

Relationship of radiological change to clinical outcome in rheumatoid arthritis

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SUMMARY Ninety-four patients with rheumatoid arthritis, seen within the first year after onset, have been followed prospectively with annual radiographs for a mean 63.1 months. An erosive arthropathy occurred in 72. The severity of the erosive changes showed a significant correlation with eventual clinical outcome. It is possible to predict a favourable outcome in those patients whose erosive changes become static at an early stage in the disease.

This paper seeks to establish two clinical relationships in rheumatoid arthritis (RA) firstly, that between radiological severity and eventual clinical outcome, and secondly, that between radiological progression and clinical outcome.

The appearance of early erosions in rheumatoid arthritis correlates with a worse prognosis (Fleming *et al.*, 1975). Common sense would suggest that the more severe the subsequent erosive disease the worse is the eventual clinical state, though this has not yet been quantified. Indeed, exceptions to this appear in the literature (De Haas *et al.*, 1974), the so called 'robust rheumatoids', where good function is maintained despite an extensive erosive arthropathy.

A prospective study of early RA has given us the opportunity to examine the relationship between radiological severity and clinical outcome. In an earlier paper (Brook and Corbett, 1977) we described the *x*-ray changes in early rheumatoid arthritis and found that our patients fell into two groups as assessed by progression of erosive changes, namely 'static' and 'progressive'. We are now able to report on the relationship between these two groups and their subsequent clinical status.

Patients and methods

The material for this paper is taken from the Middlesex Hospital Prospective Study of Early

Rheumatoid Disease (Fleming *et al.*, 1975, 1976). The radiological features of this study have already been described (Brook and Corbett, 1977). Briefly, 94 patients with RA presenting within the first year of onset (mean 7.9 months) were followed prospectively with annual radiographs of hands and feet. The sample included 41 men and 53 women, mean age at onset 48.9 years. Mean radiological follow-up was 63.1 months. Severity of *x*-ray change was assessed by totalling of point scores for the extent of involvement at individual sites, total number of erosions, and degree of osteoporosis. For analysis the cases have been divided into four groups: non-erosive, mild, moderate, and severe. It was also possible to divide the patients into 'progressive' (those in whom erosions continued to enlarge or appear at new sites) and 'static'.

Clinical data were gathered prospectively every 4 months for a mean follow-up of 53 months. The patients were divided into three prognostic categories on the basis of functional grade, extent of joint involvement, grip strength, and duration of early morning stiffness (Fleming *et al.*, 1976). These categories were 'improved', 'mild', and 'severe', but for the purpose of this analysis the first two have been considered together as 'mild'.

Clinical and radiological assessments were performed independently.

Results

CLINICAL ASSESSMENT

Of the 94 patients, 55 had persistently severe or deteriorating disease and 39 had improved or pursued a much milder course.

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RADIOLOGICAL SEVERITY

25 patients were judged to show severe changes, 25 moderate, and 22 mild. 22 had no erosive change.

RADIOLOGICAL PROGRESS

36 of the erosive cases showed progressive changes. The remaining 36 erosive cases became static at a mean 22.1 months from the onset of joint symptoms, 29 of them within the first 2 years. The 22 nonerosive cases were regarded as static.

ANALYSIS

The relationship of radiological severity to clinical outcome is shown in Table 1. There was an obvious trend for the milder clinical cases to be milder radiologically. In fact, there is no statistically significant difference between 'nonerosive' and 'mild', nor between 'moderate' and 'severe'. If, however, we combine 'moderate and severe' (50 patients) and compare it with 'nonerosive and mild' (44 patients), the relationship is highly significant ($\chi^2 = 33.25$, $P < 0.001$). The relationship of radiological severity to clinical outcome is shown in Table 2. This is also highly significant ($\chi^2 = 14.81$, $P < 0.001$).

Table 1 Comparison of clinical severity and radiological severity (94 patients)

	Clinically mild	Clinically severe
Radiologically nonerosive	18	4
Mild	14	8
Moderate	5	20
Severe	2	23

Table 2 Comparison of clinical severity and radiological progress (94 patients)

	Clinically mild	Clinically severe
Radiologically static	33	25
Radiologically progressive	6	30

Discussion

These results indicate clearly the relationship between an erosive arthropathy and eventual clinical status. It is of fundamental importance in RA that the occurrence of erosions strongly indicates a poor prognosis as measured by clinical variables with a bias towards joint function. The more severe these radiological changes, the more likely the patient is to have a poor outcome. This study gives quantitative support to this commonsense concept.

The identification (Brook and Corbett, 1977) of a subgroup of erosive patients who could become radiologically 'static' within the first few years of joint symptoms was of interest, and we have now been able to assess the subsequent clinical course of this subgroup. Though none of these patients regained radiological normality, their clinical status was much better at the end of the follow-up period than those whose erosive arthropathy was progressive. Thus quiescence of clinical signs and symptoms may be reflected early in the x-ray.

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