

Arthroscopic Management of Superior Labral Anterior and Posterior (SLAP) and Associated Lesions: Clinical Features and Functional Outcome

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Abstract

Introduction: The superior labral anterior and posterior (SLAP) lesion is a cause of chronic shoulder pain and significant disability. This study aims to review the distribution of types of SLAP lesions, associated lesions and the outcome of arthroscopic management. **Materials and Methods:** This series involved all 33 patients who underwent arthroscopic management of SLAP and associated lesions by a single surgeon. The pre- and postoperative disability scores were assessed using the disabilities of the arm, shoulder and hand (DASH) outcome measure. **Results:** Type 2 SLAP lesion (64%) was the most common. Forty-eight per cent of the cases were associated with an ipsilateral shoulder lesion. A 10- point pre- and postoperative DASH score reduction was noted in 63% of the patients with isolated SLAP lesions and 73% of those with associated lesions. **Conclusion:** Arthroscopic management of the SLAP and its associated lesions results in improved functional outcome. The presence of associated lesions should be actively sought and managed in the same operative session.

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Introduction

A superior labral lesion is a pathologic abnormality at the site of the long head of the biceps tendon insertion into the superior labrum extending in an anterior-posterior direction. This lesion results in a significant disability for the patient.

There are few studies that examine the incidence of the different types of superior labral anterior and posterior (SLAP) lesions, the presence of other shoulder pathologies and the outcome of the surgical management of SLAP lesions.¹⁻⁵ We present our series of 33 patients and their surgical outcomes.

Materials and Methods

The study cohort consisted of 33 consecutive subjects who underwent shoulder arthroscopy for the management of SLAP and concomitant lesions by the senior author (BKC) between 2001 and 2004. The treatment was based on the type of SLAP lesion.^{3,4,6} In Type 1 lesions, the torn and frayed labral tissue was debrided with preservation of the attachment of the labrum and biceps tendon to the glenoid. Type 3 lesions were treated with excision of the bucket handle portion of the tear. Type 4 lesions were

treated with excision of the torn labral and the split portion of the biceps tendon. Type 2 lesions were managed with reattachment of the torn labrum and biceps anchor to the superior glenoid neck with biodegradable (2 patients) or metallic suture anchors (31 patients). Patients with partial rotator cuff tears were treated with debridement and Bankart lesions were repaired arthroscopically with suture anchors.

All procedures were performed under general anaesthesia with the patient in a lateral decubitus position. The arm was placed in an arm holder under 4.5 kg of traction. The diagnostic arthroscopy was performed using the standard posterior portal. The anterior-lateral and anterior-superior portals were used as working portals. All the intra-articular lesions were identified and recorded in the operative notes. The SLAP lesion was classified into 4 types based on the classification described by Synder.⁷

Postoperatively, the patients were limited to early pendular shoulder exercises with a gradual progression of forward flexion from 90 degrees to 150 degrees over 6 weeks. Strengthening exercises commenced 6 weeks after the operation. The patients were advised to avoid vigorous sports activities for 6 months after the operation.

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The case records and operative notes were reviewed in all cases. The preoperative and postoperative functional status of the subjects were assessed by a single observer and scored using the disabilities of the arm, shoulder and hand (DASH) outcome measure.⁸ A 10-point difference between the pre- and postoperative scores was considered as the minimal important change.⁹

Results

Patient Profile

The study cohort consisted of 33 patients who underwent arthroscopic management of SLAP and concomitant lesions. Ninety-four per cent (31) were male patients with a mean age of 28.5 years (range, 19 to 50). The patients were assessed at a median postoperative period of 16 months (range, 7 to 53).

Lesion Profile

Sixty-seven per cent (22) of the patients sustained the injury in their dominant upper limb. The majority of the lesions were Type 2 lesions (64%, 21 patients) (Fig. 1). Forty-eight per cent (16) of the cases had concomitant pathologies in the same shoulder. These included Bankart lesions (8) and partial rotator cuff tears (8). All the Bankart lesions were repaired at the time of the SLAP repair and all the patients with partial rotator cuff tears were treated with debridement.

Cause of Injury

Forty-two per cent (14) of the patients sustained the injury following a fall or a road traffic accident (Fig. 2). Twenty-seven per cent (9) sustained the injury during sports activities. The sports included judo, soccer, basketball and rugby. Twenty-one per cent (7) of the patients sustained the injury while carrying heavy loads. Nine per cent (3) of the patients did not recall any specific precipitating activity.

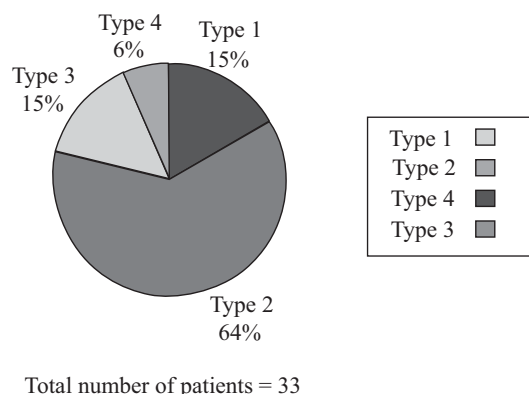


Fig. 1. Distribution of type of SLAP lesions.

Functional Outcome

The DASH outcome measure was utilised to measure the functional status of the patients.⁸ Twenty-seven of the 33 patients (82%) were recalled for assessment (Table 1). Six patients were lost to follow-up. Based on the criteria recommended by Gummesson et al,⁹ a 10-point difference between the pre- and postoperative DASH scores was considered a minimal important change for the patient. Of the 27 patients assessed, 16 patients had isolated SLAP lesions and 11 patients had associated lesions. In the group with isolated SLAP lesions, 63% (10) had a 10-point disability score difference. In the group with associated lesions, 73% (8) had a 10-point disability score difference. The overall rate of improvement was 67% (18).

Complications

There was no perioperative complication in our series of 33 patients. However, 2 patients (Nos. 26 and 27, Table 1) reported higher postoperative disability scores. Both of the patients had Type 2 SLAP lesions with associated Bankart lesions. Both lesions were repaired arthroscopically during the same operative session. 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.

Discussion

The superior labral lesion was reported by Andrews et al¹⁰ in a series of overhead throwing athletes who complained of pain and symptoms of clicking and popping in the glenohumeral joint. They postulated that this labral injury was a deceleration injury that occurred in the follow-through phase of throwing, with the biceps decelerating the elbow as it went into extension, thereby causing a traction injury to the anterosuperior labrum by virtue of the biceps root attachment to the anterosuperior labrum and glenoid. Synder et al⁷ subsequently described SLAP lesions in the general population and classified the lesion into 4 types. These include:

1. Type 1 (11%) – marked fraying of the free edge of the superior labrum.
2. Type 2 (41%) – avulsion of the labral-bicipital complex from the glenoid.
3. Type 3 (33%) – displaced bucket handle tear of the superior labrum with an intact biceps anchor.
4. Type 4 (15%) – bucket handle tear of the superior labrum, with extension into the biceps tendon.

With our research, we aimed to study the distribution of the various types of SLAP lesions, the concomitant pathological findings and the functional outcome following

Table 1. Clinical Features and Disabilities of the Arm, Shoulder and Hand (DASH) Scores of Study Cohort

S/No.	Age (y)	Sex	Type of lesion	Associated lesion	Preoperative DASH	Postoperative DASH	Score difference
1	24	1	1	Nil	27.3	6.8	-20.5
2	25	1	1	Nil	15.9	4.5	-11.4
3	45	2	1	Nil	38.6	18.2	-20.5
4	25	1	1	Nil	20.5	2.3	-18.2
5	34	1	2	Nil	45.5	13.6	-31.9
6	22	1	2	Nil	18.2	4.5	-13.6
7	25	1	2	Nil	20.5	9.1	-11.4
8	24	1	2	Nil	38.6	18.2	-20.4
9	35	1	2	Nil	59.0	0.0	-59.0
10	33	1	3	Nil	50.0	22.7	-27.3
11	50	1	1	Rotator cuff tear	13.6	2.3	-11.4
12	19	2	2	Bankart	56.8	20.5	-36.3
13	25	1	2	Bankart	40.9	27.3	-13.6
14	25	1	2	Rotator cuff tear	15.9	4.5	-11.4
15	46	1	2	Rotator cuff tear	40.9	6.8	-34.1
16	39	1	3	Rotator cuff tear	36.4	2.3	-34.1
17	29	1	3	Rotator cuff tear	34.1	13.6	-20.5
18	19	1	4	Bankart	18.2	4.5	-13.7
19	35	1	1	Nil	38.6	34.1	-4.5
20	44	1	2	Nil	20.5	13.6	-6.9
21	23	1	2	Nil	6.8	4.5	-2.3
22	41	1	2	Nil	15.0	11.0	-4.0
23	25	1	2	Nil	31.8	22.7	-9.1
24	23	1	2	Nil	27.3	20.5	-6.8
25	21	1	2	Rotator cuff tear	22.7	15.9	-6.8
26	20	1	2	Bankart	2.3	9.1	6.8
27	20	1	2	Bankart	6.8	20.5	13.7

arthroscopic intervention in the isolated SLAP lesion and associated lesions.

The DASH outcome measure is a 30-item, self-report questionnaire designed to measure physical function and symptoms in patients with any or several musculoskeletal disorders of the upper limb.⁸ The questionnaire was designed to help describe the disability experienced by people with upper-limb disorders and also to monitor changes in symptoms and function over time. Gummesson et al⁹ studied the longitudinal construct validity and the mean rated health change after surgery in 109 patients who underwent arthroscopic acromioplasty and carpal tunnel surgery. They reported that the DASH can detect and differentiate changes in disability overall in patients with upper extremity musculoskeletal disorders. A 10-point difference in score might be considered as a minimal

important change. This criterion was adopted in the review of the outcome in our study.

Morgan et al² reported on a series of 102 consecutive Type 2 SLAP lesions without associated Bankart lesion or anterior instability. Fifty-three of these cases were overhead throwing athletes and 49 were non-throwers with single event trauma. All the lesions were repaired arthroscopically with anchor sutures. Using the University of California at Los Angeles (UCLA) scoring system, excellent results were achieved in 85 (83%) cases, 14 (14%) cases had good results and 3 (3%) cases had fair results. None of the cases had poor results. Of the 53 throwers, 44 were baseball pitchers of whom 84% returned to their pre-injury level of activity or better. Burkhart et al¹¹ noted in their review of the “Dead Arm Revisited” that baseball has generated an epidemic of Type 2 SLAP lesions. In our Asian population,

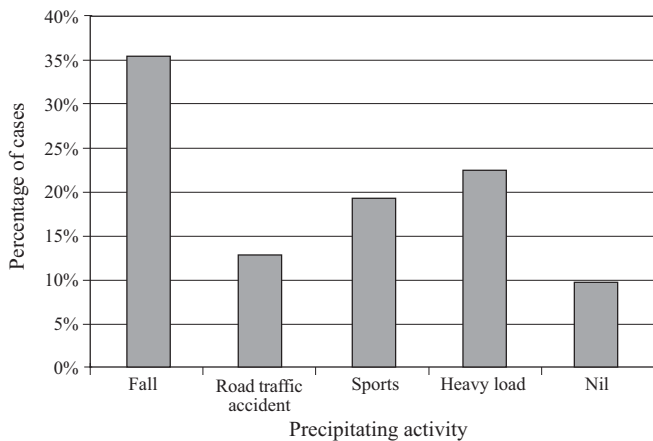


Fig. 2. Distribution of precipitating activity.

sports involving an overhead throwing motion (e.g., baseball) are not commonly played, which would explain the low incidence of SLAP tears due to sporting activities (Fig. 2). Instead, traumatic events, i.e. falls and road traffic accidents, accounted for 47% of the precipitating causes.

In our cohort of patients, Type 2 lesions (64%) were the most common. This was similarly reported by Synder et al (41%), Bencardino et al (47%) and Jee et al (88%).^{7,12,13} Kim et al¹ found in their review of 103 patients that 74% had Type 1 lesions and 21% had Type 2 lesions.

An important point to note is the presence of concomitant lesions that occur with SLAP lesions. We found that 48% of cases in our series of patients had associated lesions, i.e. Bankart lesion and rotator cuff tear. Kim et al¹ reported 90% association with other lesions, i.e. rotator cuff tear and Bankart lesion. This association with other shoulder pathologies has also been linked to an age predilection for association with certain lesions. Rotator cuff lesions were more commonly associated with patients who were more than 40 years old, whereas Bankart lesions were more commonly seen in patients less than 40 years old. Therefore, in the management of SLAP lesions, it is imperative that associated lesions be looked out for at the time of surgery. In addition, the authors recommended that care must be taken when ascribing symptoms to a SLAP lesion when other lesions are present.

The various reports thus far have focused on the management outcome of isolated SLAP lesions without associated Bankart lesions. Rhee et al⁵ reported similar results in their review of arthroscopic intervention of 44 unstable SLAP lesions. Eighty-six per cent of their patients had good or excellent UCLA scores. Samani et al¹⁴ 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 al² reported at 1-year follow-up of 102 repairs of Type 2 lesions that the

clinical results assessed by the UCLA rating scale were excellent in 85 (83%) patients, good in 14 patients (14%) good, fair in 3 patients (3%) and there were no poor results. In our series, we report that 63% of the patients with isolated lesions showing significant improvement in their postoperative disability score.

However, studies on the management of associated Bankart and SLAP lesions are limited. A biomechanical study performed by Panossian et al¹⁵ in 6 cadaveric shoulders had demonstrated that Type 2 SLAP lesions cause significant glenohumeral instability, which can be effectively treated with arthroscopic techniques using anchor sutures. Warner et al¹⁶ reported on the preliminary results of the arthroscopic repair of associated Bankart and SLAP lesions. Over a 3-year period, 9 out of 585 patients were found to have SLAP lesions. Seven patients also had an associated Bankart lesion. These patients underwent arthroscopic repair using the Suretac Fixation technique. At an average follow-up period of 19 months (range, 15 to 22), 5 of the 7 patients (71%) had no pain, a full range of movement and a full pre-morbid activity level. One patient redislocated at 4 months postoperatively and 1 developed a stiff shoulder.

In our study, 73% of patients with associated lesions reported a 10-point reduction in the postoperative disability score. This outcome supports the recommendation that SLAP and concomitant lesions should be managed in the same operative session.

In conclusion, arthroscopic management of SLAP lesions provides good and improved functional outcome in two thirds of our patient cohort. The presence of concomitant lesions should be actively sought and managed in the same operative session.

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