PERSISTENT MEDIAN ARTERY CAUSING CARPAL TUNNEL SYNDROME- MRI CASE REPORT

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ABSTRACT

BACKGROUND

Persistent Median Artery (PMA) is an accessory artery in the forearm and wrist. It is a persistent embryological remnant that usually regresses by eighth week of gestation. The persistent medial artery accompanies the median nerve as it courses through the forearm and carpal tunnel. The persistent medial artery is contained within the epineurium of the median nerve. The artery can cause impingement upon the median nerve in the carpal tunnel and cause Carpal Tunnel Syndrome (CTS).

KEYWORDS

Persistent Median Artery, Carpal Tunnel, Carpal Tunnel Syndrome.

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BACKGROUND

Compression upon the median nerve in the carpal tunnel is the most common form of median nerve entrapment. It typically presents with nocturnal pain, paraesthesia or hyperesthesia in the distribution of the median nerve and/or weakness of the thenar muscles." Magnetic Resonance Imaging (MRI) and Ultrasonography (USG) are the useful imaging modalities in the evaluation of neuropathy at the carpal tunnel. Both the modalities are equally reliable in the diagnosis of carpal tunnel syndrome. Important observation to be noted is the quantitative cross-sectional area measurement of the median nerve at the level of the pisiform bone.²⁻³ Contrast-enhanced MRI is used in cases where the median nerve appears normal in spite of strong clinical evidence of carpal tunnel syndrome and in postoperative follow up cases. Furthermore, imaging is done to identify structural causes of median nerve compression such as synovitis, ganglion, aberrant muscle tumours and anatomic variants (such as persistent median artery).

PMA as a cause of CTS have been documented by Eversman and Barfred et al and in several other reports."³

Case Presentation

Twenty-five-year-old male patient presented with clinical symptoms of CTS. Physical examination showed mild wasting of the thenar muscles with mild hypoesthesia in the first three fingers. Nerve conduction studies showed supportive evidence of CTS. There was delayed distal latency and sensory motor amplitude reduction in the median nerve.

MRI of the wrist was performed on a 1.5 Tesla MRI scanner (General Electric Signa HD xd). Axial T1, T2, coronal STIR and proton density fat suppressed sequences were used. MRI showed artery on the medial aspect of the median nerve compressing and distorting the architecture of the median nerve. Nerve conduction study showed evidence of median nerve neuropathy.

Figure 1. Images Showing Persistent Medial Artery Impingement [Straight Arrow] Upon the Median Nerve [Curved Arrow]

a - Axial T1W
b - Axial T2W
c - Sagittal STIR
d - Coronal PDFS.

DISCUSSION

Carpal tunnel is bounded anteriorly by the transverse carpal ligament and posteriorly by the arch of carpal bones. The median nerve and flexor tendons of the forearm course through the carpal tunnel from the forearm to the palm. The
The median nerve lies beneath the transverse carpal ligament and superficial to the flexor tendons.\textsuperscript{5} Median nerve and its branches are easily identifiable on MR images.

Conditions that cause crowding of the structures within the carpal tunnel result in median nerve compression that may result in pain, paraesthesia or sensory loss in the median nerve distribution and progressive atrophy of the thenar muscles. This is termed as carpal tunnel syndrome and is the most common entrapment neuropathy.\textsuperscript{6}

Median artery functions are well defined. In the embryo, it is the main route of blood supply to the hand and forearm along with the interosseous artery. After the 8th week of gestation, it regresses and is replaced by the ulnar and radial arteries. In postnatal life, its vestige remains as the arteria comitans nervi mediani.

Figure 2. Embryonic Development of the Arteries of the Forearm

**Stage 1** - Presence of the interosseous artery directly from the brachial artery and a small portion of the median artery.

**Stage 2** - Reduction of the interosseous artery, development of the ulnar artery and the median artery. Partial development of the radial artery.

**Stage 3** - Development of the ulnar artery and the radial artery. Formation of the palmar arch. Reduction of the interosseous artery and the median artery.

Many studies on the anatomical variations of persistent median artery and median nerve have been conducted either surgically\textsuperscript{7} or sonographically.\textsuperscript{8}

Several studies have elucidated the clinical implications of the median artery in carpal tunnel syndrome.

Persistent median artery as a cause of median nerve compression was first suggested by Bunnel in 1957. Rose et al published a case of thrombosis of persistent median artery as a cause of acute carpal tunnel syndrome.\textsuperscript{9} Case aneurysm of the median artery inside the carpal tunnel compressing upon the median nerve has been reported.\textsuperscript{10}

**CONCLUSION**

In summary, persistent median artery should be considered as a differential diagnosis in clinical practice as cause of median nerve entrapment in the carpal tunnel.

**REFERENCES**


