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## SYNOVECTOMY OF THE ELBOW IN RHEUMATOID ARTHRITIS

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In view of the fact that Porter and his collaborators (1974) reported that in a hospital population suffering from rheumatoid arthritis, 25 per cent of the cases had severe disability in the upper extremities resulting totally or partly from disease of the elbow and that only 28 per cent showed no clinical evidence of elbow involvement, it is astonishing how little has been written concerning surgery of the elbow in rheumatoid arthritis. Since the elbow joint is not as heavily burdened as the knee joint, symptoms of synovitis in its early stages are not as pronounced there as in the knee.

In our clinic, synovectomy of the elbow is a frequent operation and we believed it would be of interest to make a follow-up study of a patient material which was homogeneous and where the surgical technique was standardized.

### MATERIAL AND METHODS

#### *Clinical material*

During the period 1965-1971, synovectomy was performed on 118 elbows in 91 patients at the Department of Orthopaedic Surgery in Lund. All of the patients had classical or definite rheumatoid arthritis. Eight patients (13 elbows) were excluded from the follow-up (five had died and three were not found) but three patients (four elbows) are included who at follow-up were already re-operated (arthroplasty). The latter four elbows are classified as failures. During the period of this study, arthroplasty was not performed as the first operation; "the small operation" (synovectomy + resection of the radial head) was always undertaken as a first trial. Details concerning the patients are given in Table 1.

The main indication for operation was pain. In a few cases the presence of a persistent synovitis and/or progressive joint stiffness or loss of movement (mainly

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Table 1.

	Male	Female	Total
Number of patients	30	54	84
Number of elbows	37	68	105
Right side	41 patients		
Left side	22 patients		
Both sides	21 patients		
	84 patients = 105 elbows		
Mean age at operation	46 (16-65) years		
Mean duration of rheumatoid arthritis	17 years		
Mean duration in elbow	9 years		
Mean observation time	3 <sup>3</sup> / <sub>4</sub> (1 <sup>1</sup> / <sub>4</sub> -6 <sup>2</sup> / <sub>4</sub> ) years		

rotation) were the main indications. The pain was graded as severe, moderate, or none and was registered both at work and at rest.

#### *Technique of operation*

The operation was usually performed under regional anaesthesia with a pneumatic cuff. All operations were performed in the following way: radial approach, the capsule and collateral ligament were split longitudinally and detached from the supracondylar ridge of the humerus in continuity with periosteum. The head of the radius was excised in all cases. This permitted wide access to all aspects of the joint, including the posterior recess. When the joint had been cleared of synovium (much is to be found around the neck of the radius), the capsule and the lateral ligament were sutured with silk around the drain, and the skin closed. No external fixation was made. The drain was removed after 24 hours, and active and passive exercises started. Some of the patients left the hospital 2 days after surgery but most stayed longer.

#### *Complications*

We had one radial nerve palsy, completely restored after 6 months, one haematoma and one superficial infection. These three patients were all very satisfied at follow-up. One patient had a wound rupture on the 11th day. After resuture, superficial infection developed and the patient was dissatisfied at follow-up because of pain during movement.

## RESULTS

Results were assessed on the basis of the patient's own opinion, the severity of any residual pain, changes in the range of movement, signs of recurrent synovitis and instability, and X-ray findings.

Table 2. Pain before and after surgery, 105 elbows.

	Constantly		Occasionally		Never		Less than preoperatively
	Preop.	Postop.	Preop.	Postop.	Preop.	Postop.	
Pain at rest	80	14	25	62	0	29	91 = 87 %
Pain at work	102	40	3	51	0	14	80 = 78 %

Table 3. Hinge and rotation movement after surgery, 105 elbows.

	Hinge	Rotation
Gain	40	63
Same within $\pm 10^\circ$	55	32
Loss	10	10

Table 4. Pre- and postoperative X-ray grading of elbows (see text).

Grade	Preop.	Postop.	Preop. grade of 20 elbows in dissatisfied patients
I	0	0	
II	26	20	3
III	62	58	5
IV	17	27	12
	105	105	20

*Patient's own opinion:* 72 patients with 85 operated elbows were satisfied with the operation at follow-up. That means 81 per cent satisfaction (calculated per elbow).

*Pain:* Relief of pain was good, as seen in Table 2; 78 per cent had less pain at work and 87 per cent had less pain at rest.

*Mobility:* Hinge and rotation movements were maintained or improved in most of the joints (Table 3).

*Stability:* No patient complained of symptoms which could be attributed to joint instability.

*Recurrent synovitis:* Eight patients had swelling with pain and three of these had symptoms on the ulnar side only.

*Radiological findings* are shown in Table 4. The pre- and post-operative AP and lateral radiographs of each elbow were assessed and an overall radiological grade of disease severity was assigned according

*Table 5. Reasons given by 20 patients for being dissatisfied (some patients gave more than one reason.*

Swelling with pain	5
Swelling with pain, ulnar side only	3
Pain without swelling	11
Pain with weakness	4
Rotation movement less	4
Hinge movement less	5

*Table 6. Reoperated elbows of 20 dissatisfied patients and preliminary results.*

	Result
Ulnar synovectomy + transposition of the ulnar nerve	2 good
Trimming proximal end of the radius + resynovectomy (bad surgical technique)	2 good
Resection of the ulnar head	2 good
Interposition - arthroplasty	4 good
Hinge prosthesis	3 2 good, 1 infect.
(No reoperation: 7 elbows)	13

to the following scale, based on that of Steinbrocker et al. (1949): Grade I = osteoporosis and soft tissue changes only; Grade II = mild or moderate degree of erosive change, mild or moderate reduction of joint space; Grade III = joint space markedly narrowed (to less than 1 mm) and more extensive erosions; Grade IV = subluxation, no joint space, bad deformation of the radial head. Six elbows have passed from Grade II to Grade III and three of these patients are dissatisfied. Ten elbows have passed from Grade III to Grade IV (five are dissatisfied), and for twelve elbows where the preoperative grade was IV the patients are dissatisfied.

Twelve patients with 20 elbows are dissatisfied and the patients' reasons for being dissatisfied are shown in Table 5. Thirteen of these 20 elbows were reoperated. The reoperations are shown in Table 6.

#### DISCUSSION

Assessment of the results of synovectomy in rheumatoid arthritis has many problems. In the upper limb it is particularly difficult to evaluate the function of a single joint in a patient suffering from polyarticular disease.

To show if synovectomy has a preventive effect, meaning that it stops the disease in the elbow, a prospective study must be made on elbows belonging to Grade I. To make a reasonably complete synovectomy we consider it necessary to resect the radial head, but as this resection gives symptoms in the distal radio-ulnar joint in about 50 per cent of patients not suffering from rheumatoid arthritis (Taylor & O'Connor 1964), we, like Porter et al. (1974), do not think that this resection is acceptable in a purely prophylactic operation.

Published reports on follow-up investigations of synovectomy of the elbow, with few exceptions, cover only limited and heterogeneous material: Wilkinson & Loury (1965), Merle d'Aubigné & Delbarre (1969), Torgerson & Leach (1970), Saltzer & Schwägerl (1970), Inglis et al. (1971) and Marmor (1972).

Wilson et al. (1973) reported on 55 elbows in 46 patients with good pain relief in about 90 per cent, but the surgical technique is not uniform in their material: sometimes they made two incisions, sometimes they resected the radial head.

Porter et al. (1974) reported on 123 patients with 154 elbows, about 50 per cent of which were classified as Grade III on the Steinbrocher X-ray scale. The first 62 elbows were operated through a radial incision, but in the last 92 elbows two incisions were made. According to Porter et al. (1974), surgery gives noticeable pain relief in about 70 per cent of the cases, whereas range of movement is not affected to any great degree. Cases operated with two incisions showed better results, but here the observation time was shorter.

In our series we obtained noticeable pain relief at rest in about 90 per cent of the elbows and at work in about 80 per cent (Table 2), and these results are slightly better than those of Porter et al. (1974) and about the same as those reported by Wilson et al. (1973). In 60 per cent of our cases there was a gain in rotation movement and, what surprised us, in 38 per cent there was a gain in hinge movement. This may be caused mainly by resection of the often badly deformed radial head, which was a mechanical hindrance to movement, but also by pain relief. The ten patients who lost in hinge movement were the same who lost in rotation.

In our series, no patient complained of symptoms which could be attributed to joint instability. Porter et al. (1974) found the same and this may be explained by the fact that a joint with less pain than before seems stronger to the patient.

During the period covered by the present investigation (1965–1971)

we performed only seven arthroplasties (four interpositions, three hinges); in all cases we performed synovectomy + radial head resection as a first step. We think that this fact strongly argues in favour of "the small operation," which is easily done, demands very little postoperative treatment, and, with few complications, helps about 90 per cent of patients with the most usual and worst symptom, viz., pain at rest. We believe that examination of the elbows should be routine in the case of all rheumatic patients, including especially palpation of the head of the radius and assessment of pain and crepitation by pro- and supination movements. We believe that many arthroplasties could be avoided if synovectomy + resection of the radial head were undertaken at an early stage. We find that the radial incision is sufficient in most cases; to add an ulnar incision no doubt causes more extensive operative trauma in the joint, with stiffness and difficulty in regaining the preoperative range of movement.

#### SUMMARY

The results of 105 synovectomies + resection of the radial head in 84 patients with rheumatoid arthritis are shown. Pain was the main indication for surgery, and  $1\frac{1}{4}$ - $6\frac{2}{4}$  years later about 80 per cent had pain relief at work, 90 per cent pain relief at rest. About 60 per cent of the elbows gained in rotation movement; about 40 per cent gained in hinge movement. Thirteen elbows had to be reoperated. In all cases there was only radial approach to the joint, which the authors find gives adequate exposure, few complications, and easy postoperative treatment.

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