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Case Report

Post-Traumatic Compression of the Supra-Scapular Nerve: A Gunshot Wound on a Case

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Abstract

The compression of the nerve is a known pathology since the late fifties, described for the first time par Thompson & Kopell. Many etiologies have been described, including traumatic aetiology further to a fracture of the scapula by bullet wound, which is never reported in the literature and falls within the framework of a syndrome of trapping. The identification of the NSS lesion requires not only careful clinical examination of the shoulder, but also a detailed neurophysiological evaluation, possibly using imagery.

Diagnosis and treatment of this compression should be as early as possible, before the installation of irreversible amyotrophy. The surgery of different causes of compression has improved the functional prognosis of the injured shoulder.

Introduction

Nerve lesions of the scapular girdle are rare entities, unknown, and sometimes diagnosis are difficult to spot those lesions. NSS compression is a known pathology since 1959, described for the first time by Thompson and Kopell [1]. Although its incidence is low, it accounts for 1 to 2% of all shoulder pain and 0.4% of ductal neuropathies [2]. Compression of the NSS can be direct further to a trauma or to extrinsic compression by a neighborhood structure. Anatomical variants may also be involved in the pathophysiology of these lesions, especially when the nerve passes through a fibrous or osteo-fibrous canal. A displaced scapula fracture may be the cause of NSS compression [3]. This is the case of our patient, who was the victim of a ballistic trauma, causing a fracture of the Scapula, including one of its fragments whose abruptly compressed the NSS at the level of the coracoidal indentation. The context of the shoulder wound as well as the complementary examinations, Such as Magnetic Resonance Imaging (MRI) and Electromyography (EMG), can easily eliminate differential diagnostics: Spinal pathology, shoulder tendon lesion, Parsonage and Turner syndrome, myopathy, syringomyelia etc. The therapeutic management consists of a surgical release of the NSS associated with an etiologic treatment if necessary.

Observation

We report the case of a 45-year-old patient with no specific ATCD, right-handed, victim three months ago of a ballistic trauma at the level of the right shoulder, Having abruptly caused partial functional impotence of the shoulder, Associated with the sensation of muscular weakness and scapular neuralgia ill-systematized. Bilateral and comparative clinical examination, noted a fibrous scar of a penetrating and transfixing wound of Scapula (Figure 1), in the form of an inlet orifice of the bullet, at the level of the super-posterior face of the right shoulder, and an anterior outlet. A clear amyotrophy was revealed in the supra and infra-spinous muscles, with the appearance of supra and infra-spinous fossae. The mobility of the shoulder was compromised, with little external rotation thwarted, and a spectacular weakness of the disfigured abduction of the shoulder. The neurological examination showed a hypoesthesia of the stump of the shoulder. . The rest of the examination of the elbow, wrist, and cervical spine was normal. The standard radiograph of the shoulder showed a complex fracture of the Scapula's body. The EMG of the upper right limb revealed signs of active denervation on the supra and infraspinatus, suggestive of NSS compression at the coracoidal indentation. MRI of the shoulder showed the complex fracture of the scapula (Figure 2), which compromises the path of the NSS at the level of the coracoidal notch, and confirms the neurogenic amyotrophy of the supra and infra-spinous muscles (Figure 3). The treatment at the beginning consisted of an immobilization of the shoulder by a scarf elbow to the body for six weeks, with analgesic and vitamin therapy, followed by physiotherapy. However, in view of the persistence of painful symptoms and amyotrophy, and after confirmation of NSS compression, and the elimination of other differential diagnoses by means of complementary examinations and in

Figure 1: Image showing the inlet of the bullet at the posterior surface of the scapula.

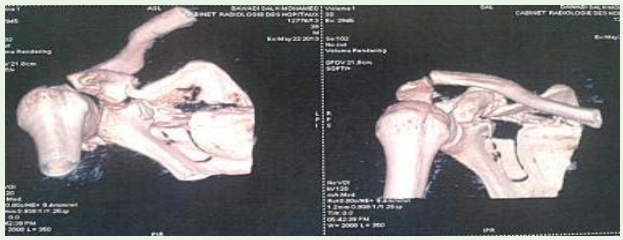

Figure 2: Image of MRI showing a complex fracture of the scapula.

Figure 3: Image of MRI showing amyotrophy of supra and infra - spinous muscles.

particular MRI, the surgical indication was given. The open surgical technique consisted of a trans-trapezial posterior approach (Figure 4), with NSS neurolysis at the level of the coracoidal indentation and section of the transverse supra-scapular ligament.

Shoulder immobilization was prescribed for 15 days, followed by specialized rehabilitation, focused on maintaining mobility, muscle strengthening and electro-stimulation to improve trophicity. Clinical examination after 5 months revealed indolence and good recovery of muscle strength (Figure 5), but with persistent discreet amyotrophy of the infraspinatus pit. The resumption of professional activities has been possible, with job adjustment.

Figure 4: Image in per-operative showing the trans-trapezoidal pathway.

Figure 5: Image of postoperative control clinic with resumption of the external rotation of the shoulder.

Discussion

The historical origin of the compression of the NSS rests with Andre Thomas for the first clinical description in 1936 [4], then with Kopell and Thompson in 1959, before the complete development of Rengachary in 1979 [3]. The traumatic compression of the NSS following a fracture of the Scapula by a firearm is an etiology whose mechanism is never reported in the literature. These acute lesions often lead to partial paralysis of the shoulder. It is therefore essential to detect them early, because allowing them to evolve often leads to the appearance of secondary lesions which are often difficult to manage. The NSS on the motor plane innervates only 2 essential muscles of the rotator cuff, the supra-spinous muscle and the infra-spinous muscle, it participates in 70% of the sensitive innervation of the shoulder, and thus in 15% of cases, this nerve innervate the lateral region of the arm [5]. Compression of the NSS with the coracoidal indentation [6] causes progressive denervation and paralysis of the shoulder in the supra and infra-spinous muscles, responsible for progressive muscular amyotrophy, the weakness of the shoulder which predominates on the external rotation, of the scapular pains, and of the tendonous atrophy which may lead to a secondary rupture

This compression of the NSS which originates from the roots C5C6 of the brachial plexus may be primitive, without apparent cause due to the compression of the nerve in the narrow osteo-fibrous anatomical canal in which it runs. We distinguish proximal compression at the level of the coracoidal indentation and a distal compression at the level of the spino-glenoid notch, which defines a primitive ductal syndrome [7].

This compression can also be secondary to different etiologies, progressive installation (large rupture of the cuff, on crack of the bead, on ossification or exostosis, following the development of a small spino-glenoid cystic tumor) [8], or of brutal installation following trauma (Fractures of the scapula [9], glenohumeral dislocations [10], fracture of the base of the coracoid, or clavicle, wounds) or iatrogenic, during shoulder surgery, Use of the posterior and anterior superior channels.

The diagnosis is based primarily on clinical examination. The EMG remains fundamental and essential for the positive diagnosis and for the prognostic prognosis, but is sometimes insufficient to determine the exact seat and especially the etiology, even if its sensitivity is 74 to 91% [11], it may be negative at the beginning of the evolution of the major cuts, and in the event of muscular atrophy, then it regains a slowing of the conduction velocities, an extension of the motor distal latency, and the presence of a neurogenic muscular tracing that characterizes the neuropathy.

MRI is essential to complete the assessment, reveals the initial edema of muscular denervation, muscular atrophy specific to the supra and infra-spinous muscle [12], and lesions potentially causing nerve compression (Para-labial cysts, fractures of the scapula). And it allows recognizing the main differential diagnoses (tumors, Parsonage-Turner syndrome).

Conservative medical treatment should be initiated as soon as the diagnosis of supra-scapular neuropathy is confirmed, and rehabilitation may be proposed, but recovery will be unpredictable [13]. However, when this neuropathy is secondary to a compressive lesion of the nerve, the surgical approach seems the most appropriate in order to avoid deterioration of the muscle [14]. In our typical case of scapular pains of brutal installation, associated with functional impotence and amyotrophy in a man, victim of a wound by bullet in the shoulder, and especially since the imagery was contributory, The surgical indication was clear. Surgery should be considered in subjects with compressive nerve injury, massive rupture of the rotator cuff, or prolonged symptoms associated with significant atrophy of the supra- and infra- spinous muscles.

The operative technique had to be simple, such as the short trans-trapezial posterior approach [15]. In addition to the original article by Lafosse et al [16], other authors have relied on anatomical studies [17] to describe novel NSS neurolysis processes, such as transverse scapular ligament resection [18]]. Others have advocated a plasty of the coracoidal notch, in order to increase the space for the nerve, when it passes at this level [19]. An arthroscopic neurolysis technique has been developed by Sampson in the United States, by Ruiz Cottoro in Spain and by Lafosse in France [20]. It has also permitted joint and tendinous assessment, but requires significant experience and risks ignoring certain anatomical abnormalities. In 90% of cases, the release of the NSS is done at the level of the first tunnel on the coracoidal indentation. In cases of posterior cysts, excision of the cyst is sufficient to release the nerve.

For open surgery, very few complications are reported, and a majority of patients get a resolution of their symptoms, and an improvement in their muscle strength. The latter seems better for the supra-spinous muscle than for the infraspinatus [6]. The reversibility of atrophy is more difficult to predict. In the Fabre et al. Study [21], it was observed in 52% of cases. Kim et al [22] report an improvement in pain in 88% of patients following surgery. The results are good in more than 90% of the beginner forms. Only recovery of muscle strength may take a few months if preoperative muscular atrophy has been advanced. Severe amyotrophy may not be regressive. The convalescence and complete recovery of the shoulder will be staggered over 9 to 12 months. This long delay corresponds, on the one hand, to the nerve regeneration delay and then to the muscular recovery period (correction of the amyotrophy) of the shoulder.

Conclusion

The traumatic compression of the NSS following a fracture of the Scapula by a firearm is an etiology whose mechanism is exceptional. The varied symptoms with the location of the attack, the sudden or progressive onset of pain and amyotrophy are evocative signs of NSS suffering.

A rigorous diagnostic approach, based on a set of clinical arguments, an EMG study and an MRI, must remain the rule to guide the treatment. Conservative treatment, even early, is not very effective. And in the absence of recovery, surgical neurolysis alone or with ligamentous section improves scapulalgia and motor deficit, and avoids significant functional sequelae associated with amyotrophy that compromise the resumption of activities. The surgical release of NSS is a reliable intervention, with satisfactory and lasting results on pain and muscle strength. Earlier diagnosis and treatment allow for better muscle recovery.

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