ISSN 2618-1584 Vol. 5, Issue 12: 63-67, DOI: 10.25236/FMSR.2023.051208

Clinical Analysis of Shoulder Arthroscopy in the Treatment of Cysts in the Spinal Pelvic Incision

Feng Huang[1], Ning Jiang[2,*], Weijian Zhang[1], Chunxiao Wang[1], Guodong Liu[1], Lun Ning, Ruijun Mao[1]

[1]Shandong Provincial Armed Police Corps Hospital, Jinan, Shandong, China
[2]Shandong Maternal and Child Health Hospital, Jinan, Shandong, China
[*]Corresponding author

Abstract: *It is of great significance to explore the clinical efficacy of arthroscopic treatment of glenoid incision cysts and associated injuries under shoulder arthroscopy. This article retrospectively analyzed 11 patients with glenoid incisure cysts admitted from August 2016 to February 2022. Among them, 7 had symptoms of suprascapular nerve compression, and 5 had SLAP injury. The preoperative shoulder MRI confirmed the diagnosis of glenoid incisure cysts in the shoulder joint. All cysts were removed under arthroscopy and combined shoulder joint lesions such as SLAP injury and rotator cuff injury were treated. This paper evaluates shoulder joint function through VAS score, ASES score, Constant score, and MRI examination to assess whether the cyst relapses. The study found that all 11 patients were followed up for an average of 32 months. The VAS score, ASES score, and Constant score of the patients increased from preoperative (5 ± 1), (8 ± 3.2), and (61 ± 8.6) to (1 ± 0.5), (11 ± 1.2), and (83 ± 5.4), respectively. The differences between preoperative and postoperative were statistically significant ($P<0.05$). There were no postoperative complications, and the shoulder joint activity returned to normal. The abductor and supinator muscle strength of the shoulder joint returned to level V. MRI reexamination showed no recurrence of cysts. Research suggests that arthroscopic surgery on the shoulder has significant advantages and can achieve good early therapeutic effects for cysts of the glenoid notch, especially those with pelvic lip injury or rotator cuff injury.*

Keywords: *Shoulder arthroscopy, Gangyu notch, cyst*

1. Introduction

Spinoglinoid notch cyst (SNC) is a rare shoulder cyst in clinical practice, often found during shoulder magnetic resonance imaging to exclude other diseases. The glenoid notch is a bony notch located on the lateral side of the scapular spine and the posterior medial side of the glenoid joint, connecting the supraspinatus fossa and the infraspinatus fossa. The suprascapular nerve (SSN) runs inward and downwards from the supraspinatus fossa, entering the infraspinatus fossa [1]. Cysts in the glenoid notch may cause compression of the adjacent suprascapular nerve, leading to clinical symptoms, often manifested as chronic blunt pain in the posterior upper part of the shoulder joint, weakened shoulder abduction or external rotation muscle strength, and atrophy of the infraspinatus muscle may occur during a longer course of disease.

From August 2016 to February 2022, our department treated 11 patients with cysts in the glenoid incision of the shoulder joint. All patients underwent cyst resection under arthroscopy, accompanied by superior labrum anterior and posterior (SLAP) injuries to the shoulder joint and rotator cuff injuries, which were repaired together, achieving good early efficacy.

2. Materials and methods

2.1 General information

11 patients, 8 males and 3 females; Age range from 19 to 56 years old, with an average of 35 years old; 7 cases were accompanied by symptoms of suprascapular nerve compression, and 5 cases were accompanied by SLAP injury; 6 cases had a clear history of trauma; Before the surgery, anterior and posterior X-ray films, CT three-dimensional reconstruction, and MRI of the shoulder joint were taken. Based on symptoms, signs, and imaging examination, the diagnosis was clearly diagnosed as a cyst of

ISSN 2618-1584 Vol. 5, Issue 12: 63-67, DOI: 10.25236/FMSR.2023.051208

the glenoid notch of the shoulder joint. Before surgery, VAS score, ASES score, and Constant score were used to evaluate the shoulder joint function of the patient. Typical cases are shown in Figures 1-4.

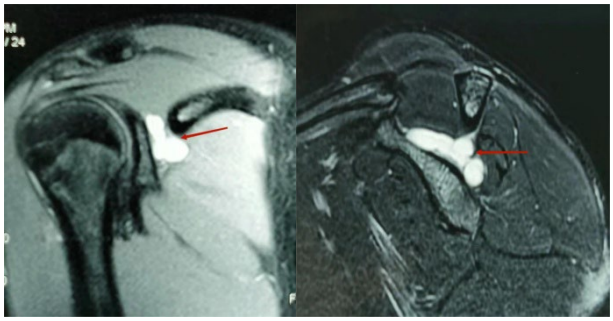

Figure 1: MRI shows a huge cyst at the right shoulder glenoid notch

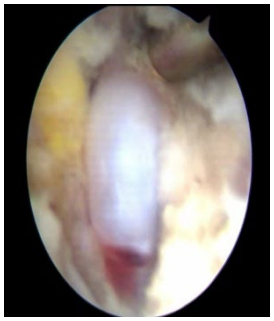

Figure 2: Exposed cyst

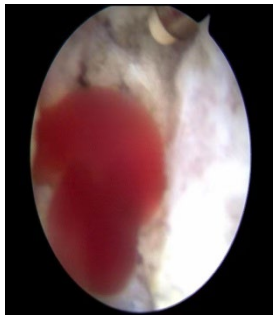

Figure 3: Cysts release light red cystic fluid

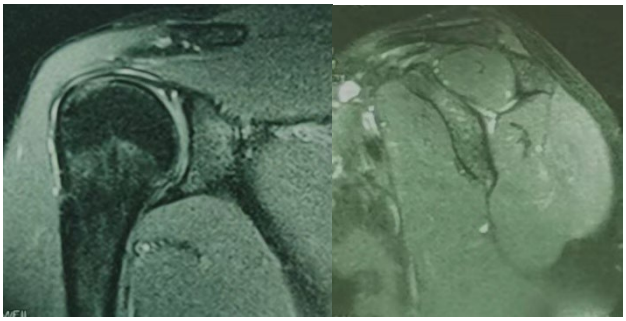

Figure 4: MRI reexamination showed no recurrence of the cyst

2.2 Surgical methods

Under general anesthesia, the patient takes a beach chair position and undergoes arthroscopic exploration of the glenoid humeral joint through a posterior approach [2]. By incorporating the Wilmington approach, the posterior superior joint capsule at the outer edge of the scapular lip was incised with a plasma knife, separated inward along the neck of the scapula, and the joint capsule wall was exposed and opened. A portion of the joint capsule wall was removed for pathological observation, Then fully aspirate and decompress the scapular nerve without suturing the joint capsule. It needs pay

ISSN 2618-1584 Vol. 5, Issue 12: 63-67, DOI: 10.25236/FMSR.2023.051208

attention to protecting the scapular arteries and veins during surgery to prevent intraoperative and postoperative bleeding. For patients with combined SLAP injury, Bankart injury, or rotator cuff injury, the residual tissue at the injury site should be cleaned with a plane knife, the fresh bone bed should be ground, and the corresponding injury should be repaired after the anchor screw is implanted.

2.3 Postoperative rehabilitation training

Patients with simple SNC do not need fixation and begin active and passive shoulder joint exercise on the second day after surgery. For patients who underwent pelvic lip suturing, the brace should be worn for 6-8 weeks, and passive exercise should be performed on the second day after surgery. Ice should be applied after the activity, and active exercise should be performed 4-5 weeks later. Active muscle strength training should be performed 6 weeks later.

2.4 Statistical processing

The data was statistically analyzed using SPSS 20.0 software, and the measurement data was represented by $x \pm s$ using paired t-tests. $P<0.05$ indicates a statistically significant difference.

3. Results

All 11 patients were followed up for an average of 32 months, ranging from 10 to 61 months. The VAS score, ASES score, and Constant score of the patients increased from preoperative (5 ± 1), (8 ± 3.2), and (61 ± 8.6) to (1 ± 0.5), (11 ± 1.2), and (83 ± 5.4), respectively. The differences between preoperative and postoperative were statistically significant ($P<0.05$). There were no postoperative complications such as infection or nerve damage. The shoulder joint activity returned to normal, and the abductor and supinator muscle strength of the shoulder joint returned to level V. MRI examination showed no recurrence of cysts.

4. Discussion

4.1 Anatomy and pathogenesis of suprascapular nerve entrapment caused by SNC

The suprascapular nerve is a mixed motor and sensory nerve. The suprascapular nerve originates from a branch of the upper trunk of the brachial plexus. It tilts from front to back and passes through the posterior cervical triangle, parallel to the lower edge of the hyoid muscle, extending along the outer side of the deep surface of the flexor muscle, and passing through a fibrous bone channel composed of the transverse ligament of the scapula and the scapular notch. The suprascapular foramen runs around the inner side of the bone. Surgery enters the supraspinatus fossa. The suprascapular nerve and suprascapular arterio-vein bypass the suprascapular and glenoid notch laterally, enter the infraspinatus fossa in an arc manner, and send out muscle branches to innervate the infraspinatus muscle [3]. The suprascapular incisura is a bony seal at the upper margin of the scapula, located inside the root of the coracoid process. The suprascapular nerve usually emits two motor branches to the suprascapular muscle at a distance of 1cm from the suprascapular notch. It passes down through a bone fiber canal composed of the scapular transverse ligament and the glenoid notch, turns to the infraspinatus fossa, and divides into 2 to 4 motor branches to innervate the infraspinatus muscle [4]. Therefore, the supraspinatus muscle and the infraspinatus muscle will be involved when the supraspinatus nerve is compressed by the cyst in the supraspinatus notch. When SNC compressions occur, only the infraspinatus muscle is involved, and the supraspinatus muscle is normal [5].

4.2 Clinical and imaging manifestations of SNC

Patients often have a history of direct or indirect shoulder injury, often manifested as chronic blunt pain in the posterior and upper part of the shoulder joint, weakened shoulder abduction or external rotation muscle strength, and longer course of disease may lead to atrophy of the infraspinatus muscle. Generally, there is a clear tenderness point, and electromyography shows a significant decrease in the motor conduction velocity of the suprascapular nerve. Kessler et al. [6] believe that SLAP injury is closely related to the occurrence of SNC, possibly due to the unidirectional valve mechanism formed after pelvic lip tear, leading to continuous leakage and accumulation of joint fluid, leading to the formation of cysts.

ISSN 2618-1584 Vol. 5, Issue 12: 63-67, DOI: 10.25236/FMSR.2023.051208

MRI examination can detect the presence of SLAP injury, as well as the presence of cysts at the suprascapular and glenoid incisions. MRI can detect early changes in denervation, such as early atrophy of affected muscles, manifested as decreased muscle volume and fat infiltration [7]. The diagnostic points of MRI for suprascapular nerve compression caused by SNC can be divided into direct and indirect signs [8]. Direct signs refer to the observation of SNC compression on the suprascapular nerve, while indirect signs mainly refer to muscle changes. When the suprascapular nerve is heavily compressed, the nutritional effect of the nerve on the muscles is impaired. The acute phase of suprascapular nerve compression will lead to muscle edema, with no significant changes in muscle volume, and fat suppression on PDWI imaging showing increased muscle signal.

4.3 Treatment of SNC

The treatment methods for SNC include conservative treatment, percutaneous aspiration, open surgical resection, and arthroscopic resection. Acupuncture aspiration, due to its high recurrence rate, is less commonly used in clinical practice [9]. Compared to conservative treatment, surgical resection has a clear therapeutic effect. Arthroscopic cyst resection, nerve decompression, and treatment of intra-articular lesions (such as pelvic lip tear and rotator cuff injury) are currently the most commonly used methods in clinical practice, which are divided into two types: the posterior superior joint capsule approach and the subacromial space approach. Jin Wenming et al. [10] believe that the prerequisite for the translingual approach is the presence of intra-articular glenoid lip injury, a large blind spot in the field of vision, and the inability to fully expose the cyst. The advantage is that there is less soft tissue dissection, which can directly repair the glenoid lip injury; the approach through the subacromial space has a large operating space and can fully expose the cyst without damaging the pelvic lip. The limitation is that it can cause significant damage to soft tissue. The author used a transglenoid cleft or posterior superior joint capsule approach. For those with SLAP injury and accompanied by a larger cleft, this approach is used, while for those without SLAP injury, the posterior superior joint capsule approach is used. Both approaches can achieve the goal, and the surgeon can choose their own familiar approach. The main surgical methods are fenestration and decompression of the cyst [11] or complete resection. Meng Qingyang et al. [12] believe that SNC is pathologically consistent with tenosynovial cysts, and internal septated or non fenestrated polycystic cysts are the basis for recurrence, and should be completely removed to avoid cyst recurrence. However, Liu Weijie et al. [13] achieved definite results in relieving symptoms of suprascapular nerve compression by cutting open the joint capsule and performing cyst decompression and internal drainage. The upper joint capsule is attached to the deep surface of the supraglenoid and infraspinatus tendons as a thin fibrous structure, and the rotator cuff plays an important role in maintaining stability above the shoulder joint. Li Yan et al. [14] believe that removing cysts through the posterior superior joint capsule approach will not affect the stability above the shoulder joint. Most of the cases in this group did not fully expose the cyst during surgery. Firstly, some patients have large cysts that are difficult to fully expose. Excessive incision of the joint capsule may affect the stability of the shoulder joint and increase the risk of neurovascular damage; Secondly, the author believes that as long as the cystic fluid is fully released, the purpose of decompression can be achieved, and postoperative neurological symptoms can also be restored. Among them, there are also polycystic cysts, and postoperative MRI reexamination shows no incomplete drainage or recurrence, which may be related to the small sample size. It is currently a consensus to repair the damaged lip of the glenoid incision cyst with SLAP injury, but there is still controversy over whether to remove the cyst. Lichtenberg et al. [15] performed arthroscopic cyst resection and repair of pelvic lip injury in 8 patients, resulting in significant pain relief and recovery of shoulder joint function. And Youm et al. [16] believe that only performing lip repair surgery can also achieve good therapeutic effects. The study by Kim DS [17] found no significant statistical difference in the effectiveness of the two surgical methods. The possible reason is that in cases where the cyst of the glenoid notch is combined with the injury of the glenoid lip, the valve was damaged during soft tissue cleaning and bone surface freshening during the repair of the injury, indirectly completing the decompression of the cyst.

5. Conclusion

In summary, for SNC, especially those with pelvic lip injury or other intra-articular lesions, shoulder arthroscopic surgery has a definite therapeutic effect, obvious advantages, and can achieve good early efficacy. The sample size of this group of cases is small, and long-term follow-up results are still needed.

ISSN 2618-1584 Vol. 5, Issue 12: 63-67, DOI: 10.25236/FMSR.2023.051208

References

[1] Eckmann MS, Bickelhaupt B, Fehl J, et al.Cadaveric Study of the Articular Branches of the Shoulder Joint [J].Regional Anesthesi&Pain Medicine, 2017,42: 564-570.
[2] Zhang Yinquan, Wang Yi, Lou Yi, et al. Mid-term efficacy follow-up of shoulder arthroscopic surgery for SLAP injury[J]. Chinese Journal of Bone and Joint Injury, 2018,21, 36(3):279-281.
[3] Yamakado K. Quantification of the learning curve for arthroscop-ic supra-scapular nerve decompression: an evaluation of 300 cases [J].Arthroscopy, 2015,31 :191-196.
[4] Liu Shitong, Wang Shaohua, Li Shaoke, et al. MRI diagnosis of suprascapular nerve entrapment caused by glenoid notch cyst[J]. Journal of Clinical Radiology, Volume 38, Issue 9, 2019, 2019, 38(9):1730-1733.
[5] SHAH AA,BUTLER RB,SUNG SY,et al.Clinical outcomes of suprascapular nerve decompression [J]. J Shoulder Elbow Surg,2011,20 (6) :975-982.
[6] Kessler MA, Stoffel K, Oswald A, et al. The SLAP lesion as a reasonfor glenolabral cysts: a report of five cases and review of the literature [J]. Archives of Orthopaedic & Trauma Surgery, 2007, 127:287-292.
[7] Yanny S, Toms AP. MR patterns of denervation around the shoul-der [J].Ajr American Journal of Roentgenology, 2010,195: W157-W163.
[8] BEELER S,EK ET,GERBER C.A comparative analysis of fatty infil-tration and muscle atrophy in patients with chronic disease rotator cuff tears andsuprascapular neuropathy [J]. Shoulder Elbow Surg, 2013,22 (11) :1537-1546.
[9] Buyukdogan K, Altintas B, Koyuncu O, et al.Ultrasound-guided intralesional methylene blue injection for the arthroscopic decompression of spinoglenoid notch cyst causing suprascapular [J].Arthrosc Tech, 2019, 9(11):e1785-e1789.
[10] Jin Wenming, Zhao Gen, Li Han, et al. The glenoid notch cyst was resected through the subacromial space under shoulder arthroscopy[J]. Orthopedics, 2012, 13(5):405-408.
[11] Jerome TJ, Sabtharishi V, Thirumagal Sk. Open surgical decompression for large multiloculated spinoglenoid notch ganglion cyst with suprascapular nerve neuropathy[J]. Cureus, 2021, 13(2):e13300.
[12] Meng Qingyang, Liu Ping. Results of arthroscopic resection of glenoid notch cysts via gangular approach in 28 cases followed for 1 year[J]. Chinese Journal of Minimally Invasive Surgery, 2002, 22(8):609-613.
[13] Liu Weijie, CAI Yan, Qi Chao, et al. Treatment of suprascapular nerve entrapment syndrome caused by glenoid notch cyst by posterior arthroscopic incision and decompression[J]. Chinese Journal of Orthopedics, 2018,38(7): 390-395.
[14] Li Yan, Li Dianwei, Yang Mingyu, et al. Two cases of scapuloscapular superior notch cyst treated by arthroscopy combined with endoscopy via superior articular capsule approach[J]. Chinese Journal of Prosthoplastic and Reconstructive Surgery, 2019, 35(3):401-402.
[15] Lichtenberg S, Magosch P,Habermeyer P. Compression of the suprascapular nerve by a ganglion cyst of the spinoglenoid notch:the arthroscopic solution[J]. Knee Surg Sports Traumatol Arthrosc, 2004, 12(1):72-79.
[16] Youm T, Matthews PV, El Attrache NS. Treatment of patients with spinoglenoid cysts associated with superior labral tears without cyst aspiration, debridement, or excision [J]. Arthroscopy, 2006, 22(5): 548-552.
[17] KIM DS, PARK HK, PARK JH, et al. Ganglion cyst of thespinoglenoid notch: comparison between SLAP repairalone and SLAP repair with cyst decompression [J].J Shoulder Elbow Surg, 2012, 21 (11) :1456-1463.