

Safety, Efficacy, and Cost-Effectiveness of Simultaneous Bilateral Arthroscopic Bankart Repair for Bilateral Shoulder Instability

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Background: Bilateral shoulder instability and Bankart lesions are not rare and frequently require surgical treatment. Bilateral instability may be treated with either a single-stage, simultaneous bilateral Bankart repair or 2-stage surgery.

Purpose/Hypothesis: To compare simultaneous bilateral arthroscopic Bankart repair to 2-stage repair in terms of clinical outcomes and hospitalization costs. It was hypothesized that simultaneous repair would provide clinical outcomes similar to those of 2-stage Bankart repair while yielding lower hospitalization costs.

Study Design: Cohort study; Level of evidence, 3.

Methods: Patients who underwent simultaneous bilateral arthroscopic Bankart repair (group 1) were matched by age, sex, and injury type to control patients who had unilateral Bankart repair (group 2). All patients were operated on by the same surgeon in the same institution between 2007 and 2017 and had a minimum follow-up duration of 24 months. Patients with inflammatory arthritis, metabolic/malignant disease, previous shoulder surgery, a glenoid bone loss $\geq 25\%$, or off-track Hill-Sachs lesion were excluded. The 2 groups were compared in terms of pre- and postoperative Western Ontario Shoulder Instability Index (WOSI) scores, hospitalization costs, complications, and recurrent instability. The hospitalization cost of group 2 was multiplied by 2 to create a projection of the estimated cost of 2 sequential unilateral Bankart repairs.

Results: The study population comprised 48 patients (38 men [79.17%] and 10 women [20.83%]; mean age, 25.5 years at surgery and 22.75 years at first dislocation). Group 1 included 32 shoulders in 16 patients, while group 2 consisted of 32 shoulders in 32 patients. The mean hospitalization cost (in 2020 US dollars) was $\$26,010 \pm \1455 for group 1 and $\$33,591 \pm \1574 for group 2 ($P < .001$). Both groups had improved WOSI scores after surgery and achieved similar scores at the latest follow-up. There was 1 redislocation in each group (3.13%). No surgery- or anesthesia-related/medical complications were recorded in either group.

Conclusion: For bilateral shoulder instability, clinical outcomes of simultaneous bilateral arthroscopic Bankart repair were similar to those of 2-stage repair; however, lower hospitalization costs were seen after simultaneous bilateral repair compared with 2-stage surgery.

Keywords: bilateral; shoulder instability; Bankart; shoulder arthroscopy; cost

Bankart lesions, defined as the detachment of the glenoid labrum and capsule from the glenoid rim, are the most common injury encountered in shoulder instability, with a prevalence of 97% to 100%.^{2,3,18} This structural injury can be successfully treated with arthroscopic repair.^{5,10} The incidence of bilateral involvement in shoulder instability has been reported to be 17% to 24%.^{8,13} This may occur as a bilateral injury during the initial trauma, or a contralateral injury may occur subsequently after the initial dislocation episode on 1 side, especially in young and active patients.^{8,13} Patients with symptoms of instability in both

shoulders can undergo treatment with a single-stage, simultaneous bilateral Bankart repair, or the surgery can be staged by operating on the contralateral shoulder after healing and rehabilitation of one side.

Several studies have analyzed the health care expenditures of common arthroscopic procedures, such as anterior cruciate ligament reconstruction and rotator cuff surgery, while bundled payment systems are being increasingly adopted.¹⁹ We were unable to find any study analyzing the financial burden of simultaneous bilateral arthroscopic Bankart repair in the current literature.

The aim of this study was to compare outcomes and hospitalization costs between simultaneous bilateral arthroscopic Bankart repair and 2-stage arthroscopic Bankart repair. Our hypothesis was that simultaneous repair would

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TABLE 1
Study Inclusion and Exclusion Criteria^a

Inclusion Criteria	Exclusion Criteria
Age ≥ 18 y	Age < 18 y
Operated for symptomatic instability in the shoulder evaluated with Bankart lesion	Any diagnosis of any inflammatory arthritis, metabolic, or malignant disease
Glenoid bone loss $< 25\%$	Glenoid bone loss $\geq 25\%$
No off-track Hill-Sachs lesion on CT	Off-track Hill-Sachs lesion on CT
Having a postoperative rehabilitation program	Any previous operation regarding the shoulder joint
Follow-up ≥ 24 mo	Follow-up < 24 mo

^aCT, computed tomography.

yield comparable outcomes and lower hospitalization costs compared with 2-stage repair.

METHODS

Study Design

After obtaining institutional review board approval, we conducted a retrospective, comparative, single-center analysis. Patients who underwent simultaneous bilateral arthroscopic Bankart repair for bilateral anterior glenohumeral instability in a single institution by the senior author were reviewed. Inclusion and exclusion criteria are listed in Table 1.

A total of 18 consecutive patients were identified from the institutional database between the years 2007 and 2017. One patient was excluded for follow-up of less than 24 months and another for being younger than 18 years, leaving 32 shoulders from 16 patients in the study group (group 1). These 16 patients in group 1 were randomly matched by age, sex, and type of shoulder injury with a control group (group 2) of 32 patients (32 shoulders) who were operated on by the same surgeon (T.B.) using the identical techniques in the same period. The patient enrollment flowchart is shown in Figure 1.

Between June and December 2020, the matching of the control group (group 2) was performed by another orthopaedic surgeon (T.P.), while patient credentials, clinical scores, and data on hospitalization costs, and any record of complications were collected by a third blinded surgeon (K.Y.). Clinical outcomes, hospitalization costs, and complication rates of both groups were compared.

Surgical Technique

All patients were operated on under general anesthesia in the beach-chair position. Both shoulders of patients in group 1 were draped and prepared simultaneously. A standardized surgical technique was used in all patients using posterior and anterior arthroscopy portals. The detached labrum was mobilized from the glenoid, and soft tissue adhesions were released. The glenoid rim was debrided and decorticated until a bleeding and smooth surface was created. The labrum was reduced to the glenoid rim and fixed with 3 or 4 bioabsorbable 3.5-mm knotless anchors (Push-Lock; Arthrex) and No. 2 FiberWire (Arthrex). Capsular shift was performed when needed.

Postoperative Care

Postoperative care was the same for both groups. All patients were discharged on the day after surgery because the health insurance terms and policies in our country require an overnight hospital stay for full coverage of health expenses. However, Bankart repair is performed as an outpatient procedure in most countries.

The operated upper extremity was immobilized in a sling for 3 weeks. The patients were allowed elbow and wrist flexion/extension in the first week. Basic activities of daily living such as feeding, conducting personal hygiene, and using a computer were permitted after the second week. At the end of 3 weeks, patients started a standardized physical therapy program under the supervision of an experienced physical therapist in the same institution. Postoperatively, functional self-sufficiency and self-care of patients were preserved to a large extent. Full range of motion of the elbows was allowed for all patients in both

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Ethical approval for this study was obtained from Halic University.

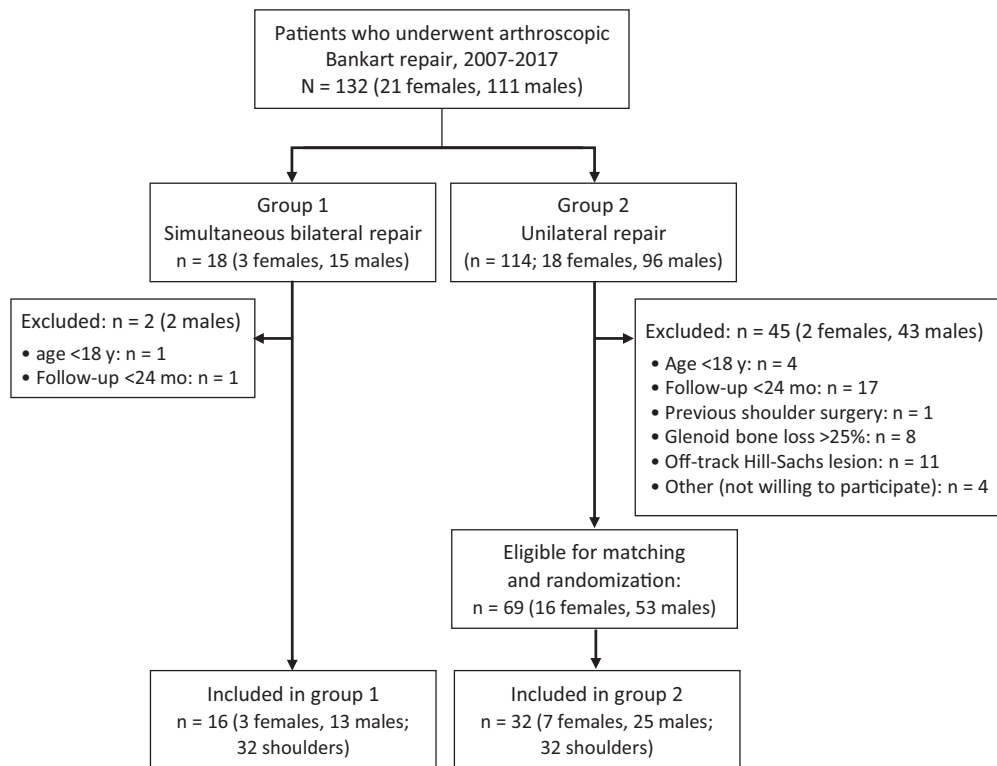


Figure 1. Flowchart of patient enrollment.

groups from the first postoperative day on, so that they could use their hands to reach for the mouth, face, and hair. Thus, all patients were able to attend to their own nutrition and peroneal care, which requires only internal rotation. Patients in group 2 were able to take a shower and change clothes with the help of the contralateral extremity, while patients in group 1 needed the help of a caregiver for 3 weeks. To ensure safe driving, patients in both groups were allowed to drive 6 weeks after the operation.

Outcome Measures

The Western Ontario Shoulder Instability Index (WOSI)⁹ was used for the assessment of subjective shoulder function and stability. WOSI scores were recorded preoperatively and at the last follow-up visit (24-108 months postoperatively). Patients in group 1 were asked to complete the WOSI questionnaire twice, once for each shoulder.

Hospitalization cost was defined as the total cost of preoperative anesthesiologic examinations/tests, implants, disposables, surgeon's fees, 1-night hospital stay, any medical treatment during hospitalization, and postoperative outpatient physical therapy. The hospitalization cost of group 2 was multiplied by 2 to create a projection of the estimated cost of 2 sequential unilateral Bankart repairs. Costs are reported in 2020 US dollars.

Surgery-related complications such as recurrent/persistent pain, stiffness/arthrofibrosis, wound complications, tendon and/or ligament injuries, bone fracture, implant

failure, hematoma formation, nerve palsy, and vascular injury, as well as anesthesia-related/medical complications such as venous thromboembolism, pneumonia, respiratory failure, arrhythmia, congestive heart failure, myocardial infarction, renal failure, and cerebrovascular accidents, were screened from hospital records, patient interviews, and examinations at follow-up visits.

Statistical Analysis

SPSS software (Version 22.0; IBM) was used for statistical analysis. The Student *t* test was used to compare quantitative variables between groups, and the chi-square test and Fisher exact test were used for the analysis of categorical variables where appropriate. $P < .05$ was considered statistically significant.

Because of the retrospective nature of the study and limited number of bilaterally operated patients, no a priori power analysis was completed. Instead, a post hoc power analysis was performed for clinical scores and hospitalization costs with a type 1 error rate of 0.05.

RESULTS

The characteristics of the study groups are summarized in Table 2. The age and sex distributions were comparable between groups 1 and 2. The mean follow-up was significantly longer in group 1 compared with group 2 (59.1 ± 24.2 months [range, 24-108 months] vs 34.6 ± 11.1 months

TABLE 2
Patient and Surgery Characteristics^a

	Group 1: Simultaneous Repair; 16 Patients, 32 Shoulders	Group 2: 2-Stage Repair; 32 Patients, 32 Shoulders	<i>P</i>
Sex, No. of patients (%)			>.999
Male	13 (81.25)	25 (78.13)	
Female	3 (18.75)	7 (21.87)	
Age at first dislocation, y	21.61 ± 4.5	23.89 ± 5.9	.072
Age at surgery, y	23.4 ± 5.4	26.7 ± 5.3	.068
Anchors used, No. of shoulders (%)			.403
3	19 (59.38)	23 (71.87)	
4	13 (40.62)	9 (28.13)	
Follow-up, mo	59.1 ± 24.2	34.6 ± 11.1	.002

^aData are reported as mean ± SD unless otherwise indicated. Boldface *P* value indicates a statistically significant difference between groups ($P < .05$).

TABLE 3
Preoperative and Latest Follow-up WOSI Scores of Both Groups^a

WOSI Score	Group 1: Simultaneous Repair	Group 2: 2-Stage Repair	<i>P</i>
Preoperative	37.21 ± 5.75	30.89 ± 5.58	.061
Latest follow-up	9.14 ± 1.78	8.07 ± 1.18	.543
<i>P</i>	<.001	<.001	

^aBoldface *P* values indicate a statistically significant difference between preoperative and latest follow-up scores ($P < .05$). WOSI, Western Ontario Shoulder Instability Index.

TABLE 4
Hospitalization Costs and Postoperative Complications^a

	Group 1: Simultaneous Repair	Group 2: 2-Stage Repair	<i>P</i>
Hospitalization cost, \$	26,010.34 ± 1454.73	33,590.98 ± 1574.0	<.001
Surgery-related complications	0 (0)	0 (0)	NA
Anesthesia-related/medical complications	0 (0)	0 (0)	NA
Recurrent dislocations	1 (3.13)	1 (3.13)	>.999

^aData are reported as mean ± SD or No. of shoulders (%). Boldface *P* value indicates a statistically significant difference between groups ($P < .05$). NA, not applicable.

[range, 24-85 months]; $P = .002$). Bankart repair was performed with either 3 or 4 anchors. The average number of anchors used did not differ significantly between the 2 groups.

WOSI Scores

Preoperative and final follow-up WOSI scores for each group are summarized in Table 3. Patients in both groups reported significantly improved shoulder function and stability scores compared with the preoperative status, and patients in both groups reached the minimal clinically important difference for the WOSI, defined as an improvement of 10.4%.⁷ Both the preoperative and final follow-up WOSI scores were comparable between groups, suggesting that there was no significant difference regarding shoulder function between them.

Hospitalization Costs and Postoperative Complications

The mean hospitalization cost was \$26,010 ± \$1455 for group 1 and \$16,795 ± \$787 for group 2. When the values for each patient in group 2 were multiplied by 2, hospitalization cost became \$33,591 ± \$1574, a value significantly higher than that for group 1 ($P < .001$) (Table 4).

No surgery- or anesthesia-related/medical complications were observed in either group. One patient (3.13%) in each group experienced recurrent dislocation after Bankart repair, both in the form of total glenohumeral dislocations (at 14 months postoperatively in group 1 and 27 months postoperatively in group 2) (Table 4).

Post hoc power analyses revealed a statistical power of 100% for hospitalization cost and 80.9% for WOSI score. When the patients in group 1 were asked whether they would have the simultaneous bilateral surgery again or

would prefer staged surgery, 15 of 16 patients (93.75%) were in favor of simultaneous bilateral surgery.

DISCUSSION

The results of the present study confirmed our hypothesis that patients undergoing simultaneous bilateral arthroscopic Bankart repair have similar clinical and functional outcomes and safety and lower hospitalization costs compared with those undergoing unilateral arthroscopic Bankart repair.

While not reported to be rare, bilateral Bankart injury can occur during the initial trauma, or a contralateral injury may occur subsequently after the initial dislocation episode. O'Driscoll and Evans¹³ reported that 16% of patients who had surgery for unilateral shoulder instability developed instability in the contralateral shoulder at 20 years after surgery. They also reported that 20 of 188 (10.6%) patients with bilateral instability were initially evaluated with bilateral involvement. In our series, 2 of 16 (12.5%) patients were initially evaluated with bilateral involvement, while the other 14 patients refused surgery for the index unstable shoulder but agreed to undergo surgical treatment after developing instability on the contralateral side. Bilateral shoulder instability is usually seen in young men.¹² Our bilateral instability cohort (group 1) similarly had a male preponderance of 81.25% (13/16), and the average age was 23.4 ± 5.4 years.

Patients with bilateral shoulder instability may be operated on in 2 separate surgical sessions, where 1 side is operated on after the repair and rehabilitation of the first shoulder has been completed. This approach necessitates 2 prolonged periods of physical therapy, may delay the patient's return to work (especially for patients working as laborers who need both arms to perform their job) or sports, and increase the burden to the society. In contrast, simultaneous bilateral surgery requires only 1 postoperative physical therapy period, may decrease the morbidity, and may allow earlier return to work or sports. We were unable to find a study comparing simultaneous bilateral arthroscopic Bankart repair with unilateral or 2-stage bilateral repair in the current literature. Melis et al¹² reported that clinical outcomes of 1-stage and 2-stage Latarjet procedures in bilateral shoulder instability were similar at an average follow-up time of 100 and 186 months. Another study comparing bilateral arthroscopic rotator cuff repair to unilateral repair reported better clinical and functional outcomes in the bilateral group without additional complications, longer hospitalization, or rehabilitation than unilateral repair.¹⁴ Both groups in our study showed significant improvement in both clinical outcome scores, indicating improvement in stability and function. There were no significant differences between the 2 groups at the last follow-up. The scores of both groups in our study were comparable to the results of current studies.^{20,22} Although the sample size of this study may seem small, a post hoc analysis for WOSI score proved a statistical power over 80%.

Recurrence rates after arthroscopic Bankart repair have been reported to be 3.4% to 23.1%,^{1,10,16,21} and this rate increases with longer follow-up.²⁰ Moreover, there is a growing debate surrounding the patient position during Bankart repair. Those who advocate for the beach-chair position emphasize the ease of transition to open procedures, if necessary; the ease of orientation; and more favorable ergonomics for the surgeon.¹¹ However, the recurrence of shoulder instability after Bankart repair in the beach-chair position has been reported to be nearly double that of surgery performed in the lateral decubitus position.⁶ Contrary to the current literature, the recurrence rate of 3.13% in beach-chair position for both groups in our study was similar to those of other short-term studies.²¹

An increasing number of studies have investigated healthcare expenses of common arthroscopic procedures, such as anterior cruciate ligament reconstruction, rotator cuff surgery, and shoulder instability surgery.^{4,17,19} Chalmers et al⁴ reported that 39% of the costs for arthroscopic shoulder instability surgery were operative facility costs. In our study, the operative facility was used only once for group 1 and assumed to be used twice for 2 separate surgeries and 2 hospital stays for group 2. Thus, all costs for group 2 were multiplied by a factor of 2. Simultaneous bilateral surgery resulted in \$7580 (29%) cost savings compared with staged surgery.

Difficulty in activities that needed overhead movements and/or the use of both arms (such as reaching things on a high shelf, driving, lifting heavy and/or large objects, etc) and assistance required from family and friends during the first 3 postoperative weeks were some disadvantages of simultaneous bilateral surgery.

The risk of anesthesia-related complications—mainly venous thromboembolism—has been reported to be higher in arthroscopic rotator cuff repair surgery, especially if the duration of anesthesia is longer than 80 minutes.¹⁵ As another disadvantage of simultaneous bilateral surgery, a similarly higher risk of anesthesia-related complications might have been expected because of longer anesthesia durations. However, the complication rates in both groups of this study were similar.

Strengths and Limitations

The main strengths of this study were that all procedures were performed by the same surgeon using the identical surgical technique and the postoperative rehabilitation was uniform, resulting in a homogenous study population, and patients in both study groups were matched for age, sex, and injury type to minimize selection bias.

The main drawback of this study was that it was retrospective in nature, carrying all the biases common to these studies, such as selection bias. The limited number of patients might be attributed to strict inclusion criteria. The cost comparison was made with bilateral surgery and unilateral surgery multiplied by 2. Comparison to staged unilateral surgery might have given a more realistic scenario; however, the number of patients who were consecutively operated on by the same surgeon and fulfilling the inclusion criteria was not sufficient to build a control group.

Moreover, because of the temporary need of a caregiver for bilaterally operated patients and the resulting financial burden, this study was able to assess only the hospitalization costs but was unable to calculate the total treatment cost or cost-effectiveness. Another limitation of this study is that it does not assess time to return to work.

Also, hospitalization cost per procedure in this study may seem very high, but the main reason of these high costs is that the health institution was a private university hospital, and all costs were billed to the private health insurance of the patients, which mandates an overnight hospital stay.

Another drawback of this study is that conclusions made for simultaneous bilateral surgery in the beach-chair position may not be applicable to the lateral decubitus position. Simultaneous bilateral surgery in the lateral decubitus position might require the patient to be repositioned and redraped once one side had been operated. This technical issue would require a longer anesthesia time and increase the risk of infection, leading to a higher rate of complications. Moreover, any surgeon would not feel comfortable with the patient lying on the newly operated shoulder.

Despite the fact that many surgeons prefer the lateral decubitus position in arthroscopic Bankart repair surgery and the generalizability of this study may seem low, the number of surgeons who prefer the beach-chair position is still not small, and this study may be a guiding article for them in the setting of simultaneous bilateral Bankart injury.

CONCLUSION

The clinical outcomes of simultaneous bilateral arthroscopic Bankart repair are similar to those of unilateral surgery; however, simultaneous bilateral repair may have a lower hospitalization cost than 2-stage surgery for bilateral shoulder instability treatment.

REFERENCES

1. Aboalata M, Plath JE, Seppel G, Juretzko J, Vogt S, Imhoff AB. Results of arthroscopic Bankart repair for anterior-inferior shoulder instability at 13-year follow-up. *Am J Sports Med.* 2017;45(4):782-787. doi:10.1177/0363546516675145
2. Bankart AS. Recurrent or habitual dislocation of the shoulder-joint. *Br Med J.* 1923;2(3285):1132-1133. doi:10.1136/bmj.2.3285.1132
3. Carrazzone OL, Tamaoki MJ, Ambra LF, Neto NA, Matsumoto MH, Belloti JC. Prevalence of lesions associated with traumatic recurrent shoulder dislocation. *Rev Bras Ortop.* 2015;46(3):281-287. doi:10.1016/S2255-4971(15)30196-8
4. Chalmers PN, Uffman W, Christensen G, et al. A single-institution analysis of factors affecting costs in the arthroscopic treatment of glenohumeral instability. *JSES Int.* 2020;4(2):297-301. doi:10.1016/j.jseint.2020.01.006
5. Cordasco FA, Lin B, Heller M, Asaro LA, Ling D, Calcei JG. Arthroscopic shoulder stabilization in the young athlete: return to sport and revision stabilization rates. *J Shoulder Elbow Surg.* 2020 May;29(5):946-953. doi:10.1016/j.jse.2019.09.033
6. Frank RM, Saccomanno MF, McDonald LS, Moric M, Romeo AA, Provencher MT. Outcomes of arthroscopic anterior shoulder instability in the beach chair versus lateral decubitus position: a systematic review and meta-regression analysis. *Arthroscopy.* 2014;30(10):1349-1365. doi:10.1016/j.arthro.2014.05.008
7. Harris JD, Brand JC, Cote MP, Faucett SC, Dhawan A. Research pearls: the significance of statistics and perils of pooling. Part 1: Clinical versus statistical significance. *Arthroscopy.* 2017;33(6):1102-1112. doi:10.1016/j.arthro.2017.01.053
8. Hovelius L, Olofsson A, Sandström B, et al. Nonoperative treatment of primary anterior shoulder dislocation in patients forty years of age and younger. A prospective twenty-five-year follow-up. *J Bone Joint Surg Am.* 2008;90(5):945-952. doi:10.2106/JBJS.G.00070
9. Kirkley A, Griffin S, McLintock H, Ng L. The development and evaluation of a disease-specific quality of life measurement tool for shoulder instability. The Western Ontario Shoulder Instability Index (WOSI). *Am J Sports Med.* 1998;26(6):764-772. doi:10.1177/03635465980260060501
10. Komnos GA, Banios K, Liantsis A, et al. Results of arthroscopic Bankart repair in recreational athletes and laborers: a retrospective study with 5 to 14 years of follow-up. *Orthop J Sports Med.* 2019;7(11):2325967119881648. doi:10.1177/2325967119881648
11. Lohre R, Regan W, Goel DP. Surgeon ergonomics during arthroscopic shoulder surgery. *J Orthop Exp Innov.* 2020;13307.
12. Melis B, Flanagan B, Mizuno N, Raiss P, Walch G. Bilateral anterior shoulder instability: epidemiology and results after bilateral open Latarjet procedure. *Obere Extremität.* 2015;10:96-100. doi:10.1007/s11678-015-0311-7
13. O'Driscoll SW, Evans DC. Contralateral shoulder instability following anterior repair. An epidemiological investigation. *J Bone Joint Surg Br.* 1991;73(6):941-946. doi:10.1302/0301-620X.73B6.1955441
14. Pak CH, Moon YL, Sim SW, Elsayed MI. Bilateral arthroscopic rotator cuff repair using a single-stage procedure. *Orthopedics.* 2015;38(5):e423-e427. doi:10.3928/01477447-20150504-61
15. Sager B, Ahn J, Tran J, Khazzam M. Timing and risk factors for venous thromboembolism after rotator cuff repair in the 30-day perioperative period. *Arthroscopy.* 2019;35(11):3011-3018. doi:10.1016/j.arthro.2019.05.045
16. Shin JJ, Popchak AJ, Musahl V, Irrgang JJ, Lin A. Complications after arthroscopic shoulder surgery: a review of the American Board of Orthopaedic Surgery database. *J Am Acad Orthop Surg Glob Res Rev.* 2018;2(12):e093. doi:10.5435/JAAOSGlobal-D-18-00093
17. Tashjian RZ, Belisle J, Baran S, et al. Factors influencing direct clinical costs of outpatient arthroscopic rotator cuff repair surgery. *J Shoulder Elbow Surg.* 2018;27(2):237-241. doi:10.1016/j.jse.2017.07.011
18. Taylor DC, Arciero RA. Pathologic changes associated with shoulder dislocations. Arthroscopic and physical examination findings in first-time, traumatic anterior dislocations. *Am J Sports Med.* 1997;25(3):306-311. doi:10.1177/036354659702500306
19. Uffmann WJ, Christensen GV, Yoo M, et al. A cost-minimization analysis of intraoperative costs in arthroscopic Bankart repair, open Latarjet, and distal tibial allograft. *Orthop J Sports Med.* 2019;7(11):2325967119882001. doi:10.1177/2325967119882001
20. Vermeulen AE, Landman EBM, Veen EJD, Nienhuis S, Koorevaar CT. Long-term clinical outcome of arthroscopic Bankart repair with suture anchors. *J Shoulder Elbow Surg.* 2019;28(5):e137-e143. doi:10.1016/j.jse.2018.09.027
21. Virk MS, Manzo RL, Cote M, et al. Comparison of time to recurrence of instability after open and arthroscopic Bankart repair techniques. *Orthop J Sports Med.* 2016;4(6):2325967116654114. doi:10.1177/2325967116654114
22. Wade R, Reddy PVB. Functional outcome of arthroscopic double row repair for Bankart lesion. *J Orthop.* 2018;15(3):792-797. doi:10.1016/j.jor.2018.03.021