Acta Orthopaedica et Traumatologica Turcica xxx (2017) 1–5

Contents lists available at ScienceDirect

Acta Orthopaedica et Traumatologica Turcica

journal homepage: https://www.elsevier.com/locate/aott

Single anterior portal: A better option for arthroscopic treatment of traumatic anterior shoulder instability?

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ARTICLE INFO

Article history:
Received 24 December 2015
Received in revised form
23 August 2016
Accepted 15 September 2016
Available online xxx

Keywords:
Arthroscopy
Bankart
Shoulder
Single portal

ABSTRACT

Objective: The aim of this study was to compare single and double anterior portal techniques in the arthroscopic treatment of traumatic anterior shoulder instability.
Methods: A total of 91 cases who underwent arthroscopic Bankart repair for anterior shoulder instability were reviewed. The patients were divided into 2 groups as Group 1 (47 male and 2 female; mean age: 25.8 ± 6.8) for arthroscopic single anterior portal approach and Group 2 (41 male and 1 female; mean age: 25.4 ± 6.6) for the classical anterior double portal approach. The groups were compared for clinical scores, range of motion, analgesia requirement, complications, duration of surgery, cost and learning curve according to a short questionnaire completed by the relevant healthcare professionals.
Results: No statistically significant difference was found between the 2 groups in terms of pre-operative and post-operative Constant and Rowe Shoulder Scores, range of motion and complications ($p > 0.05$). In Group 2 patients, the requirement for post-operative analgesics was significantly higher ($p < 0.001$), whereas the duration of surgery was statistically significantly shorter in Group 1 ($p < 0.001$). In the assessment of the questionnaire, it was seen that a single portal anterior approach was preferred at a higher ratio ($p = 0.035$). The cost analysis revealed that the cost was 5.7% less for patients with a single portal.
Conclusion: In the arthroscopic treatment of traumatic anterior shoulder instability accompanied by a Bankart lesion, the anterior single portal technique is as successful in terms of clinical results as the conventional double portal approach. The single portal technique has advantages such as less post-operative pain, a shorter surgical learning curve and lower costs.
Level of Evidence: Level-III Retrospective case-control study.

The glenohumeral joint is a synovial joint, and is the most commonly dislocated joint in the human body.[1] Glenohumeral luxation is seen in approximately 2% of the population.[2] Bankart lesion, which is defined as anteroinferior detachment of the glenoid labrum, has been demonstrated in 87%–100% of first-time dislocations.[3,4] Since risk of recurrent dislocation is high, particularly in younger patients, it persists as a problem, lowering quality of life at later age.[5] Currently, the most popular method of treatment is arthroscopic repair. Successful results observed in studies of anterior instability treatment using single anterior portal without the need for an additional portal have been published in literature.[6,7]

The aim of the present study was to compare clinical scores, length of hospital stay, analgesia requirement, and total cost of treatment of single portal and double portal techniques for Bankart lesion repair performed due to traumatic anterior shoulder instability. Hypothesis was that single portal technique could be reliable treatment alternative for Bankart lesion.

Patients and methods

A retrospective evaluation of patients who underwent arthroscopic Bankart repair for anterior shoulder instability between 2009 and 2012 at Adana Numune Training and Research Hospital

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Peer review under responsibility of Turkish Association of Orthopaedics and Traumatology.

http://dx.doi.org/10.1016/j.aott.2017.03.002

Please cite this article in press as: Çiçek H, et al., Single anterior portal: A better option for arthroscopic treatment of traumatic anterior shoulder instability?, Acta Orthop Traumatol Turc (2017), http://dx.doi.org/10.1016/j.aott.2017.03.002

and who were followed-up for at least 2 years was conducted. Exclusion criteria were multi-directional instability, accompanying superior labral tear from anterior to posterior and/or rotator cuff tear, anterior labrum atrophy, diagnosis of posterior bony Bankart, or exitus during follow-up. Study included total of 91 patients who met the criteria. Patients were separated into 2 groups. Group 1 comprised 49 patients (47 males, 2 females) on whom single portal technique was used, and Group 2 comprised 42 patients (41 males, 1 female) who were operated on using double portal technique. Data were obtained from patient records, including preoperative Constant Shoulder Score (CSS) and Rowe Score for Instability (RWS) test results and external rotation and abduction angles (measured with goniometer) of the pathological shoulder. Groups had similar demographic characteristics in terms of age and gender (Table 1).

All surgical procedures were performed by the same orthopedist with different accompanying assistant doctors and specialist surgeons. All patients were operated on in beach-chair position under hypotensive general anesthesia with the aid of arthropump (Arthrex AR − 6480 DualWave Arthroscopy Pump, Inc., Naples, FL, USA) with adjustable pressure and flow speed. Classic posterior portal was used for imaging.

In Group 1, single anterior portal was opened 1 cm lateral and 1 cm superior to the corocoid notch for 7.5-mm cannula and in Group 2, 2 anterior portals, anterior-inferior and anterior-superior, were opened with the same characteristics. In all patients, following preparation of the glenoid and release of the labrum, and after passing non-degradable sutures (FiberWire; Arthrex, Inc., Naples, FL, USA) through in lasso-loop fashion, labrum fixation was achieved with at least 3 knotless anchors (PushLock; Arthrex, Inc., Naples, FL, USA) of 2.9-mm or 3.5-mm diameter (Fig. 1).

Duration of surgery, requirement for postoperative analgesia (Tramadol İ.V, Contramal; Abdi İbrahim İlaç Sanayi ve Ticaret A.S., Istanbul, Turkey) and length of hospital stay were retrieved from records of each patient. Patient request for analgesia for pain was defining criterion in determining analgesic dose.

Cost was calculated separately for each patient. Since same rehabilitation protocol was applied, rehabilitation expenses were not included in cost calculation. Codman's pendulum exercises were initiated on first day after surgery. Shoulder-arm sling with abduction pillow was used by the patients for 3 weeks, followed by smooth shoulder-arm sling with abduction pillow for additional 3 weeks. Rehabilitation program with the Department of Physical Treatment and Rehabilitation was initiated at the end of the first week; forced external rotation was not allowed for 6 weeks. All patients had follow-up examinations two times at month. Evaluation of external rotation and abduction angles of the operated shoulder was recorded using CSS and RWS tests at final assessment. Any perioperative or postoperative complications were also noted.

Fig. 1. View of lasso lock inserted intra-operatively to labrum before glenoid anchoring.

Statistical analysis

Analysis of data was performed using SPSS for Windows statistical software package (version 11.5; IBM Corp., Armonk, NY, USA). Conformity to normal distribution of continuous and discrete numerical variables was analyzed using Kolmogorov–Smirnov test. Descriptive statistics were expressed as mean ± SD, or as median (minimum–maximum) for continuous and discrete numerical variables, and as number and percentage for nominal variables.

Significance of the difference between groups in terms of mean values was evaluated with Student's t-test, and in terms of median values with Mann–Whitney U test. Significance of the difference in median values of follow-up time between groups was evaluated with Wilcoxon signed-rank test. Spearman's correlation test was applied to determine any statistically significant relationship between continuous and discrete numerical variables. Nominal variables were assessed with Pearson's chi-square or Fisher's exact test. Unless otherwise stated, results were considered statistically significant at value of $p < 0.05$. Bonferroni correction was applied to prevent Type I error in all likely multiple comparisons.

Results

In comparisons between Group 1 and Group 2, no significant difference was found in terms of mean age, gender distribution, affected side, mean follow-up time, total number of dislocations, or time between first dislocation and surgical treatment (Table 1).

Table 1
Demographic and clinical characteristics of the patients by group.

Variables	Group 1 (n = 49)	Group 2 (n = 42)	p value
Age (years)	25.8 ± 6.8	25.4 ± 6.6	0.793[a]
Gender			1.000[b]
Male	47 (95.9%)	41 (97.6%)	
Female	2 (4.1%)	1 (2.4%)	
Affected side			0.897[c]
Right	24 (49.0%)	20 (47.6%)	
Left	25 (51.0%)	22 (52.4%)	
Follow-up time (months)	30 (25–38)	31 (25–37)	0.403[d]
Number of dislocations	5 (3–12)	6 (3–11)	0.654[d]
Time between dislocation and treatment (months)	31 (6–124)	25.5 (6–144)	0.370[d]

[a] Student's t test.
[b] Fisher's exact test.
[c] Pearson's chi-square test.
[d] Mann–Whitney U test.

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