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clinical case

PALSY OF THE SPINAL NERVE IN A COVID-19 PATIENT: ABOUT A CASE

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Abstract: The spinal accessory nerve (SAN) is the cranial nerve most susceptible to injury. Mainly when it crosses the posterior cervical triangle due to its superficial location. The most common cause of paralysis is iatrogenic after surgery at that level, although we must suspect it in other situations where the nerve can be injured by compression or stretching. Paralysis of the SAN can cause pain and instability of the shoulder girdle. An exhaustive clinical examination is required to suspect it and high-resolution ultrasound can help us in the diagnosis as a complement to the neurophysiological study.

Keywords: Spinal accessory nerve palsy, trapezius muscle, winged scapula, critical illness.

1. Introduction

The spinal accessory nerve (SAN) is the XI cranial nerve, it is formed mainly by motor fibers that innervate the trapezius muscle and the sternocleidomastoid muscle, therefore plays a major role in the stability of the shoulder girdle.

The SAN is made up primarily of motor fibers. It is made up of two parts: The spinal, which arises from the first 5 cervical segments C1-C5, innervates the trapezius and sternocleidomastoid muscles. The cranial nerve that arises at the bulbar level and next to the vagus nerve innervates the laryngeal and pharyngeal muscles and the palate. (1)

The spinal accessory nerve is the cranial nerve most susceptible to injury. It most frequently occurs when it crosses the posterior cervical triangle, where it is located at a more superficial level, only covered by fascia and skin. (23)

The most common cause of NAS paralysis is iatrogenic injury during surgery for neck dissections or minor interventions in that area, as well as intense exercise, stretching, or repetitive motion. (3. 4)

Spinal nerve palsy causes weakness and atrophy of the trapezius, leading to instability of the shoulder girdle, accompanied by dropped shoulder and winged scapula with lateral displacement (figure 1). In addition to alterations in shoulder mobility, such as loss of abduction above the horizontal and pain that sometimes radiates to the arm. (2.5)

It is important to carry out an adequate evaluation of the patient to diagnose a SAN lesion early and determine the optimal management to prevent long-term complications. (6)

The use of high resolution ultrasound can help us in the diagnosis, together with the electromyographic study (EMG). Especially in the case of iatrogenic lesions, since it allows us an earlier diagnosis by ultrasound visualizing the transection of the SAN and thus being able to plan the need for surgical intervention to achieve a better clinical result. (6, 7).

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2. Clinical case

A 43-year-old male patient with no medical or surgical history of interest, who was admitted due to high fever, dry cough, arthralgia, ageusia, and asthenia. He develops acute respiratory distress syndrome due to Covid-19 pneumonia, requiring admission to the Intensive Care Unit (ICU) for 19 days with endotracheal intubation, mechanical ventilation, and ventilation in the prone position. Highlight the need for the administration of high doses of sedatives due to the presence of symptoms of agitation. The total duration of admission was 30 days.

In the first assessment in the Rehabilitation Service consultation, 3 weeks after hospital discharge, in addition to fatigue, the patient reported pain in the right scapular area of neuropathic characteristics, distal weakness and a feeling of numbness in both feet. Physical examination shows: sock hypoesthesia accompanied by distal weakness in the lower limbs; with motor balance (MB) according to the Medical Research Council in the extension of the ankle and hallux of the right foot 1/5 and in the left foot 4/5. It also presents a right-handed steppage gait.

It is worth noting an atrophy in the supraspinous fossa (figure 1) with marked weakness of the trapezius (BM 1/5), discreet winged scapula (figure 1) and difficulty in raising the arm. Sternocleidomastoid strength preserved. Presence of hyperesthesia and allodynia in the shoulder girdle.

Figure 1: Hypotrophy of the supraspinous fossa (left) and right winged scapula (right).

An ultrasound was performed in the office with a linear 8-12 Mhz probe (figure 2), observing a difference in the thickness of both trapeziums, with marked hypotrophy of the upper right trapezium.

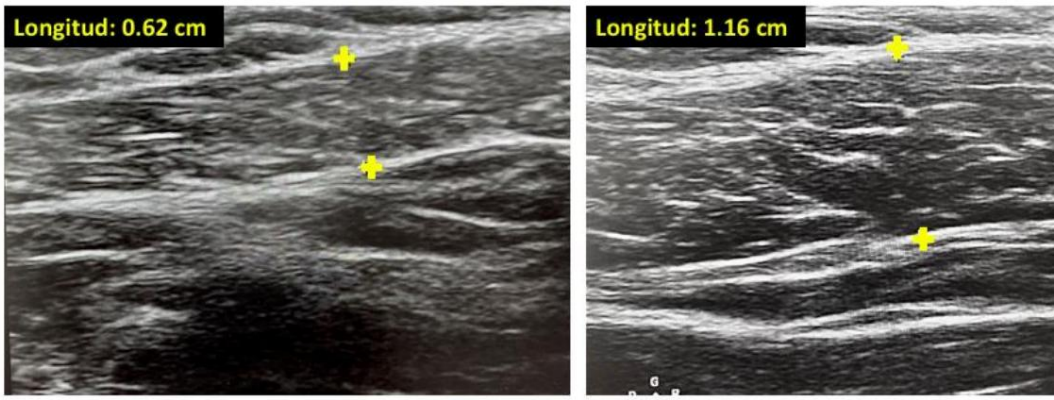


Figure 2: Ultrasound cross section of the upper right trapezius 0.62 cm, and left 1.16 cm.

An EMG of the upper and lower limbs and an MRI are requested.
Cervical and brachial plexus MRI.

The MRI shows an asymmetry in the size of the right trapezius muscle with slight signal hyperintensity in STIR (figure 3), probably due to denervation.

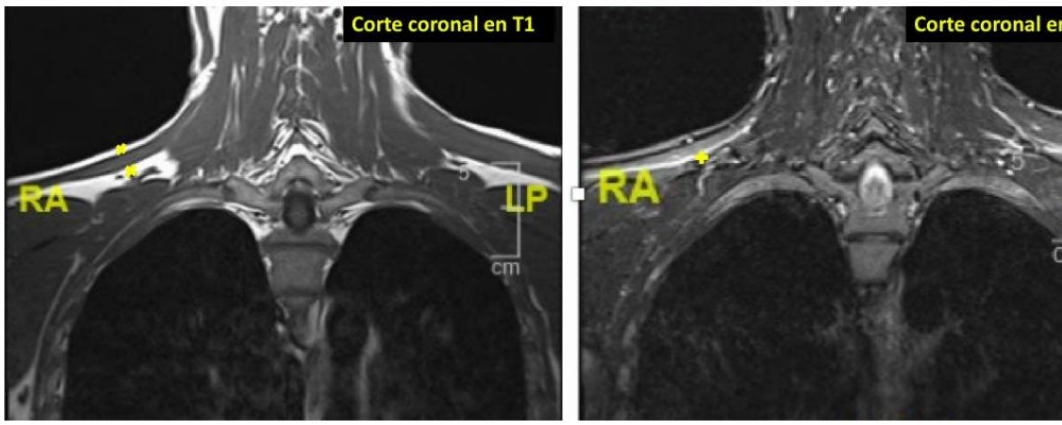
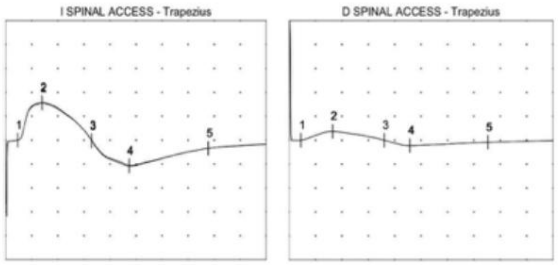


Figure 3: Coronal section of MR in T1 sequence and coronal in STIR.

The EMG shows findings compatible with a lesion of the right SAN in the subacute phase, with spontaneous activity in the trapezius muscle, poor maximum effort tracing and isolated motor unit potentials (MUP) with increased polyphasia, as well as alteration in motor conduction of the SAN to the right trapezius muscle due to a decrease in its amplitude, compared with the normal contralateral (figure 4). There is also evidence of a bilateral, asymmetric, predominantly right peroneal nerve lesion.



C MOTORA

Nervio / Lugares	Latencia ms	Amp.p-p mV	Amp.1-2 mV	Dur. ms	Dist. cm	Vel. m/s	Amp.1-2 %	Área %
I SPINAL ACCESS - Trapezius								
Neck	2,29	13,0	7,7	14,22			100	100
D SPINAL ACCESS - Trapezius								
Neck	2,24	3,0	1,9	15,78			100	100

Figure 4: Motor conduction of bilateral spinal accessory nerve

After the diagnostic suspicion, rehabilitative treatment is planned, which includes pain management with pharmacological measures, transcutaneous electrical stimulation, mobility exercises plus strengthening and gait re-education.

In the evaluation at 5 months, a very favorable evolution was observed with disappearance of pain, improvement in the level of shoulder mobility with a BM of the right trapezius muscle of 5-/5. At the level of the lower limbs: hypoesthesia persists on the lateral aspect of the calf and dorsum of the right foot with slight weakness in ankle dorsiflexors of 4/5, extensor of fingers 3/5 and extensor of hallux 1/5.

3. Discussion

Non-iatrogenic injury to the SAN is infrequent, although there are some cases described in the literature that suggest that very intense exercise on the muscles of the shoulder girdle is the main cause of spontaneous injury, due to repetitive movements, stretching, or due to muscle hypertrophy due to work or extreme sports training. (3. 4)

The only history of our patient was the mobilizations and prone postures that he required during his stay in the ICU.

Emphasize the importance of performing a thorough physical examination in patients after a critical illness, especially if they have required postures that favor compression of the SAN or after mobilizations that may cause stretching.

The differential diagnosis of possible causes of winged scapula includes: palsy of the serratus anterior due to injury to the long thoracic nerve, palsy of the trapezius due to injury to the spinal nerve, palsy of the rhomboids, and glenohumeral or subacromial pathology, among other causes. (8, 9, 10)

Although the EMG is the most sensitive procedure to assess the alteration in nerve conduction in the SAN lesion, it only gives functional information and cannot give structural information on the state of the nerve. (11, 12) Occasionally, in patients with a complete transection, the presence of a low-amplitude motor response and some PUM can be observed, which may be due to different causes, including partial innervation of the trapezius muscle directly by branches of the cervical plexus. (13)

For all these reasons, high-resolution ultrasound can serve as a complement to the electromyographic study in the SAN lesion, since it can give us structural information that the EMG study cannot assess. It is fast, allows real-time evaluation, visualizes the location of the lesion, and helps in preoperative planning.

In addition, it allows us to visualize the smallest nerve branches that cannot be assessed with other techniques such as MRI. (12, 14)

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