

INDIRECT ARTHROSCOPIC DECOMPRESSION OF SPINOGLENOID CYST WITH SUPRASCAPULAR NEUROPATHY: REPORT OF TWO CASES AND LITERATURE REVIEW

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ABSTRACT

Suprascapular nerve compression is rare and should be considered in the differential diagnosis of patients with shoulder pain and external rotation deficit. Spinoglenoidal cysts may cause compression, and posterosuperior glenoid labrum lesions are the most likely hypothesis to explain their appearance. Magnetic resonance imaging and electromyography define the diagnosis. Indirect arthroscopic decompression of the cyst and repair of

the glenoid labrum enable complete neurological recovery. The authors report two cases of isolated paralysis of the infraspinatus muscle caused by compression due to spinoglenoidal cysts that were treated by means of arthroscopy, and present the pre and postoperative assessments.

Keywords – Scapula/innervation; Muscle atrophy/physiopathology; Nerve compression syndromes/etiology; Cysts/surgery; Arthroscopy

INTRODUCTION

Some neuropathies of the upper limbs may cause shoulder and arm pain. In many cases, the diagnosis may be delayed for months or even years⁽¹⁾. Neurological lesions may be caused by various pathological conditions, including repetitive microtrauma, such as in the sports of volleyball and tennis⁽²⁾; hypertrophy of the upper or lower transverse scapular ligament⁽³⁾; direct trauma, such as in shoulder luxation and scapular fractures⁽⁴⁾; abnormal configuration of the scapular incisure⁽⁵⁾ and external compression caused by the presence of tumor formation or ganglia^(6,7).

Compressive suprascapular neuropathy was first described in 1959⁽⁸⁾ and is a diagnostic possibility to be considered, particularly in young patients, sports players or manual workers who present shoulder pain, lateral rotation deficit and muscle hypotrophy^(9,11). Paralabral cysts with neurological involvement were first reported by Aratani *et al*, in 1970, and 21 cases had been described by 1991, in the Japanese and American literature⁽⁶⁾. Such cysts may also be responsible for localized shoulder

pain, without causing any nerve lesion^(12,13), or they may just be a chance finding, without clinical expression, which has become particularly so since the advent of magnetic resonance imaging (MRI)⁽¹³⁾.

To make the diagnosis, careful history-taking and in-depth knowledge of the complex anatomy of the shoulder are required. These cysts may be located not only in the suprascapular incisure, with involvement of the supraspinatus and infraspinatus muscles, but also in the spinoglenoid incisure, with paralysis of the infraspinatus alone^(2,6,7,9,11,14). The latter is more frequent, according to Ogino *et al*⁽⁶⁾.

Most authors agree that spinoglenoid paralabral cysts appear secondarily to lesions of the posterosuperior labrum of the glenoid, thereby allowing extravasation of synovial fluid from the joint and leading to the formation of extra-articular accumulations^(6,7,10,13,14). The diagnosis is confirmed by means of electroneuromyography, despite false negatives⁽¹⁴⁾, and by means of MRI, which does not detect the labral lesion in more than 53% of the cysts⁽¹³⁾.

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Several treatments have been proposed for these lesions, such as observation^(14,15); needle aspiration⁽¹⁵⁾; open drainage of the cysts alone^(6,7,9,14,16); arthroscopic suturing of the posterosuperior labrum of the glenoid and open drainage of the spinoglenoid paralabral cysts^(14,15); arthroscopic suturing of the labrum without dealing with the cyst⁽¹⁵⁾; and, lastly, a totally arthroscopic procedure on both the cyst and the labrum^(10,13,15). Arthroscopic drainage of spinoglenoid paralabral cysts can be performed indirectly, in which the extravasation of the yellowish fluid is perceived through the labral defect, or directly, in which the cyst is observed after posterosuperior capsulotomy and before cyst drainage. The latter is a useful procedure when there is no labral lesion or when indirect drainage has been unsuccessful⁽¹³⁾.

Here, we make remarks about two cases of spinoglenoid cysts that were associated with lesions of the posterosuperior labrum of the glenoid and suprascapular neuropathy, and were drained indirectly by means of arthroscopy. We also present their pre and postoperative assessments. This study received approval from the research ethics committee of the General Hospital of Goiânia.

CASE REPORTS

Case 1

This was a 19-year-old male patient with a complaint of pain in his right shoulder that had started one year earlier after getting out of a truck and turning his arm. The

pain was located on the posterior face of the shoulder, with irradiation to the lateral face of the arm. He did not report any muscle weakness. On physical examination, he presented hypotrophy of the infraspinatus muscle, with a normal range of motion, but with a strength deficit in relation to lateral rotation against resistance. The rotator cuff strength tests were negative, except for the Patte test and infraspinatus test, which were positive. In relation to propaedeutics for instability, all the tests were negative, including the Speed test. Simple radiography on the shoulder was normal, while MRI made it possible to identify the presence of a cystic lesion located in the spinoglenoid region, with a T2 hypersignal, which was best viewed in axial sections (Figure 1a). There was also a lesion on the posterior labrum of the glenoid and slight denervation of the infraspinatus muscle (Figure 1b). Pre-operative electroneuromyography showed compression of the motor branch of the suprascapular nerve to the infraspinatus muscle.

Case 2

The patient was a 16-year-old boy with a complaint of posterior pain in the left shoulder that started five months earlier. The physical examination had the same semiological characteristics as in Case 1. MRI detected the presence of a cystic lesion of 1 cm in diameter in the spinoglenoid region (Figure 2), also with the presence of a lesion on the posterior glenoid labrum. The pre-operative electroneuromyography was normal and did not suggest any impairment of the suprascapular nerve.

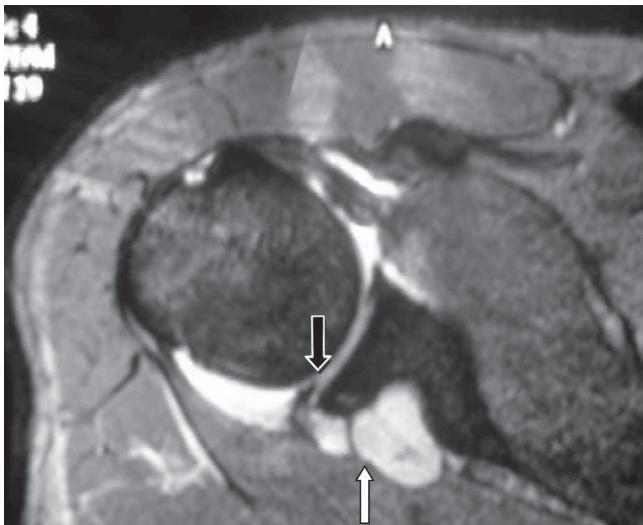


Figure 1A – Case 1. Magnetic resonance imaging: T2 axial section showing spinoglenoid cyst (white arrow) in the right shoulder, associated with a posterior labral lesion (black arrow)



Figure 1B – T2 sagittal section showing spinoglenoid cyst with the scapular spine of the right shoulder and slight denervation of the infraspinatus muscle (black arrow)

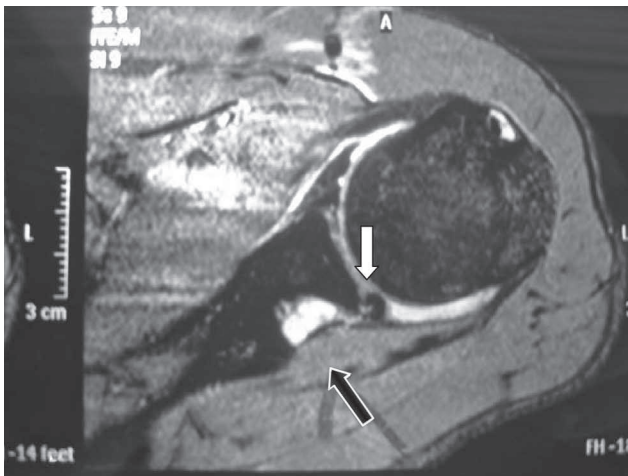


Figure 2 – Case 2. T2 axial section of the left shoulder, showing the cyst (white arrow) and the posterior labral lesion (white arrow)

A retest was performed, with attention focused on this nerve, and the result was again negative, despite the clinical expression of neurological involvement.

Three months after the first consultation in case 1 and seven months in case 2, the patients underwent shoulder arthroscopy. While making the joint inventory, we did not observe any signs of impact or joint lesion in the rotator cuff, but we noted the presence of a lesion on the posterosuperior labrum of the glenoid (Figure 3).

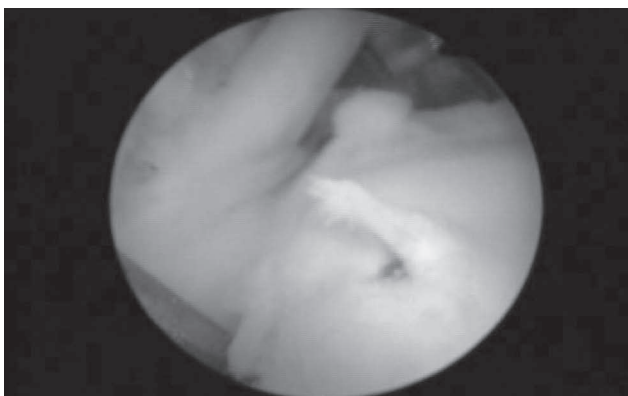


Figure 3 – Case 1. Right shoulder viewed through the posterior port, with posterior labral lesion

Through this, indirectly, the cyst was drained using a periosteal elevator and 4.0 mm soft-tissue shaver blades. The extravasation of thick yellowish fluid into the joint could be seen (Figure 4). After arthroscopic drainage of the cyst, the posterosuperior labrum was repaired using a 3.5 mm anchor and no. 2 non-absorbable thread (Figure 5). After the operation, the patients remained im-

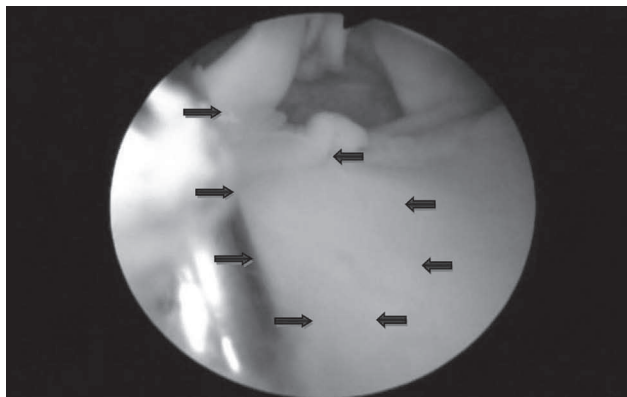


Figure 4 – Case 1. Extravasation of yellowish fluid, delimited by arrows, viewed through the posterior port in the right shoulder

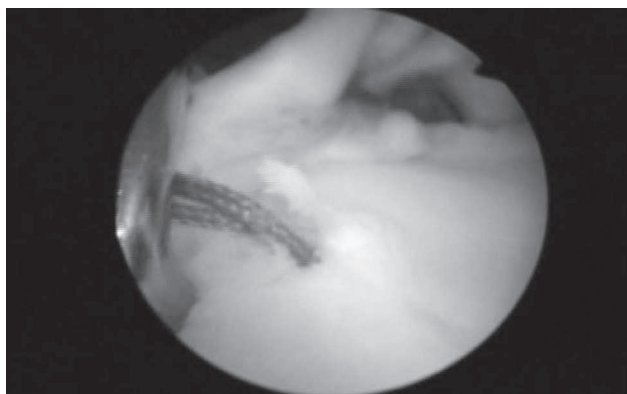


Figure 5 – Case 1. Suture thread for repairing the posterior labral lesion in the right shoulder, through the posterior port

mobilized for one month and then began passive assisted exercises. They were allowed to resume active exercises six weeks after the operation. MRI on case 1, performed in the seventh month after the operation, demonstrated complete remission of the cyst (Figure 6) and regression of the changes to the belly of the infraspinatus muscle. Electroneuromyography performed at this time showed that there was no longer any impairment of the suprascapular nerve, with a great improvement in the condition and practically complete axonal reinnervation, and with normal action potential for the infraspinatus muscle.

MRI on case 2, performed three months after the operation, also demonstrated that the cyst was no longer present (Figure 7). No postoperative electroneuromyography was performed on case 2, because the preoperative examination had been normal.

At the time of the last assessment, the patients' shoulders were painless, with significant improvement in muscle strength and hypotrophy of the infraspinatus muscle.

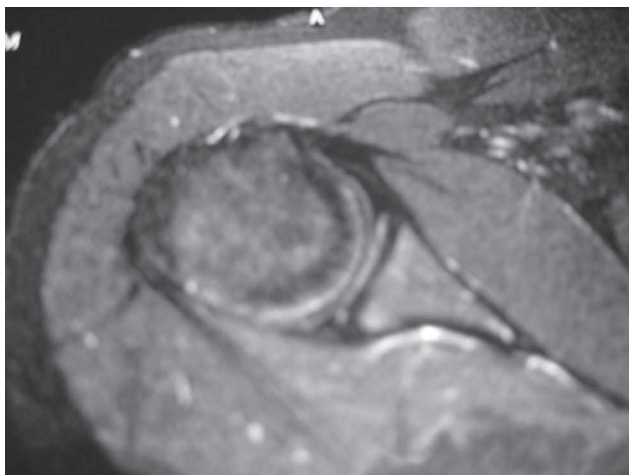


Figure 6 – Case 1. Complete remission of the cyst, on T2 axial section in right shoulder, seven months after arthroscopy

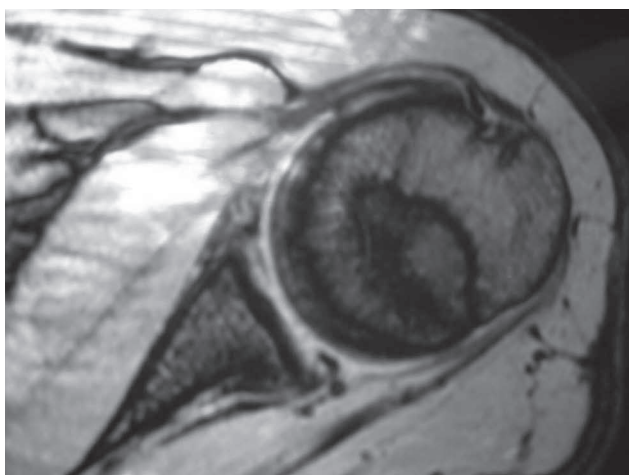


Figure 7 – Case 2. Axial section in left shoulder, showing complete remission of the cyst, three months after the arthroscopic procedure

DISCUSSION

Compressive suprascapular neuropathy is a condition that is rarely recognized as a cause of functional abnormalities of the shoulder and scapular belt. The suprascapular nerve is a mixed nerve (both motor and sensory functions) that originates in the upper trunk of the brachial plexus, from the C5 and C6 roots, and receives contributions from the fourth cervical root in more than 50% of individuals⁽¹⁾. It crosses the deep posterior triangle of the neck, below the omohyoid and trapezius muscles and enters the suprascapular incisure (the first compression site) below the superior transverse scapular ligament⁽¹⁷⁾. The suprascapular artery and vein pass above this ligament. This nerve supplies two motor branches to the supraspinatus muscle and sensory

branches to the acromioclavicular and glenohumeral joints, and continues on an obliquely descending path, going around the spinoglenoid incisure (a second possible compression site) and under the inferior transverse scapular ligament (which is present in 50% of individuals)⁽²⁾, and then heads towards the infraspinous fossa, at which it supplies three to four motor branches to the infraspinatus muscle⁽¹⁴⁾. At the spinoglenoid incisure, the suprascapular nerve is very close to the glenohumeral joint and passes the posterior glenoid border at a distance of 18 to 21 mm⁽¹⁸⁾. Knowledge of the unique anatomy of the path of this nerve shows the sites at which it could potentially suffer compression, not only in the suprascapular foramen but also at the spinoglenoid incisure, through ganglionic or cystic lesions that occupy space^(6,7,9,10,12,16).

Spinoglenoid cysts may have either subacromial or intra-articular origin. Neviasser *et al*⁽¹⁹⁾ observed that the cysts have a direct connection with the subacromial bursa. However, most authors accept that cyst formation occurs through the presence of lesions of the posterior glenoid labrum, which allow extravasation of synovial fluid into extra-articular areas and do not allow it to return (valve mechanism)^(10,13,15), similar to popliteal cysts in the knee. Moore *et al*⁽¹⁴⁾ observed from arthroscopy on eleven shoulders with spinoglenoid paralabral cysts that ten of them presented associated superior labrum anteroposterior (SLAP) tears. Among 17 patients in an IV group who underwent arthroscopic treatment on cysts adjacent to the glenoid, Piatt *et al*⁽¹⁵⁾ found that all of them presented posterosuperior labral lesions. Tirman *et al*⁽²⁰⁾ had the same finding among 20 shoulders. The two patients that we treated presented posterior labral lesions that were seen on MRI and during the operation, and we sutured the site after indirectly draining the spinoglenoid paralabral cysts because we believed that this was the causal factor in cyst formation, thereby avoiding postoperative recurrence.

MRI is the gold standard examination for diagnosing this pathological condition^(7,10,12,16,19,21), even though the associated posterior labral lesion cannot be identified in 53% of the cysts⁽¹³⁾. Westerheide *et al*⁽²²⁾ affirmed that among 14 patients, MRI detected the labral lesion in 85% of the cases, and that all of these cases were confirmed intraoperatively. Some authors have preferred to use ultrasonography as a preoperative means for cyst diagnosis^(6,7). Since the clinical condition is characterized by pain on the posterior face of the shoulder, ex-

ternal rotation deficit and hypotrophy of the infraspinatus muscle, electroneuromyography becomes essential when neurological lesions are suspected. This can define whether the compression affects the supraspinatus and infraspinatus muscles (high) or only gives rise to paralysis of the infraspinatus alone (low).

The study by Moore *et al*⁽¹⁴⁾ seems to us to have the greatest relevance in relation to the electroneuromyography and cyst variables. Among 20 electromyograms on patients with cysts, 12 showed denervation of the infraspinatus muscle alone, four showed it in both the supraspinatus and infraspinatus, and four were interpreted as normal. One important finding from their study was that four positive electromyograms were initially interpreted as negative, even with clinical atrophy of the infraspinatus. Among our patients, one electromyogram showed impairment of the motor branch to the infraspinatus muscle and the other was normal, even through this case showed the clinical characteristics of neurological lesions. We believe that because the suprascapular nerve supplies three or four branches to the infraspinatus, the cyst may only compromise one of these branches. Thus, depending on where the needles are placed, the examination may produce normal results. This particular anatomical relationship has to be verified and the needles have to be distributed at several sites on this muscle, so that the examination does not produce false negative results. Even with the negative electromyogram in our case 2, we decided that this patient should undergo the operation because of the existing clinical condition. Catalano and Fenlin⁽¹²⁾ described five patients with cysts who did not present neurological involvement. Notwithstanding this, three of them underwent the operation because of their muscle weakness. None of them had undergone preoperative electromyography.

Since the suprascapular nerve is located 18 to 21 mm from the posterior glenoid border, there is the possibility that a small-sized cyst in this region could cause compression of this nerve. Therefore, when the semiology, electromyography and MRI support a diagnosis of spinoglenoid paralabral cyst, surgical removal of this cyst becomes necessary, because spontaneous regression is rare^(9,14).

The drainage can either be open^(6,7,9,16) or arthroscopic^(10,13,15). Open drainage through a posterior route has the disadvantage that the posterior labral lesion responsible for cyst genesis is not dealt with and repaired.

Hence, this method presents high rates of postoperative recurrence. Among ten patients who underwent operations using the open route, Piatt *et al*⁽¹⁵⁾ found that one patient (10%) was dissatisfied with the result. Skirving *et al*⁽⁷⁾ reported that, among three patients who underwent operations, one (33.3%) presented recurrence after five years of evolution. Osteotomy of the scapular spine is sometimes necessary for better access to the cyst^(6,12). Moore *et al*⁽¹⁴⁾ reported that among the four patients with partial resolution of the cyst, three were treated by means of open surgery and the other by means of a combined open and arthroscopic procedure.

Arthroscopic drainage enables direct or indirect access to the cyst⁽¹³⁾, with the possibility of repairing the lesion of the glenoid labrum (the causal factor), lower morbidity and high rates of satisfactory results. Piatt *et al*⁽¹⁵⁾ reported that among the ten patients on whom the arthroscopic procedure was performed, all of them were satisfied and were free from pain in their daily activities. Westerheide *et al*⁽²²⁾ reported that 100% of the cases that underwent videoarthroscopic procedures presented improvements in external rotation strength, without recurrences after a mean of 51 months of follow-up. According to Iannotti and Ramsey⁽²³⁾, the success of the method can be ascribed to the combination of lack of recurrences and resolution of the symptoms. From our point of view, arthroscopy is the best method, both for diagnosis and for treatment.

Chen *et al*⁽²¹⁾ described three cases of spinoglenoid cysts associated with SLAP lesions that were treated arthroscopically, with MRI and electromyography performed before and after the operation. Carrera *et al*⁽¹⁰⁾ also documented the postoperative result using these examinations. In our study reporting on two cases, postoperative MRI showed that the cysts were in remission and postoperative electromyography showed that the motor branch of the suprascapular nerve to the infraspinatus was unimpaired. Postoperative electromyography was not performed in case 2 because the preoperative examination had shown normal results. These complementary examinations helped the surgeon to carry out postoperative verifications on the lesions, comparatively with the preoperative findings.

CONCLUSION

Indirect arthroscopic decompression of the spinoglenoid cysts was shown to be an adequate procedure in the two cases thus operated.

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