

Pronator Teres Syndrome Among Other Compressive Neuropathies of the Upper Limb: A Case Report

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ABSTRACT

Pronator teres syndrome (PTS) is a condition involving entrapment of the median nerve as it passes between the muscular bellies of the pronator teres muscle. It is a rare condition, often misdiagnosed as other compressive neuropathies of the upper limb. We present a rare case of PTS associated with ulnar nerve compression at the elbow and median nerve compression at the wrist. Electrophysiological studies revealed entrapment of the median nerve at the wrist and ulnar neuropathy at the elbow. Dynamic ultrasound of the forearm confirmed morphological changes in the median nerve as it traversed the pronator teres muscle. The patient showed significant improvement following corticosteroid treatment, rehabilitation, and functional readaptation techniques.

Conclusions: PTS should be considered in patients presenting with sensory disturbances in the forearm and wrist. Differentiating it from other compressive neuropathies is critical, as early diagnosis enables the implementation of conservative therapeutic measures to prevent progression to structural nerve damage.

Keywords: Nerve; median; pronator; neuropathy; syndrome; teres.

Level of Evidence: IV

Síndrome del pronador redondo en el contexto de otras neuropatías compresivas del miembro superior. Presentación de un caso

RESUMEN

El síndrome del pronador redondo consiste en un atrapamiento del nervio mediano en su recorrido entre los vientres musculares del músculo pronador redondo. Es un cuadro poco común que habitualmente se confunde con otras neuropatías compresivas del miembro superior. Se presenta un caso infrecuente de síndrome del pronador redondo asociado a la compresión del nervio cubital en el codo y del nervio mediano en la muñeca. El estudio electrofisiológico detectó un atrapamiento del nervio mediano en la muñeca y una neuropatía cubital a nivel del codo. La ecografía dinámica del antebrazo constató una afectación morfológica del nervio mediano a su paso por el músculo pronador redondo. El paciente mejoró con la aplicación corticoides y técnicas de rehabilitación y readaptación. **Conclusiones:** Se debe sospechar un síndrome del pronador redondo en pacientes que consultan por alteraciones sensitivas en el antebrazo y la muñeca. El diagnóstico diferencial con otras neuropatías compresivas es fundamental, porque la detección precoz permite indicar medidas terapéuticas conservadoras que eviten una progresión hacia la lesión estructural del nervio.

Palabras clave: Nervio mediano; pronador redondo; neuropatía; síndrome.

Nivel de Evidencia: IV

INTRODUCTION

Pronator teres syndrome (PTS) is characterized by entrapment of the median nerve between the heads of the pronator teres muscle.¹⁻⁴ It is an uncommon condition that rarely occurs in conjunction with other nerve compressions in the upper limb. In such cases, the symptomatology and physical examination findings may be inconclusive due to a complex amalgam of sensory alterations that patients often struggle to describe.⁵⁻⁷ A thorough anamnesis, including detailed inquiry into the patient's history, onset, symptoms, and clinical signs, is essential to suspect PTS.

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Electrophysiological studies have limited sensitivity for sensory neuropathies,⁸ but may be helpful in identifying other sites of nerve compression. Imaging studies can be valuable in visualizing the nerve pathway and pinpointing compression sites,⁹ thereby facilitating a definitive diagnosis and enabling timely therapeutic interventions to prevent irreversible nerve damage.^{10,11}

CLINICAL CASE

A 53-year-old white man, a university professor with no significant medical history, presented to our department with complaints of paresthesia, hypoesthesia, and dysesthesia in the right forearm and hand. These symptoms had worsened over the past two weeks, which the patient attributed to prolonged guitar playing as an amateur musician, practicing for several hours daily. The symptoms improved during nighttime rest but persisted throughout the day, exacerbating during activities such as typing on a computer keyboard and driving a car or motorcycle.

A functional examination of the cervical spine showed no muscle contractures, pain on apophyseal palpation, or limitations in range of motion. Radicular elongation tests reproduced sensory symptoms along the anterior aspect of the distal third of the right arm, as well as in the dorsal, palmar, and radial regions of the forearm and hand, and in the 1st–4th fingers. No motor deficits were observed. Joint assessments of the elbow and wrist, as well as median nerve compression tests at the wrist, were negative. However, neurodynamic tests for the ulnar nerve at the epitrochlear canal intensified paresthesia along the anteromedial border of the forearm and in the 2nd–5th fingers. Symptoms were also provoked by active pronosupination, assisted supination, and active flexion of the flexor digitorum superficialis (Figure 1).



Figure 1. Exploratory tests in pronator teres syndrome. **A.** Flexor digitorum superficialis test. **B.** Pressure test. **C.** Resisted supination test.

Complementary imaging studies, including plain radiographs and an MRI of the cervical spine, revealed mild degenerative changes without spinal or spinal cord involvement.

Electrophysiological studies (electromyography and electroneurography) of the right upper limb showed mild ulnar nerve entrapment at the olecranon-epitrochlear canal and mild median nerve compression at the carpal tunnel.

Comparative ultrasound of the elbows and forearms demonstrated altered morphology and thickness of the right median nerve as it passed beneath the superficial head of the pronator teres (Figure 2), consistent with findings in most cases of PTS (Figure 3).

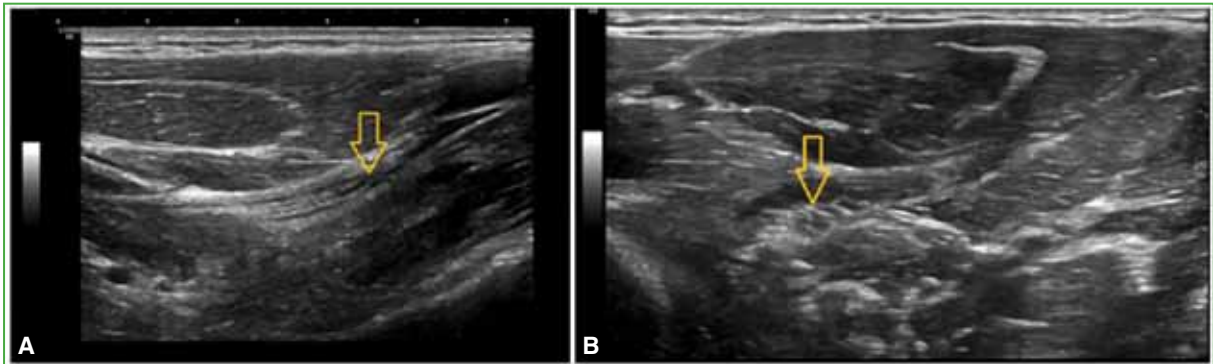


Figure 2. Ultrasound of the ventral aspect of the right forearm. **A.** Longitudinal section. **B.** Transverse section. The arrow shows compression of the median nerve as it passes between the heads of the pronator teres muscle.

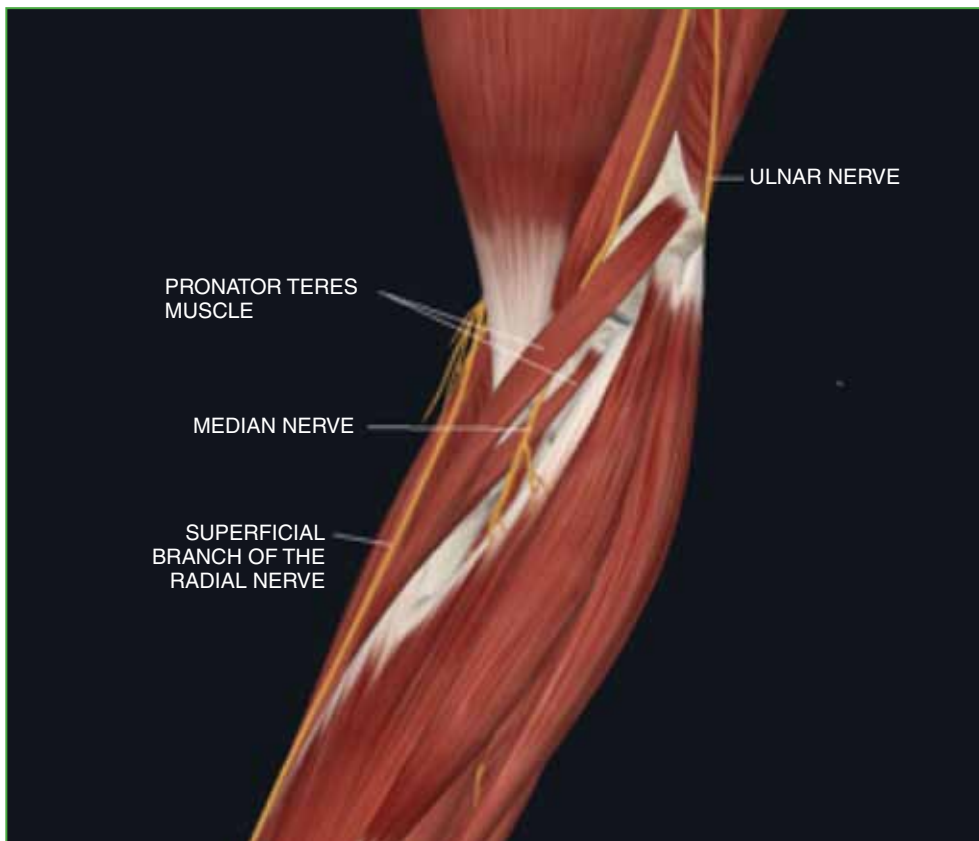


Figure 3. Median nerve in its path between the two heads of the pronator teres muscle. Source: *Complete Anatomy* interactive atlas, version 10.0.1, modified.

A primary diagnosis of PTS was established in the context of concurrent carpal tunnel syndrome and ulnar nerve neuropathy at the elbow. Conservative management was initiated, including: functional rest, avoiding repetitive pronosupination movements and refraining from musical activities; physiotherapeutic interventions, such as massage therapy, electrotherapy, and stretching exercises; pharmacological treatment with oral corticosteroids (oral deflazacort 30 mg/day for 5 days, followed by a tapered dosage over 20 days); and daily supplementation with a vitamin B complex combined with alpha-lipoic acid for 2 months.

After two months of conservative treatment, the patient experienced significant improvement and resumed his musical activities, adhering to recommendations for postural correction, technique refinement, stretching, and limiting prolonged practice sessions. At a follow-up visit three months later, he showed a good response to treatment and reported no symptoms of compressive neuropathy in the median or ulnar nerve territories.

DISCUSSION

The pronator teres muscle is located in the anterior and proximal region of the forearm. Its two heads originate from the medial epicondyle of the humerus and the medial border of the coronoid process of the ulna, respectively, and insert on the middle third of the lateral aspect of the radius via a single tendon. The muscle is innervated by the median nerve, which passes between the two heads in 74–82% of cases,¹⁻³ making it a predisposing factor for the development of pronator teres syndrome (PTS).³

PTS was first described by Henrik Seiffert in 1951. In 66% of cases, nerve entrapment occurs between the heads of the pronator teres,⁴ presenting with paresthesias in the palm of the hand and the 1st–4th fingers, pain in the anterior forearm that worsens with activity and improves with rest, and, occasionally, weakness of the musculature innervated by the median nerve distal to the compression site.⁵

A differential diagnosis must be considered to distinguish PTS from conditions such as cervical radiculopathy, brachial plexus neuropathies, thoracic outlet syndrome, and other compressive neuropathies of the upper limb, including carpal tunnel syndrome.⁶ In carpal tunnel syndrome, median nerve compression occurs below the transverse carpal ligament, typically causing nocturnal pain while sparing the palm's sensory function, as the palmar cutaneous branch does not traverse the carpal tunnel.⁷ Additional causes of median nerve compression include the Struthers ligament, which connects the humerus to the medial epicondyle and may lead to pain and paresthesias in the forearm, hand, and fingers, exacerbated by forearm supination and elbow extension. *Lacertus fibrosus*, while a rare cause, can also compress the median nerve at the elbow.¹² Anterior interosseous nerve syndrome manifests with muscle weakness of the flexor group but typically lacks sensory involvement.¹³ Compression of the median nerve in the fibrous arch of the flexor digitorum superficialis is more common and produces symptoms similar to PTS.¹³ Furthermore, canalicular compressions of the ulnar or radial nerves should be included in the differential diagnosis, as pain and paresthesias do not always align with the classic dermatomal patterns.

Symptoms and clinical evaluation are critical for diagnosing PTS. Electrophysiological studies are of limited diagnostic value, with a sensitivity of only 10%. Among patients with clinically suspected PTS, fewer than 50% are confirmed by electrodiagnostic tests.¹⁴ Nonetheless, electromyography and electroneurography can help rule out alternative compression sites in patients with distal sensory or motor symptoms. MRI and high-frequency ultrasound are recommended for definitive diagnosis, as they enable visualization of the nerve pathway and areas of compression.¹⁵

In cases of mild compression, conservative treatments—including anti-inflammatory medications, corticosteroids, and physiotherapy focused on muscle relaxation and nerve stimulation—can be effective. Promising results have been reported with ultrasound-guided hydrodissection of the median nerve using 5% dextrose,¹⁰ and some authors suggest dry-needling techniques.¹¹ Surgical nerve decompression is reserved for severe cases or those unresponsive to conservative treatment.^{9,16}

CONCLUSIONS

The case presented is notable because the median nerve was entrapped at both the pronator teres and the transverse carpal ligament, in addition to concurrent ulnar nerve compression at the elbow. This combination resulted in complex symptomatology and inconclusive findings during clinical examination. It is essential to recognize the low sensitivity of electromyography and understand that a negative result does not rule out PTS. Misinterpreting or overlooking this can lead to diagnostic errors.

A thorough clinical history, physical examination, and appropriate imaging studies are paramount. Clinicians should also consider the possibility of PTS coexisting with other canalicular syndromes of the upper limb. Prompt and accurate diagnosis of PTS enables effective conservative treatment, which can prevent progression to irreversible nerve damage and avoid the need for surgical intervention.

Conflict of interest: The author declares no conflicts of interest.

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