Clinical and laboratory studies of inflammatory polyarthritis in patients with leprosy in Papua New Guinea

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SUMMARY The results of a combined clinical and laboratory study in 55 patients throughout the leprosy spectrum are reported. Thirty one of these patients suffered from an inflammatory peripheral polyarthritis which has not been previously described and which was unassociated with the characteristics of erythema nodosum leprosum reactions or with Charcot's joints. α_2 Macroglobulin was raised significantly only in those patients with leprosy and arthritis.

Key words: acute phase proteins, arthritis.

Charcot joints and the arthritis associated with erythema nodosum leprosum reactions are well recognised features of leprosy.¹ Rarely an arthritis mainly affecting the joints of the wrists, elbows, and knees² and proximal joints^{3,4} has been recorded.

In the present study patients throughout the leprosy spectrum⁵ have been clinically examined for arthropathy with particular emphasis on the diarthrodial joints.

Patients and methods

Thirty two male and 23 female patients were included (Table 1). The mean age was 40.4 (SEM 1.9) years. The mean duration of leprosy infection was 7.4 (SEM 0.9) years. All patients were seen in their home village within a small geographical area of the Western Highlands in Papua New Guinea. In every patient the diagnosis was based on clinical and histopathological features.⁵ Examination of the joints and of related tendons, entheses, blood vessels, muscle, and skin was performed, and in all patients the Ritchie articular index was also recorded.⁶ Patients with erythema nodosum leprosum, Charcot's arthropathy, or whose limbs were not normal according to clinical neurological examination were excluded from this study. Features within the history or on examination of the patients with

seronegative spondylarthritis or of recent systemic disturbance, especially gastrointestinal symptoms, precluded entry into this study. Hepatitis B infection was excluded serologically.

LABORATORY METHODS

Serum was separated and kept at -4°C in Papua New Guinea until transported to the UK in dry ice and storage at -70°C . α_1 Acid glycoprotein (α_1 AGP),⁷ α_2 macroglobulin (α_2 MG),⁷ C reactive protein (CRP),⁸ and IgM rheumatoid factor⁹ were determined by established methods.

STATISTICS

Non-parametric tests (Mann-Whitney U test) were used to compare data between the clinical groups.

Results

CLINICAL FEATURES

Thirty one patients had a peripheral symmetrical inflammatory polyarthritis (mean age 43.4 (SEM 2.2) years) (Table 1) and 24 leprosy patients did not (mean age 36.5 (3.2) years).

The history was that of an insidious evolving arthritis presenting months or years after the onset of the first symptoms of leprosy and appearing independently of type 1 or type 2 lepra reactions. The pattern was one of chronic exacerbations and remissions. Morning stiffness lasted variably between 15 minutes and one hour and inactivity stiffness ('gelling') varied between 10 and 15 minutes.

Accepted for publication 13 April 1987.

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Table 1 Patients studied

Leprosy type	No of patients		Sex (M:F)		Age (years)		Duration of disease (years)	
	Total	Arth*	Total	Arth	Total	Arth	Total	Arth
Lepromatous leprosy	21	10	14:7	10:0	43.6 (3.1)†	41.1 (4.2)	11.9 (1.2)	11.0 (2.2)
Borderline	11	6	6:5	1:5	33.4 (3.2)	34.7 (2.9)	3.4 (1.0)	3.0 (1.2)
Borderline tuberculoid	2	2	0:2	0:2	43, 45	43, 45	6, 9	6, 9
Tuberculoid leprosy	21	13	12:9	3:10	40.4 (3.2)	39.6 (3.9)	7.9 (1.8)	8.4 (2.4)

*Arth=results for those with arthritis.

†Values are mean (SEM).

Table 2 Comparison of leprosy patients with and without arthritis

Acute phase protein	Leprosy alone (n=24)	Leprosy + arthritis (n=31)	p Value
CRP (mg/l)	8.1 (4.1)*	10.7 (4.5)*	0.754 NS
α_1 AGP (mg/l)	492 (40)	490 (44)	0.934 NS
α_2 MG (mg/l)	6367 (1464)	11747 (1252)	0.02 S

CRP=C reactive protein; α_1 AGP= α_1 acid glycoprotein; α_2 MG= α_2 macroglobulin.

*Values are mean (SEM).

The joints affected were those of the wrist, metacarpal and proximal interphalangeal joints of the hands, the knees, and the metatarsophalangeal joints of the feet. Joints were erythematous, warm, and swollen. Joint effusions were present in some but not others. Synovial proliferation was not detected. There was pain over the joint margin and pain experienced on both active and passive joint movements. Neither subcutaneous nor tendinous nodules nor any of the extra-articular manifestations of the seronegative spondarthritides¹¹ or of rheumatoid arthritis were detected. The symptoms and signs of the arthritis never resolved completely between acute episodes and all had been left with a degree of morning stiffness and painful joints.

LABORATORY RESULTS

IgM rheumatoid factor was detected in significant titre (1/32) in 11 leprosy patients, five with and six without arthritis.

α_2 Macroglobulin, but not CRP or α_1 AGP, was significantly ($p=0.02$) raised in patients with leprosy and arthritis (Table 2).

Discussion

The symmetrical peripheral polyarthritis described in this study has not been reported before in patients with leprosy and differs in a number of ways from

arthritis in this disease recorded previously.¹⁻⁴ Firstly, peripheral rather than proximal joint involvement was found. Secondly, the arthritis was symmetrical; no consistent pattern of joint involvement has been previously recorded. Thirdly, the arthritis did not differ in evolution and clinical presentation in any leprosy subgroup. In the 'field' conditions in which this study was conducted it was not possible to obtain synovial fluid or biopsy specimens, and, similarly, because of the lack of radiology it is not possible to say whether there was an underlying erosive process.

IgM rheumatoid factor is commonly found in patients with leprosy¹² and in this study was found more commonly in leprosy patients without arthritis. Although rheumatoid arthritis cannot be excluded, the large number of patients involved and the lack of clinical evidence of any underlying destructive arthritis make this unlikely. The evolution of the arthritis and the pattern of joint involvement, in the absence of systemic disturbance, do not correspond to any arthritis reported previously in Papua New Guinea.¹³ In particular, the arthritis reported here is different from the non-specific arthritis prevalent in the Highlands region,¹⁴ in which proximal joint involvement in an oligoarticular distribution is seen.

α_2 Macroglobulin and α_1 AGP bind and transport potentially destructive enzymes released at the site of tissue destruction.¹⁵ The significant rise in α_2 MG in patients with arthritis probably reflects the superimposed joint inflammation upon the background of the chronic inflammatory disease process mediated by *Mycobacterium leprae*.

The nature of the study meant that the incidence and prevalence of arthritis in patients with leprosy could not be established. This study highlights, however, that a symmetrical polyarthritis of the diarthrodial joints may be a facet of leprosy infection; enhanced tissue destruction is suggested by raised α_2 MG levels.

We wish to thank Dr Constable of the Royal Victoria Infirmary, Newcastle upon Tyne for his support and advice. This study could not have taken place without the support of the Medical Research Council, LEPR, and that of the Arthritis and Rheumatism Council (Great Britain) to which we are indebted.

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