



A 38-year-old man presenting with a >1-month history of increased sensitivity to touch in the right index finger, thumb and middle finger with a positive Tinel's sign over the median nerve

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Answer

Thrombosed persistent median artery resulting in compression of a bifid median nerve.

Discussion

Imaging findings

Figure 1a and 1b demonstrate a markedly distended vessel within the carpal tunnel with loss of normal flow-void consistent with thrombosis. More proximally in the distal forearm, there are 3 small calibre vessels lying immediately adjacent to a normal-sized median nerve (MN), these representing the persistent median artery (PMA) and venae comitantes (Fig. 1c). Figure 1d shows the thrombosed vessel lying between and compressing the 2 nerve bundles of a bifid MN and bowing of the flexor retinaculum consistent with raised intracompartmental pressure. Doppler US showed a normal arterial wave pattern confirming that the vessel is a PMA (Fig. 2a),

while within the carpal tunnel the distended PMA is filled with echogenic thrombus (Fig. 2b).

Disease definition and its significance

The PMA is an accessory artery that arises from the ulnar artery in the proximal forearm and courses adjacent to the MN. The median artery, which provides major intra-embryonic blood supply to the forearm and hand, normally regresses by the 8th week of gestation. The PMA is unilateral in approximately 70% of cases and commonly associated with an anomalous median nerve which is frequently bifid. Cadaveric studies focusing on the anomalous PMA have found that prevalence varies from 0.6 to 30%. Bifid MN prevalence is also variable and ranges from 2 to 26% per wrist. The bifid MN anomaly has been reported to have an incidence of 0.8–2.8% in patients with CTS, and in most cases, it has been reported with a concomitant PMA [1–4]. More recent studies focused on depicting these findings using randomly selected patients who underwent MR imaging have been carried out. It has been proven that there was a high prevalence of bifid

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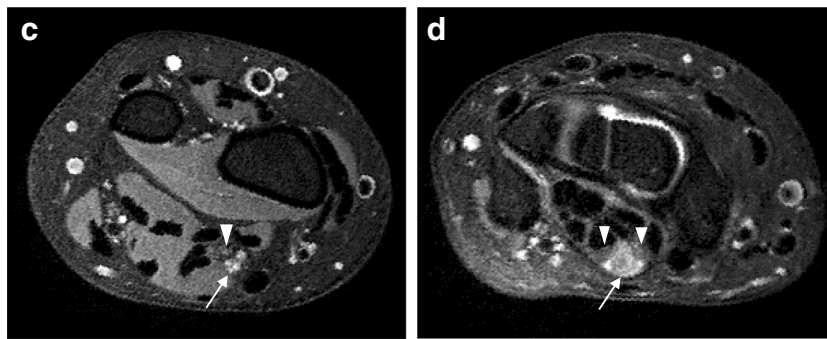


Fig. 1 **c** Axial fat-suppressed PDW FSE MR image of the right distal forearm shows the persistent median artery and venae comitantes (arrow) adjacent to the median nerve (arrowhead) just proximal to the carpus. **d**

Axial fat-suppressed PDW FSE MR image of the right wrist shows the enlarged thrombosed persistent median artery (arrow) between a bifid median nerve (arrowheads) within the carpal tunnel

median nerve (19%) and PMA (11%) within the carpal tunnel regardless of gender or age. The PMA was more frequently identified on the left side, unlike our case report [5].

Case contextualisation and patient's management/outcome

The current patient presented with symptoms in the median nerve distribution and the imaging appearances are classical for a thrombosed PMA with associated bifid median nerve. Anticoagulation therapy has been instituted and the thrombosed PMA will be monitored with repeat Doppler US. If symptoms persist, the patient will be considered for surgical decompression.

Differential diagnoses

The commonest differential diagnosis is idiopathic carpal tunnel syndrome (CTS). On sonography and MRI, there is enlargement of the median nerve proximal to the flexor retinaculum, distal flattening of the nerve and palmar bowing of the flexor retinaculum. Other differential diagnoses include MN compression at the elbow, cervical radiculopathy (C6, C7), flexor carpi radialis tenosynovitis, brachial plexopathy,

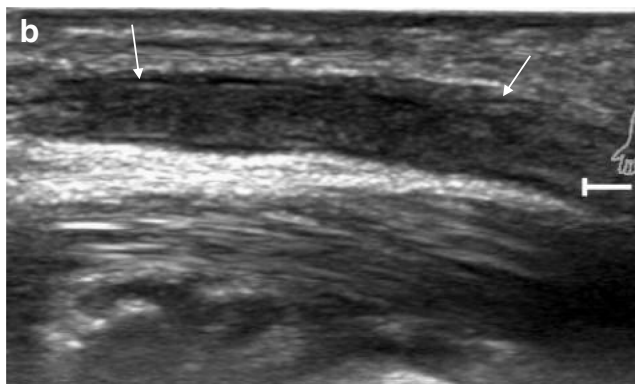


Fig. 2 **b** Longitudinal US at the level of the carpal tunnel showing the enlarged thrombosed persistent median artery (arrows)

thoracic outlet syndrome and 1st carpo-metacarpal joint arthritis [6].

Take home message

A PMA and bifid median nerve should always be sought when assessing the carpal tunnel on both MRI and ultrasound. Whilst thrombosis of a PMA is very rare, these normal variants are important findings to document both in relation to percutaneous carpal tunnel steroid injections and surgical decompression. Treatment of a thrombosed PMA is initially conservative with anticoagulation therapy [7], but surgical decompression can be considered if symptoms persist [8].

Asif Saifuddin: Conceptualisation, review of draft manuscript and proof read final manuscript.

Author contribution Georgiana Zamfir: conceptualization, principal investigator, literature review, writing of draft and final manuscripts, proof read final manuscript.

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Declarations

All authors reviewed and are happy with the final manuscript version submitted for review.

Conflict of interest The authors declare no competing interests.

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