We analysed the results of arthroscopic synovectomy of the wrist in 18 patients (19 wrists) with rheumatoid arthritis who had not responded to conservative treatment. The patients’ symptoms were assessed using visual analogue scales for pain and satisfaction. Standard posteroanterior radiographs which were taken pre-operatively and at final follow-up were analysed using a modified Larsen scoring system (normal, 0; total destruction, 40). The mean follow-up period was 29.2 months (24 to 45). The mean pre-operative pain score was 8.58 which decreased to 3.58 one year after surgery and increased again to 4.42 at final follow-up. This suggested a gradual increase in pain with time. The mean satisfaction score was 6.26. The mean modified Larsen’s score was 9.8 pre-operatively and 13.9 at final follow-up, which demonstrated the slow progression of degenerative changes.

Arthroscopic synovectomy for rheumatoid arthritis of the wrist allows effective pain relief and high patient satisfaction, although any prolonged benefits will require long-term follow-up.

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Synovectomy is normally used in rheumatoid arthritis to relieve pain and to preserve joint function when conservative measures have failed. The main disadvantages of conventional synovectomy are the relatively major trauma with consequent discomfort for the patient, the long period of rehabilitation and the risk of post-operative joint stiffness.1,2 Recent surgical advances have made arthroscopic synovectomy possible. The technique has been used successfully in the knee and other joints.1,3-6 Its use has several advantages over open procedures including minimal post-operative pain, a small incision and no need for formal rehabilitation as the procedure is relatively atraumatic.

Several authors have described the techniques for arthroscopic synovectomy of the wrist,7-11 but few clinical results have been published. The purpose of this study was to assess the results of arthroscopic synovectomy of the wrist in patients with rheumatoid arthritis.

Patients and Methods

Between 1997 and 2000, arthroscopic synovectomy of the wrist was undertaken on 18 patients (19 wrists) with rheumatoid arthritis of the wrist. There were four men and 14 women with a mean age of 49.2 years (36 to 64). All patients had been under the care of rheumatologists and were receiving systemic treatment including non-steroidal anti-inflammatory drugs, anti-rheumatic agents, such as sulphasalazine, hydroxychloroquine, penicillamine and methotrexate, low dose prednisolone and intra-articular steroid injections. All patients had pain and dysfunction of the wrist due to synovitis which had not responded to systemic treatment for at least six months. The mean duration of rheumatoid involvement of the wrist before the operation was 2.7 years (1 to 10). The mean erythrocyte sedimentation rate was 46 mm/hr (10 to 86). All but three patients had a positive rheumatoid factor. Nine of the 18 patients had undergone surgical synovectomy of other joints. Patients who had extensor tenosynovitis, or severe involvement of the distal radio-ulnar joint (DRUJ) which had required arthroplasty, were excluded. Arthroscopic surgery was not indicated for wrists which had severe radiographic destruction or gross deformity. The mean follow-up period was 29.2 months (24 to 45).

Surgical technique. Surgery was performed under general anaesthesia. The forearm was suspended in a traction device by using a 5.5 to 7.0 kg load and finger traps. A tourniquet was applied to the upper arm. A 2.4 mm or 2.9 mm diameter, 30˚ arthroscope, and a motorised shaver system with a 2- or 3.5 mm diameter synovial resector blade, was used for the synovectomy. The larger diameter arthroscope and blade
were preferred, while taking care not to damage the articular cartilage.

The 3-4 and 4-5 portals were used as standard entry points for the radiocarpal joint. Radial and ulnar portals were used for the mid-carpal joint. In order to gain access to all areas of the radio- and mid-carpal joints, and to excise as much synovial tissue as possible, additional portals were used. The 1-2 and 6U (ulnar) portals were particularly useful for viewing the dorsal side of the radiocarpal joint. In the mid-carpal joint, an accessory portal for the scaphoid-trapezium-trapezoid (STT) joint was often used. In order to avoid tendon and nerve injuries, the exact positions for these portals were identified by puncturing the joint with a needle and using small artery forceps to spread through the subcutaneous tissue to the capsule. All visibly inflamed synovium was resected down to the joint capsule (Fig. 1).

When there was disruption of the triangular fibrocartilage, the DRUJ could be reached from the radiocarpal joint (Fig. 2). Separate portals for the DRUJ were occasionally used for the shaver, while viewing the joint itself through the perforated triangular fibrocartilage. The operating time ranged from 50 to 80 minutes.

Post-operatively, a compression dressing was applied and active movement of the wrist was permitted two to three days after the operation. All patients continued to take anti-rheumatic medications under the care of rheumatologists.

**Assessment.** The patient’s subjective assessment of pain was evaluated before the operation, one year after, and at final follow-up using a visual analogue scale (10 points for intolerable pain). Patient satisfaction was also evaluated using a visual analogue scale (10 points for maximum satisfaction). The flexion-extension arc of the wrist was measured pre-operatively and at the final follow-up.

Standard radiographs were taken at final follow-up and the degenerative changes were compared with the pre-operative findings. The wrist joint in the posteroanterior radio-
graphs was divided into eight compartments (Fig. 3), and each compartment was quantitatively assessed using a modified Larsen’s scoring method (Table I). The numerical assessments for each compartment were added giving a maximum possible score for degenerative change of 40 points. The radiographic assessments were performed blindly by three surgeons, and the mean value of each assessment was taken as the final score.

For statistical comparisons, the mean pain scores prior to surgery, one year after surgery and at final follow-up were compared by using a repeated measures analysis of variance and a Dunnett test as a post-hoc test. In order to determine the relationship between the pre-operative degree of degenerative change and the clinical results after synovectomy, Pearson’s correlation test was used to compare the pre-operative radiographic score with the pain and satisfaction scores at final follow-up. Significance was determined when $p < 0.05$.

**Results**

All patients experienced a reduction in pain after surgery except for two who underwent a second arthroscopic synovectomy three and ten months later, due to persistent pain and progression of radiographic degenerative changes. After the second operation, one reported a reduction in pain but the other had marked progression of degenerative change and persistent pain at final follow-up.

Using the visual analogue scale, the mean pain score improved from 8.6 points (6.2 to 9.5) pre-operatively to 3.6 points (1.0 to 7.2) one year after surgery. However, it increased again to 4.4 points (1.3 to 7.9) at final follow-up. The improvement and deterioration of the pain scores were consistent for the majority of patients and were statistically significant ($p < 0.05$). The mean satisfaction score at final follow-up was 6.3 points (2.4 to 10). The mean flexion-extension arc increased from 81˚ pre-operatively to 92˚ at final follow-up.

The mean pre-operative modified Larsen’s score was 9.8 ± 6.1 (SD). When the radiographic score was converted into the Larsen’s grading system, 13 wrists were grade 1, four were grade 2, one was grade 3 and one was grade 4. Comparison of the pre- and post-operative radiographs revealed slow progression of the degenerative changes. The mean radiographic score showed an increase from 9.8 to 13.9 ± 6.7 (SD) at final follow-up. When we defined an increase in the radiographic score of five or more at final follow-up as evidence of radiological progression of degenerative change, four of the 19 wrists showed progression after synovectomy.

No significant correlation could be found between the severity of the degenerative change and the subjective assessment after surgery, when the pre-operative radiographic score was compared with the pain ($r = -0.37$) and satisfaction score ($r = 0.27$). There were no complications of surgery.

**Discussion**

Arthroscopic synovectomy might be considered as a better treatment option for patients with rheumatoid arthritis, if the results were comparable to those of an open synovectomy. The complete removal of pathological synovium is a prerequisite for this. Multiple portals are required, unlike more standard arthroscopic procedures, in order to gain access to all areas of the wrist. We used a 1-2 portal and an STT (scapho-trapezio-trapezoidal) portal in addition to standard portals. These portals are not routinely used in other arthroscopic procedures.

Care should be taken to avoid damage to the articular cartilage during synovectomy, although the procedure time can become much longer when a small diameter arthro-
scope and resector blade are used. Because of the long-standing inflammatory process, patients with a rheumatoid wrist often have lax joints which are easily enlarged by traction. We found that a large diameter arthroscope and blade, normally used for larger joints, could be used safely and effectively as it offers a better view and facilitates the rapid removal of synovium.

The synovium of the DRIJ can be removed from the radiocarpal joint through a perforation in the triangular fibrocartilage. However, this approach does not allow access to all areas of the joint. We did not perform a synovectomy of the DRIJ by using two separate portals because of the risk of articular cartilage damage in a limited joint space. When marked synovitis or severe radiographic involvement of the DRIJ are seen, we believe that open methods with or without arthroplastic procedures, such as a Darrach’s operation, are preferable.

We developed a modified scoring system which was based on the Larsen’s radiographic grade in order to assess the degenerative change in the wrist joint more quantitatively. The wrist joint has a complicated shape to its articular surface formed by many bones. We divided the articular surface into eight compartments and assessed each compartment separately. We believe that our system makes the radiographic assessment more reliable by reducing interobserver variation. As our scoring system has a numerical scale from 0 to 40 points, instead of the simple categorisation of the Larsen’s staging system, it also makes any comparison between pre- and post-operative radiographs more reliable.

It is well known that the best results of synovectomy are seen in the early stages of rheumatoid involvement. In the knee joint, many reports have suggested that synovectomy should be limited to chronically painful and swollen joints with early radiographic changes. In our study, those patients who showed advanced destruction of the articular surface of the wrists were also included; they reported good results after synovectomy, particularly in terms of pain relief. This suggests that the stage of degenerative change before surgery did not correlate significantly with the clinical results. As opposed to the joints of the lower limb, the wrist is not a weight-bearing joint and can cope well with applied loads during activity. We suggest that arthroscopic synovectomy should be considered for a wrist with advanced degenerative change before considering fusion or arthroplasty.

A limitation of this study is the relatively short follow-up. Our study showed a tendency towards an exacerbation of and a slow radiographic progression of degenerative changes over time. Adolfsson and Frisén reviewed 24 wrists in 19 patients which had been treated by arthroscopic synovectomy and reported good results with regard to pain and function after a mean of 3.8 years. The long-term efficacy of arthroscopic synovectomy of the wrist remains to be determined. Several studies of open synovectomy have shown beneficial effects on the function of the wrist for a considerable time, as well as a possible delay in the degenerative process. The general view of synovectomy for other joints is that there are few long-term effects on the degree or progress of degenerative change.

The course of the disease after surgery is difficult to assess for a number of reasons. The most important is the continuation of medication after operation. All the patients in our study continued their medical therapy, but no attempt was made to standardise it.

Our study has shown that arthroscopic synovectomy of the wrist in rheumatoid arthritis reduces pain and gives high patient satisfaction. It requires a short period of rehabilitation with no risk of post-operative stiffness. It also offers superior views and excellent access to all compartments of the wrist and is an effective way to remove pathological synovium. We believe that this procedure is indicated in patients who have active synovitis of the wrist despite appropriate systemic treatment. However, further follow-up is required to assess the longer term benefits of arthroscopic synovectomy compared with a standard, open approach.

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References


