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Original article

Is rotator cuff repair appropriate in patients older than 60 years of age? Prospective, randomised trial in 103 patients with a mean four-year follow-up



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ABSTRACT

Background: The objective of this randomised trial was to compare surgical rotator cuff repair to simple decompression by acromioplasty and biceps tenotomy in patients older than 60 years of age with a mean follow-up of 4 years.

Hypothesis: Tendon repair produces better functional outcomes than simple decompression and prevents progression towards cuff tear arthropathy in the longer term.

Patients and method: Of 130 initially included patients older than 60 years of age and having rotator cuff tears deemed amenable to surgical repair, 103 (79%) were evaluated after a mean of 4 years. These patients had been randomly allocated to acromioplasty and tenotomy (AT group, $n=49$) or to acromioplasty, tenotomy, and tendon suture (CR group, $n=54$). The tear was distal in 41 patients, intermediate in 40, and retracted in 22. At last follow-up, the evaluation included the clinical Constant's Score, radiographs and, in the CR group, ultrasonography.

Results: The complication rate was 4%. The mean Constant Score was 44 preoperatively; values after 4 years were 76 overall ($P=0.01$), 78 in the CR group, and 73 in the AT group ($P=0.01$). The tendon-healing rate as assessed using ultrasonography was 63%. The Constant Score was significantly better when tendon healing was achieved (82/73, $P<0.001$). In the AT group, the acromio-humeral distance was significantly shorter (6.9 mm/7.8 mm, $P=0.03$) and eccentric humeral head position was more common (44%/26%, $P=0.01$).

Discussion: Arthroscopic rotator cuff repair provides better functional outcomes than does simple decompression in patients older than 60 years and prevents cuff tear arthropathy with eccentric humeral head position in the medium term. Tendon healing is the main determinant of outcomes after rotator cuff repair.

Level of evidence: II, randomised trial.

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1. Introduction

Rotator cuff tears are common in older individuals [1]. Although usually asymptomatic, they are often diagnosed during a workup for shoulder pain. The frequency of this clinical situation contrasts with the lack of certainty regarding the best management options. Good outcomes obtained after simple decompression surgery [2,3], together with the tendon healing impairments seen with advancing age [4,5], may cast doubt on the benefits of tendon suture. At

the 1998 SOFCOT symposium, rotator cuff repair was deemed inadvisable after 65 years of age and a case-by-case discussion of the treatment indications was recommended for patients aged 55 to 65 years.

Nevertheless, in the absence of tendon suture, the humeral head position becomes eccentric and functional impairments develop eventually [2,3,6,7]. The development over the past decade of arthroscopic techniques has diminished the invasiveness of tendon repair surgery, which is now easily performed in elderly patients. In addition, older individuals now enjoy many more years of good health than previously and are often physically active or even regular sports participants who therefore have a strong demand for good function. Mean patient age in published case-series

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studies of cuff repair has increased in recent years [8–13]. However, although these studies showed good outcomes, they failed to demonstrate that tendon suture was superior over simple decompression surgery.

Our main hypothesis was that tendon suture in addition to decompression (acromioplasty and biceps tenotomy) would produce better functional outcomes than decompression alone in patients who were older than 60 years at surgery and who were reevaluated 4 years later. We also hypothesised that tendon healing might be associated with better function and that tendon suture might prevent gradual loss of humeral head centring in the long-term. This study extends our previously published data obtained after 1 year of follow-up [14].

2. Patients and method

2.1. Patients

We conducted a single-centre randomised trial between February 2007 and July 2008. We included patients older than 60 years with rotator cuff tears involving the supraspinatus tendon with or without an extension to the infraspinatus tendon, confirmed by magnetic resonance imaging (MRI) or computed arthrotomography (CT-arthrography) and considered amenable to repair based on radiological findings (fatty degeneration < stage 3 and centred humeral head) and intraoperative criteria (reducibility of the tendon). Exclusion criteria were previous surgery on the involved shoulder, concomitant sub-scapularis tendon tear, spontaneous tear of the long head of biceps tendon (LHBT), pseudo-paralysis or stiffness of the shoulder, gleno-humeral osteoarthritis, eccentric humeral head, or fatty degeneration > stage 2 according to Goutallier et al. [15]. With alpha set at 0.05, 130 patients were needed to obtain 80% statistical power.

The 130 included patients were allocated at random to acromioplasty and tenotomy only (AT group, $n = 60$) or to AT plus tendon suture (CR group, $n = 70$). Randomisation occurred on the day before surgery and the patients were then informed about the type of procedure they would receive. In all, 103 (79%) patients were reevaluated during a visit after a mean follow-up of 4 years (range, 3–5), including 54 in the CR group and 49 in the AT group. Of the 27

patients who were not reevaluated, 6 had died and 21 had been lost to follow-up or were unable to travel to our centre, usually because of unrelated health problems.

Our study population of 103 patients included 53 women and 50 men with a mean age of 68 ± 5.1 years (range, 60–82 years) at surgery. The tear was on the dominant side in 75 (73%) patients. Preoperatively, the mean Constant Score was 44 ± 12.8 (range, 18–73), the mean acromio-humeral distance (AHD) was 8.3 ± 1.6 mm (range, 6–12 mm), and the humeral head was always centred. The arthroscopic evaluation of the tear conducted according to Thomazeau et al. and Bernageau [16,17] showed 42 distal, 39 intermediate, and 22 retracted tears. None of the preoperative parameters studied showed statistically significant differences between the two groups (Table 1).

2.2. Operative technique and postoperative care

All patients underwent arthroscopic surgery in the lateral decubitus position. Evaluation of the gleno-humeral joint then of the subacromial area provided detailed information on the tear in the coronal and sagittal planes. Exclusion criteria (sub-scapularis tear, spontaneous LHBT tear, and irreparable tear) were sought. LHBT tenotomy flush with the glenoid attachment and decompression acromioplasty were performed in all patients in both groups. In the CR group, tendon suture was consistently achieved using metal anchors inserted into the tip of the greater tuberosity after abrasion of the footprint, in a single-row ($n = 21$) or double-row ($n = 33$). The number of anchors used was recorded. All procedures were performed by one of three senior surgeons (OR, FS, DM).

Partial immobilisation was achieved by wearing a simple sling for 4 weeks. A passive self-rehabilitation programme was taught to all patients on day 1 and started immediately, with simple oral analgesics. Hospital-stay length was recorded for each patient. After 4 weeks, physiotherapy sessions were prescribed if needed.

2.3. Method

At last follow-up, all patients were assessed by an observer who was independent from the surgeon. The clinical evaluation included passive and active motion range measurements, cuff testing,

Table 1
Demographic data of the study patients.

	Overall	AT group	CR group	P value (CR vs. AT)
Number of patients	103	49	54	
Mean age	68 ± 5.1 (60.6–81.5)	69 ± 5.6 (60.6–81.3)	67 ± 4.5 (61–81.5)	0.15
Males/females	50 (49%)/53 (51%)	24 (49%)/25 (51%)	26 (48%)/28 (52%)	0.85
Dominant side involved	75 (73%)	33 (67%)	41 (76%)	0.26
Preoperative Constant Score	44 ± 12.8 (18–73)	43.5 ± 12.4 (18–68)	44 ± 13.2 (19–73)	0.84
Pain	5.4 ± 2.8 (0–10)	5.5 ± 2.8 (0–10)	5.2 ± 2.8 (0–10)	0.59
Activity level	9.4 ± 3 (2–17)	9.7 ± 2.8 (4–17)	9.2 ± 3.2 (2–16)	0.42
Range of motion	22.8 ± 7.7 (6–38)	22 ± 7.4 (6–36)	23.5 ± 8 (8–38)	0.34
Strength	6.1 ± 3.3 (0–18)	6.3 ± 3.4 (2–18)	5.9 ± 3.2 (1–16)	0.54
Acromio-humeral distance	8.3 ± 1.6 (6–12)	8.2 ± 1.7 (6–12)	8.3 ± 1.5 (6–13)	0.38
Distal tear	42 (41%)	21 (43%)	21 (39%)	
Intermediate tear	39 (38%)	20 (41%)	19 (35%)	0.51
Retracted tear	22 (21%)	8 (16%)	14 (26%)	
Operative time (minutes)	37 ± 20.2 (10–90)	20 ± 6.1 (10–40)	53 ± 14.8 (20–90)	<0.001
Physical therapy	73 (71%)	28 (58%)	45 (85%)	0.003

AT: acromioplasty and tenotomy only; CR: acromioplasty, tenotomy, and tendon suture.

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