Arthroscopic Management of Type II Superior Labrum Anterior to Posterior (Slap) Lesions: Minimum 2-Year Follow Up

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Abstract

Background: Superior labrum anterior to posterior (SLAP) lesions are labral tears that extend anteriorly from the posterior superior labrum, involving the long head of the biceps tendon originating from the glenoid labrum, and stopping before the anterior glenoid notch.

Aim of the work: evaluation of the clinical outcome of anchor repair of type II superior labrum anterior to posterior (SLAP) lesions using arthroscopy.

Patients and Methods: A prospective study between May 2015 and September 2018 in our university hospital. Twenty five patients who had type II superior labrum anterior to posterior (SLAP) lesion had managed by anchors repair arthroscopically. Patients mean age was 35.23 ranging from 20 to 48 years 22(88%) males and 3(12%) females. Inclusion criteria were type II SLAP lesions that did not respond to non-surgical treatment, and SLAP lesions either isolated or associated with other lesions (Bankart lesion &Partial rotator cuff lesions). Shoulders with intra-articular chondral damage, full thickness rotator cuff tear, rotator cuff repair, labral repair outside of the superior labrum, bony subacromial decompression, and acromioclavicular joint resection were excluded.

Results: Twenty-two (88%) of the patients in this study were males with only 3 (12%) females. The mean age at the time of operation was 35.23 ranging from 20 to 48 years. All patients were unilaterally involved with the dominant side being affected in 20 patients (80%) and the non-dominant side in only 5 patients (20%). Eleven patients (44%) were athletes, six patients (24%) labors and eight patients (32%) workers. University of California at Los Angeles (UCLA) score after 12 months from operation was 33.24 with rang from 22-36. Comparing UCLA score before operation with UCLA score at 6 months and at 12 months showed highly significant improvement before and 6 months after operation (p < 0.001) and 12 months after operation (p < 0.001). There is no significant relation between sex and UCLA score after 6 month (P-value 0.785) and 12 months (P-value 0.299).

Conclusion: Treatment of SLAP lesions by arthroscopy is challenging and provides good functional outcome.

Keywords: Biceps anchor · SLAP tear · SLAP repair · Biceps tenodesis · Shoulder arthroscopy

1. INTRODUCTION

Andrews et al. (1) were the first to describe Superior glenoid labrum tears as a source of shoulder pain in the context of the high demand throwing athlete (professional baseball pitchers). The pathology correlated with the immense stress placed on the shoulder and the biceps brachial is muscle during the throwing motion.

Snyder et al (2) authored the term Superior Labrum Anterior and Posterior (SLAP) tear to depict the pathology of the labrum in overhead tossing competitors.

Superior labrum anterior to posterior (SLAP) sores are labral tears that stretch out from the posterior superior labrum, including the long head of the biceps tendon which originates from the glenoid labrum, and halting before the anterior glenoid notch (1). Lesions of the superior glenoid labrum and biceps anchor are a notable reason for shoulder torment (2). Advances in shoulder arthroscopy have prompted improvements in identification and treatment of superior labral anterior-posterior (SLAP) tears (3).
Late biomechanical contemplates have proposed a few hypotheses for the pathogenesis of SLAP tears in tossing competitors and the impact of these injuries on typical shoulder biomechanics (4). Advances in imaging methods have prompted improved precision in diagnosing SLAP tears. Be that as it may, the analysis of clinically applicable SLAP tears stays testing as there are no particular assessment discoveries and the recurrence of related shoulder injuries (5).

Definitive diagnosis of suspected SLAP tears is confirmed during arthroscopic evaluation (6). Progress in surgical techniques had made it possible to achieve accurate repair in selected types of injury. Recent studies have shown predictably good functional results and an acceptable rate of return to sport and/or work with arthroscopic treatment of SLAP tears (2).

2. Patient and Method

This prospective study consisted of twenty five patients who had done arthroscopy for the treatment of isolated type II SLAP lesions or concomitant with partial tear of rotator cuff or Bankert lesion between May 2015 and September 2018 in our university hospital. Patients mean age was 35.23 ranging from 20 to 48 years. Patients diagnosed thorough clinical examination (history, clinical presentation and examination), radiological diagnosis (plain x-ray & MRI), SLAP lesions that did not respond to non-surgical treatment, and lastly SLAP lesions either isolated or associated with other lesions (Bankert lesion & rotator cuff lesions). Shoulders with intra-articular chondral damage, full thickness rotator cuff tear, rotator cuff repair, labral repair outside of the superior labrum, bony subacromial decompression, and acromioclavicular joint resection were excluded.

2.1. Surgical Procedures

The patient is anesthetized under general anesthesia. The initial operative evaluation involves an examination under anesthesia. The shoulder is examined to assess passive range of motion, inferior sulcus translation compared with the contra lateral side, and presence of asymmetric anterior or posterior load and shift at 0° and 90 of forward elevation in the scapular plane (7). A diagnostic arthroscopy is performed next. Arthroscopy may be performed in either the beach chair position. The glenohumeral joint is evaluated via a standard posterior viewing portal and an anterior rotator interval working portal. Areas to be probed and visualized include the articular surfaces, the biceps tendon, the glenoid labrum, and the rotator cuff.

The biceps tendon, biceps anchor, and superior labrum are probed for areas of fraying or instability. An unstable or type II SLAP tear is present when the superior labrum can be displaced with a probe beyond the articular cartilage margin of the glenoid, thereby exposing underlying subchondral bone. Areas of fraying are debrided. Portals are established through which repair of an unstable SLAP is performed. Most repairs are performed through the anterior-superior rotator interval portal combined with a posterior-lateral portal of Wilmington (Fig.1) (8). After debridement of labral fraying, the glenoid neck and rim are abraded with a burr or shaver. Suture anchors are inserted through the working portals at an angle of approximately 45° onto the glenoid rim. Suture anchors are placed at the 10, 11, 1, or 2 o’clock positions on the glenoid depending on the anterior and posterior extent of superior labral detachment. Typically, one or two anchors are used for repair.

A single vertical stitch from each suture anchor is placed around the inner edge of the labrum centrally and through the capsulolabral tissue peripherally using an arthroscopic piercing.
instrument loaded with a shuttle suture or using a suture lasso. A sliding arthroscopic knot reinforced with alternating half-hitches is used to secure the labrum to the glenoid (Fig.2). After the SLAP repair, any associated pathology is addressed as appropriate.

Postoperatively, patients participate in a detailed rehabilitative protocol under the supervision of a physical therapist. Sling immobilization with pendulum, elbow, and wrist exercises are initiated during the first 3 to 6 weeks. At 3 to 6 weeks, passive and active-assisted range-of-motion exercises are begun. After 6 weeks, progressive strengthening of the rotator cuff and the scapular stabilizers is initiated. Three months after the operation, patients progress to an aggressive exercise program. Then during the next 6 months, the patients were regularly examined every 2 months till end of one year from time of surgery, and we did assessment for all patients after one year post-operative according UCLA score.

Patients are returned to full active duty when at least 80% of motion and strength are regained and when they are able to confidently perform the physical requirements of their occupational specialty.

3. RESULTS

Twenty-two (88%) of the patients in this study were males with only 3 females (22%). The mean age at the time of operation was 35.23 ranging from 20 to 48 years. All patients were unilaterally involved with the dominant side being affected in 19 patients (76%) and the non-dominant side in only 6 patients (24%). Eleven patients (44%) were athletes, six patients (24%) labor and eight patients (32%) workers. (Tab.1)

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<th>Age</th>
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<th>Sex</th>
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<th>22</th>
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<th>Slab Type</th>
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<th>76%</th>
<th>Type 5</th>
<th>6</th>
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Ten patients (40%) had an isolated SLAP lesion while the remaining 15 (60%) had associated lesions; 8 had associated bankart lesion, 7 had subacromial impingementand one had a small PASTA (Partial Articular Side Tendon Avulsion) lesion. Nine patients (36%) had central position anchor, 16 patients (64%) had
non central position of the anchor. Twenty patients (80%) had 1 anchor for fixation of SLAP, Five patients (20%) had 2 anchor.

All patients were assessed pre-operatively and then after 6 and 12 months post-operatively using UCLA score. UCLA score before operation was 18.23 with range from 15-22. UCLA score after 6 months from operation was 29.65 with range from 16-36. UCLA score after 12 months from operation was 32.24 with range from 22-36. Table 2 show UCLA score before operation and 6 months after and 12 months after operation. Comparing UCLA score before operation with UCLA score at 6 months and at 12 months showed highly significant improvement before and 6 months (p < 0.001) and 12 months after operation (p < 0.001).

Table 2. UCLA score before operation and 6 months after and 12 months after operation

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<tr>
<td>UCLA Score Before Operation</td>
<td>Mean 18.23</td>
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<td></td>
<td>Range 15-22</td>
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<tr>
<td>UCLA 6 Month After Surgery</td>
<td>Mean 29.65</td>
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<td></td>
<td>Range 16-35</td>
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<tr>
<td>UCLA Score 12 Month After Surgery</td>
<td>Mean 33.24</td>
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<td></td>
<td>Range 22-36</td>
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There is no significant relation between sex and UCLA score after 6 month and 12 months (P >0.05). Although there was statistically significant better clinical results in left dominant than non-dominant after 6 months and one year and final follow up (P-value <0.05). No statistically significant difference after 6 month and 12 months (P-value >0.05). Although there was better UCLA score at non traumatic patient, there was statistically insignificant before and after 6 month and 12 months and at final follow up (P >0.05). There was statistically insignificant between central and non-central position of the anchor (P >0.05) before, after 6 months and 12 months after operation. No statistically insignificant relationship between the number of the anchor 6 month, 12 month and UCLA score (P >0.05). There was statistically significant inverse correlation found between age of the studied patients and UCLA score at 12 months while no statistically significant correlation found between age and UCLA score before operation or at 6 months (Fig.3)

Two patients reported higher postoperative disability scores. Both of the patients had Type 2 SLAP lesions with associated Bankart lesions. Both lesions were repaired arthroscopically in the same time. Postoperatively, the patients reported higher disability scores due to a sensation of instability without frank dislocation. A postoperative magnetic resonance imaging (MRI) reported healed Bankart and SLAP lesions. The patients were managed non-operatively with intensive physiotherapy.

4. DISCUSSION

Kim et al. (9) in their study a Level IV study assessing the outcome of arthroscopic repair of isolated superior type II SLAP tears using suture anchors in 34 patients. The mean patients’ age was 26, and mean follow-up was 33±9 months. As indicated by the UCLA scoring system, the result was evaluated as excellent in 27 patients, good in 5, fair in 2, and poor in 0, with a success rate of 94%. The mean DASH score improved from 33.2 to 13.6. In addition, 100% of patients in the non-overhead athlete had an excellent to good outcome though 89% of patients in the overhead athlete sports had excellent to good outcome. In general, 14 of the 34 patients (41%) had the option to come back to their pre-injury level of action.
Ide et al. (10) analyzed the result of type II SLAP repair utilizing anchors suture in overhead-throwing athlete in a Level IV case series. The mean age was 24 years and mean follow-up was 41 months by independent examiner. According to modified Rowe scoring system, the outcomes were reviewed as excellent in 30 patients, good in 6, fair in 4, and poor in 0, converting into a success rate of 90%. Of the 40 competitors, 30 (75%) had the option to come back to their pre-injury level of execution without impediment.

Frei et al. (11) in a review investigation of 48 patients who experienced arthroscopic SLAP repair utilizing bioabsorbable anchor sutures demonstrated huge improvement in Constant, ASES and VAS. No distinctions were seen between the results of non-competitors, non-overhead competitors, recreational overhead competitors, and university overhead competitors, recommending that SLAP type II repair is effective autonomous of the patient's job or game.

Reinold et al. (12) in a prospective investigation of 84% of competitors with an accompanying SLAP repair came back to rivalry with excellent to good results utilizing the Modified Athletic Shoulder Outcome Scale. In our study examination of 25 patients mean age were 35.23 with the range from 20 to 48 years. The mean follows up period was two years. UCLA score before activity was 18.23. After activity UCLA score became 33.24. The UCLA score was excellent in 22 patients, good in 2 patients and fair in 1 patient. The patient satisfaction was 96%.

What's more, there was a factually critical improvement in both the UCLA score somewhere in the range of 6 and a year postoperatively. These results suggest, like most published studies, that rehabilitation from SLAP repair takes a longer time than most other shoulder pathologies and return to pre-injury level of activity may take up to a year. This was affirmed by Neri et al. (13) who found an interim to come back to play of 10 months' post SLAP repair in a cohort study performed on 31 athletes. In this study was show that there was statistically significant reverse relationship found between age of the studied patients and UCLA score at 12 months while no statistically significant correlation found between age and UCLA score before operation or at 6 months. This might be due to that the younger had motivation to doing well in order to return back to sport or work.

Denard et al. (14) in prospective study, Level IV series of Fifty-five patients were available for long-term follow-up at a mean of 77 months, concluded that 87% of cases, a good or excellent functional outcome can be anticipated after arthroscopic repair of type II SLAP lesions. They conclude a poor outcome with Workers’ Compensation cases and older age (≥40 years). In discussing the results of SLAP repair with age, Neri et al. (15) and Alpert et al. (16) in that no statistical difference was found in outcome scores with increasing age of the patient. This was despite the fact that older patients did slightly worse than younger ones. But they conclude that older patients tend to have longer recovery periods and are more prone to complications, especially stiffness, thus they require early supervised physiotherapy.

In our study, no biomechanical testing was performed, but clinical outcome showed no statistically significant difference between one or two anchor fixation. Also it showed insignificant clinical outcome with centrally placed anchors when compared to non-central anchors. In Coleman et al. (17) explored the consequences of a Level IV review case arrangement that thought about the result of type II SLAP repair with or without attendant acromioplasty. The study discussed follow-up in 50 of 73 patients who experienced sort II SLAP repair. The two groups SLAP tears were balanced out with a bioabsorbable anchors. At development, the patients finished an L’Insalata questionnaire, a physical assessment, and American Shoulder and Elbow Surgery (ASES) poll were led by an independent examiner. As per both scoring systems, there was no statistically significant difference in outcome between the 2 groups after an average of 3.5 years follow up. The authors stated that 47 of the 50 patients (94%) in the study were able to return to their pre-injury level of competition.

Enad (18) studied out a Level III retrospective cohort study to compare the outcome of SLAP repair between those patients with isolated SLAP injuries (group I) and those with concomitant pathologies (subacromial impingement and/or partial rotator cuff tear) (group II). The mean age was 31.6 years with a minimum follow-up of 24 months. All SLAP lesions were arthroscopically repaired with bioabsorbable suture anchors. There was no
significant difference in UCLA scores between the 2 groups, with overall success rate of 92%. However, there was a statistically significant difference in the mean ASES and Visual Analogue Scale (VAS) scores. Group II had a higher ASES score and a lower VAS score compared with group I. The cohort was only matched based on age, and thus selection bias may have been introduced by not controlling other issues; such as arm dominance, acute versus chronic onset, activity level, and so on. An independent examiner was not identified, potentially introducing detection bias.

In our 15 of the 25 patients had an associated impingement problem and in agreement with the results of Coleman et al. (17) the results of our study showed no statistically significant difference in the UCLA score between 12 months post-operative and 24 months. These results, however, were un-coordinate on other criteria such as age, traumatic versus non-traumatic onset and, level of activity. In addition, an independent examiner was not identified. Therefore, these factors may introduce detection of bias, which may result in inaccurate conclusions.

The various reports thus far have focused on the management outcome of isolated SLAP lesions without associated Bankart lesions. Rhee et al. (19) reported similar results in their review of arthroscopic intervention of 44 unstable SLAP lesions. 86% of their patients had good or excellent UCLA scores while, 14% of their patients had fair or poor UCLA scores. Samani et al. (20) also reported an overall success rate of 88% with 23 of 25 cases returning to their pre-injury level of sports participation following arthroscopic treatment. Morgan et al. (21) reported at 1-year follow-up of 102 repairs of Type 2 lesions that the clinical results assessed by the UCLA score were excellent in 85 (83%) patients, good in 14 patients (14%) good, fair in 3 patients (3%) and there were no poor results. Lim et al. (22) reported that 63% of the patients with isolated lesions showing significant improvement in their postoperative disability score. In this study, (90%) of the patients with isolated lesions showing significant improvement in their postoperative UCLA score with returning to their pre-injury level of activity participation following arthroscopic treatment.

In this our study, 15 of the 25 patients had an associated impingement problem, 80% of these patients had associated lesions had improvement in the postoperative UCLA score. Lim et al. (22) reported that 73% of patients with associated lesions had improvement in the postoperative disability score. This outcome supports the recommendation that SLAP and concomitant lesions should be managed in the same operative session.

5. Conclusion

Arthroscopic repair of anterior to posterior type II SLAP lesions provides good and improved functional outcome particularly with a component rotator cuff tear is present. There were insignificant clinical results of the patients managed by one or two anchor sutures or the position of the anchors but this need more biomechanical studies for the use of one or two anchor sutures needed and also the position of the anchor.

References


