TREATMENT OF RHEUMATOID ARTHRITIS BY A SANATORIUM REGIME THE BLACK NOTLEY EXPERIMENT

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In 1954, as a direct result of the recommendations of the Royal College of Physicians Committee on Chronic Rheumatic Diseases (1951), the North-East Metropolitan Regional Hospital Board initiated a regional scheme for the treatment of this group of diseases. This involved a Central Regional Rheumatism Centre at the London Hospital with peripheral centres elsewhere in the Region. One of these was at a sanatorium (Black Notley Hospital, Braintree), which had beds available because of the reduced demand for sanatorium treatment of bone and joint tuberculosis. A small unit comprising ten beds for female patients in the care of Mr. M. C. Wilkinson and Dr. W. S. Tegner was therefore set up as a pilot experiment to study whether the treatment of rheumatoid arthritis by sanatorium methods was likely to make a useful contribution to the management of this disease.

Since this time we have admitted suitable cases from the London Hospital to this unit. The patients have been treated on standard sanatorium lines, with prolonged rest in bed, as much out of doors as possible, and with suitable splinting. Specific drug therapy, other than routine analgesics and iron, was not given, and steroid administration was discontinued in those cases who had previously been receiving these substances. Physiotherapy and other rehabilitation procedures were limited to the last few weeks of the stay in hospital, both because this was in line with previous sanatorium practice and because facilities were limited. A control group was formed of patients admitted to beds in the rheumatism unit at the London Hospital; a random selection of patients for admission to Black Notley was impracticable, because the number of those who

would accept admission to a hospital in the country often some 50 miles away from their homes and families for many months was barely sufficient to fill the available beds, let alone to provide an equal number of controls. This attitude is an important factor and contrasts with the willingness to accept sanatorium treatment for tuberculosis. Clearly, if it could be shown that such a regime was worthwhile for certain categories of rheumatoid arthritis, this resistance might be overcome. It is the purpose of this report to examine whether there is evidence to encourage us to take such a view.

Clinical Material

To date forty patients have been admitted to the Unit, 38 of them for a period of 4 months or more. Of these, all but one (who went abroad and has been lost sight of) have been followed up. The average follow-up time was 17 months (range 6 to 46 months). Two patients discharged themselves soon after admission because they would not accept the regime required, and they have been excluded from the analysis of the results.

(a) *Type of Case Admitted.*—Patients whom we considered to have severe progressive disease with a bad prognosis, and for whom prolonged hospitalization seemed the only hope, and who were prepared to accept sanatorium treatment made up the number of cases admitted. They are compared with cases admitted to the beds under our care in the London Hospital during the same period and, where applicable, to other series of cases of rheumatoid arthritis in the literature.

TABLE I

PATIENTS ADMITTED TO BLACK NOTLEY COMPARED WITH LONDON HOSPITAL IN-PATIENTS (FEMALE) DURING THE SAME PERIOD, AND WITH EDINBURGH AND BOSTON SERIES

Series	No. of Patients	Mean Age on Admission (yrs)	Mean Duration of Disease (yrs)	Mean Age at Onset (yrs)
Black Notley	40	51.7	9.4	42.3
London Hospital (In-patients)	62	48.3	7.5	40.8
Duthie, Thompson, Weir, and Fletcher (1955)	205	50.5	7.3	43.5
Short, Bauer, and Reynolds (1957)	186	43	5.1	37.9

(b) *Age on Admission* (Table I).—The mean age on admission was 51.7 years. There were an equal number in the 41-50 and 51-60 decades which together form three-quarters of the total material (Fig. 1). During the same period we admitted to the beds in the London Hospital 62 female patients who were slightly younger (mean age 48.3 years). Our series at the sanatorium is strictly comparable to that reported by Duthie, Thompson, Weir, and Fletcher (1955) of 205 female cases admitted to the Rheumatism Unit in Edinburgh (mean age 50.5 years); in the Boston series (Short, Bauer, and Reynolds, 1957) of 186 females admitted to the medical wards of the Massachusetts General Hospital between 1930-1936 the mean age was 43 years. The mean age of the patients selected for the Empire Rheumatism Council Aspirin-

Fig. 1.—Age distribution of patients on admission to Black Notley.

Cortisone Trials (1955, 1957), which included both males and females and was essentially an out-patient study, was 48.3 years. Our patients, therefore, were representative so far as age is concerned of the usual hospital rheumatoid arthritis population, the mean age being slightly higher than that of those admitted for short periods of treatment in our general wards.

(c) *Duration of Disease* (Table I).—The mean duration in the Black Notley group was 9.4 years; the distribution is illustrated in Fig. 2. This shows that nearly all the patients had had symptoms for more than one year and that 60 per cent. had

Fig. 2.—Duration of disease before admission to hospital in two series of patients (London and Black Notley).

had the disease for 6 years or more. The 62 female patients admitted to our beds in the general wards had a mean disease duration of 7.5 years; 52 per cent. of this group had had arthritis for 6 years or more. A disease duration of less than one year, however, was twice as frequent (16 per cent. compared with 8 per cent.), and only 5 per cent. had a disease duration of 20 years or more, compared with 15 per cent. of those admitted to Black Notley. The mean duration in the Edinburgh series was 7.3 years, that in the E.R.C. Aspirin-Cortisone Trial 7.1 years, and that in the Massachusetts General Hospital series 5.1 years. The duration of disease was longer, therefore, in the Black Notley patients, than in the other groups.

(d) *Age at Onset of Disease* (Table I).—The Black Notley patients showed no important differences from the other groups, the mean age being 42.3 years.

(e) *Course of Disease before Admission*.—In view of the suggestion by Duthie and others (1955) that there may be, at least in the early cases, some connexion between the course of the disease before admission and the subsequent prognosis, we classified our patients in the same manner as Duthie and his colleagues into three groups (Fig. 3):

- (1) Those whose disease had been rapidly progressive since an acute onset;
- (2) Those in whom the course had been characterized by exacerbations and remissions of variable duration;

- (3) Those with insidious onset and slowly progressive disease.

It will be seen that in nearly two-thirds of the Black Notley cases the disease took a progressive course compared with 40 per cent. of the Edinburgh cases and 40 per cent. also of our London Hospital in-patients. It is generally thought that it is the slowly progressive natural history which carries the worst prognosis, and if this is so then the Black Notley patients represent, as a group, those with the worst prognosis.

(f) *Functional Capacity on Admission*.—All patients were assessed for functional capacity on admission on the same basis as that in general use: Grade I representing fitness for all normal activities, Grade II some restriction but complete independence, Grade III some degree of dependence, and Grade IV complete dependence (Fig. 4, overleaf).

All the Black Notley cases were equally distributed between Functional Capacities III and IV. Only nine of the 62 cases (14 per cent.) of the London Hospital in-patient series were in Functional Capacity IV, and 24 (39 per cent.) were in Functional Capacity I or II, a distribution very similar to the Edinburgh series. In the Empire Rheumatism Council out-patient series, no less than 70 per cent. were in Functional Capacity I or II. The present series, therefore, was considerably worse in terms of functional capacity than the other series used for comparison.

Fig. 3.—Course of disease before admission to hospital in three series of patients (London, Edinburgh, and Black Notley).

Fig. 4.—Functional capacity on admission to hospital in four series of patients (London, Edinburgh, Black Notley, and E.R.C.).

(g) *Disease Activity on Admission.*—This was also assessed by the criteria of Duthie and others (1955), Grade 1 representing very active disease, Grade 2 moderately active disease, and Grade 3 inactive disease (Fig. 5). In terms of disease activity the Black Notley material does not differ significantly from the other series.

In summary, therefore, the patients selected for admission to Black Notley represented the more severe group of rheumatoid arthritics when considered in terms of disease duration, previous course of the disease, and functional capacity, whilst the disease activity was similar to that in other groups admitted to hospital in London and Edinburgh.

Fig. 5.—Disease activity on admission to hospital in three series of patients (London, Edinburgh, and Black Notley).

Duration of Hospitalization

Two patients discharged themselves after 1 and 2 months' stay at Black Notley. The remaining 38 stayed for an average of 6 months and 2 weeks; the range was from just under 4 months to 20 months, the largest number staying between 5 and 8 months (60 per cent.). The average duration of hospitalization of Duthie's cases was 9 to 10 weeks (range 2 weeks to 9 months).

Results

(a) *Functional Capacity*.—Fig. 6 shows a comparison between the functional capacity on admission, discharge, and follow-up. On discharge there was a distinct improvement in the Black Notley cases, 70 per cent. of which are now in Grade III, leaving only 22·5 per cent. in Grade IV. These nine cases represent the hard core of severely and permanently crippled arthritics and comprise about one-quarter of the whole. Three cases have moved up to Grade II (7·5 per cent.); this improvement is highly significant ($P<0\cdot01$). On follow-up two of our patients (5 per cent.) were found to have moved up to Grade I, and a further five had improved to Grade II. Duthie's patients behaved in much the same way, in that on the whole they continued to improve after discharge with a slight tendency to slip back to Grade IV.

Fig. 6.—Functional capacity on admission to Black Notley, on discharge, and on follow-up.

(b) *Disease Activity* (Fig. 7).—There was a moderate degree of improvement in disease activity between admission and discharge. Although this is not as striking as that seen in functional capacity, it does just reach significance at the 5 per cent. level. Follow-up figures showed little change.

Fig. 7.—Disease activity on admission to Black Notley, on discharge, and on follow-up.

(c) *Effect on Erythrocyte Sedimentation Rate and Haemoglobin Percentages* (Table II).—A moderate fall in the mean erythrocyte sedimentation rate

TABLE II
MEAN SEDIMENTATION RATE AND HAEMOGLOBIN LEVELS ON ADMISSION, DISCHARGE, AND FOLLOW-UP

Time of Estimation	Mean Erythrocyte Sedimentation Rate (mm./hr)	Mean Haemoglobin (per cent.)
On Admission	50·4	69
On Discharge	37·5	79
On Follow-up	39	79

warrant admission to hospital, satisfactory results can often be obtained by rest in bed combined with splinting, physiotherapy, and simple analgesics. Some two-thirds of their patients were eventually able to lead a useful and independent life. However, one-third of their group had a functional capacity only one grade below normal on admission and, as they point out, a high functional capacity on admission carries a good prognosis as regards functional capacity on discharge. All our patients, by contrast, were in functional capacity Grade III and IV, and had also had a longer disease duration than the Edinburgh group.

The effect of prolonged hospitalization of the order of 6 months on rheumatoid arthritis does not appear to have been reported before. We consider that our preliminary data suggests that this course is worth pursuing. Our finding that functional capacity does improve with hospitalization *alone* without making use of modern rehabilitation techniques, whilst disease activity appears to be less favourably influenced, suggests that a different emphasis should perhaps be placed on the "sanatorium regime" *versus* rehabilitation. It seems clear that disease activity does not improve strikingly with even prolonged sanatorium treatment, a finding which lends no support to any suggestion that it is simply the natural history of the disease which is being recorded. On the other hand, perhaps more important, it seems that, even without rehabilitation, functional capacity is partially dissociated from disease activity. We suggest, therefore, that much greater concentration on rehabilitation is desirable, and might well produce better results than those reported here. Our preliminary view is that the use of beds in sanatoria is justified for the special group of rheumatoid arthritics studied here and might well be expanded. This will require the provision of close, specialized, medical supervision, so that use may be made of steroid or other drug therapy where indicated, which may be fitted in to the whole problem presented by these severe cases.

Finally, public recognition of the need to accept prolonged hospitalization may have to be fostered. This would make it possible to provide treatment for the type of case which the general hospital for various reasons cannot handle.

Summary

For the past 4 years, ten beds for female patients which were previously used for the treatment of tuberculosis at Black Notley Sanatorium have been made available to us. During this time forty patients with severe rheumatoid arthritis were admitted for

an average stay of 6½ months. They were treated on standard sanatorium lines with prolonged rest in bed as much out of doors as possible and with suitable splinting. All other treatment was much restricted. This group of patients had a higher duration of disease than those admitted to our beds in the London Hospital during the same period (an average of 9.4 years compared with 7.5). A comparison of the Black Notley group of patients with other comparable groups shows that they represented a more severely affected group as measured by functional capacity and course of disease before admission, although there were no significant differences in the degree of disease activity.

At the time of discharge there was a significant improvement in the Black Notley cases in functional capacity, the proportion only partially disabled increasing from 50 to 68 per cent. and the proportion completely incapacitated decreasing from 50 to 24 per cent. At follow-up (average time 17 months), further improvement in functional capacity was observed. Improvement in disease activity also took place, although this improvement was less than that in functional capacity. Severe incapacity appeared to be no contraindication to admission to the sanatorium regime, but the functional capacity of patients with a short duration of disease improved more than that of those with a long duration of disease.

This preliminary data suggests that sanatorium treatment of rheumatoid arthritis is worth pursuing, but that much greater emphasis should be placed on adequate rehabilitation procedures.

We gratefully record our appreciation to Mr. M. C. Wilkinson and to Dr. W. S. Tegner for allowing us to report patients under their care.

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DISCUSSION

MR. M. C. WILKINSON (*Black Notley*) said that he was pleased that Black Notley had been selected for this experiment. He had noticed that, in the past, patients with rheumatoid arthritis misdiagnosed as tuberculosis had seemed to do as well as the tuberculous cases on sanatorium treatment. Before antibiotics had been

available, the value of open-air therapy for tuberculosis had been acknowledged. He believed that there were certain similarities between rheumatoid arthritis and tuberculosis, and sometimes the two occurred in the same person. He made a plea for rather earlier operative treatment of rheumatoid joints—particularly for limited debridements.

PROF. KELLGREN said that information about these severe cases was useful, but that this was the type of case one would expect to benefit least from rest in bed. A controlled trial of the effect of conservative treatment in milder cases was desirable.

DR. WENLEY agreed that the crucial question was the comparison between in-patient rest in bed and out-patient care without rest in bed in the early cases. It would be difficult to work such a trial, but it should be possible now that it had been shown that even patients with chronic deforming disease could respond to such treatment.

DR. J. J. R. DUTHIE (*Edinburgh*) said that in his hospital they were taking the matter one stage further in terms of rest. They were putting all affected joints into splints, and could at least say that rheumatoid joints did not become ankylosed when immobilized for a month. Information about this sort of in-patient treatment was essential in view of the increasing availability of sanatorium beds which might be used for the treatment of rheumatoid arthritis.

MR. OSMOND-CLARKE (*London*) reminded members that rest for any acute joint had been advocated for many years, at least since the days of Hilton and H. O. Thomas. This form of treatment had been in existence at the Robert Jones and Agnes Hunt Hospital at Oswestry since the early 20th century and had been used too in Edinburgh, Black Notley, and many other centres. He hoped that members would not be too eager to accept Mr. Wilkinson's plea for debridement type of surgery in rheumatoid arthritis; clearly there was a place in the doubtful joint for early biopsy.

PROF. KELLGREN thought that in the past they had been misled about the effect of plaster splinting by its misapplication in patients with ankylosing spondylitis. In this disease splinting had very bad results indeed, and this had suggested that splinting in general was bad.

PROF. E. G. L. BYWATERS (*Taplow*) said that patients who came to hospital came at a time when they were in a relapse, so that almost any form of treatment was likely to be followed, in the majority of cases, by some improvement. What was needed was a comparison with a control series. He thought that it was fashionable to advocate rest in bed for rheumatoid arthritis, but this could be carried so far that the patient continued to be carried.

DR. H. F. WEST (*Sheffield*) hoped that trials of prolonged rest in bed would not be carried out on patients who had young children at home.

In answer to a member who asked how long patients were kept in bed, Dr. Wenley said that they were given from 4 to 6 weeks of complete rest.

Traitement de l'arthrite rhumatismale par un régime de sanatorium. "L'expérience de Black Notley"

RÉSUMÉ

Pendant les dernières 4 années dix lits pour des femmes antérieurement destinés au traitement de la tuberculose au sanatorium de Black Notley, se trouvaient à notre disposition. Pendant ce temps quarante malades atteintes d'arthrite rhumatismale sévère y avaient été admises et ont séjourné pendant 6½ mois en moyenne. Elles étaient soumises au régime ordinaire de sanatorium avec repos prolongé au lit, en plein air autant que possible, et avec attelles appropriées. Tout autre traitement était très réduit. Chez ces malades la durée antérieure de la maladie était plus grande que chez des malades admises dans nos salles à *London Hospital* à la même période (9,4 ans comparé à 7,5 ans en moyenne). Une comparaison du groupe des malades de Black Notley aux autres groupes similaires montre que celui-là était plus sévèrement atteint en ce qui concerne la capacité fonctionnelle et l'évolution de la maladie avant l'hospitalisation, bien qu'il n'y avait pas de différence appréciable en ce qui concerne le degré d'activité de la maladie.

Au moment du renvoi de Black Notley on a noté une amélioration fonctionnelle appréciable; le pourcentage des invalides partiels était augmenté de 50% à 68% et le pourcentage des invalides totales diminué de 50% à 24%. A la revue (au bout de 17 mois en moyenne) l'amélioration fonctionnelle était augmentée. On a noté aussi une amélioration de l'activité morbide, bien qu'elle fût moins accentuée que celle de la capacité fonctionnelle. Une incapacité sévère ne semblait pas constituer une contre-indication à l'admission au régime de sanatorium, toutefois, la capacité fonctionnelle des malades depuis peu de temps s'améliorait plus.

Ces données préliminaires suggèrent que le traitement de sanatorium de l'arthrite rhumatismale vaut bien la peine, on doit cependant insister beaucoup plus sur des procédés de réhabilitation appropriés.

Tratamiento de la artritis reumatoide con un régimen de sanatorio. "El experimento de Black Notley"

SUMARIO

Durante los últimos cuatro años diez camas para mujeres, anteriormente destinadas al tratamiento de la tuberculosis en el sanatorio de Black Notley, fueron puestas a nuestra disposición. Durante este tiempo 40 enfermas con artritis reumatoide severa se admitieron y quedaron durante un promedio de 6½ meses, siendo sometidas a un régimen regular de sanatorio, con reposo en cama y al aire libre cuando posible y con soporte ortopédico apropiado. Otras formas de tratamiento fueron muy reducidas. En estas enfermas la duración anterior de la enfermedad fué mayor que en enfermas similares en nuestro servicio en el *London Hospital* durante el mismo período (9,4 años comparados con 7,5 años, en promedio). En comparación con otros grupos similares, el grupo de enfermas de Black Notley fué más gravemente afecto en su capacidad funcional y en la evolución de la enfermedad antes de la hospitalización, aunque no hubo diferencia apreciable en el grado de la actividad morbida.

Al tiempo de la salida de Black Notley, se notó una mejoría apreciable de la capacidad funcional; el porcentaje de las parcialmente incapacitadas fué aumentado de un 50% a un 68%, mientras el por ciento de las totalmente incapacitadas disminuyó de un 50% a un 24%.

24%. A la revista (en promedio después de 17 meses) la mejoría funcional fué aumentada. Se notó también una mejoría en la actividad mórbida, aunque menos acentuada que en la capacidad funcional. Una incapacidad grave no pareció contra-indicar la admisión al régimen de sanatorio, pero en una enfermedad de poca

duración la capacidad funcional mejoraba más que cuando la enfermedad había durado mucho tiempo.

Estos datos preliminares sugieren que el tratamiento de sanatorio de la artritis reumatoide vale la pena, se debe, sin embargo, insistir mucho más sobre métodos de rehabilitación apropiados.