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Carpal tunnel syndrome associated with the bifid median nerve: a rare anatomical variation

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Expression of interest : none

Abstract: *Carpal tunnel syndrome (CTS) represents one of the most common reasons for hand consultation. CTS is idiopathic in most cases, whose complexity of several mechanisms could explain how this pathology is linked to its causes and effects. In this clinical case we will try to shed light on a rare association of a SCC secondary to an exceptional anatomical variety of the median nerve.*

Keywords : Carpal tunnel syndrome, bifid median nerve

Introduction :

CTS represents a set of clinical and electrical signs that occur when the median nerve is compressed or irritated within the CC. The first clinical description of this syndrome dates back to 1854 by Paget, while the correlation between anatomy and symptoms was established by Marie in 1913 [1-2].
the most common ductal syndrome affecting the upper limb. The diagnosis of an idiopathic origin is made after excluding other etiologies [3]. However, the systematic search for a specific etiology rarely leads to conclusive results. In this case study, we deal with an exceptionally uncommon origin that was identified incidentally.

Observation :

She is a 48-year-old patient, mother of 4 children. She presents with paresthesias such as tingling of the fingers, aggravated by effort radiating to the palmar surface of the thumb, index and middle fingers and the radial half of the ring finger bilaterally, more marked on the right. The clinical examination reveals shiny and dry skin in the region innervated by the median nerve of both hands, as well as a reduction in muscle mass in the thenar region.
Muscle strength assessment, it was noted that abductor brevis muscle strength was 2, opponent was 3, flexor pollicis brevis was 2 on the right side. On the left side, the strength of abductor brevis muscle was 3, opponent was 4, flexor pollicis brevis was 3.
Loss of sensation on examination of sensitivity in the first and second fingers, as well as the outer half of the ring finger on the palmar side. In addition, the dorsal side of the last two phalanges of the index and middle fingers also showed a loss of sensitivity.

Provocation tests showed positive results: the Tinel test and the Phalen test .
A standard x-ray was done, which revealed no bony abnormalities that could explain the patient's symptoms.
Ultrasound of the CC reveals an increase in the transverse cross-sectional area of the nerve measuring 16 mm2 associated with an anatomical variety such as bifid carpal tunnel on the right with a Doppler which does not demonstrate the presence of the persistent median artery **(figure 1).**

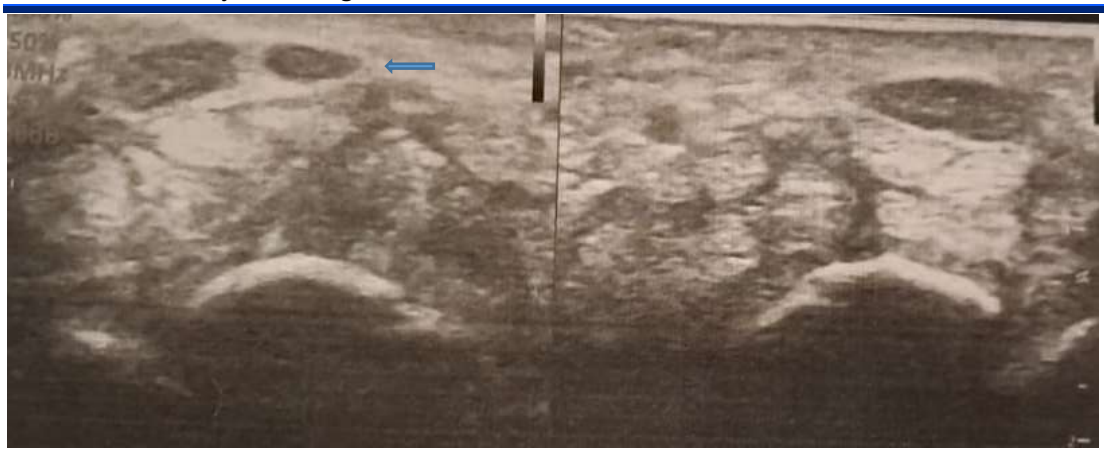

figure 1: ultrasound image shows a bifid aspect of the median nerve of the right hand (arrow).

The EMG shows severe sensory damage to the axonal and motor mechanisms of the two median nerves when passing to the wrists.
The patient benefited from a corticosteroid infiltration at the level of the right CC associated with the prescription of NSAIDs and pregabalin , the symptoms were improved where the patient presented a significant recovery of her muscular strength also the trophic disorders gradually disappeared after of 3 months. We completed our treatment with 20 rehabilitation sessions.

Discussion :

The bifidity of the median nerve corresponds to the division into two distinct branches of the trunk of the median nerve within the CC.
Lanz in 1977 divided this anatomical variation into four groups, of which our patient is classified Group 3 of the Lanz Classification.
The bifidity of the median nerve is a particular anatomical variety rarely discussed in the literature, which makes comparing our case with a similar case described in the literature difficult.
High division of the median nerve proximal to the CC is an anomaly that has an incidence rate of 2.8%, with an incidence of 0.8% to 2.3% in patients with CTS.
The bifid median nerve is one of the causes of CTS due to its relatively higher cross-sectional area compared to a non-bifid median nerve.
The study carried out by [Tahir A] on a sample of 196 upper limbs, including 98 cadavers, revealed anatomical variations of the median nerve at the level of the brachial plexus and the arm, including the presence of three roots, as well as anastomoses with the musculocutaneous nerve and ulnar nerve. Of which no variant form was noted, testifying to the rarity of our case [4].
Another study by [L Chen] involving 160 median nerves. A bifid median nerve was in 9.4%, a persistent median artery was in 17.5%.
High-frequency ultrasound has also been proposed to diagnose SCC and to search for anatomical variations. [5]
Detection of a bifid median nerve is easy using magnetic resonance imaging [6]. The combination of MRI and ultrasound has helped surgeons avoid potential surgical risks.
The purpose of this case reports the interest in the existence of the bifid median nerve is a crucial element to take into account during surgical decompression in order to avoid persistent nerve damage to the median artery. Additionally, this knowledge is important in deciding whether to inject above the bifurcation or into the epineurial nerve trunks in the context of corticosteroid injections.
Two treatment approaches are possible: conservative and surgical. Medical treatment is generally preferred as first-line treatment for mild cases [7].
Surgery is recommended in cases of ineffectiveness of medical treatment or severe damage. However, it has no direct impact on the repair of nerve damage and this can be explained by nerve regrowth [8].

Conclusion :

The bifid median nerve is a rare anatomic variant that can contribute to CTS, it is most commonly associated with patent median artery of the wrist.
It is important to be aware when planning CC release surgery and symptomatic injections of local treatments.

Conflict of interest : none

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