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SURGICAL TREATMENT OF RUPTURE OF THE ROTATOR CUFF TENDON

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Rupture of the rotator cuff tendon still constitutes a therapeutic problem, although surgical repair of this lesion was introduced in the beginning of this century (Codman 1934). This tendon tear differs from others in that operative treatment is not always considered a matter-of-course. Gratifying results are sometimes obtained with conservative therapy, and initially it is difficult to select the cases in which surgery would be the method of choice. However, it may be assumed that the best results are obtained by operations performed soon after injury, as is generally the case in tendon ruptures.

MATERIAL AND METHOD

The series followed up consists of 55 patients with arthrographically verified rupture of the rotator cuff tendon surgically treated at the Department of Orthopaedics and Traumatology, Helsinki University Central Hospital, during the period 1960–1970 (Bakalim & Pasila 1973). Only three patients were under 40 years of age, 11 were 40–49 years old, 34 were 50–59 and seven were over 60 years. The age distribution of the patients is similar to that for osteo-arthritis. It may be mentioned that of 193 patients with ruptures of the rotator cuff tendon treated at the Physical Department of our hospital from 1960–1965, only 24 (12 per cent) were operated upon (Pasila 1965). The majority of the present, surgically treated patients were labourers performing heavy work, who did not progress satisfactorily by physiotherapy. The operation was performed within 3 months of injury in over half the cases (30/55), and within half a year in 43/55 cases (Table 1). Only 12/55 tears were treated surgically more than half a year after the accident. The indications for surgery were painful weakness of the shoulder joint and nocturnal pain. A pre-requisite for surgery was full passive abduction.

Operative repair of the rotator cuff tendon was carried out in practically all recent ruptures (time lapse between rupture and operation less than 6 months).

In connection with operative repair, partial excision of the acromion was performed in 20 first-operated cases in order to facilitate the postoperative

mobilization of the shoulder joint. Excision of the acromion allowed the possibility of reaching a far retracted rupture margin. Later the excision of the acromion was abandoned because of the untoward effect mentioned in the results.

Excision of the acromion alone was the only procedure carried out in 16/55 patients, as this was the treatment of choice when the time lapse from the accident exceeded half a year (10/12). In more recent ruptures this operation alone was carried out occasionally in small ruptures when the width of the tear was less than 2 cm (6/40).

The rupture was complete in all operated cases and usually was transversal. In a few cases the rupture also involved part or all of the infraspinatus. The supraspinatus tendon was generally retracted, the margin usually frayed and thickened. The width of the tear was measured at the operation and classified as small or large depending on whether it was smaller or larger than 2 cm. There were 32 small and 23 large tears. The bursa subacromialis and subdeltoidea often were obliterated. No calcium deposits were observed. No large osteo-arthritic changes could be demonstrated. Sometimes it was difficult to distinguish previous osteo-arthritic changes from secondary post-traumatic changes.

The rotator cuff repair was performed either according to the McLaughlin method (1962) or a bilateral incision was made to permit suturing the refreshened tendon brim through burr holes in the bone along a groove chiselled cranially in the greater tubercle.

RESULTS

Postoperatively the patients were followed up for at least 1 year or until they were definitely able to resume working.

The results of surgery are illustrated by the change in active abduction of the shoulder joint as shown in the diagrams in Figure 1, the first of which represents the state just before operation and the second the final range of abduction attained after operation. The latter diagram shows that active abduction was permanently impaired in some cases. As was to be expected, active abduction was more limited preoperatively in the patients with large ruptures.

A patient treated by partial excision of the acromion more than half a year after the accident had preoperatively had a normal range of active abduction despite having a total avulsion of the whole rotator cuff tendon. After complete excision of the acromion without cuff repair, the head of the humerus was dislocated upwards to such an extent that active abduction was under 30 degrees at follow-up examination 3 years post-operatively, although passive abduction was normal. Owing to the extent of the tear, the acromion had been necessary to prevent upward dislocation of the head of the humerus during active abduction.

The same tendency towards impaired abduction was frequently ob-

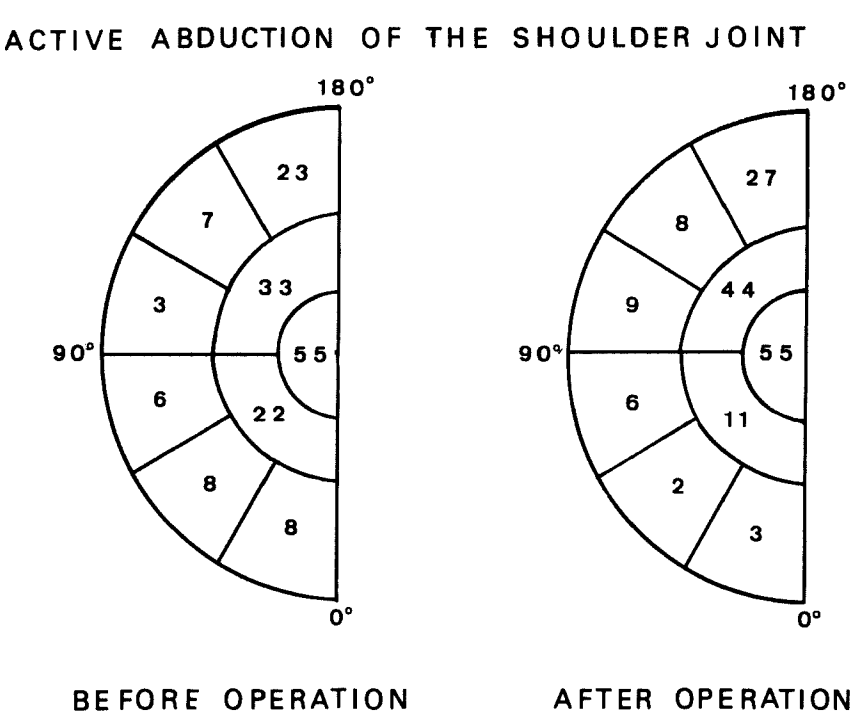

Figure 1.

Table 1. Time lapse between accident and operation.

Time from accident to operation	No. of patients
< 1 month	7
1– 3 months	23
3– 6 months	13
6–12 months	3
>12 months	9
Total	55

served in connection with partial excision of the acromion. Of the patients on whom excision of the acromion was performed either alone or in connection with operative repair, eight showed impairment of the range of active abduction. By contrast, active abduction decreased in only one out of 19 patients treated by operative repair alone.

In labourers performing heavy work, the return to work may be

considered the criterion of a successful operation. Half the labourers (23/44) were able to return to their previous work (Table 2). Postoperatively they were not able to work for at least 3 months. Of the patients who still had not returned to work half a year after the operation, very few returned later (2/23). All patients operated upon within 1 month of the accident returned to their previous work.

Table 2. Unfitness for work and return to heavy work.

Months	Duration of unfitness for work			Total
	3	3–6	6–9	
Returned	11	10	2	23
Not returned				21
Total				44

Table 3. Return to heavy work related to width of the rupture.

Width of rupture	Return to work	Unfit for work	Total
Small ruptures	13	12	25
Large ruptures $>$ 2 cm	10	9	19
Total	23	21	44

The extent of the tear did not seem to influence the return to heavy work (Table 3).

Independently of the extent of the resection, excision of the acromion brought immediate relief of nocturnal pain.

DISCUSSION

A tear of the rotator cuff tendon was operatively treated within a month of the accident in four labourers performing heavy work. All of them returned to their previous work. This group is too small to permit any further conclusions, but it seems evident that operative repair ought to be considered immediately after injury if the clinical symptoms are severe enough. This would include some patients who also might recover after conservative therapy, but considering that

recovery takes several months, even after conservative treatment, surgery makes no appreciable difference in this respect. Codman (1934) recommended surgical intervention soon after the accident. Heikel (1968) found excellent and good results after early surgical repair. A delay of about a month, during which time physical therapy is given, has been considered to cause no harm (McLaughlin 1962). Operative treatment is recommended when good abduction is not restored by conservative treatment for 1–1½ months (Da Palma 1950), 2–4 months (Campbell 1963), 4–6 months (Debeyre et al. 1965).

Adams (1964) and Magnusson (1959) recommended against operative treatment of patients over 40 years of age. In the present material only three patients were under 40. The age distribution was similar to that for osteo-arthritis. The significance of degenerative changes in the aetiology of ruptures in the rotator cuff tendon is generally accepted (McLaughlin 1944, 1962, Olsson 1953, Magnusson 1959, Bunnell 1959). In our series the degenerative changes found at operation were not very predominant. No large osteo-arthritic changes and no calcification were demonstrated. Perhaps the traumatic origin is more dominant in our operated patients.

According to Bunnell (1959), removal of a portion of acromion can be done if it blocks abduction. Excision of the acromion allows the possibility of reaching a far retracted rupture margin. A tendency toward impaired abduction was frequently observed after excision of the acromion either alone or in connection with operative repair of the tear. Active abduction decreased in only one patient treated by operative repair alone. In the case of a large rupture, excision of the acromion cannot be recommended as the only procedure carried out, because the acromion is necessary to prevent upward dislocation of the head of the humerus in abduction. An untoward effect of excision of the acromion was observed after operative repair of a tear, when the head of the humerus dislocated upwards and impaired active abduction. According to Hazlett (1971), failure to achieve satisfactory repair, together with excision of the acromion, gave unsatisfactory results because without rotator cuff integrity the intact acromion was important to the shoulder.

Excision of the acromion alone is adequate in selected cases, when surgical treatment is resorted to a long time after the accident. It may be recommended for treating small tears in patients with satisfactory abduction strength, especially if the painful arc symptom is not relieved

by any other means. Excision of the acromion brings relief of nocturnal pain in patients with rupture of the rotator cuff tendon.

Labourers performing heavy work with a torn rotator cuff often are incapacitated for work even after successful operative treatment of the lesion.

SUMMARY

A total of 55 tears of the rotator cuff tendon were surgically treated at the Department of Orthopaedics and Traumatology, Helsinki University Central Hospital, during the period 1960–1970. The rate of operative treatment was about 12 per cent. When more than half a year had elapsed since the accident, excision of the acromion was almost the only operative procedure carried out (10/12 patients). Excision of the acromion was performed as the only procedure in 16 cases and in connection with surgical repair of the rotator cuff tendon in 20 cases. This operation brings relief of nocturnal pain, but it is harmful in the treatment of large tears when used alone and sometimes also in connection with surgical repair of the rotator cuff tendon. Surgical repair of the lesion seems to give the best results, provided it is performed within 1 month of the injury.

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