

Original article

<https://doi.org/10.18019/1028-4427-2022-28-6-755-759>**Comparison of surgical and conservative treatment of shoulder instability after primary dislocation in patients over 45 years old**Alexey A. Makovsky^{1,2✉}, Ruslan V. Zaytsev¹, Vadim E. Dubrov¹¹ Lomonosov Moscow State University, Moscow, Russian Federation² Moscow Clinical Scientific Center of A.S. Loginov, Moscow, Russian Federation**Corresponding author:** Alexey A. Makovsky, Makovskiya@yandex.ru**Abstract**

Introduction Shoulder dislocation is one of the most common shoulder injuries and occurs in all age groups. Methods for diagnosing and treatment of the middle and older age groups patients with acute injury currently remain open. Surgical treatment is usually applied only in cases of chronic instability. However, conservative treatment in cases with a missed rotator cuff tear leads to a dysfunction of the shoulder joint and can lead to the development of chronic pain and recurrent shoulder instability. Therefore, it is necessary to develop an algorithm for diagnosing the rotator cuff tear and to find the most optimal methods for its surgical correction. **The purpose** of the study was to compare the results of conservative and surgical treatment in patients of the middle and older age groups after traumatic dislocation of the shoulder, accompanied by rotator cuff tear. **Materials and methods** The study is based on a prospective analysis of examination and treatment of 114 patients with shoulder dislocation aged 18 to 89 years. Among all patients with rotator cuff tear, 19 patients were selected for conservative treatment and 24 patients for surgical refixation of the rotator cuff tendons. **Results** The result of treatment was assessed 12 months after the surgical operation or the injury using ULCA shoulder score, DASH and ASES. It was found the scores of patients who underwent surgery for rotator cuff tear were significantly better than in the patients treated conservatively. **Conclusion** Therefore, all patients of middle and older age groups with dislocation of the shoulder should be examined for the presence of rotator cuff tear. In case the rotator cuff is torn, surgical treatment is preferred over conservative treatment.

Keywords: shoulder dislocation, shoulder instability, rotator cuff tear

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INTRODUCTION

Traumatic dislocation of the shoulder may occur in people of all ages, but commonly affects people who lead an active lifestyle [1, 2], so the incidence of such dislocations continues to increase [3]. At the same time, according to various studies, up to 64 % of all shoulder dislocations occur in patients older than 45 years [2, 4, 5].

Shoulder dislocation may be accompanied by a certain complex of injuries: a fracture of the glenoid cavity of the scapula, an impression fracture of the head of the humerus (HH), damage to the capsule, ligaments and cartilaginous labrum of the joint, tear of the rotator cuff (RC), as well as fractures of the proximal humerus [2, 6].

Despite a significant number of studies devoted to this topic [4, 7–10], it is difficult to determine the damage that makes the main contribution to the development of shoulder joint (SJ) instability [6]. This causes difficulty in choosing the right treatment algorithm and surgical intervention tactics of managing patients with shoulder dislocation [11, 12].

The issues of tactics for diagnosis and treatment of the patients of the middle and older age groups with acute injuries currently remain open; and surgical treatment is actively discussed only in cases of chronic instability of the shoulder joint [13]. Nevertheless, it

is the conservative treatment of primary dislocation of the shoulder that in most cases leads to recurrence of SJ instability and persistent pain in the presence of rotator cuff tear [14]. The traditional approach to the treatment of shoulder dislocation using immobilization of the upper limb has significant pitfalls: a high risk of developing chronic instability of the SJ, the risk of stressful fatty degeneration of the bellies of the muscles of the rotator cuff, degeneration of damaged shoulder structures, persistent pain syndrome in patients of middle and older age groups, a long period disability [4, 14, 16].

Young patients who experience regular microtrauma of the shoulder, young athletes in throwing sports, as well as athletes in contact sports most often injure the rotator cuff due to high-energy trauma [17]. Patients of the middle and older age groups may frequently damage it even by a low-energy household activity due to the ongoing degenerative age-related changes in the tendons of the rotator cuff [18]. As a result, a missed injury to the rotator cuff leads to the limitation of the shoulder function and causes the development of chronic pain syndrome and recurrent SJ instability. Therefore, it is necessary to develop an algorithm for diagnosing its tear, as well as rational methods of surgical correction [5, 17, 19–22].

Purpose To compare the results of conservative and surgical treatment of patients of middle and older

age groups after traumatic dislocation of the shoulder, accompanied by rotator cuff injury.

MATERIALS AND METHODS

The study was based on a prospective analysis of the results of examination and treatment of 114 patients with shoulder dislocation aged 18 to 89 years (mean age, $SD 51.5 \pm 18.4$) who applied to Moscow traumatologic and orthopedic hospitals in 2015-2020. All patients expressed their consent to participate in the study and agreed with the proposed treatment plan. Patients were included in the study after the dislocated shoulder joint had been reduced. Exclusion criteria were signs of disease of the shoulder joint before injury, indirect radiological signs of a rotator cuff injury, high-energy trauma, difficulty in shoulder dislocation reduction, fractures of the proximal humerus at the time of injury (except for impression fractures of the head of the humerus).

All patients underwent magnetic resonance imaging (MRI) within one week after the injury to assess the nature and extent of SJ injuries after reduction of the dislocation. Rotator cuff injury was found in 43 patients over 45 years of age, who were divided into two groups, a group of conservative treatment and a group of surgical treatment. The first group included patients whose main method of treatment was conservative treatment, the second group included patients who underwent surgery followed by a course of rehabilitative treatment, the same as in the group of patients without surgical treatment. All patients were offered surgical treatment. Upon refusal, the patient was included in the first group. Exclusion from the first group and inclusion in the second group was possible only during the first 6 weeks after the dislocation. Thus, the group for surgical treatment included patients without chronic injuries of the rotator cuff, which are characterized by a higher proportion of failures and complications after surgical treatment [21].

The conservative treatment group included 19 patients from the older age group with confirmed RC injury, 9 men and 10 women (47.4 % and 52.6 %, respectively). The mean age of patients was 63.6 ± 11.9 years (45 to 88 years), 95 % CI 58.28-68.98. Conservative treatment consisted of initial immobilization of the upper limb for three weeks, followed by training for recovery of active movements.

The group for surgical treatment included 24 patients, 15 men and 9 women (62.5 % and 37.5 %, respectively), their mean age was 59.6 ± 11.09 years (45 to 84 years), 95 % CI 55.15-64.02. Surgical intervention was performed both using the methods of optical video equipment (arthroscopy) and using open techniques. Given the lack of difference in the outcomes

of endoscopic and open surgeries [23–26], the method of intervention was chosen randomly. Fifteen (62.5 %) patients underwent endoscopic intervention, and 9 (37.5 %) patients underwent open surgery.

At the first stage of the endoscopic method of intervention, diagnostic arthroscopy was performed; the SJ components were examined thoroughly and the severity of their damage was assessed. In the absence of bone defects that significantly affect the biomechanics of chronic instability in the joint, subacromial decompression and visualization of the rupture of the RC tendons were performed followed by RC refixation to the anatomical site of tendon attachment using anchor fixators. Fixation, depending on the size of the injury and the degree of tendon retraction (Fig. 1), was performed using both single-row (62.5 % of patients) and double-row (37.5 % of patients) sutures.



Fig. 1 Radiographic check of the shoulder joint: result of arthroscopic suture of the rotator cuff

In the open intervention, after visual and palpation identification of injuries, the tendons were fixed to the greater tubercle of the shoulder joint with a transosseous suture. A standard transdeltoid anterolateral approach was used with a skin incision up to 5-7 cm long, parallel to the fibers of the deltoid muscle. After stitching through the tendon, the threads were pulled and tied in a position of abduction sufficient to ensure good contact between the tendons and the greater tubercle.

In the postoperative period, patients underwent a course of rehabilitation measures which was identical to the course in the conservative treatment group.

A year after shoulder dislocation in the conservative treatment group and a year after surgery in the surgical treatment group, patients were clinically examined and interviewed using specialized functional scales. The functional SJ state was assessed using the systems for evaluating the function of the upper limb and SJ: UCLA (University of California Los Angeles), DASH (Disability of the Arm, Shoulder and Hand Outcome Measure), ASES (Shoulder assessment form American shoulder and elbow surgeons) [12, 16].

The main issue was the analysis of the data obtained specifically with the help of questionnaires, because

the ultimate goal of the work is to compare the results of treatment, which are of subjective nature to a great extent.

The functional and clinical states of the upper limb in cases of non-compliance or in the presence of a tendency to non-compliance with the conditions of normal distribution were compared using the Mann-Whitney U-test. Student's t-test was calculated by comparing mean values in normally distributed sets of quantitative data. Shapiro-Wilk test was used to assess compliance with the normal distribution of the sign. Critical significance was accepted at $p < 0.05$.

RESULTS

One year after the episode of shoulder dislocation, pain among the patients who were treated conservatively completely relieved in 5 (26.3 %) at rest, and seven (36.8 %) noted a complete recovery of the SJ range of motion. Full range of SJ motion and the absence of pain were observed in 4 (21 %) patients. During clinical examination, all the tests indicated the absence of RC pathology in 3 (15.8 %) patients. In 14 (73.7 %) subjects, pain persisted during clinical examination and manual tests. Also, in the conservatively treated group, two patients had episodes of recurrent SJ instability per year (Table 1).

Table 1

Summary of clinical examination of patients after 12 months

Characteristics	Group of surgical treatment, n = 24		Group of conservative treatment, n = 19	
	Positive result	%	Positive result	%
Pain relief	16	66.7	5	26.3
Full range of motion	11	45.8	7	36.8
Recurrent dislocation	0	0	2	10.5

The analysis of treatment results 12 months after surgery showed that 16 (66.7 %) patients from the surgical treatment group reported a complete relief of pain at rest, and 11 (45.8 %) patients had complete restoration of the range of SJ motion. During clinical examination, all the tests indicated the absence of RC pathology in 11 (45.8 %) patients. In 6 (31.6 %) subjects, slight pain persisted during physical examination and manual tests. There were no recurrences of dislocation in this group (Table 1).

By comparing the studied groups with statistical methods, it was found that in the group of patients who were treated conservatively, the Jobe test, the "lift-off" test, the Napoleon test and the external rotation test of the shoulder were recorded significantly more frequently than in the group of patients who were treated surgically. No significant difference was found for other characteristics.

The evaluation of the SJ functional state with the UCLA in the group of patients with conservative treatment showed that 8 (42.1 %) patients had fair treatment results and 11 (57.9 %) patients had poor results. Among the patients who underwent surgery, 18 (75 %) had a fair functional state of the upper limb, and 6 (25 %) had a poor one. The mean upper limb function UCLA score in the group of patients who underwent conservative treatment was 24.9 ± 6.37 (95 % CI 22.03-27.76), and the mean score in the group of patients who underwent surgical treatment it was 29.04 ± 3.8 (95 % CI 27.53-30.56) points (Fig. 2).

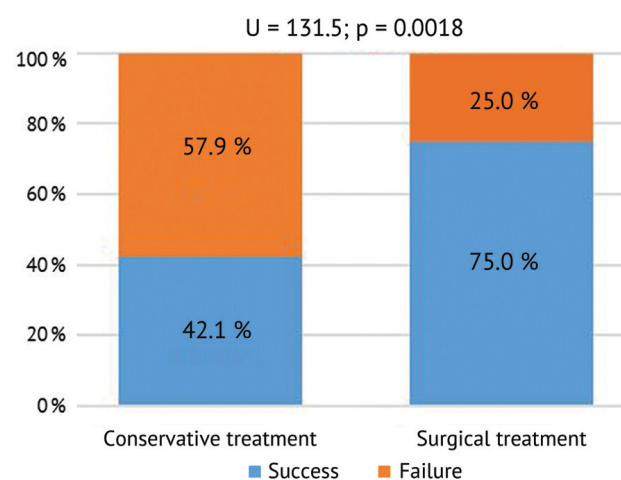


Fig. 2 Results of patients' examination with UCLA system after 12 months: successful and failed outcomes in the groups

The observed improvement in functional outcomes, assessed using the Mann-Whitney test, was statistically significant ($U = 131.5$, $p = 0.018$).

The DASH score in the group of patients with isolated conservative treatment was the median of 53 points with an interquartile range from 27 to 59.5. In the group of patients who underwent surgical RC repair, the median was 23 points with an interquartile range of 15.75 to 32.5 (Fig. 3). The observed differences in functional DASH values one year after the injury or surgery were statistically significant ($U = 77.5$, $p = 0.0001$).

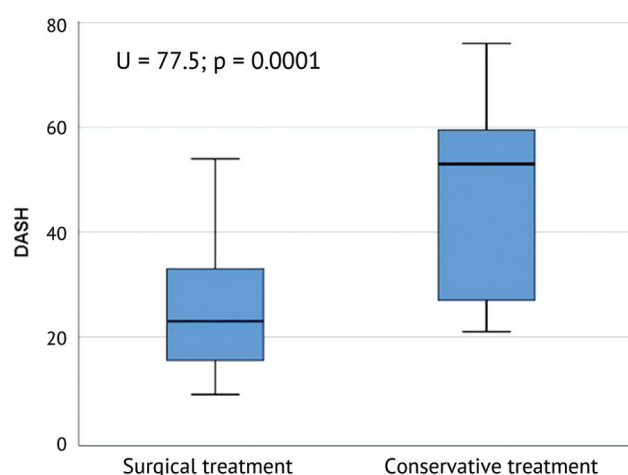


Fig. 3 Functional upper limb state assessed with DASH in points

ASES evaluation of the functional state of patients who underwent only conservative treatment averaged 56.84 ± 15.7 (95 % CI 49.77-63.90), and in patients who

were treated surgically, it was $80, 6 \pm 11.87$ (95 % CI 75.83-85.33) points (Fig. 4). Pair-wise comparison of the groups established significantly better indicators of the SJ state in patients after surgical RC restoration ($p = 0.0001$).

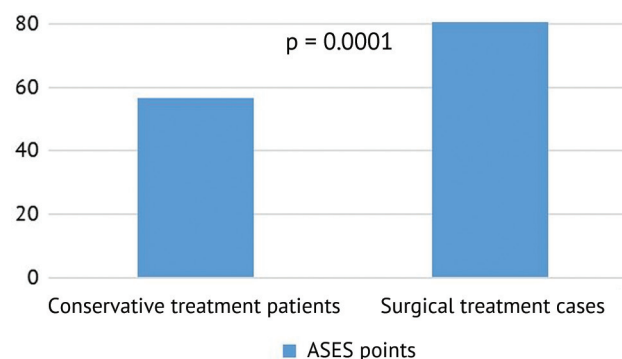


Fig. 4 Results of patients' examination with the ASES system after 12 months

DISCUSSION

Despite the availability of literature data on rotator cuff injuries associated with shoulder dislocations, in everyday practice, this injury has been still not given sufficient attention [27, 28]. It should be noted that the common for our country treatment of such injuries includes immobilization for 4-6 weeks [5, 28], despite the fact that numerous publications have shown that the common period of immobilization for the already altered by degenerative dystrophic processes of the rotator cuff can lead to significant tendon displacement proximally and to an increase in the degree of degeneration [5]. Moreover, after the termination of immobilization, these patients undergo repeated, but often unsuccessful, courses of physiotherapy exercises [28]. As a result, during the period of immobilization and rehabilitation, a pronounced fatty degeneration of muscles develops, leading to additional damage to the shoulder structures due to the lack of centering of the humeral head [27, 28]. When the tendons are torn off in the damaged RC muscles, contraction of the muscle fibers occurs, which, in turn, leads to proximal displacement of the tendons. All these processes result in further significant degenerative dystrophic changes in the tendons and

significantly reduce the success of surgical treatment of RC injuries [19]. During the operation, there are problems with fixing the tendon to the anatomical site of attachment, difficulties with tendon suturing due to thread cutting, and the formation of incompetent scar tissue at the site of fixation in the postoperative period. Thus, timely early diagnosis of RC injury contributes to the determination of a pathogenetically substantiated optimal clinical strategy.

The results of this study are comparable with the data of world literature. Thus, RC lesions in people older than 45 years were recorded in 64 % of patients [5]. Among the patients treated surgically, complete pain relief was obtained in 66.7 %, while in the group of conservative treatment in only 26.3 % of cases. Instability recurrence was recorded only among patients of the conservative group, while among patients who were treated surgically, relapses of shoulder instability were not observed.

Pair-wise comparison of the functional state of the shoulder, assessed by the UCLA, DASH, ASES systems 12 months after the injury or operation showed that the results of surgical treatment were higher than those of conservative treatment.

CONCLUSION

The results of surgical treatment are significantly better than the results of conservative treatment in patients older than 45 years diagnosed with shoulder dislocation and associated rotator cuff injury. Therefore, the tactics of examination and treatment of such patients

should primarily be aimed at early detection of rotator cuff injury and at early surgical recovery, which will significantly reduce the number of complications and improve the outcomes of treatment of patients with traumatic shoulder dislocation.

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