital and No Recurrences

	No. of Cases	Signs Normal	Signs Unchanged	Signs Less	Signs More	Died
Total	43	2	30	5	6	0
1st attacks ..	24	2	15	4	3	0
2nd attack ..	19	0	15	1	3	0
Aortic incompetence in hospital: ..	8	0	8	0	0	0
1st attack ..	5	0	5	0	0	0
2nd „ ..	3	0	3	0	0	0
Mitral valve disease in hospital: ..	18	2	15	0	1	0
1st attack ..	11	2	8	0	1	0
2nd „ ..	7	0	7	0	0	0
Mitral and aortic lesions in hospital: ..	17	0	7	5	5	0
1st attack ..	8	0	2	4	2	0
2nd „ ..	9	0	5	1	3	0

Of the 30 in whom the signs were unchanged, equal numbers had been seen in first and second attacks; 8 had had aortic incompetence only, 15 dominant mitral valve disease, and 7 both lesions. Though there was no change in clinical signs, in 12 there was some reduction of heart size on x-ray examination and in one some increase. Twenty-seven were followed after five years and no further change was noted.

The two patients who had no signs of heart disease at five years had been seen in first attacks with mitral-valve disease evidenced by mitral systolic murmurs. The systolic murmurs were not audible at the third and subsequent follow-ups to seven and eight years.

All five in whom the signs became less had had mitral and aortic incompetence. Four had been seen in first attacks. In two of them mitral incompetence had disappeared at two years but aortic incompetence persisted; the findings were unchanged at six and nine years. In the other two there was no aortic incompetence but still mitral incompetence at one year; the signs remained unchanged at eight years. The other had had previous rheumatic fever. At five years there was no evidence of mitral valve disease but still some aortic incompetence. One year later the aortic incompetence disappeared and the heart was normal.

Of the six in whom the signs were more marked, three had been seen in first attacks; one had mitral-valve disease only and the other five mitral and aortic incompetence. Three developed opening snaps in addition to mitral systolic murmurs, as possible evidence of some stenosis, two at three years and one at five years. In the other three there was increased aortic incompetence with enlargement of the left ventricles, though in one the mitral signs disappeared.

Conclusions.—In patients discharged from hospital with grade 3 or more murmurs there may be a regression of physical signs over a follow-up period of five years, particularly if there has been only one attack (six out of seven patients whose signs returned to normal or became less had only one attack as compared with 18 out of 36 who were unchanged or worse). The usual change is then the disappearance of slight aortic or mitral incompetence. Occasionally (6 out of 43 cases) the signs became more marked. Thus there may be increasing aortic incompetence, and opening snaps may develop in patients with mitral incompetence as possible evidence of early stenosis: frank mitral stenosis (snapping first sound, opening snap, and mitral diastolic murmur) did not occur.

19 Patients With Recurrences

Of these 19 patients, 15 had one recurrence of rheumatic fever, three had two or more, and one had three attacks of chorea. Eleven were seen for follow-up five years after their last attack, the other eight at two to four years. When last seen, four were normal, in three there had been no change in signs since the first admission, in three the signs were less, in seven they were more marked, and two had died (Table II).

TABLE II.—19 Patients with Recurrences

Cardiac Status in Hospital	No. of Cases	Cardiac Status at Follow-up				
		Normal	Signs Unchanged	Signs Less	Signs More	Died
Total	19	4	3	3	7	2
No carditis or grade 1-2 murmurs: ..	6	4	0	0	2	0
1st attack ..	5	4	0	0	1†	0
2nd or later attack ..	1	0	0	0	1*	0
Grade 3 murmurs: ..	13	0	3	3	5	2
1st attack ..	5	0	3	1†	1*†	0
2nd or later attack ..	8	0	0	2*	4 (3*)	2* (1†)

* 2-4 year follow-up. † More than 1 recurrence.

All four that were normal had had no carditis or slight carditis during their first admission, had been seen in first attacks and had only one recurrence (five-year

follow-up in all). The three in whom the signs were unchanged had had grade 3 murmurs in first attacks and only one recurrence (five-year follow-up). The three cases in whom the signs were less had all had mitral and aortic incompetence. One had been seen in a first attack, had two recurrences and only mitral incompetence when last seen at five years. The other two had had previous attacks and one recurrence; in one mitral and in the other aortic incompetence had disappeared at the last follow-up (five years in one and two to four years in the other).

Two of the seven in whom the signs were more marked had had only grade 1-2 murmurs in their first admission. One of them, seen in a first attack, had three recurrences of rheumatic fever and, later, mitral and aortic incompetence (five-year follow-up). The other, seen in a second attack with a soft basal diastolic murmur, had a recurrence at five years with a transitory mitral systolic murmur, and two years later had all the signs of mitral stenosis as well as slight aortic incompetence (two-year follow-up). The other five had had grade 3 murmurs in their first admission. One, who had been admitted in a first attack with aortic incompetence and a transitory mitral diastolic murmur, had three recurrences of chorea and, two years later, mitral stenosis (two-year follow-up). The other four had had previous rheumatic fever and only one recurrence. At the last follow-up there was increased mitral and aortic incompetence in one case (five-year follow-up), opening snaps had developed in addition to mitral systolic murmurs in two (two to four years in both), and there were signs of mitral stenosis (opening snap and mitral diastolic murmur) in the other, who had had only a mitral systolic murmur previously (two to four-year follow-up). Thus three of the seven ultimately had signs of mitral stenosis, which had not been observed in cases without recurrences.

The two patients who died had been admitted with grade 3 murmurs in second attacks. One had bacterial endocarditis at three years and the other died in failure from a second recurrence.

Conclusions.—Patients with no carditis or slight carditis in first attacks who have had only one recurrence may be normal at follow-up (four out of four cases), but with previous attacks or more than one recurrence serious heart disease may develop. Patients with grade 3 murmurs may be no worse after recurrences and the signs may even be less, despite more than one recurrence or histories of previous attacks. Often, however, the signs become more severe or the patients may die. Such deterioration occurs with more than one recurrence or with histories of previous attacks. The outlook after recurrences is therefore worse in patients with marked carditis who have had previous attacks or who have more than one recurrence.

Cardiac Status on First Admission to Hospital and at Follow-up in Relation to Total Number of Attacks of Rheumatic Fever

The cardiac status on first admission to hospital in 139 patients who originally comprised the bed-rest series, and at the last follow-up in the 125 who were seen at five years (four died in hospital and there were 10 defaulters at follow-up) in relation to the total number of attacks of rheumatic fever will now be considered.

Cardiac Status in Hospital (139 Patients).—25 had no signs of heart disease, 51 had grade 1-2 murmurs, and 63 had grade 3 murmurs during their first admission to

this hospital (Table III); 107 had been seen in first attacks, the other 32 had had previous rheumatic fever or chorea. Of the 25 who were normal, 24 were admitted in first attacks, as were 48 out of 51 with grade 1-2 murmurs. Thus of a total of 76 with no carditis or slight carditis 72 were seen in first

TABLE III.—*Cardiac Status on First Admission in 139 Patients in Relation to Number of Attacks of Rheumatic Fever*

	No. of Cases	Normal	Grade 1-2 Murmurs	Grade 3 Murmurs
Total	139	25	51	63
Admitted in 1st attack	107	24	48	35
Admitted in 2nd or later attacks	32	1	3	28

attacks. Of the 63 with more marked carditis on admission (grade 3 murmurs), on the other hand, half had had previous attacks, and of those admitted in attacks (32) the majority (28) had grade 3 murmurs. Thus there was good correlation between the degree of carditis and the number of attacks.

Status at Follow-up (125 Patients).—All 125 patients were followed for five years after discharge from hospital, and, as has been stated, 19 of them had recurrences during this period. Of the 19 with recurrences 11 were seen five years later, the other eight at two to four years. Thus 117 of the 125 patients were seen five years after their last known attack and eight at two to four years; 84 had then had one attack, 25 two, and 16 three or more; 59 were normal, in 43 the heart signs were unchanged, in 8 they were less, and in 15 they were more marked or the patients had died (Table IV). Of the 59 who were normal, the majority

TABLE IV.—*Cardiac Status at Follow-up in 125 Patients in Relation to Total Number of Attacks of Rheumatic Fever*

	No. of Cases	Normal	Un- changed	Signs Less	Signs More or Death
Total	125	59	43	8	15
1 attack	84	52	25	4	3
2 attacks	25	6	16	1	2
3 or more attacks	16	1	2	3	10

(52) had had one attack; where the signs were unchanged or less, similar numbers had had one or two or more attacks; but when the signs were more marked or the patients had died, most had had three or more (10/15). Looked at another way, with one attack 3 out of 84 were worse at follow-up; with two attacks, 2 out of 25; but with three or more attacks, 10 out of 16. Of 13 survivors who were worse at follow-up, five had questionable evidence of developing mitral stenosis (opening snaps in addition to mitral systolic murmurs); three had definite stenosis; three had increased aortic incompetence; and 2 had increased aortic and mitral incompetence. All three with mitral stenosis had had three or more attacks.

Conclusions.—The degree of carditis on first admission to hospital is closely related to the previous history: in first attacks the majority of patients have no or slight carditis; in second or later ones, most have serious heart disease. In patients who are followed for five years after their last attack of rheumatic fever there is most likely to be deterioration in cardiac status or death in those who have had three or more attacks. The development of mitral stenosis seems to be closely related to the total number of attacks, as it was not observed except after three or more.

Comparison with Other Cases Treated with A.C.T.H., Cortisone, or Aspirin

Seventy-three patients were treated in this hospital with six-week courses of A.C.T.H., cortisone, and aspirin in the U.S.-U.K. Trial in 1951-52 (Co-operative Clinical Trial, 1955) and were followed for five years. All were given prophylaxis (sulphonamide 1 g. daily) in hospital, and most continued to take the drug regularly after discharge. During the five-year follow-up period five had recurrences.

In the two series therefore (bed-rest and U.S.-U.K. Trial) there were 174 patients who did not have recurrences (106 bed rest and 68 U.S.-U.K.) and 24 who did (19 bed rest and 5 U.S.-U.K.).

174 Patients without Recurrences (Table V).—103 had had no or slight carditis in hospital—40 in the U.S.-U.K. trial and 63 in the bed-rest series. Similar numbers in

TABLE V.—Comparison at Follow-up Between Cases Treated with Cortisone, A.C.T.H., or Salicylates, and Bed Rest. 174 Patients with No Recurrences

Cardiac Status in Hospital	No. of Cases	Cardiac Status at Follow-up				
		Normal	Un-changed	Signs Less	Signs More	Died
Carditis nil or slight	103	89	14	0	0	0
U.S.-U.K. trial ..	40	36	4	0	0	0
Bed-rest series ..	63	53	10	0	0	0
Carditis more marked	71	3	50	9	9	0
U.S.-U.K. trial ..	28	1	20	4	3	0
Bed-rest series ..	43	2	30	5	6	0

both treatment groups still had slight heart disease at five years, and in none had serious heart lesions developed. Of the other 71 with more marked carditis in hospital (28 U.S.-U.K. trial and 43 bed rest), the cardiac status was also similar in the two groups at five years.

24 Patients with Recurrences (Table VI).—The recurrence rate was higher in the bed rest series who were not on prophylaxis (15%) than in the U.S.-U.K. Trial who were (6.8%). Four patients in the bed-rest

TABLE VI.—Comparison at Follow-up of Cases Treated with Cortisone, A.C.T.H., or Salicylate, and Bed Rest. 24 Patients with Recurrences

	Total No. Cases	No. with Recurrences	No. with Increase in Signs	Deaths
Bed-rest series ..	125	19 (15%)	7	2
U.S.-U.K. trial ..	73	5 (6.8%)	0	0

series had more than one recurrence but none in the U.S.-U.K. trial. When last seen for follow-up after the recurrences, none of the five in the U.S.-U.K. trial were worse, whereas in seven of the bed-rest series the signs were more severe and two had died. Six of the nine patients in the bed-rest series who deteriorated or died after the recurrences had had grade 3 murmurs on their first admission here and histories of previous attacks: there were no recurrences in similar cases in the U.S.-U.K. trial.

Conclusions.—There was no significant difference in cardiac status at five years between the two treatment groups if those that had recurrences were excluded. With recurrences, on the other hand, patients treated by bed rest alone and no prophylaxis did worse than those in the U.S.-U.K. trial who were given prophylaxis in hospital and after discharge. There were more recurrences in the bed-rest group—sometimes more than

one—and many patients were worse or died after them, particularly those admitted with marked carditis in second attacks. In the U.S.-U.K. trial series, on the other hand, recurrences were few; there was never more than one, none occurred in patients admitted with marked carditis in second attacks, and no one was worse after them. We conclude, therefore, that treatment with steroid or salicylate in hospital has little influence on the cardiac status at follow-up, but that prophylaxis, in this case with a sulphonamide, has a beneficial effect by reducing the number of recurrences and thereby preventing further heart damage. Because of this experience, we now institute prophylaxis on patients who were treated in the bed-rest series here and not given prophylaxis in hospital if they are readmitted with recurrences, or as out-patients if they are 16 years of age or less or have had an attack of rheumatic fever within the past five years.

Discussion

There were fewer changes in cardiac status in our series than in those of Ash (1948) and of Bland and Jones (1951), but we followed all our cases for only five years (though some for 6 to 10 years) and they followed theirs for 10 to 20 years. A quarter of Bland and Jones's cases had been discharged with normal hearts and yet had heart disease at 10 years. Similar cases in our own series were all normal at five years, as were the third of them followed for 6 to 10 years. Our experience is therefore that if patients have no heart disease in hospital they will have none at follow-up over periods of 5 to 10 years if there are no recurrences. We also found no serious heart disease in patients who had had grade 1-2 diastolic murmurs as evidence of slight carditis, again excluding those with recurrences. There was therefore nothing to support the view that transitory mitral diastolic murmurs may be the precursors of mitral stenosis, at least up to five years.

Changes in cases with more marked carditis were also slight if there were no recurrences, though in a few the signs became less and in others more. Thus slight mitral or aortic incompetence disappeared in some patients after two to three years, particularly in those admitted in first attacks, and in others aortic incompetence increased or opening snaps developed in addition to mitral systolic murmurs as possible evidence of stenosis; frank stenosis was not observed. Treatment with cortisone, A.C.T.H., or salicylate in hospital did not influence the findings at follow-up, for they were similar at five years whether drugs had been used or the patients treated simply by bed rest.

With recurrences, changes in the heart during the follow-up period were more severe; 30% of the patients who had them became worse or died. Some developed mitral stenosis, which had not been observed in cases without recurrences, and there was close correlation between changes in cardiac status and the total number of attacks: all with frank mitral stenosis had had three or more. This, we realize, is difficult to reconcile with the fact that about 55% of patients with mitral stenosis give no history of rheumatic fever (Parkinson and Hartley, 1946).

Whereas there was no difference at follow-up between the bed-rest and the drug-treated series in those without recurrences, with recurrences there was a marked difference, for half of the series treated with bed-rest became worse or died after them, compared

with none of the U.S.-U.K. series. The bed-rest cases had had no prophylaxis until after this assessment, and the U.S.-U.K. group were given penicillin followed by sulphonamide 1 g. daily in hospital and after discharge. Recurrences were more frequent in the unprotected group: some had more than one, whereas this never occurred in the protected group, and, as has been stated, many unprotected cases were worse after the recurrences whereas there was no deterioration in the protected. The type of case that did worse in the unprotected group, those admitted in second attacks with marked carditis, did not have recurrences while on prophylaxis.

We believe, therefore, that the differences in cardiac status at follow-up between the two groups of cases—one treated with salicylate or hormone in hospital and given prophylaxis and the other by bed rest and no prophylaxis—can be explained wholly by the beneficial effect of prophylaxis in reducing the number of recurrences and thereby the ultimate amount of cardiac damage, and that other drug treatment played no significant part. Thus our finding in the acute phase of the disease—that hormone therapy in the dosage we have used, though of value in special circumstances, does not significantly affect cardiac status in the majority of cases—has been borne out by the subsequent course at follow-up. The results emphasize, however, the value of prophylaxis, and show that this is the most certain method we have at present of reducing morbidity from rheumatic heart disease.

Summary

The follow-up findings over a period of 5 to 10 years in 125 patients with rheumatic fever treated in this unit by bed rest alone and not given prophylaxis are considered separately in 19 who had recurrences and in 106 who did not. Patients without recurrences who had no abnormal heart sign in hospital were normal at follow-up; those with soft (grade 1-2) murmurs were normal or still had soft murmurs (none was worse); with more severe carditis (grade 3 murmurs) there was usually no change at follow-up, but in a few the signs were less (and some returned to normal) and in others more marked (increased aortic incompetence or development of opening snaps in addition to mitral systolic murmurs). With recurrences, however, there was often deterioration and sometimes death, especially in those admitted in second attacks or who had more than one recurrence.

Cardiac status on admission to hospital in these cases and subsequently at follow-up has been related to the total number of attacks of rheumatic fever or chorea. On admission in first attacks, most had no or slight carditis; in second or later ones the majority had marked heart disease. At the last follow-up the majority of those whose cardiac status had deteriorated (including deaths) had had three or more attacks, and mitral stenosis was observed to develop only in such cases.

The findings at follow-up in the bed-rest series, who were not given prophylaxis, have been compared with those in 73 other patients admitted in later years and treated with six-week courses of A.C.T.H., cortisone, or aspirin and given prophylactic sulphonamide 1 g. daily in hospital and after discharge. Nineteen of the bed-rest cases had recurrences but only five of the drug-treated series. In patients without recurrences there was no difference between the two treatment groups in regard to changes in cardiac status at follow-up. With recurrences, on the other hand, there were marked

differences: recurrences were more common in the bed-rest series (no prophylaxis) and deterioration was common after them, whereas in the treated (prophylactic sulphonamide 1 g. daily) recurrences were uncommon and no one was worse after them.

It is concluded that treatment in hospital with steroid or salicylate has comparatively little influence in most instances on cardiac status at follow-up, but that prophylaxis has a beneficial effect and is the most certain way we have of reducing the morbidity and mortality rate from rheumatic fever.

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PLACE OF RADIOTHERAPY IN TREATMENT OF CANCER OF THE LARYNX*

BY

M. LEDERMAN, M.B., B.S., F.F.R., D.M.R.E.

Deputy Director Radiotherapy Department, Royal Marsden Hospital; Consultant Radiotherapist to Royal National Throat, Nose and Ear Hospital and Metropolitan Ear, Nose and Throat Hospital

There can be no doubt that in the treatment of laryngeal cancer any method that enables the patient to preserve his life and at the same time conserve his larynx must be regarded as the treatment of choice. Radiotherapy alone can do this, and it would seem both humanitarian and in the best traditions of medicine to offer patients this form of treatment wherever possible. It is the purpose of this paper to try to show what radiotherapy can offer sufferers from cancer of the larynx.

Clinical Material

During the period 1933-59 some 959 cases of laryngeal cancer were seen at the Royal Marsden Hospital, and the majority of these (807) were referred without any previous treatment having been given (Table I). Much of the material for this study has been

TABLE I.—Cases of Cancer of Larynx, 1933-59

Total number of patients seen	959
Previously untreated cases	807
Recurrent cases	85
Post-operative cases	25
Patients seen but not treated by radiotherapy	42

drawn from the Royal National Throat, Nose and Ear Hospital, and the Metropolitan Ear, Nose and Throat Hospital. Statistically it is important to emphasize that the patients formed a selected group, since they did not include all the cases seen by all members of the staffs at either the Royal Marsden Hospital or its co-operating hospitals. Some of the cases included in the earlier part of this series were treated by my predecessor, Dr. C. A. P. Wood, and in recent years others have been treated by my colleague, Dr. V. M. Dalley.

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