ISSN: 2634 - 680X

Journal of Clinical Case Studies Reviews & Reports

SCIENTIFIC Research and Community

Research Article

Open Access

Clinical Evaluation of the Arthroscopic Decompression of Spinoglenoid Notch Cyst through a Single Posterior Portal

Yi Zhang[1], Youliang Shen[1], Dewei Kou[1], Jinli Chen[1], Tengbo Yu[2*] and Chao Qi[1]

[1]Affiliated Hospital of Qingdao University, China

[2]Qingdao Municipal Hospital, China

ABSTRACT

Introduction: To describe and evaluate the arthroscopic spinoglenoid notch cyst (SGNC) decompression technique through a single posterior working portal.

Methods: From January 2010 to March 2022, 20 patients of SGNC were included who were available for minimum of 2 years of follow-up. All surgical procedures were conducted with a suprascapular nerve decompression via posterior portal. For assessments, the visual analog scale (VAS), Constant-Murley shoulder score (CS), American Shoulder and Elbow Surgeon (ASES) score, magnetic resonance image (MRI) and electromyogram (EMG) were used to compare preoperative and postoperative at follow-up. MRI and EMG were taken at 6 months postoperatively.

Results: All 20 patients were included in this study. Mean follow-up was 32.5 ± 11.71 months. The VAS improved from 4.5 ± 3.1 to 1.5 ± 0.50 ($P < .001$), the mean CS improved from 40.8 ± 14.89 to 88.3 ± 7.51 ($P < .001$), and the mean ASES score improved from 50.5 ± 10.62 to 87.8 ± 6.95 ($P < .001$) at last follow-up. The postoperative MRI and EGM performed at a mean of 6 months for all 20 cases revealed complete symptomatic remission. The satisfaction level with surgery was good to excellent in 19 patients.

Conclusion: For treatment of SGNC, arthroscopic decompression through single posterior portal was found to be a simple and effective method, maximizes visualization and reduces possible damage to the suprascapular nerve.

***Corresponding author**
Tengbo Yu, Qingdao Municipal Hospital, China.

Received: November 12, 2024; **Accepted:** November 18, 2024; **Published:** December 30, 2024

Keywords: Spinoglenoid Notch Cyst, Arthroscopy, Capsulotomy, Intra-Articular Drainage, Suprascapular Nerve Entrapment

Abbreviations
MRI- Magnetic Resonance Imaging
EMG/NCV- Electromyogram and Nerve Conduction Velocity
SS- Suprascapular Neuropathy
N- Normal
VAS-Visual Analog Scale
ASES-American Shoulder and Elbow Surgeons

Introduction

Spinoglenoid notch cyst (SGNC) is a relatively rare disease of shoulder pain or weakness, causes only less than 2.3% of all painful shoulders, related to the limited mobility of suprascapular nerve passed through the spinoglenoid notch and the proximity of the rotator cuff [1]. The shoulder pain characteristic from the SGNC is vague and similar to other lesions found at cervical and shoulder regions. One third of the patients will have limitation of external rotation or forward elevation depending on the nerve compression level [2]. Magnetic resonance imaging (MRI) and nerve physiology study such as electromyogram (EMG) and nerve conduction velocity (NCV) could assist in identifying the site and level of suprascapular nerve entrapment. Surgical treatment is indicated when conservative measures fails along with positive result from EMG and NCV showing nerve dysfunction [3-5].

With the advancement of arthroscopic techniques, many open excisions have been shifted to arthroscopic decompression of SGNC. Satisfactory outcomes have been reported with the minimal soft tissue damage and low recurrence rate [2, 6-11]. Three main arthroscopic management have been described to decompress SGNC, the labral tear approach, capsulotomy approach and the subacromial approach [4,6,10,12-20]. The advantage of labral tear approach is the superior visualization to the labrum which mostly related to SGNC pathology, especially for the superior labrum anterior and posterior (SLAP) lesion. Through SLAP lesion is considered to be a predominant cause of SGNC formation, not all cases could be found an obvious lesion [13, 15, 21-23]. The capsulotomy approach is a blunt decompression technique minimize the risk of suprascapular nerve injury [24,5]. Despite the advantages, the intra-articular approach has limitation on the SGNC direct visualization that may resulted in incomplete cyst decompression [4]. The subacromial approach provide direct cyst visualization at the base of scapular spine [2,8,18,20,24]. From Wilmington portal and anterolateral portal, it was easy to excise

the SGNC with a shaver from the subacromial approach [4,6,21,22,25]. The downside of subacromial approach is the possibility to encounter and injure the accompanying vessels while bursectomy performed with arthroscopic shaver.

Several technical notes and case reports for these approaches had shown good outcomes and rare complications. Nevertheless, the potential surgical risks were rarely described in the previous studies. Considering The major cause of suprascapular nerve entrapment is compression from SGNC, we suggest that a single arthroscopic intra-articular drainage of SGNC could provide sufficient nerve decompression.

The purpose of current study was to describe the clinical outcome of arthroscopic decompression of SGNC through single posterior portal. We hypothesized that this technique can provide simpler and more time-saving decompression with satisfactory clinical outcomes, balancing the advantages of both approaches.

Materials and Methods

Study Population

Ethical clearance was obtained from research ethics committee of the Affiliated Hospital of QingDao University prior to this retrospective study. From January 2010 to March 2022, 20 eligible patients underwent arthroscopic decompression of SGNC with or without SLAP repair (Table 1). Inclusion criterias were (1) SGNC lesion identified from pre-operative MRI or magnetic resonance arthrography (MRA) (Figure 1), (2) failed regular conservative treatment for at least 6 months, (3) arthroscopic decompression of SGNC through a posterior capsulotomy approach, and (4) patients with 18 months minimum follow-up after surgery. The exclusion criterias were (1) previous shoulder surgery, (2) concomitant pathologic conditions that needed to be repaired such as rotator cuff tear or dislocation, and (3) SGNC decompression through other approaches.

Table 1: Demographic Data

Demographic	
Age (years)	40.6 (range 29 ~ 56; SD ± 10.11)
Sex (female/ male)	9/11
Symptom duration (months)	12.7 (range 7 ~ 43; SD ± 8.42)
Side of involvement (left/ right)	8/12
Involvement of dominant arm (number, %)	12 (60%)
Preoperative shoulder range of motion (active)	
Forward elevation (°)	155.8 (range 145 ~ 178; SD ± 15.83)
External rotation (°)	42.6 (range 25 ~ 75; SD ± 13.74)
Internal rotation (°) in abducted position	8.5 (range 5 ~ 18; SD ± 5.07)
Cyst size on preoperative MRI	
Size in coronal oblique plane (cm)	2.3 (range 1.1 ~ 3.7; SD ± 1.16)
Size in sagittal oblique plane (cm)	1.7 (range 1.0 ~ 3.0; SD ± 0.77)
Size in axial plane (cm)	1.9 (range 1.2 ~ 3.5; SD ± 0.83)
Lobulation of the cysts	
Single	8(40%)
Multiple	12 (60%)
MRI preop (Cyst without/with type I/ with type II SLAP)	6/9/5
EMG/NCV preop (SS/N)	15/5
Preoperative clinical scores	
VAS score	4.5 (range 1 ~ 7; SD ± 3.1)
Constant score	40.8 (range 31 ~ 82; SD ± 14.89)
ASES score	50.5 (range 30 ~ 84; SD ± 10.62)

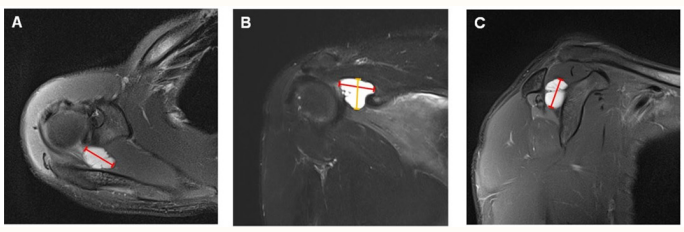

Figure 1: The Preoperative Magnetic Resonance Images of Multiple Segmental Paralabral Cyst in the Right Shoulder of a 39-Year-Old Man.

(A) Axial View, with a Width of 26.9 mm.
(B) Coronal Oblique View, with a Width of 27.2 mm in Horizontal Line (red) and 22.6 mm in Vertical Line (orange).
(C) Sagittal Oblique View, with a Width of 23.1 mm.

The surgical indications were posterior shoulder pain with or without infraspinatus atrophy for at least 3 months, SGNC as seen by MRI or MRA, and suprascapular neuropathy diagnosed by preoperative EMG/NCV. All patients involved in this study were consented and agreed upon the usage of their medical data.

Adjunctive Examination

The preoperative diagnostic routine included shoulder conventional radiographs (anteroposterior, true anteroposterior, and axillary views), MRI or MRA, and EMG/NCV. The size of SGNC was evaluated at the oblique coronal, oblique sagittal, and axial cut of MRI images by one professional radiologist (DP Hao) (images show in Fig. 2). The EMG and NCV was recorded at 6 months postoperatively. Recurrence of SC was assessed by performing a follow up MRI in all patients.

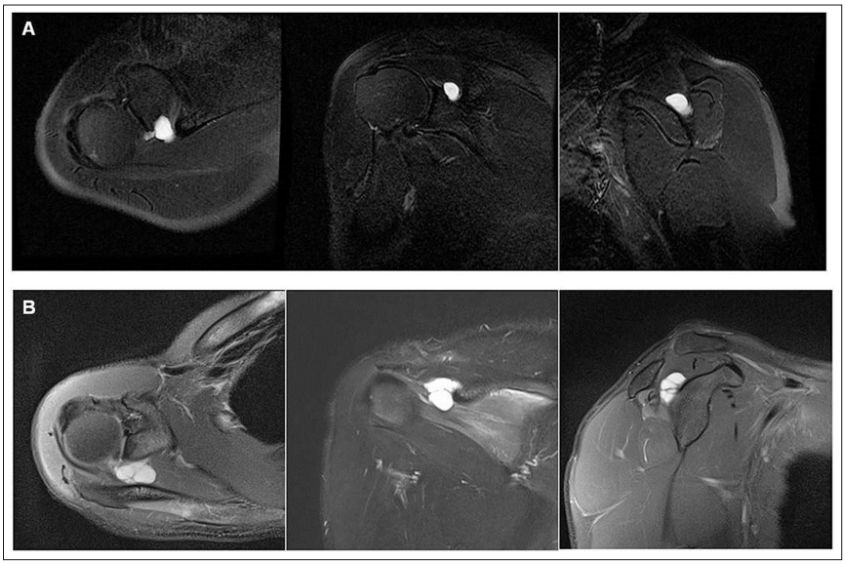

Figure 2: Preoperative Magnetic Resonance Images.
(A) An Uni-Lobular type Cyst without Segmentation
(B) A Multi- Lobulated type Cyst.

Clinical Outcomes Evaluation

Clinical outcomes were evaluated with visual analog scale (VAS) score for pain, range of motion (ROM), Constant-Murley and American Shoulder and Elbow Surgeons (ASES) scores for functional outcome. All evaluations were performed by a single shoulder surgeon who was blinded to the surgical procedure.

The patient's satisfaction was evaluated as excellent, good, fair, or poor at the final follow up. All patients accepted a minimum of 2 years follow-up.

Surgical Procedures

Although the spinoglenoid cyst is easily found and operated in the beach-chair position, the combined posterior labral tear or SLAP tear could be required to repair that can be addressed in the lateral decubitus position. Shoulder traction device was used in all patients (Spider2 traction system, Smith & Nephew, USA) was used to maintain the arm in 20° of flexion and 30°of abduction. All surgical procedures were performed by a single experienced shoulder surgeon (C.Q).

Firstly, the external landmarks are marked, including the acromion, coracoid, acromioclavicular joint, and the portal incisions. In this technique, the standard posterior portal (1 cm medial and 2 cm inferior to the posterolateral margin of acromion) and Wilmington viewing portal (1 cm anterior and 1 cm lateral to the posterolateral corner of acromion) are consistently established in all patients. Other accessory portals are case dependent. Then the posterior portal is established, and a 30° arthroscope is inserted into the glenohumeral joint. Here whether the anterior working portal will be established on case dependent, but the Wilmington viewing portal is prioritize established. The arthroscope exchanged to the Wilmington viewing portal, and the labral pathology and cyst location are evaluated carefully using a probe through the posterior working portal.

Under the view of Wilmington portal, the posterior capsule overlying the cyst is probed to confirm the location and depth of the SGNC. We carved the posterosuperior capsule layered using an electrocautery device through the posterior portal, until reaching the spinoglenoid notch where the SGNC was located adjacent to. The lateral membrane of SGNC would be shaved and then the mucinous fluid resulted from the decompression will confirm the procedure (show in Fig. 3). We could deliver the camera into capsular window from the Wilmington portal to examine the cyst. The septum of the cyst was carefully removed until the suprascapular nerve and vessel were identified (show in Fig. 4). The limited incision of posterior capsule does not need to suture to ensure the mucinous fluid of cyst drainage into the joint smoothly.

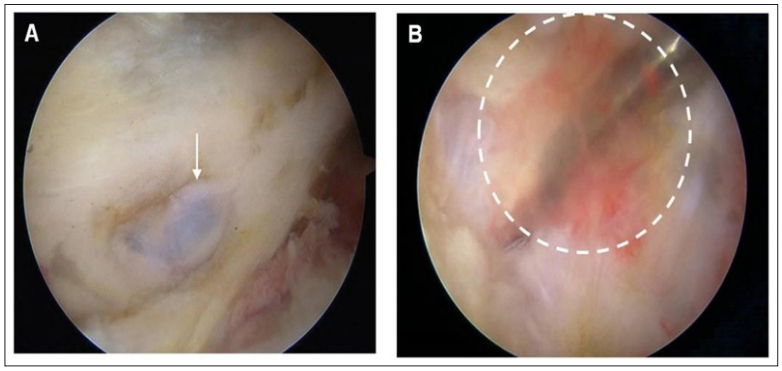

Figure 3: SGNC shows under arthroscopy.
(A) Arthroscopic images of SGNC (white arrow)
(B) The mucinous fluid outflow from the cyst cavity.

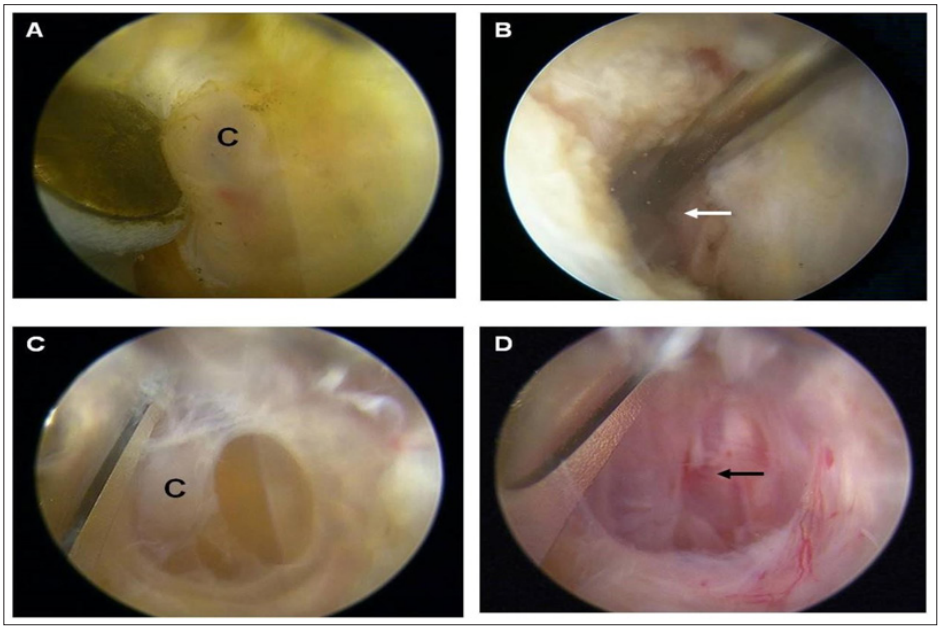

Figure 4: The Procedures of the Arthroscopic Decompression of SGNC Via the Posterior Approach Capsulotomy with Intra-Articular Drainage.
(A) Revealing the outer boundary of the cyst by making a incision along the edge of the labrum.
(B) Cut open the outer boundary of the cyst and make a intra-articular drainage (white arrow).
(C) Intracystic exploration using a shaver.
(D) Arthroscopic exploration in the cyst cavity, carefully separating the fascia of SSN and blood vessel bundles until the artiary pulsation (black arrow) was observed. (C, cyst)

The decision for SLAP repair would be done intra-operatively. If a SLAP lesion was not identified or not need to repair, only arthroscopic debridement and decompression was performed. Otherwise, the type II SLAP lesion woule be sutured with anchor bolts adding the auxiliary anterior interval portal.

Postoperative Rehabilitation

For patients who underwent cyst decompression alone, the affected arm was kept in an abduction brace for 2 weeks. The pendulum and passive range of motion (ROM) exercises began on the first day after surgery. After 2 weeks, the self-assisted passive and active ROM exercises were encouraged. Active strengthening exercises using an elastic band were started 4 to 12 weeks postoperatively. Nearly full active ROM were allowed after 3 months postoperatively.

For patients who underwent concomitant SLAP repair, the affected arm was kept in an abduction brace for 4 weeks. The pendulum and passive range of motion (ROM) exercises were encouraged on the first day after surgery. The self-assisted passive exercises were started 4 to 8 weeks postoperatively, and after which the active range of motion exercises began. Active strengthening exercises using an elastic band were started 3 to 6 months postoperatively. Nearly full active ROM were allowed after 6 months postoperatively.

Statistical Analysis

All result were expressed by mean and standard deviation. Preoperative and postoperative clinical scores were compared by a paired t-test or Wilcoxon signed rank test according to the result of prior distribution-free tests. All statistical evaluations were performed using PASW Statistics software (19.0, SPSS, Chicago, IL, USA). A $P < 0.05$ was considered statistically significant.

Results

Patient Demographics and Arthroscopic Findings

A total of 20 patients were included in our study, 8 lesions on the left and 12 on the right (show in Table 1). There were 11 male and 9 female subjects in this study with a mean age of 40.6 years (40.6± 14.33, range 29–56 years). The mean body mass index is 24.5 ± 4.0kg/m2. The mean duration period was 12.7 months (12.7 ± 20.24, range 7–43 months). The dominant arm was involved in 12 patients (60%). Eight patients had a definite trauma history when the symptoms started. The remaining 12 patients experienced insidious onset of symptoms, but 6 of those had various levels of preinjury activity.

All the patients complained feeling of dull pain in the posterolateral shoulder that aggravated at external rotation. 14 patients (70%) had external rotation weakness on physical examination, although no definite infraspinatus muscle atrophy was shown on preoperative MRI. Preoperative EMG/NCV examination was performed in all patients and 15 patients who complained of subjective external rotation weakness were found positive changes compared with the contralateral side. No result was consistent with definite suprascapular nerve injury on the remaining 5 patients.

SGNC extended in the spinoglenoid notch was evident on MRI in all patients. The cysts size on preoperative MRI were shown in Table 1 and Fig. 1. Twelve cases were multi-lobulated type, and the remaining 8 showed uni-lobular type (Fig. 2). No obvious atrophy or fatty degeneration of rotator cuff musculature was found on MRI. A concomitant type II SLAP lesion was identified in 5 patients (25%), 9 patients (45%) showed a type I SLAP lesion which did not need repair, and the remaining 6 patients (30%) showed a normal variant of the superior labrum. All the SLAP lesions were located on the posterior- superior side of the glenoid (9 − 1 o'clock). The mean operation time was 26 minutes (26.25 ± 9.71, ranges 18–42 minutes) with or without SLAP repair.

Functional and Radiological Outcomes

At the final follow up of 32.50 ± 12.46 months (range, 18–56 months), the overall preoperative functional scores were significantly improved (show in Table 2). The VAS score improved from 4.5 ±3.1 to 1.5 ±0.50 (P < .001), the Constant-Murley shoulder score improved from 40.8 ± 14.89 to 88.3 ± 7.51 (P <.001), and the ASES score improved from 50.5 ± 10.62 to 87.8 ± 6.95 (P < .001). The postoperative active ROMs were improved except of internal rotation. Forward elevation was improved from 155.8°±15.83 to 163.6°±7.21(P = .004), and External rotation was improved from 42.6°±13.74 to 59.2°±6.65 (P < .001). The mean of preoperative and postoperative internal rotation was 8.5°±5.07 and 8.7°±4.43 (P = .351). A postoperative 6-month MRI showed no recurrence of the SGNC in all patients. A postoperative 6-month EMG/NCV was performed in patients with positive findings on preoperative examination, and no evidence of suprascapular neuropathy was shown in the follow-up EMG/NCV. There was no complication related to surgery. All the patient's satisfaction with surgery was excellent or good at final follow-up (images show in Figure 5).

Table: 2 Clinical Functional Scores and Active Range of Motion

Preoperative Value		Postoperative Value	P Value
VAS score	4.5 ± 3.1	1.5 ± 0.50	< .001
Constant score	40.8 ± 14.89	88.3 ± 7.51	< .001
ASES score	50.5 ± 10.62	87.8 ± 6.95	< .001
Forward elevation	155.8°±15.83	163.6°±7.21	= .004
External rotation	42.6°±13.74	59.2°±6.65	< .001
Internal rotation	8.5°±5.07	8.7°±4.43	= .351

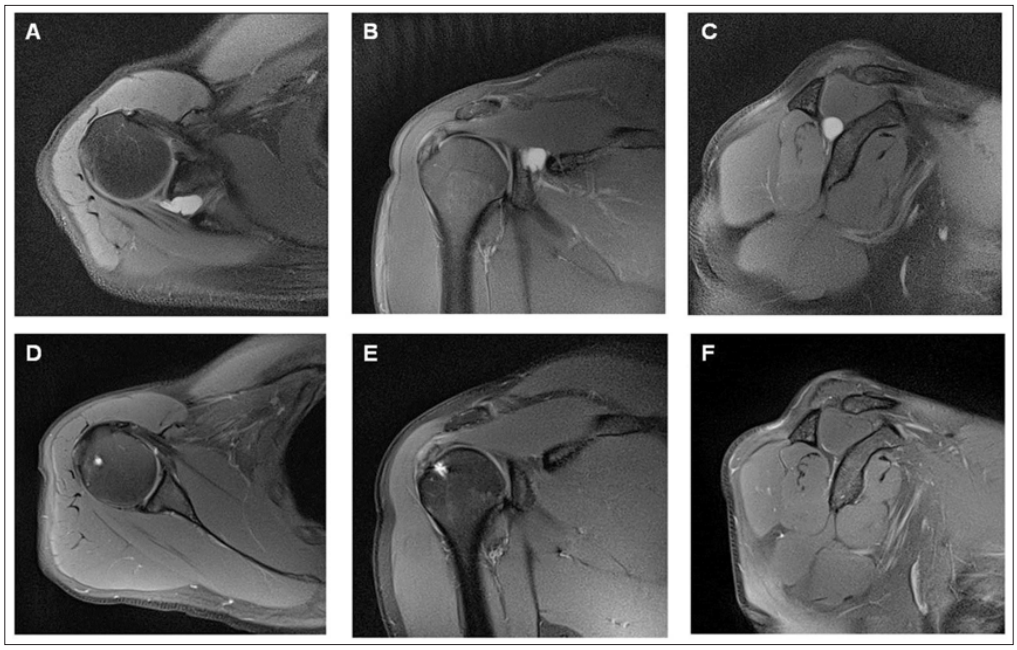

Figure 5: A Right Shoulder of a 49-Year-Old Man, Preoperative and Postoperative Magnetic Resonance Images of Spinoglenoid Notch Cysts Via the Posterior Approach Capsulotomy with Intra-Articular Drainage.

(A) Axial view before arthroscopic decompression.
(B) Coronal oblique view.
(C) Sagittal oblique view.
(D) Axial view 2 years after arthroscopy shows the disappearance of cysts.
(E) Coronal oblique view 2 years after arthroscopy.
(F) Sagittal oblique view 2 years after arthroscopy.

Discussion

Our results showed that decompression of SGNC through intra-articular posterior capsulotomy from single posterior portal resulted in satisfactory clinical outcomes. Our technique combined the advantages from both intra-articular and subacromial approach which provide direct cyst visualization as well as reduce iatrogenic injury of suprascapular nerve-vascular bundle. It is proven to be a simple, quick and effective method that completely decompressed SGNC at the final follow up.

Several studies have reported that one-way valve mechanism in connection with the labral tear is the main pathomechanism of SGNC [6,12,13,15,26-28]. Min Soo Shon et al. reported all consecutive 20 patients with SGNC had associated labral tears in the glenohumeral joint [5]. Westerheide et al. reported that 50% (7 in 14 cases) of the patients were needed a labral repair in all cases of suprascapular nerve palsy secondary to SGNC [11]. But in other researches, no obvious visible communication was found in 57% of the patients between the cyst and joint [8,24,28]. And in our study, 14 cases were confirmed to have a clear SLAP lesions (type I 9/ type II 5) in arthroscopy in our study. The cysts might result from the repetitive overhead activities which affect the connective tissue fibers originated from the posterosuperior capsule without direct communication to the glenohumeral joint [4,29]. The other possibility is that the labrum lesion was spontaneously healed.

Arthroscopic decompression of SGNC is the preferred treatment compare to open technique due to the advantages of minimal invasive manner. Both intra-articular and subacromial approach were reported to have satisfactory and effective outcomes whether the cyst was decompressed or extirpated [18,19,22,25,26]. If the labral lesion existed, labral tear approach is an easy way with superior visualization to perform labrum suturing. Otherwise, the capsulotomy approach and the subacromial approach will be taken.

The intra-articular arthroscopic technique was more well received in previous studies which could address the co-existing labral lesion concurrently. Many studies described the used of arthroscopic shaver blade through the labral tear to incise the cyst membrane [5,12,19,25]. whatever through the labral tear approach and capsulotomy approach, this technique may lead to incomplete cyst decompression when the cyst was found to be multilobulated or located at a distance from the glenoid, and might also incise the posterior capsule if there is no obvious co-existing labral lesion.

The subacromial approach is recognized as a more reliable way of arthroscopic decompression of SGNC which provide direct visualization and decompression regardless cyst size and lobulation [4,18,19,20,30]. Arthroscopic procedure includes the identification of scapular spine and division of supraspinatus and infraspinatus muscle interval. This approach is more straightforward than intra-articular approach. Some studies of this technique have shown good results in isolated infraspinatus or combined supraspinatus atrophy patients with suprascapular neuropathy [4,17,20,31,32]. However, this technique requires thorough bursectomy and normal soft tissue dissection to identify the supraspinatus and infraspinatus muscle interval with a blunt switching stick. Although there are few reports, associated myocutaneous hemorrhage or iatrogenic suprascapular nerve injury are more likely to occurred compared to intra- articular arthroscopic technique [31,32].

In recent years, simpler methods have emerged by improving traditional approach, and some surgeons found that only one working portal was enough to complete the decompression. The advantages of this single working portal technique are shorten the operation time, decreasing the risk of iatrogenic rotator cuff, nerve or vessels injury, and avoiding unnecessary superior capsule incision for cyst exposure. Trai Promsang et.al improved the arthroscopic decompression through the labral tear using only 2 portals, 1 anterior viewing portal and 1 posterior working portal [33]. Jian-Fa Chen et.al reported another arthroscopic technique for posterior-superior capsular fenestration through a trans-rotator cuff approach [16]. Cameron J Phillips et.al present a surgical technique using an intra-articular transcapsular approach which maximizes visualization and efficiency and reduces possible damage to the SSN [34].

Our method is also belonging to the single working portal technique, having the advantages of quick, safe and easy to operate for surgeons. If the cyst is single without diaphragm, a limited posterior capsulotomy is enough to maintain the clinical outcomes through established a cyst intra-articularly drainage. If the cyst is multiple lobulation or located at a distance from the glenoid, the direct visualization through Wilmington portal could help to evaluate the cyst location and the adjacent suprascapular nerve and vessels. The posterior capsule incision did not require to repair to maintain an intra-articular drainage to keep a pressureless state of cyst by a minimum and brief arthroscopic decompression. The visible pulsation from the vessel will confirm the complete decompression. We found it is not necessary to completely remove the cyst and later skeletonize the epineurium for it can increase the risk of iatrogenic suprascapular nerve injury.

There are several limitations in the current study. Firstly, this is a therapeutic case series without control group. Secondly, the sample size included in this study is small. Thirdly, the inconsistent final follows up time. It is difficult to ensure the recurrence of the cyst in those with 2 years final follow up compare to those with 32.5 months follow-up. Those with the longer final follow up time showed no residual external rotation weakness or shoulder pain, and all of them had good to excellent postoperative functional scores.

Conclusions

Arthroscopic decompression of SGNC through single posterior portal with intra-articular drainage resulted in excellent clinical outcome. This technique demonstrated an effective, simple and minimal invasive to address SGNC with no recurrence and complete suprascapular nerve decompression.

Declarations

Funding Declaration

This research was funded by the National Natural Science Foundation of China (NO. 31802022).

Author Contribution

All authors contributed to the study conception and design. Y.Z.contributed to the data collection. Y.S. did the statistical analysis and prepared the tables. Figures were prepared by Y.S. and D.K. Material preparation were performed by Y.S. D.K. and J.C. The operation was performed by Q.C. The first draft of the manuscript was written by Y.Z. and J.C., and all authors commented on previous versions of the manuscript. T.Y. provided critical review and substantially revised the manuscript. All authors read and approved the final manuscript.

References

1. Tung GA, Entzian D, Stern JB, Green A (2000) MR imaging and MR arthrography of paraglenoid labral cysts. AJR American journal of roentgenology 174: 1707-1715.
2. Abboud JA, Silverberg D, Glaser DL, Ramsey ML, Williams GR (2006) Arthroscopy effectively treats ganglion cysts of the shoulder. Clinical orthopaedics and related research 444: 129-133.
3. Kadir Buyukdogan, Burak Altintas, Özgür Koyuncu, İlker Eren, Olgar Birsel, et al. (2020) Ultrasound-Guided Intralesional Methylene Blue Injection for the Arthroscopic Decompression of Spinoglenoid Notch Cyst Causing Suprascapular Neuropathy. Arthroscopy techniques 9: e1785-e1789.
4. Kim SJ, Choi YR, Jung M, Park JY, Chun YM (2017) Outcomes of Arthroscopic Decompression of Spinoglenoid Cysts Through a Subacromial Approach. Arthroscopy: the journal of arthroscopic & related surgery: official publication of the Arthroscopy Association of North America and the International Arthroscopy Association 33: 62-67.
5. Shon MS, Jung SW, Kim JW, Yoo JC (2015) Arthroscopic all-intra-articular decompression and labral repair of paralabral cyst in the shoulder. Journal of shoulder and elbow surgery 24: e7- e14.
6. Kim DH, Sohn HJ, Kim JH, Cho CH (2023) Clinical Outcomes Following Arthroscopic Decompression and Repair versus Repair Alone in Patients with a Concomitant Spinoglenoid Cyst and SLAP Lesion: A Systematic Review. Diagnostics 13: 2364.
7. Kim SH, Kim SJ, Sung CH, Koh YG, Kim YC, et al. (2009) Arthroscopic suprascapular nerve decompression at the suprascapular notch. Knee surgery, sports traumatology, arthroscopy: official journal of the ESSKA 17: 1504-1507.
8. Lichtenberg S, Magosch P, Habermeyer P (2004) Compression of the suprascapular nerve by a ganglion cyst of the spinoglenoid notch: the arthroscopic solution. Knee surgery, sports traumatology, arthroscopy: official journal of the ESSKA 12: 72-79.
9. Park JH, Lee YS, Park JW, Yoo JC, Kang JW, et al. (2010) Effective arthroscopic treatment of large, anteriorly extended spinoglenoid cysts. Archives of orthopaedic and trauma surgery 130: 423-426.
10. Piatt BE, Hawkins RJ, Fritz RC, Ho CP, Wolf E, et al. (2002) Clinical evaluation and treatment of spinoglenoid notch ganglion cysts. Journal of shoulder and elbow surgery 11: 600- 604.
11. Westerheide KJ, Dopirak RM, Karzel RP, Snyder SJ (2006) Suprascapular nerve palsy secondary to spinoglenoid cysts: results of arthroscopic treatment. Arthroscopy: the journal of arthroscopic & related surgery: official publication of the Arthroscopy Association of North America and the International Arthroscopy Association 22: 721-727.
12. C KS, Varshney A, Yoo YS, Lee SJ (2017) Arthroscopic Intra-articular Spinoglenoid Cyst Resection Following SLAP Repair. Arthroscopy techniques 6: e1795-e1799.
13. Chen AL, Ong BC, Rose DJ (2003) Arthroscopic management of spinoglenoid cysts associated with SLAP lesions and suprascapular neuropathy. Arthroscopy: the journal of arthroscopic & related surgery: official publication of the Arthroscopy Association of North America and the International Arthroscopy Association 19: 15-21.
14. Schroder CP, Skare O, Stiris M, Gjengedal E, Uppheim G, et al. (2008) Treatment of labral tears with associated spinoglenoid cysts without cyst decompression. The Journal of bone and joint surgery 90: 523-530.
15. Youm T, Matthews PV, El Attrache NS (2006) Treatment of patients with spinoglenoid cysts associated with superior labral tears without cyst aspiration, debridement, or excision. Arthroscopy: the journal of arthroscopic & related surgery: official publication of the Arthroscopy Association of North America and the International Arthroscopy Association 22: 548-552.
16. Chen JF, Wang ZL, Zhang JM, Wang YY, Yang R, et al. (2022) Trans-Rotator Cuff Approach for Spinoglenoid Cysts: Tips and Traps. Arthroscopy techniques 11: e2249-e2253.
17. Lafosse L, Tomasi A, Corbett S, Baier G, Willems K, et al. (2007) Arthroscopic release of suprascapular nerve entrapment at the suprascapular notch: technique and preliminary results. Arthroscopy: the journal of arthroscopic & related surgery: official publication of the Arthroscopy Association of North America and the International Arthroscopy Association 23: 34-42.
18. Wang YJ, Cui GQ (2010) Arthroscopic excision of spinoglenoid notch cyst through two different approaches. Chinese medical journal 123: 3154-3156.
19. Bhatia S, Chalmers PN, Yanke AB, Romeo AA, Verma NN (2012) Arthroscopic suprascapular nerve decompression: transarticular and subacromial approach. Arthroscopy techniques 1: e187-e192.
20. Ghodadra N, Nho SJ, Verma NN, Stefanie Reiff, Dana P Piasecki, et al. (2009) Arthroscopic decompression of the suprascapular nerve at the spinoglenoid notch and suprascapular notch through the subacromial space. Arthroscopy: the journal of arthroscopic & related surgery: official publication of the Arthroscopy Association of North America and the International Arthroscopy Association 25: 439-445.
21. Kim DS, Park HK, Park JH, Yoon WS (2012) Ganglion cyst of the spinoglenoid notch: comparison between SLAP repair alone and SLAP repair with cyst decompression. Journal of shoulder and elbow surgery 21: 1456-1463.
22. Amit M Momaya, Adam Kwapisz, W Stephen Choate, Michael J Kissenberth, Stefan J Tolan, et al. (2018) Clinical outcomes of suprascapular nerve decompression: a systematic review. Journal of shoulder and elbow surgery 27: 172-180.
23. Pillai G, Baynes JR, Gladstone J, Flatow EL (2011) Greater strength increase with cyst decompression and SLAP repair than SLAP repair alone. Clinical orthopaedics and related research 469: 1056-1060.
24. Iannotti JP, Ramsey ML (1996) Arthroscopic decompression of a ganglion cyst causing suprascapular nerve compression. Arthroscopy: the journal of arthroscopic & related surgery: official publication of the Arthroscopy Association of North America and the International Arthroscopy Association 12: 739-745.
25. Werner CM, Nagy L, Gerber C (2007) Combined intra- and extra-articular arthroscopic treatment of entrapment

neuropathy of the infraspinatus branches of the suprascapular nerve caused by a periglenoidal ganglion cyst. Arthroscopy: the journal of arthroscopic & related surgery: official publication of the Arthroscopy Association of North America and the International Arthroscopy Association 23: e321-e323.

26. Romeo AA, Ghodadra NS, Salata MJ, Provencher MT (2010) Arthroscopic suprascapular nerve decompression: indications and surgical technique. Journal of shoulder and elbow surgery 19: 118-123.
27. Tashjian RZ, Burks RT (2009) Arthroscopic aspiration and labral repair for treatment of spinoglenoid notch cysts. American journal of orthopedics 38: 94-96.
28. Tirman PF, Feller JF, Janzen DL, Peterfy CG, Bergman AG (1994) Association of glenoid labral cysts with labral tears and glenohumeral instability: radiologic findings and clinical significance. Radiology 190: 653-658.
29. Ogino T, Minami A, Kato H, Hara R, Suzuki K (1991) Entrapment neuropathy of the suprascapular nerve by a ganglion. A report of three cases. The Journal of bone and joint surgery 73: 141-147.
30. David J Beard, Jonathan L Rees, Jonathan A Cook, Ines Rombach, Cushla Cooper, et al. (2018) Arthroscopic subacromial decompression for subacromial shoulder pain (CSAW): a multicentre, pragmatic, parallel group, placebo-controlled, three-group, randomised surgical trial. Lancet 391: 329-338.
31. Shah AA, Butler RB, Sung SY, Wells JH, Higgins LD, et al. (2011) Clinical outcomes of suprascapular nerve decompression. Journal of shoulder and elbow surgery 20: 975- 982.
32. Soubeyrand M, Bauer T, Billot N, Lortat-Jacob A, Gicquelet R, et al. (2008) Original portals for arthroscopic decompression of the suprascapular nerve: an anatomic study. Journal of shoulder and elbow surgery 17: 616-623.
33. Promsang T, Kongrukgreatiyos K, Kuptniratsaikul S (2018) Arthroscopic Decompression of Spinoglenoid Notch Cyst and SLAP Repair Through a Single Working Portal. Arthroscopy techniques 7: e963-e967.
34. Phillips CJ, Field AC, Field LD (2018) Transcapsular Decompression of Shoulder Ganglion Cysts. Arthroscopy techniques 7: e1263-e1267.