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Trapezius-rhomboid plane block for myofascial pain syndrome. Description of a new intervention

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ABSTRACT

Introduction: Myofascial pain syndrome is a chronic pain condition prevalent in the general population. Muscular symptoms at the level of the trapezius and rhomboid muscles are frequent and the response to therapeutic interventions established so far is variable.
Methods: We present a case series of six patients who underwent a new technique of interfacial trapezius-rhomboid block (TRB) performed under ultrasonographic guidance by applying 10 cubic centimeters (cc) of analgesic solution (bupivacaine 0.25 % and methylprednisolone 40 mg) in the interfacial plane between the trapezius and rhomboid muscles at the level of the fifth and sixth ribs.
Results: At a follow-up of one and eight weeks, measurements of numerical rating scale (NRS) pain intensity were carried out, finding an average decrease of NRS pain intensity by 70 %.
Conclusion: This new technique may be considered for the treatment of myofascial pain syndrome of the trapezius and rhomboid muscles. Larger future studies are needed to better establish its safety and efficacy.

1. Introduction

Myofascial pain syndrome is a very frequent clinical condition that affects all age groups and may be related to different pathological conditions such as inflammatory, postural, metabolic, and even oncological [1]. Its origin is multifactorial and is based on the modifications of the local environment of the skeletal muscle cell, where there is a loss of ATP in the myosin and actin junction, generating a decrease in the rupture of cross-links and an increase in the accumulation of calcium in the sarcoplasmic reticulum [2]. These alterations at the cellular level generate a process of poor muscle contraction with permanent ischemic changes in the muscle that in turn generate a reflex contraction and a picture of pain that manifests itself both at rest and in movement, which due to its facial characteristics can become chronic [3].

The diagnosis of this condition can be made by ultrasonography where the myofascial triggers points appeared to be 0.05–0.5 cm^2 nodules of varying hypo-echogenicity and magnetic resonance where hyperintensities are found in the muscle, but in both imaging media the findings may be nonspecific. For this reason, the application of clinical criteria tends to be the most commonly used diagnostic tool [4,5]. The internal consensus for the diagnosis of this condition is based on three clinical criteria: the presence of a tense muscle band, a hypersensitive point, and referred pain [6]. Its treatment has been based for years on pharmacological interventions with centrally acting muscle relaxants, and stretching, in addition to interventional management with dry needling or infiltration of local anesthetics, steroids, and botulinum toxin directly into the hypersensitive point [5]. One of the most frequently encountered points is in the trapezius and rhomboid muscles, due to their large size and biomechanical demands for different activities.

Although there are multiple therapeutic approaches, the effectiveness of these interventions is variable and adds to the fact that a patient may have different pain points that meet diagnostic criteria in very close portions, requiring multiple punctures that may increase symptoms [7]. In this direction, interfacial blocks have taken a relevant role in multiple conditions, however, their study in myofascial pain syndrome and more specifically in the dorsal location at the level of the trapezius and rhomboid muscles is still limited [8].

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Based on the factors described and given the high incidence of patients with myofascial pain in the localization of the trapezius muscle to the rhomboid muscle, this case series of six patients describes a new interfacial approach technique for the treatment of myofascial pain syndrome.

2. Case series

Six adult patients with chronic pain from Bogota, Colombia had been diagnosed with myofascial pain syndrome between the scapula and spinous processes in relation to the trapezius and rhomboid muscles. The patients gender included four female and two male patients with age range between 36 and 76 years old, and in terms of pain and procedure location laterality we performed three bilateral and three unilateral interventions (Table 1). The diagnosis was made by meeting the Munich clinical criteria including hypersensitivity spot in taut bands, referred pain, local tenderness to palpation, restriction of movement and pain during contraction [9].

The patients had been diagnosed with myofascial pain syndrome for at least six months, had been managed with centrally acting muscle relaxants, anti-inflammatory and non-opioid analgesics at therapeutic doses, and had undergone at least 12 sessions of physical therapy based on stretching, strengthening, massage, and ultrasound without significant clinical response. None of the patients had hematologic or oncologic conditions that contraindicated dorsal-level intervention (Table 1).

Informed consent was obtained from each patient before the procedure. The technique of intervention consisted of interfacial trapezius-rhomboid block (TRB) with ultrasound guidance using a high-frequency linear transducer (5–11 MHz). We performed a unilateral or bilateral scan according to the pain location of each patient, starting in the spine of the scapula with the transducer in a vertical axis with medial displacement of 1 cm to locate the fourth rib. Subsequently, the ultrasound is moved caudally in a longitudinal section up to the fifth and sixth ribs (we selected this anatomical position, since in previous ultrasound evaluations we found a better visualization of the plane that separates the muscles), over these structures the trapezius muscle is appreciated and below this the rhomboid, between both muscles is the interfacial trapezius rhomboid plane (Fig. 1). A 22G spinal needle is advanced in plane until reaching the intervention target, 10 cubic centimeters (cc) of analgesic solution (bupivacaine 0.25 % and methylprednisolone 40 mg) are applied. The opening of the interfacial space was in a cephalocaudal and mediolateral distribution (Fig. 2).

After each intervention, the patients were observed for 30 minutes and were discharged. Pain intensity as measured by numerical rating scale (NRS) 1–10 was assessed before the procedure, and at 30 minutes after the procedure [10]. It was also assessed during the routine follow up visits at one and eight weeks after the intervention by independent medical staff (Table 1; Fig. 3).

Table 1
24-hour NRS pain intensity improvement, 1 Week NRS pain intensity improvement, 8 Weeks (final) NRS pain intensity improvement in % and laterality of myofascial pain.

Age in years	Sex	24-h improvement	1 Week Improvement	8 Weeks final improvement in %.	Side
76	Female	Yes	Yes	70 % improvement	Bilateral
56	Male	Yes	Yes	80 % improvement	Right
40	Male	Yes	Yes	90 % improvement	Right
39	Female	Yes	Yes	40 % improvement	Bilateral
48	Female	Yes	Yes	50 % improvement	Bilateral
43	Female	Yes	Yes	70 % improvement	Left

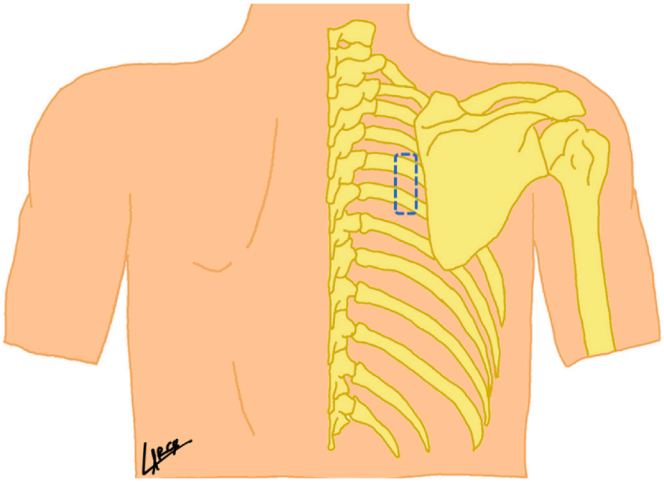

Fig. 1. Patient in supine decubitus, in blue lines, location of transducer to perform TRB intervention. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

All patients demonstrated an improvement in pain intensity NRS of an average of 70 %, these results were similar in the one and the eight-week follow-ups in more than 80 % of patients (Fig. 3); the minimum improvement considered was at least 30 % in relation to the baseline condition. In addition to the improvement in pain perception, patients showed improvement in their daily life activities, including sports and work. No patient presented secondary events or increased pain and continued their treatment with a home rehabilitation plan focused on stretching and muscle strengthening.

3. Discussion

This study presents a previously undescribed technique for addressing myofascial pain syndrome localized to the trapezius rhomboid musculature, the TRB. Some articles have considered trapezius muscle intervention as a therapeutic target; however, an interfacial technique has not been previously established in this regard [11].

It is presumed that the localization of different neurological structures at the interfacial plane may be an explanation for the symptomatic improvement of patients. Cadaveric studies at the level of the trapezius muscle show the existence of superficial cutaneous branches of the accessory nerve, but also interfacial branches [12]. The application of local anesthetics as an analgesic measure in deep planes has proven to be a much more effective intervention than the superficial release of myofascial points [13]. Like other interfacial blocks, the space between the trapezius and rhomboid muscles has the possibility of being decompressed with the application of medication and because it has a low resistance it facilitates the diffusion of medication [14]. We should consider in the specific case of myofascial pain syndrome that up to 30 % of the muscle force will be transmitted to this space, which in case of a painful pathology in the application of local anesthesia may decrease, in addition to forming a contractile apparatus that will diffuse the medication over the entire surface of these two muscles [14]. Finally, it is worth mentioning that all skeletal muscles are related by their connective tissue connections, which suggests that the free nerve terminals, the arrangement of the fibers, and the contractile mechanisms have a myofascial chain that is indispensable to know in order to offer treatments focused on not only one muscle if not a structural and functional group as in this case of the trapezius-rhomboid pathology [15].

Our study has significant limitation due to a very small sample and retrospective nature.

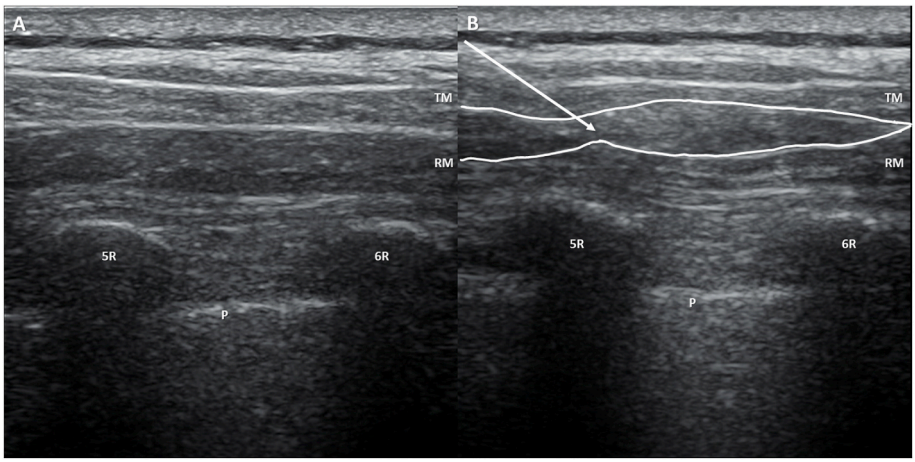

Fig. 2. Trapezius-Rhomboid plane block (TRB).
A- Ultrasound section in vertical plane observing the bony landmarks and the trapezius-rhomboid fascia.
B- Medication diffusion pattern in the trapezius-rhomboid fascia.
P: Pleura, **5R:** Fifth rib, **6R:** Sixth rib, **TM:** trapezius muscle, **RM:** rhomboid muscle, **Arrow:** medication diffusion pattern.

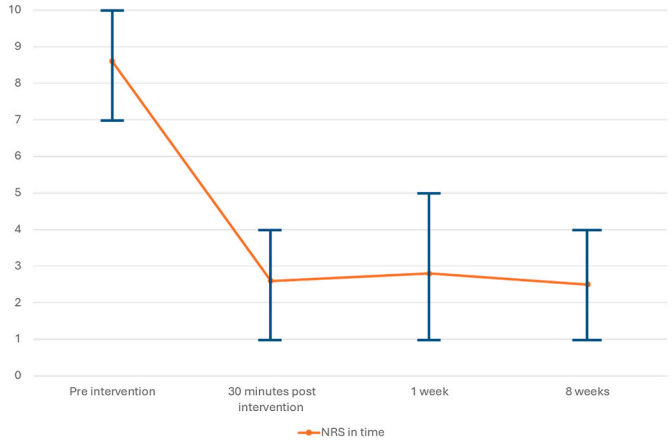

Fig. 3. Follow-up of the (NRS) numerical rating scale over time.The points and the displacement of the line are based on the NRS averages including the ranges at each measurement points.

4. Conclusion

Myofascial pain syndrome located in the trapezius and rhomboid muscles is a common painful clinical condition that negatively affects the quality of life. In this case series we describe a new technique of interfacial block that can be a potential alternative to existing treatments. Future larger, prospective, studies are needed to better evaluate the safety and effectiveness of this new approach for treatment of myofascial pain syndrome.

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Conflict of interest

We declare no conflict of interest. All available information is included in the article.

5. Authors' participation

LA: Graphic design, bibliographic search and writing of the article, patient intervention.

JC: Bibliographic research and article writing, patient intervention.

DC: Graphic design, bibliographic search and writing of the article, patient intervention.

CG: Bibliographic search, editing and final correction of the article.

RV: Bibliographic search, editing and final correction of the article.

Conflict of interest

We declare no conflict of interest.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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