



## Suprascapular neuropathy in volleyball players

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**Entrapment neuropathy of the suprascapular nerve (SNE), although a recognised clinical entity, is a relatively rare cause of shoulder pain and subjective weakness in the athlete involved in overhead sports like volleyball and badminton.**

**This study deals with the presentation and management of four unusual cases of suprascapular nerve entrapment in volleyball players. Four male volleyball players presented to our department with intractable shoulder pain and subjective sensation of shoulder weakness. They all had visible wasting of both supraspinatus and infraspinatus muscles, together with weakness of abduction and external rotation of the arm. They all responded temporarily to a diagnostic injection of local anaesthetic. MR imaging was useful in diagnosing space occupying lesions in three cases and the presence of a hypertrophic suprascapular ligament in one case.**

**Due to failure of non-operative treatment, which included activity modification, rest, analgesics and rehabilitation programme over 6 months, surgery was then required to decompress the suprascapular nerve.**

**All patients were symptom free at 6 months postoperatively and after an intensive rehabilitation programme, they were able to return to their normal level of activity including sport.**

It passes laterally deep to the trapezius and omohyoid muscles and then traverses the suprascapular notch, innervating the supraspinatus muscle and gives off variable articular and sensory branches before passing around the lateral border of the spine of the scapula through the spinoglenoid notch to innervate the infraspinatus muscle.

By far the most common cause of suprascapular neuropathy is trauma, with fractures of the scapula and proximal humerus and shoulder dislocation accounting for the majority of cases (3). In addition, an overuse type mechanism of injury to the nerve at the suprascapular or spinoglenoid notches has been reported (4). Space occupying lesions such as tumours, ganglia and haematomas can cause nerve impingement, though some cases of nerve dysfunction remain idiopathic.

### PATIENTS AND METHODS

Four patients between the ages of 22 to 28 presented to our department with intractable shoulder pain and a subjective sensation of shoulder weakness. All were male volleyball players.

### INTRODUCTION

The suprascapular nerve is a mixed peripheral nerve arising from the upper trunk of the brachial plexus, which is formed by the roots of C<sub>5</sub> and C<sub>6</sub>

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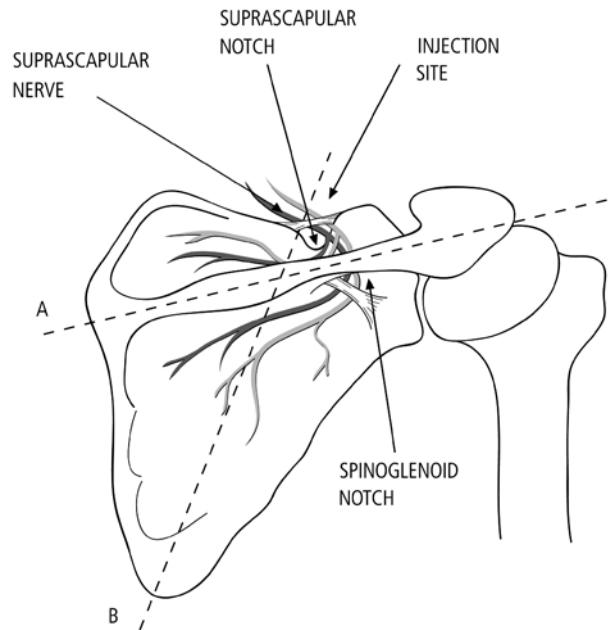


**Fig. 1.** — A patient with wasting of the supraspinatus and infraspinatus muscles.

They presented with typical deep-seated long-standing shoulder pain localised over the scapula. On examination the patients had deep-seated tenderness over the supraspinatus fossa and visible wasting of the supraspinatus and infraspinatus muscle was noted (fig 1). They all had weakness of abduction and external rotation of the arm. Plain radiographs of neck and shoulder were normal in all cases.

The pain was reduced after a diagnostic injection of local anaesthetic. The site of injection was based on anatomical landmarks as well as by noting the point of maximum tenderness on pressure over the spine. A line (A) was drawn on the skin over the spine of the scapula and another one (B) bisecting the inferior angle of the scapula (fig 2). The outer triangle formed by the two intersecting lines was bisected and a wheal was formed on this bisector about 1.5 cm from the angle. Through this wheal, a needle was introduced so that its shaft was directed towards the supraspinatus fossa. The needle was then withdrawn and reintroduced until the tip entered the supraspinatus notch. Five milliliters of 1% lignocaine and 5 ml of 0.5% bupivacaine solution was injected into this area, giving the patients temporary symptomatic relief.

Further investigations were done and included an MRI image and electromyography studies (EMG). The MRI showed that three patients had space-occupying lesions, two of them were ganglia and one lipoma (fig 3). The EMG studies showed increased spontaneous activity, fibrillations and positive sharp waves in both supraspinatus and infraspinatus muscles confirming the diagnosis of SNE syndrome.



**Fig. 2.** — Technique of suprascapular nerve block

All four patients eventually underwent surgical decompression of the suprascapular nerve through the traditional posterior approach. The patients were operated on in a 'beach chair' position. The skin incision was made parallel and slightly proximal to the spine of the scapula. The trapezius was split in the axis of its fibres. The suprascapular muscle was carefully retracted to expose the spine of the scapula and the suprascapular notch. In three patients the space occupying lesions were identified and excised together with the suprascapular ligament, whereas in the fourth case simple excision of the hypertrophic suprascapular ligament was sufficient. The suprascapular nerve was identified, decompressed focally and preserved throughout the whole procedure in all cases. A formal neurolysis was not performed in any of the cases. The trapezius was repaired and the wound closed.

## RESULTS

Initial treatment included activity modification, rest, analgesics and a graduated rehabilitation program over 6 months. Due to persistent and intractable symptoms, all underwent surgical decompression of the suprascapular nerve through the traditional posterior approach as described above.



**Fig. 3.** — An MRI of a shoulder showing a ganglion cyst compressing the suprascapular nerve.

The patients were advised to take anti-inflammatories for two weeks, followed by an early rehabilitation programme starting 24 hours post-operatively. At a follow up of six months all were pain free, the scapular muscle contour had improved and shoulder abduction and external rotation strength returned to normal. All were able to return to the same level of sport as compared to the pre-injury level.

## DISCUSSION

Suprascapular nerve entrapment is becoming more commonly recognised as a cause of the painful shoulder especially in the overhead athletes such as volley-players due to the repetitive 'spiking' manoeuvre. Since Kopell and Thomson first described this injury in 1959, more than 100 articles addressing this topic have been written, mostly in the last decade (2).

The cardinal symptom of SNE syndrome is shoulder pain. Patients often suffer for months or years before seeking medical attention. Weakness of abduction and external rotation of the arm and atrophy of the supraspinatus and infraspinatus muscles are common secondary symptoms (1).

Plain radiography of the shoulder and cervical spine should be performed to exclude the more

common causes of true or referred shoulder pain. EMG studies are diagnostic of SNE syndrome.

MRI can demonstrate the presence of a space occupying lesion around the suprascapular nerve or exclude other coincidental shoulder lesions such as rotator cuff tears. Ganglia seem to be the most common lesion causing suprascapular nerve entrapment (5). Cummins *et al* (2) identified twenty-one patients with suprascapular injury secondary to ganglion cysts. Other space occupying lesions like lipomas are very rare (2).

Local anaesthetic and steroid injection into the suprascapular or spinoglenoid notch has been found to be helpful in diagnosing SNE; the specificity of this test is however unclear (2).

The mechanism by which injury occurs at the suprascapular notch has been termed the sling effect by Rengachary *et al* (9). They noted that the nerve was often apposed to the sharp inferior margin of the superior transverse scapular ligament and that the contact was accentuated with depression and retraction, or hyperabduction of the shoulder. Kopell and Thompson (7) reported that shoulder movements that involve either abduction or cross-adduction exert a pull on the nerve and may cause its compression. Such movements are typical in sports such as volleyball. It is interesting to note that the cause of nerve entrapment in three of our patients was a space occupying lesion and not a repetitive overhead activity type mechanism.

The exact cause of ganglion cysts has not yet been clearly defined. The proximity of many of these cysts to neighbouring joints has led some authors to theorise that trauma to the capsular tissues about the joint may contribute to the formation of the ganglion cyst.

Also in support of this theory are imaging and arthroscopic findings of posterior capsulo-labral tears adjacent to and communicating with ganglion cysts (2).

None of our patients with the ganglion cysts had a lesion of the adjacent glenoid labrum.

Timing of surgery for SNE is still debatable. Conservative treatment including activity modification, physical therapy and use of anti-inflammatory agents for 3 to 6 months is often recommended. Many authors have reported complete recovery

of muscle function after conservative treatment especially in idiopathic cases (1). Although some patients improve with non-operative management, the overall rate of success is not known (2).

In intractable cases and on failure of conservative treatment, surgical decompression of the suprascapular nerve is indicated. Cummins *et al* (2) have shown that operative decompression by release of the superior transverse scapular ligament resulted in complete resolution of pain and substantial increase in muscle strength. One of our patients with persistent symptoms despite conservative treatment, had excision of the hypertrophic suprascapular ligament with complete resolution of the symptoms.

Entrapment of the suprascapular nerve can also occur at the spinoglenoid notch and surgical release of the spinoglenoid ligament in these patients is indicated (10). In our cases entrapment of the suprascapular nerve occurred at the suprascapular notch.

Unlike idiopathic causes of SNE syndrome where non-operative treatment has good outcome, surgery is more often required in cases where the cause is a space-occupying lesion (2).

Open excision of ganglion cysts through a posterior approach results in good relief, improves function and carries a negligible recurrence rate as documented by Cummins *et al* (2) in their series. Three of our patients with a space-occupying lesion, who underwent open surgical decompression of the nerve through a posterior approach, had complete relief of pain and subjective improvement in strength.

Other operative treatment options including CT or ultrasound guided aspiration carry the risk of recurrence.

Lately, arthroscopic decompression of the suprascapular nerve has been discussed as a surgical modality yielding good results (6, 8). We have no experience with arthroscopic decompression as we routinely do open procedures.

## CONCLUSION

Entrapment neuropathy of the suprascapular nerve should be considered in the differential diag-

nosis of intractable shoulder pain in the athlete especially if associated with rotator cuff weakness, and in individuals involved in overhead sports. EMG studies are useful in confirming the diagnosis and the site of nerve injury. MRI is an excellent method with which to evaluate shoulder pathology. It can help to exclude other shoulder pathologies or to look for mass lesions. Though the mainstay of treatment of suprascapular neuropathy is non-operative, surgical decompression may be indicated, which provides effective pain relief, improves function and allows satisfactory return to normal level of sporting activity.

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