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SILASTIC RADIAL HEAD PROSTHESIS IN RHEUMATOID ARTHRITIS

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This paper reports our experience of using the Silastic radial head prosthesis in 18 elbow joints affected by rheumatoid arthritis. There was a varying degree of severity of involvement in 15 of the elbows, and in a further 3 cases replacement was carried out at an early stage of the disease. The 3 cases in whom early replacement was carried out had the best results at follow-up and 11 of the remaining 15 were considered to have a satisfactory overall result. The major benefit of operation has been the relief of pain, even in the late cases, whilst preserving stability of the elbow in all but 3 cases.

Key words: elbow; rheumatoid arthritis; silicone; synovectomy

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Synovectomy of the elbow has been recognised for the last 50 years as a particularly useful procedure in gaining relief from pain (Swett 1929, Smith-Peterson et al. 1943, Porter et al. 1974). Significant involvement of the elbow joint in rheumatoid arthritis may be overlooked when other major joints are involved, and it is unfortunate that by the time surgical treatment is considered there often are soft tissue contractures and destructive articular changes. Porter et al. (1974) showed that severe disability of the elbow was present in 25 per cent of a hospital population of 225 patients with rheumatoid arthritis. Laine & Vainio (1969) in their review of 92 synovectomies considered that many patients had such long-standing disease of the elbow that they were no longer suitable for synovectomy, but Wilson et al. (1973) recommended synovectomy of the elbow even in the late stages of the disease.

This study reports our experience with synovectomy of the elbow combined with replacement of the radial head with a Silastic prosthesis.

PATIENTS

Synovectomy and radial head replacement with a Silastic prosthesis was carried out on 18 elbows between 1975 and 1979. The mean age at operation was 54 years (range 31 to 72 years). The mean duration of major elbow symptoms was 4 years (range 1 to 8 years). The mean follow-up was 2 years (range 6 months to 4½ years). All of the patients were reviewed by the authors and an overall assessment was made on the basis of objective, subjective and radiological criteria.

Indications for operation

Of the 56 rheumatoid elbows explored during the period of this study, 15 elbows were selected for radial head replacement because of extensive degenerative changes in the elbow joint, associated with persistent pain, crepitus and tenderness over the radio-humeral joint. Since preoperative radiographs are of only limited use the definitive procedure carried out at exploration was dependent on the operative findings. Exploration was carried out via a postero-lateral (Boyd's) approach.

In a further 3 elbows where a lateral approach was used synovectomy and replacement of the radial head with a Silastic prosthesis was carried out at an earlier stage in the disease where there was no gross bone involvement.

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RESULTS

Pain relief was complete in 4 elbows and was reduced to the level of a mild ache in the remaining 14 elbows. The pain did not worsen in any elbow.

The average preoperative flexion contracture of 42 degrees is an indication of the severity of the disease in the treated elbows. The average flexion contracture postoperatively was 40 degrees.

Average flexion preoperatively was 124 degrees and postoperatively 131 degrees.

The average pronation of 47 degrees preoperatively increased to 53 degrees and the average supination increased from 51 degrees to 66 degrees. The complete range of rotation postoperatively varied from 55 degrees to 180 degrees. Thus, the only significant change in mobility postoperatively was an increase of 15 degrees of supination.

Three patients have had some recurrence of synovitis, but re-exploration has not been considered necessary as yet.

In 3 elbows minor instability has developed. This has been accompanied by progressive radiographic changes to a 'Mortar & Pestle' effect (see Figure 2).

A satisfactory result indicating that the patient was pleased with the result of operation, with good pain relief and no instability, was obtained with 15 of the 18 elbows.

Figure 1. The preoperative films of an elbow badly affected (Grade III) by rheumatoid arthritis for 3 years.

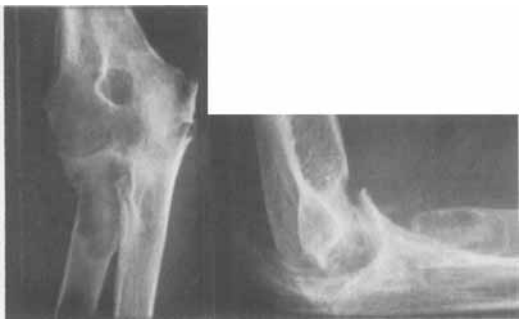

Figure 2. The appearance of the same elbow as Figure 1, 17 months after insertion of the prosthesis. There has been progression of the rheumatoid process both in the olecranon fossa and also around the stem of the prosthesis in the upper end of the radius.

RADIOGRAPHS

Preoperative radiographs and radiographs taken at the time of review were obtained and an overall radiological assessment of the extent of the disease was made using the criteria of Steinbrocker et al. (1949).

Preoperatively, 3 patients had Grade I changes, 3 patients had Grade II changes and 12 patients had Grade III changes (Figure 1). Postoperatively 4 patients had Grade II appearances, 12 patients had Grade III appearances and 2 patients had Grade IV appearances. The 2 patients with Grade IV appearances had some recurrence of their synovitis, and some associated instability of the elbow joint. We have not found any con-

Figure 3. The appearance 4½ years after insertion of a prosthesis. There is a sclerotic line round the stem of the prosthesis and the capitellum is osteoporotic.

sistent correlation between the clinical findings and the radiological grading to make the latter assessment an accurate indication of the overall function.

Osteoporosis of the capitellum, beyond the limits which one may expect in a rheumatoid elbow, has been a constant feature in postoperative radiographs. It is present at the maximal follow-up period of 52 months although it varies in degree and does not affect the remainder of the joint.

In 3 elbows the erosive changes occurred around the stem of the prosthesis and the most marked example is illustrated in Figure 2. However, a sclerotic line is generally seen around the stem and in long-standing replacement mature bone is seen around the neck of the prosthesis (Figure 3).

Two of the prostheses have broken at the junction of the stem and the head, one of the patients having a satisfactory result and the other an unsatisfactory result. The composition of the Silastic material in the prosthesis was altered in 1977 to a high performance silastic. Both of the prostheses which broke were made of the original silastic material.

DISCUSSION

Good results following synovectomy and radial head excision, even in the late case, have been reported by Brattström & Al Khudairy (1975), Torgerson & Leach (1970), Inglis et al. (1971), Marmor et al. (1972) and Taylor et al. (1976). However, Porter et al. (1974) concluded from their large series that synovectomy and radial head excision in joints with advanced disease gave few satisfactory results 3 years later. They recommended excision arthroplasty or total elbow arthroplasty in the advanced cases.

Although a favourable degree of pain relief can be obtained following excision arthroplasty, instability becomes a problem if the elbow has to bear weight. Unfortunately, this is common in the patient disabled with rheumatoid arthritis where bilateral involvement is frequent. The problems associated with total elbow arthroplasty, particularly in rheumatoid arthritis, have still to be resolved.

For these reasons, synovectomy with excision of the radial head remains the procedure of choice in many advanced cases. Taylor et al. (1976) considered that the excision of the radial head rather than synovectomy contributed most to the postoperative improvement. Porter et al. (1974) and Copeland & Taylor (1979) noted the morbidity affecting the distal radio-ulnar joint following excision of the radial head. This has been demonstrated as a late complication of excision of the radial head following trauma (Macdougall & White 1956, Taylor & O'Connor 1964). It is difficult to obtain objective evidence of instability of the rheumatoid elbow joint till a late stage has been reached. We consider that the application of a varus or a valgus stress to the elbow joint which results in pain, often indicates a degree of instability of the joint.

The major benefit of operation in our late cases has been the relief of pain. There has been no appreciable alteration in the range of movement apart from a slight increase of supination. While we agree that the early results of synovectomy and radial head excision are quite satisfactory, we consider that the silastic radial head prosthesis has conferred an additional stability to the elbow in the advanced case, without incurring the problems of excision arthroplasty or of a total elbow replacement. Furthermore, recent bioengineering work has shown that a large proportion of the force at the elbow is transmitted across the radio-humeral side of the joint, particularly in flexion (Amis et al. 1979). A radial head prosthesis should accommodate most of this force and relieve excess loading on the medial collateral ligament.

The three elbows in which synovectomy with replacement of the radial head was carried out at an early stage had, as may be expected, the best functional result in the series. However, radiographs, initially normal, indicated slight progression of the disease at follow-up. Our present policy is to carry out early synovectomy without excision of the radial head at this stage, but the preliminary findings in these three cases suggest that a more radical approach might be more appropriate.

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