Relation of glenohumeral and acromioclavicular joint destruction in rheumatoid shoulder. A 15 year follow up study

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Abstract

Objectives—To evaluate the relation of glenohumeral (GH) and acromioclavicular (AC) joint involvement in a cohort of 74 patients with seropositive and erosive rheumatoid arthritis (RA) followed up prospectively.

Methods—At the 15 year follow up radiographs of 148 shoulders were evaluated, and the grade of destruction of GH and AC joints were assessed by the Larsen method. One GH joint arthroplasty had been performed after 13 years of the disease onset and the preoperative radiograph was evaluated.

Results—Erosive involvement (Larsen grade ≥ 2) was observed in 96 of 148 (65%) of the shoulders. Both GH and AC joints were affected in 62 of 148 (42%) shoulders. GH joint alone was involved in nine (6%) shoulders and only AC joint was affected in 25 (17%) shoulders. AC joint destruction correlated with the GH joint destruction, $r=0.74$ (95% confidence intervals (CI) 0.65 to 0.80).

Conclusion—In RA AC joint is affected more often than the GH joint, but in half of the patients both joints are involved. This should be remembered when treating painful rheumatoid shoulder.

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According to the literature about 70% to 90% of patients with rheumatoid arthritis (RA) suffer from shoulder pain.^{1,2} Incidence of radiographic GH joint affection of the rheumatoid shoulder varies from 48% to 64%.^{2–4} AC joint involvement has been correspondingly reported to occur with 28% to 68% incidence.^{5–7} The relation between the GH and AC involvement has remained unclear. Some studies suggest that there is no relation between the rheumatoid destruction of these joints.^{8,9} Most authors report of a connection, where AC joint is involved in 20% to 70% of shoulders with simultaneous GH joint destruction.^{7,10–12}

The aim of this evaluation was to assess the 15 year incidence of erosive rheumatoid involvement of shoulder and relation of destruction of GH and AC joints in an inception cohort of 74 patients with rheumatoid factor positive and erosive RA.

Methods

During the period 1973–1975 a total of 121 patients with recent (< 6 months) RA were

studied at the Rheumatism Foundation Hospital, Heinola, Finland. The selection criteria, data collection strategy and details on the patients are described elsewhere.¹³ At the three year follow up 102 patients had RF positive and erosive RA. Subsequently, a total of 24 patients had died, and four patients failed to attend the 15 year follow up. Thus, 74 patients (18 men, 56 women) were the subjects of this study; the age at onset ranged from 17 to 66, mean 41.9 (SD 12.0) years.

Radiographs of all the 148 shoulders were taken at the 15 year follow up as part of a radiographic survey study. The following standard positioning was used: patient supine, slightly turned (20°) to the imaged side, and the arm in external rotation, palm facing upwards. The same radiographer confirmed correct positioning and took radiographs by the standard technique. Erosive, rheumatoid involvement of GH and AC joints was assigned by the Larsen method on a scale of 0–5.^{6,14}

JTL assessed the Larsen grades, however, in case of interpretation difficulties all the authors took part in the evaluation and the final decision. One GH joint arthroplasty had been performed and the preoperative radiograph 13 years from disease onset was assessed as Larsen grade 5. No surgical procedures had been performed into the AC joints. We have earlier reported the nature of radiographic destruction separately for GH and AC joints; erosive involvement (Larsen grade ≥ 2) was observed in 71 GH joints and in 87 AC joints in 148 shoulders.^{4,7}

Correlations were estimated by Spearman's coefficient method.

Results

Erosive, rheumatoid involvement (GH or AC joints) was observed in 96 of 148 (65%; 95% confidence intervals (CI) 57% to 73%) shoulders. Hand dominance had no influence on the destruction. Both GH and AC joints were eroded (Larsen grade ≥ 2) in 62 of 148 (42%; 34% to 50%) shoulders. Both joints remained unaffected (Larsen grade 0 or 1) in 52 of 148 (35%; 27% to 43%) shoulders.

The 71 shoulders with erosive GH joint changes presented AC joint involvement in 62 (87%; 77% to 94%) cases. The 87 shoulders with AC joint erosions showed GH joint involvement in 62 (71%; 61% to 81%) cases. In 25 (17%; 11% to 23%) shoulders AC joint was affected without GH joint involvement and only GH joint affection was detected in nine (6%; 3% to 11%) shoulders.

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Figure 1 Distribution of right (n=74) (A) and left (n=74) (B) shoulders according to the GH and AC joint Larsen grading in 74 RA patients 15 years after disease onset.

Spearman's correlation coefficient between GH and AC joint destruction was 0.74, 95% CI 0.65 to 0.80. The respective grades of destruction in both GH and AC joints are shown separately for right and left shoulders in figure 1.

Discussion

In previous reports AC joint affection has been evaluated in shoulders with existing GH joint involvement.^{6 10-12} Both Petersson and Cuomo

Figure 2 Radiograph of a rheumatoid shoulder. Erosions can be observed on the inferior joint margin of the AC joint: Larsen grade 2. The GH joint is unaffected: Larsen grade 0.

have concluded that the AC joint is clinically involved in painful rheumatoid shoulders in about one third of the cases.^{6 11} Crossan and Vallance developed a radiographic staging method for rheumatoid shoulder that also describes simultaneous AC joint changes.¹² According to our results AC joint is involved more frequently than the GH joint. In our material the shoulders with minor erosions on the AC joint, did not have any or had only slight involvement in GH joints (fig 2). At early stages of rheumatoid shoulder destruction of the AC joint seems to predominate. The similar early involvement of AC joint has been reported by Jones and Watt as well.¹⁵ Dijkstra *et al* found radiographic changes in the GH joint more than twice the amount of AC changes using their own grading method.⁸ This method assesses the joints giving five grades of destruction for GH but only three grades for AC joint, therefore it cannot be directly compared with the Larsen method.^{6 8 14}

Late affection of GH joint is reported in the literature.¹⁶ Although the GH joint was less often affected in our study, severe destruction occurred there more commonly than in the more frequently affected AC joint.^{4 7} Once GH joint becomes involved, the erosive process seems to be often progressive and may sometimes rapidly lead to an extensive destruction, whereas minor erosions on the AC joint do not seem to predict rapid destruction of the joint. However, the most severe AC joint changes were seen in shoulders with totally destroyed GH joints (fig 3). Streda's finding that AC joint destruction does not seem to have any relation with the degree of changes in the GH joint is strongly controversial to our

Figure 3 Radiograph of a rheumatoid shoulder. Extensive erosions have destroyed the distal clavicle and the articular surface of acromion. The AC joint space appears widened: Larsen grade 5. Erosive process has destroyed articular surfaces of the humerus and the glenoid. Gross bony deformation can be observed in the GH joint: Larsen grade 5.

findings.⁹ In our material only one shoulder had severely destructed AC joint (Larsen grade 5) with early destruction (Larsen grade 2) in the GH joint. The correlation between destruction in GH and AC joint is strongly supported by our findings, although the progression may differ in individual cases.

In this prospective radiographic 15 year follow up survey erosive involvement of the AC joint was more frequent than that of the GH

joint. The AC joint is a possible site of pain before erosive involvement of the GH joint. However, most often AC and GH joints were eroded together. In case of early erosions on the AC joint the GH joint is also at risk to be affected. Solitary GH joint affection was the most uncommon type of involvement of the rheumatoid shoulder. This should be taken into account in clinical practice when planning optimal treatment for painful rheumatoid shoulder.

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