Arthroscopic Repair of Type II Superior Labral Anterior Posterior Lesions With and Without Acromioplasty : A Clinical Analysis of 50 Patients

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Arthroscopic Repair of Type II Superior Labral Anterior Posterior Lesions With and Without Acromioplasty

A Clinical Analysis of 50 Patients

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Background: The treatment of type II superior labral anterior posterior (SLAP) lesions remains controversial. Many surgeons are reluctant to combine a SLAP repair with an acromioplasty for fear of postoperative shoulder stiffness and a poor clinical outcome.

Hypothesis: A SLAP repair and an acromioplasty done concomitantly may yield acceptable outcomes.

Study Design: Case series; Level of evidence, 4.

Methods: We compared the clinical results of 50 patients who had either an isolated type II SLAP repair (SLAP group, 34 patients) or a combined type II SLAP repair and acromioplasty (combined group, 16 patients). Patients were excluded for full-thickness rotator cuff tears or instability. All patients were evaluated with the L'Insalata Functional Shoulder Rating Questionnaire, with the American Shoulder and Elbow Surgeons (ASES) questionnaire, and by subjective evaluation.

Results: At an average of 3.4 years postoperatively, the L'Insalata and ASES scores were similar for the 2 groups: 87.1 and 85.8 for the SLAP group and 85.1 and 86.5 for the combined group, respectively ($P > .05$). Subjectively, only 65% of the patients in the SLAP group reported a "good" or "excellent" satisfaction with the surgery, compared with an 81% "good" or "excellent" satisfaction rating among the patients in the combined group. Seven patients (21%) in the SLAP group had postoperative clinical impingement, compared with no patients (0%) in the combined group ($P < .03$).

Conclusions: According to our data, these 2 procedures done concomitantly may yield acceptable outcomes. Our findings indicated that a combined type II SLAP repair and acromioplasty had no negative effect clinically and, furthermore, appeared to prevent residual clinical impingement.

Keywords: shoulder arthroscopy; SLAP lesions; acromioplasty

Type II superior labral anterior posterior (SLAP) lesions, as classified by Snyder et al,[11] can occur in the setting of subacromial impingement. In a later article, Snyder et al[10] reported that of 140 patients with SLAP lesions diagnosed arthroscopically, 114 patients (81%) had an additional shoulder lesion, and 66 (47%) of these patients had a positive impingement test preoperatively. In a more recent study, Samani et al[9] reported a 76% concurrence of impingement syndrome with SLAP lesions in 25 patients. However, despite this prevalence, many orthopaedic surgeons are reluctant to perform both a type II SLAP repair and subacromial decompression for fear of postoperative shoulder stiffness and, thus, a poor clinical outcome.

The symptoms of a SLAP lesion are often nonspecific and may overlap with the clinical symptoms of subacromial impingement.[10] Distinguishing between the 2 pathologic entities can be challenging. Patients with SLAP lesions

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complain of pain, especially with overhead activity, and will often report mechanical symptoms in the shoulder, such as "catching," "clicking," or "grinding." In a study by Mileski and Snyder[5] that included 140 patients with arthroscopically documented SLAP lesions, 43% of patients had a palpable pop or snap with range of motion; however, 52% of Mileski and Snyder's patients also had a positive impingement test. The O'Brien test for superior labral injury helps to elucidate a SLAP lesion.[7] In a study of 318 patients, the O'Brien test was 100% sensitive and 98.5% specific in diagnosing a SLAP lesion. However, the O'Brien test becomes less specific (95%) in the setting of combined acromioclavicular joint and superior labral lesions.

Surgical intervention with a fixation device is required for the treatment of an unstable (type II or type IV) SLAP lesion. Altchek et al[1] reported that debridement of the superior glenoid alone for a type II SLAP lesion produced good short-term results but a poor long-term outcome. In a retrospective study, Berg and Ciullo[2] identified SLAP lesions as a cause of persistent shoulder pain after distal clavicle resection in 15 patients; 10 of the 15 patients improved after an arthroscopic SLAP repair. What has yet to be established is the utility of performing both a SLAP repair and concomitant acromioplasty. The purpose of our study was to compare the clinical results of 50 patients who underwent either an isolated type II SLAP repair or a combined type II SLAP repair and acromioplasty.

MATERIALS AND METHODS

We reviewed the clinical records of 860 patients treated arthroscopically for labral injury by 5 different surgeons at our institution over a 7-year period. One hundred and forty of these patients had arthroscopically documented type II SLAP lesions, as described by Snyder et al.[10] Patients were excluded for prior ipsilateral shoulder surgery, concomitant full-thickness rotator cuff tears, instability, Bankart lesions, degenerative joint disease, and acromioclavicular joint arthritis but not for a diagnosis of subacromial impingement. Minimum postoperative follow-up was 2 years. Seventy-three patients met the inclusion criteria; 50 patients were available for follow-up evaluation. The 34 patients who had isolated SLAP repair were evaluated as the SLAP group and the 16 patients who had concomitant acromioplasties were evaluated as the combined group.

Preoperatively, all 50 patients had shoulder pain, especially with overhead activity. Four of the patients from the SLAP group and all 16 patients from the combined group had a positive impingement sign (Neer's impingement sign, Hawkins' sign, or both) documented in the chart. The O'Brien test was positive in 26 of 26 patients from the SLAP group and in 9 of 10 patients from the combined group; the test was not performed on the remaining 14 patients. None of the 50 patients had tenderness of the acromioclavicular joint. All patients had a preoperative MRI consistent with a type II SLAP lesion. In addition, each of the 50 patients had a failed course of conservative treatment lasting at least 3 months that included physical therapy, avoidance of the inciting activity, nonsteroidal anti-inflammatory medications, subacromial corticosteroid injections, or some combination thereof. In each case the conservative intervention had failed and the patient opted for surgical management.

Surgeon preference accounted for some of the variability in preoperative evaluation and indication for surgery. However, each of the 50 patients had a preoperative MRI that revealed a type II SLAP lesion. Furthermore, each of these patients complained of shoulder pain, particularly with overhead activity. Twenty patients had preoperative impingement signs. These findings were correlated with their clinical history. Subacromial decompression and acromioplasty were performed if impingement was determined to be a significant component of the patient's pain. In 4 cases the impingement sign was graded as mild and did not reproduce the patient's symptoms. Moreover, these patients all had a positive O'Brien's sign that did reproduce the patient's symptoms. As such, these patients were indicated for SLAP repair alone.

Arthroscopic surgery of the shoulder was performed in the beach-chair position using standard anterior and posterior portals. An intrascalene block was used in all 50 cases. All patients had a diagnostic arthroscopic surgery to confirm the clinical and radiographic findings of a type II SLAP lesion. In each case a probe was used to confirm an unstable biceps-labral complex. If additional lesions were found (ie, Bankart lesion, degenerative joint disease), these patients were excluded from the study. In the SLAP group, an arthroscopic shaver, rasp, or burr was used to prepare the superior glenoid to a rim of bleeding bone. Depending on surgeon preference and the anterior/posterior extent of the lesion, an additional portal through the rotator cuff was used for fixation of the SLAP lesion. This transrotator cuff approach (TRCA) was described previously by O'Brien et al.[6] In these cases, the rotator cuff was split in line with its fibers and not repaired. In the remaining cases, the standard rotator interval approach (RIA) was used. The SLAP lesions were repaired using the SureTac device (Acufex Microsurgical, Mansfield, Mass). Between 1 and 4 tacks were used.

In the combined group, a similar diagnostic arthroscopic surgery and SLAP repair were performed using the aforementioned techniques. Next, the arthroscope was placed in the subacromial space and confirmed the diagnosis of an impingement lesion. In addition, inflamed bursal tissue, an erosion in the coracoacromial ligament, and a type II or III acromion were commonly noted in the operative report. An arthroscopic shaver, burr, and radiofrequency ablation were used to perform the acromioplasty and subacromial decompression. Partial-thickness bursal-sided rotator cuff tears (<50%) were debrided and were not excluded from our study. All patients were immobilized for 2 to 4 weeks postoperatively and then started on a supervised physical therapy program.

Outcomes were evaluated using the L'Insalata Functional Shoulder Rating Questionnaire (0-100 points) to assess pain, activities of daily living, work, and overall satisfaction. Within the L'Insalata questionnaire is a subjective satisfaction question rated as "excellent," "good," "fair," or "poor." The L'Insalata questionnaire was scored according to the weighted system described by L'Insalata et al.[4] Patients were also asked if they had returned to their preinjury level of athletics. In addition, patients underwent a thorough physical

TABLE 1
Summary of Results[a]

Group	Age in Years, Mean (Range)	Follow-Up in Years, Mean (Range)	L'Insalata Points (Out of 100), Mean ± SD	ASES Points (Out of 100), Mean ± SD	Satisfaction (Good or Excellent), %
SLAP group (n = 34)	34 (16-56)	3.7 (2.6-6)	87.1 ± 14.1	85.8 ± 15.0	65
Combined group (n = 16)	42 (33-71)	3.3 (2-7)	85.1 ± 16.6	86.5 ± 15.7	81 ($P < .05$)

[a]ASES, American Shoulder and Elbow Surgeons questionnaire; SLAP, superior labral anterior posterior.

examination of the upper extremity at our institution that included testing of impingement signs (Neer and Hawkins), the O'Brien sign, range of motion, and strength. This evaluation was performed by a single physician other than the operating surgeon. During this examination, the American Shoulder and Elbow Surgeons (ASES) questionnaire was administered.[8] Similarly, once the physical examination was completed, the ASES questionnaire was scored (0-100 points). The data were then analyzed using the Student *t* test and chi-square test (SPSS software, SPSS Inc, Chicago, Ill).

RESULTS

The average age of patients in the SLAP and combined groups was 34 years (16-56 years) and 42 years (33-71 years), respectively ($P < .03$). Both groups were predominantly men, with 1 woman in the SLAP group and 2 in the combined group. The SLAP group included 9 competitive athletes, 24 recreational athletes, and 1 nonparticipant; the combined group had 1 competitive athlete, 11 recreational athletes, and 4 patients who were nonparticipatory.

The mean follow-up was 3.7 years (2.6-6 years) for the SLAP group and 3.3 years (2-7 years) for the combined group ($P > .05$). A TRCA was used for fixation of the SLAP lesion in 6 patients from the combined group and in 27 patients from the SLAP group. One to 4 tacks were used depending on the extent of the tear. Overall, an average of 1.6 tacks were placed for each patient. One patient from the SLAP group had revision surgery 2 months postoperatively secondary to a failure of the SureTac attributable to lack of compliance with postoperative protocols. There were no other reported complications in either group.

All 50 patients completed the L'Insalata Functional Shoulder Rating Questionnaire and the ASES questionnaire and underwent a thorough physical examination including the O'Brien test. The L'Insalata score was 85.1 points (±16.6) for the combined group and 87.1 points (±14.1) for the SLAP group ($P > .05$). Only 3 patients were unable to return to their preinjury level of competition. In the SLAP group, 22 patients (65%) reported a good-to-excellent result, 7 reported a fair result, and 5 reported a poor result. In contrast, 13 patients (81%) from the combined group reported a good-to-excellent satisfaction with their procedure, 2 patients reported a fair result, and 1 patient reported a poor result (see Table 1) ($P < .05$).

TABLE 2
Comparison of Surgical Techniques[a]

Variable	TRCA		RIA	
	Combined (n = 6)	SLAP (n = 27)	Combined (n = 10)	SLAP (n = 7)
Average age, years	38	34	44	34
ASES, mean	83.1	88.0	84.6	84.1
L'Insalata, mean	86.3	86.7	85.0	82.9
G-E satisfaction, n (%)	5/6 (83.3)	10/27 (63)	7/10 (70)	5/7 (71)
Impingement, n (%)	0	6/27 (22)	0	1/7 (14)

[a]TRCA, transrotator cuff approach; RIA, rotator interval approach; SLAP, superior labral anterior posterior; ASES, American Shoulder and Elbow Surgeons questionnaire; G-E, good to excellent.

The ASES scored physical examination was similar for the 2 groups: 86.5 points (±15.7) for the SLAP group and 85.8 points (±15.0) for the combined group ($P > .05$). All 50 patients had full range of motion, both active and passive, of the operated shoulder. None of the 50 patients had a positive O'Brien sign postoperatively. Seven patients (21%) from the SLAP group had a positive impingement sign and also reported continued pain with overhead activity. No patients from the combined group had impingement postoperatively. The difference in the incidence of postoperative clinical impingement between the 2 groups was statistically significant ($P < .03$). Four of the 7 patients from the SLAP group who had positive impingement signs postoperatively also had positive impingement signs preoperatively. These 7 patients had an average age of 35 years, average ASES score of 76.2, and average L'Insalata score of 76.9; 5 of the 7 reported fair or poor satisfaction. Two patients did not return to sports.

To compare similar groups, patients were evaluated by age, sport level, and surgical approach. In the combined group, the 11 recreational athletes had an average age of 42 years, ASES score of 84.8, and L'Insalata score of 89. Nine of 11 patients (82%) reported good-to-excellent satisfaction. In the SLAP group there were 24 recreational athletes, who had an average age of 38 years, ASES score of 90.2, and L'Insalata score of 88.8. Nineteen of 24 patients reported good to excellent results (79%). These differences were not statistically significant ($P > .05$).

The average age difference of 8 years may account for a sample bias. To minimize this we looked at persons aged 40 years or younger in both the combined and SLAP groups. In the combined group there were 9 patients. This group had an average ASES score of 84.5, L'Insalata score of 86.5, and good to excellent satisfaction of 67% (6/9). In the SLAP group there were 26 patients, who had an average ASES score of 85.0, L'Insalata score of 83.1, and good-to-excellent satisfaction of 58% (15/26). This was not statistically significant because of the small numbers in the subgroup ($P > .05$). Five different surgeons performed the 50 procedures. In the SLAP group, 27 of 34 had a TRCA. In the combined group, 6 of 16 had this approach. The groups had similar results and outcome scores (see Table 2) with no statistically significant differences ($P > .05$).

DISCUSSION

To our knowledge, this is the first study to compare the clinical outcome of a combined type II SLAP repair and acromioplasty with an isolated type II SLAP repair. Because of the relatively low incidence of isolated type II SLAP lesions, a retrospective analysis of this cohort was performed. The reported incidence of unstable SLAP lesions diagnosed by arthroscopic surgery ranges from 2% to 4% in the literature.[1,5,7,10] In our study, the incidence of type II SLAP lesions without rotator cuff injury or instability among a consecutive group of patients with labral tears was 8.5% (73 of 860 patients).

Patients in the combined group were, on average, older than the SLAP group; however, the combined group had similar outcomes compared with the SLAP group. Whereas all 16 patients in the combined group were given a diagnosis of clinical impingement preoperatively, in retrospect 4 patients in the SLAP group appear to have had preoperative impingement that was not treated with acromioplasty. This was attributable to mild impingement signs and lack of clinical correlation. Moreover, there was a concern among surgeons to avoid violating the subacromial space unless absolutely necessary to reduce the risk of postoperative inflammation and stiffness. Three patients who developed postoperative impingement may have had subtle impingement missed on preoperative examination or developed impingement during the postoperative rehabilitation. It is feasible that the older patients may also have had asymptomatic labral tears. Thus, we in effect treated the cause of the patients' pain by performing the acromioplasty, rendering the labral repair unnecessary. However, it must be emphasized that each of these patients had a preoperative clinical examination consistent with a superior labral lesion in addition to documentation with MRI. The comparison of these 2 groups illustrates the difficulty in distinguishing symptomatic SLAP lesions from subacromial impingement in some cases.

Good or excellent results for the surgical treatment of unstable SLAP lesions using an absorbable tack have been reported to be between 71% and 88% at minimum 2-year follow-up.[3,9] These numbers are consistent with our overall findings (70% good-to-excellent satisfaction with the procedure). We believe that the discrepancy in subjective satisfaction between the SLAP group and the combined group (65% vs 81%) is attributable in part to the higher incidence of postoperative impingement signs and pain with overhead activity among the patients in the SLAP group compared with the combined group (21% vs 0%). There was no difference in the L'Insalata scores or the ASES scores for the 2 groups; however, patient satisfaction is only 1 element of the L'Insalata questionnaire. The results are also possibly attributable to an inherent selection bias. The combined group was on average 8 years older and may have had lower expectations and demands of their shoulders than the SLAP group.

The groups were further evaluated by competition level, age, and surgical approach. When the purely recreational athletes were analyzed, the 2 groups had similar outcome scores and satisfaction. When we only evaluated patients younger than 40 years old, there were no statistically significant differences between the SLAP and combined groups. Furthermore, the TRCA and RIA techniques also yielded similar outcomes in contrast to other reports.[3]

The definitive treatment of SLAP lesions with impingement has yet to be established. Some surgeons have been loath to combine superior labral procedures with subacromial decompressions and acromioplasties because of concerns regarding motion restriction and postoperative inflammation and scarring in the subacromial space. None of the patients in our study who underwent a combined type II SLAP repair and acromioplasty experienced loss of motion postoperatively. The patients in both groups had full range of shoulder motion at greater than 2 years' follow-up based on physical examination. Our findings indicate that a combination of type II SLAP repair and acromioplasty is a clinically acceptable and reproducible procedure with good clinical outcome scores. Furthermore, one may expect similar outcomes to those patients who have had isolated procedures. Patients may have subtle preoperative impingement on physical examination supported by noting a lesion of the coracoacromial ligament that should be addressed. These injuries remain a difficult orthopaedic problem to manage. Our findings indicate that a combined type II SLAP repair and acromioplasty had no negative effect clinically and, furthermore, appeared to prevent residual clinical impingement in the combined group.

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