

Rotator Cuff Damage in the Elderly: Assessment of Function, Integrity and Strength

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Abstract

Aim: Rotator cuff injury in patients over the age of 65 years: evaluation of function, integrity and strength.

Methods: A prospective study was conducted in the Department of Orthopedic, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India from November 2018 to August 2019. consecutively selected shoulders in individuals of the specified age, with a clinical diagnosis of rotator cuff injury that had been confirmed by means of magnetic resonance imaging, were treated surgically. The inclusion criteria were that the patients should be over the age of 65 years at the time of the surgery; the procedure was performed under arthroscopic viewing and the minimum postoperative follow-up

Results: The preoperative mean UCLA score result was 17.46 and the postoperative mean was 32.39, i.e. 89.28% of the results were excellent or good. The mean result from the Simple Shoulder Test was 9.86; the worst result (score of 4) was from the oldest patient in the study (82 years of age), who presented renewed tearing of the supraspinatus, measuring 2 cm on postoperative ultrasound performed 27 months after the treatment, and an UCLA score of 13. From evaluating the postoperative ultrasound, renewed tearing was detected in 7 (25.9%) of the patients who returned for control examinations. In six cases, the lesion was less than 1 cm in length. Only in the most elderly patient was the lesion 2 cm. All of the other patients had good or excellent UCLA scores.

Conclusion: The repairs on rotator cuff lesions among patients over the age of 65 years performed by means of arthroscopy produced major clinical improvements, based on pain relief, function and integrity of the repair. The information regarding strength was inconclusive.

Keywords: rotator cuff, arthroscopy, integrity

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Introduction

Rotator cuff (RC) tears are a common cause of pain and disability of the shoulder in adult population, with an incidence that increases with age. In fact, although a genetic susceptibility seems to be present[1], the RC lesions basically result as part of a degenerative process of

aging.[2] At the beginning of the 1990s, there was a trend toward more conservative approaches toward rotator cuff lesions among the elderly. However, great technological advances have made it possible for surgeons to achieve better functional results in this age group.[3] The

advantages of arthroscopic repair are its low surgical impact, the possibility of maintaining the integrity of the deltoid and a less painful postoperative period.[4] The factors contraindicating surgical repair among the elderly include the generally larger injuries in this age group, with worse tissue quality and slower healing response than in individuals aged 50–70 years.² Moreover, elderly people have a tendency to present greater numbers of comorbidities (diabetes mellitus, rheumatoid arthritis and renal diseases), which may interfere with surgical recovery.[2,5]

A large variety of studies have analyzed the short-, medium- and long-term functional results from rotator cuff surgery.[6-8] Here, we evaluated the more advanced age group through questionnaires on functional capacity, ultrasound examinations and muscle strength measurements, with the aim of analyzing the results following arthroscopic repair of the rotator cuff in patients over the age of 65 years, in relation to function, strength and integrity.

Materials and methods

A prospective study was conducted in the Department of Orthopaedics, Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar, India from November 2018 to August 2019. After taking the approval of the protocol review committee and institutional ethics committee, 35 consecutively selected shoulders in individuals of the specified age, with a clinical diagnosis of rotator cuff injury that had been confirmed by means of magnetic resonance imaging, were treated surgically. The inclusion criteria were that the patients should be over the age of 65 years at the time of the surgery; the procedure was performed under arthroscopic viewing and the minimum postoperative follow-up. The following were exclusion criteria in this study: lesions larger than 5 cm with retraction as far as the glenoid, associated lesions (SLAP, Bankart, etc.), previous surgery on the same shoulder, presence of glenohumeral

arthrosis, follow-up of less than 24 months, refusal to participate in the study and failure to adhere to the protocol that had been established or incorrect following of this protocol. Among the 28 patients who were operated, 8 had injuries that were considered small, 12 had medium-sized injuries and 8 had large injuries. The patients were evaluated by two independent examiners who did not take part in the procedures, using the University of California at Los Angeles (UCLA) score before the operation and then, after the operation, reassessment using the UCLA score along with the Simple Shoulder Test (SST) and a visual analog scale (VAS).[9,10] The integrity of the tendons was investigated by means of ultrasound examinations performed by the same examiner, using a Toshiba device with a 7.5 MHz linear transducer.[3,11] Elevation strength and external rotation were also measured by a single examiner using a dynamometer (IDO Isometer Shoulder Muscle Strength Gauge, United Kingdom). After discarding the lowest of the three measurements, the average of the higher two measurements was used. The results were analyzed statistically using Levene's test for equality of variance and the *t*-test for equality of means. The patients were positioned in lateral decubitus and were operated under general anesthesia and brachial plexus block. Anterior, lateral and posterior portals were used and a complete inventory of the glenohumeral joint was routinely made. Following this, bursectomy was performed to identify the size of the lesion and the tendons involved. In all the cases, economical debridement of the edges of the lesion was performed and the zone for reinsertion of the rotator cuff in a juxta-articular position was prepared. The tendons were reinserted using 5 mm titanium anchors in a single row, with nonabsorbable threads that maintained separations of 1 cm between them. Acromioplasty was performed when the subacromial space was found to be greatly reduced by a curved or hooked acromion, or in situations of fibrillation of the

coracoacromial ligament. The long head of the biceps was tenotomized in three patients (10, 23 and 24), and no tenodesis was performed. During the postoperative period, the repair was protected through use of a Velpeau sling for six weeks. Self-administered passive exercises for the shoulder were started four weeks after the surgery and, after use of the sling had been withdrawn, the patients were referred for physiotherapeutic rehabilitation. Exercises against resistance were started only after the third month. Among the 28 patients evaluated, 6 (21.42%) were male and 22 (78.58%) were female; their ages ranged from 65 to 82 years, with a mean of 70.54. The dominant side was affected in 18 patients (64.28%).

Results

The preoperative mean UCLA score result was 17.46 and the postoperative mean was 32.39, i.e. 89.28% of the results were excellent or good. The mean result from the Simple Shoulder Test was 9.86; the worst result (score of 4) was from the oldest patient in the study (82 years of age), who presented renewed tearing of the supraspinatus, measuring 2 cm on postoperative ultrasound performed 27 months after the treatment, and an UCLA score of 13.(table1)

This patient also presented the lowest elevation strength: the weight lifted was 1.08 kg. The mean elevation strength was 4.64, from evaluating the left operated side.

The worst result on the analog pain scale was 8, relating to patient 19. However, on evaluating this patient's ultrasound, it was observed that the rotator cuff was intact and, from the physical examination, it was perceived that this case involved

cervical pain that had irradiated to the shoulder Patient 14 also presented only a fair result (UCLA 26). Although this patient's strength was preserved and there was no recurrence of the lesion, pain continued to be present, with functional impairment.(table 2.)

From evaluating the postoperative ultrasound, renewed tearing was detected in 7 (25.9%) of the patients who returned for control examinations. In six cases, the lesion was less than 1 cm in length. Only in the most elderly patient was the lesion 2 cm. All of the other patients had good or excellent UCLA scores.

The statistical analyses applied did not show significance, probably because of the small sample size.

Table 1: Description of patients' sex, age and length of follow-up and comparison between pre- and postoperative UCLA scores.

Patients	Sex	Age at the time of surgery	Length of follow-up (months)	Preoperative UCLA score	Postoperative UCLA score
1	F	72	35	34	35
2	F	65	47	22	35
3	F	82	27	13	13
4	F	71	48	18	32
5	F	72	63	17	35
6	F	68	64	12	26
7	F	65	66	19	30
8	F	76	30	14	34
9	F	66	50	22	35
10	M	77	31	23	35
11	F	71	68	11	35
12	M	71	53	12	35
13	F	69	57	26	35

14	F	71	55	17	26
15	F	67	62	11	28
16	M	71	60	18	35
17	F	65	64	10	30
18	F	73	46	19	35
19	F	67	82	16	29
20	F	65	44	16	35
21	F	65	44	16	35
22	M	67	26	23	34
23	M	78	34	15	35
24	M	73	63	11	34
25	F	74	68	17	32
26	F	72	38	19	35
27	F	74	38	19	35
28	F	68	50	25	34
Means	6M, 22F	70.54	51.18	17.46	32.39

Table 2: VAS, SST and elevation and rotation strength results according to the side operated.

Patients	VAS	SST	Side operated/dominant side	Right-side elevation strength	Left-side elevation strength	Right-side rotation strength	Left-side rotation strength
1	0	12	R/R	4.6	5.7	5.23	5.44
2	0	11	L/R	2.35	6	3	5.1
3	6	4	L/R	3.52	1.08	4.16	2.95
4	1	11	R/R	2.51	1.65	3.11	1.99
5	0	11	R/R	4.02	4.03	5.37	5.21
6	5	4	R/R	1.01	1.66	2.93	3.8
7	5	8	L/R	1.92	2.31	3.45	3.79
8	2	9	L/R	3.48	2.23	3.69	3.03
9	0	12	L/R	6.97	6.24	5.66	7.24
10	0	12	R/R	3.12	3.14	3.68	4.02
11	0	12	R/R	2.71	3.01	3.02	3.95
12	0	12	R/R	5.02	5.31	5.67	5.45
13	0	7	R/R	3.5	3.54	4.3	4.18
14	5	6	L/L	3.52	4.02	5.64	4.87
15	6	8	R/R	5.54	5.47	4.48	4.67
16	0	12	R/R	4.29	3.87	4.81	4.05
17	2	9	L/R	3.95	3.02	4.69	4.21
18	0	11	L/R	4.02	4.03	5.37	5.21
19	8	6	R/R	2.67	2.82	3.59	5.05
20	0	12	L/R	5.82	4.46	4.39	4.68
21	0	12	R/R	5.82	4.46	4.39	4.68
22	0	10	L/R	6.08	3.07	6.32	1.97
23	0	11	R/R	4.37	3.8	6.2	5.6
24	1	12	R/R	4.11	3.83	6.02	5.71
25	1	10	R/L	5.02	5.31	6.87	6.89

26	0	12	R/R	4.64	4.78	5.24	5.06
27	0	11	R/R	3.56	4.01	4.98	5.2
28	0	9	R/R	4.57	4.12	6.25	5.89
Means	1.50	9.86		4.06	3.82	4.73	4.64

Discussion

In treating symptomatic lesions of the rotator cuff that have not responded to conservative treatment based on analgesics, gains in range of motion and muscle strengthening, surgical treatment deserves to be taken into consideration.[7,11,12]

A decision to implement surgery needs to be made by evaluating the patient's functional incapacity in day-to-day activities, together with important information from magnetic resonance imaging, which makes it possible to assess the degree of retraction of a tendon and the existence of any fatty degeneration in the muscle belly.[13-15]

Many patients over the age of 65 years are known to be still performing activities with high functional demands and would benefit from repair to allow them to continue their activities, even though these demands are lower than those of young patients.

Many people may consider that the changes that occur in tendons with advancing age lead to limitation of the capacity for healing and that when repairs are made, the rehabilitation requires greater effort.[5,16]

In the light of these difficulties encountered in the tendons of the rotator cuff of this group of patients over the age of 65 years, some authors have performed decompression and simple debridement of complete tears of the rotator cuff that did not respond to conservative treatment.¹⁶⁻²⁰ Since reconstruction of the rotator cuff is increasing showing results that are better than those from simple debridement, performing debridement alone can no longer be justified.[4,6,7,21,22] In the studies by Gartsman and Grondel et al.,[23] the same conclusion was reached: pain relief and functional improvement were

only temporary if simple debridement was performed.

In our study, we found that the postoperative UCLA score was higher in 27 out of the 28 patients re-evaluated. The measurements of elevation strength and external rotation that were made using the dynamometer produced results that did not allow us to come to a conclusion, with regard to comparing the operated and non-operated sides, because there was some disparity in the values.

Patients who presented renewed tearing sometimes had greater strength than on the non-operated side. Since we did not evaluate the integrity of the tendon on the non-operated side, these results might be explained by the possible existence of lesions in these unevaluated shoulders.

Postoperative complications from arthroscopic repairs on rotator cuff lesions, such as stiffness, infection, sympathetic reflex dystrophy, deep vein thrombosis and death, do not have high prevalence in the literature,[24] and our study corroborates this information. There was no anchor failure, but renewed tearing of the rotator cuff with lesions of up to 3 cm was observed in seven of the 27 patients who were re-evaluated by means of ultrasound examinations. In these patients, the postoperative UCLA and SST gave good results.

The options for performing surgery on the tendons of the rotator cuff include open repair, mini-open repair and purely arthroscopic repair. The decision on which type of repair to perform will depend on the surgeon's familiarity with these types and his preferences. The advent of the totally arthroscopic repair technique has enabled surgery with smaller incisions (access through portals), lower aggression toward

soft tissues, maintenance of the integrity of the deltoid muscle and its acromial insertion, reduction of postoperative pain and morbidity and the possibility of correcting intra-articular pathological conditions.[4,6,20,25,26]

One limitation of our study was the lack of a control group. We considered that the minimum length of follow-up of 24 months was adequate, given that previous studies found that the maximum time taken for healing to be achieved was six to nine months after the surgery[27] and that after a 12- month period, no further changes relating to healing were observed.[28,29]

During the operation, the rotator cuff was completely reconstructed and debridement was not performed in any of the cases. The results from this study suggest that if a lesion can be completely repaired at the time of the surgery, functional improvements can be expected in the patients, independent of the age group.

We performed ultrasound examinations on 27 out of the 28 patients and considered that this was an important additional factor in this study, which made it possible to examine the integrity of the rotator cuff. It is known that renewed tearing of the rotator cuff after the operation does not necessarily lead to a poor result,[3,30,31] and we also observed this. Choosing surgery gives patients the possibility of improving their painful symptoms and achieving functional improvement, and the data obtained suggest that surgical indications are valid, despite frequent occurrences of renewed tearing.

Conclusion

The repairs on rotator cuff lesions among patients over the age of 65 years performed by means of arthroscopy produced major clinical improvements, based on pain relief, function and integrity of the repair. The information regarding strength was inconclusive.

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