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Bifid median nerve: a case report at the wrist

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Abstract

The median nerve is a terminal branch of the brachial plexus. It arises in the axilla and ends in the hand by dividing into three common palmar nerves after passing through the carpal tunnel deep to the flexor retinaculum at the wrist. The bifid median nerve corresponds to a bifurcation of the median nerve trunk inside the carpal tunnel. It is a rare variation that is often associated with the persistence of the wrist median artery. The authors report here a fortuitous discovery of a case of bifid median nerve during the wrist dissection of a cadaverous melanoderm belonging to the Wolof ethnic group in Senegal. The bifurcation started at about 14 cm distal and lateral to the medial bicipital groove with the medial trunk ending in the third interdigital space and the lateral trunk which gave four branches. There was neither the wrist median artery nor any other variations of the normal structures at the wrist. The bifid median nerve is rare but should be kept in mind. Being aware of this kind of variation is important to avoid nerve lesions during carpal tunnel surgery.

Keywords: Bifid median nerve, carpal tunnel.

INTRODUCTION

The bifid median nerve is an anatomical variation that is due to an early and proximal division of the nerve trunk before entering into the carpal tunnel. It is a rare variation, hand surgeons must be aware of it to avoid median nerve injury in carpal tunnel release operations. The frequency of this variation is estimated at 2.8% [1]. We report here a case of the bifid median nerve within the carpal tunnel with a cleavage that occurred at the level of the superficial finger flexor muscles at 14 cm from the distal part of the medial bicipital groove.

CASE

The bifid median nerve was found in an adult male Wolof cadaver during dissection of the anterior region of the wrist. The Wolof is a tribal group of western Africa. To identify the origin of the two branches of this bifid nerve and to describe their paths and termination, the dissection was extended to the antebrachial region and the elbow joint. Therefore at the elbow joint, the trunk of the median nerve emerged from the medial bicipital groove and then followed a vertical path, medially. In the forearm, the trunk crossed the origin of the ulnar artery and passed between the two heads of the pronator teres muscle and between the palmaris longus muscle in front. At 10.5 cm from its exit, it gave a branch to the flexor carpi radialis muscle. At 3.5 cm from the origin of this branch to the flexor carpi radialis muscle, the main trunk is divided into two other trunks. A medial trunk which at 3 cm from its origin penetrated the superficial flexor muscle of the fingers and then emerged at the junction between the fleshy belly and the terminal tendon of this muscle. It followed up to the wrist in the carpal tunnel. A lateral trunk engaged between the tendons of the superficial flexor muscle and penetrated the carpal tunnel. In the carpal tunnel, the lateral trunk ran anterior to the tendon of the flexor pollicis longus muscle and the medial trunk just superficial to the tendons of flexor digitorum superficialis. At its end, the lateral trunk gave four branches (one for the thenar eminence, two for the outer surface of the thumb and the first interdigital space and one for the second interdigital space). The medial trunk continued into the third interdigital space.

DISCUSSION

The anatomic variations of the median nerve have been classified into four groups by Lanz [1]: group 1 include variations affecting the course of the thenar branch; group 2 concerns the presence of accessory branches at the distal

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Figure 1: Location of the duplication of median nerve in the forearm, about 14 cm from elbow joint. MN (Median Nerve), FCR (Flexor Carpi Radialis).

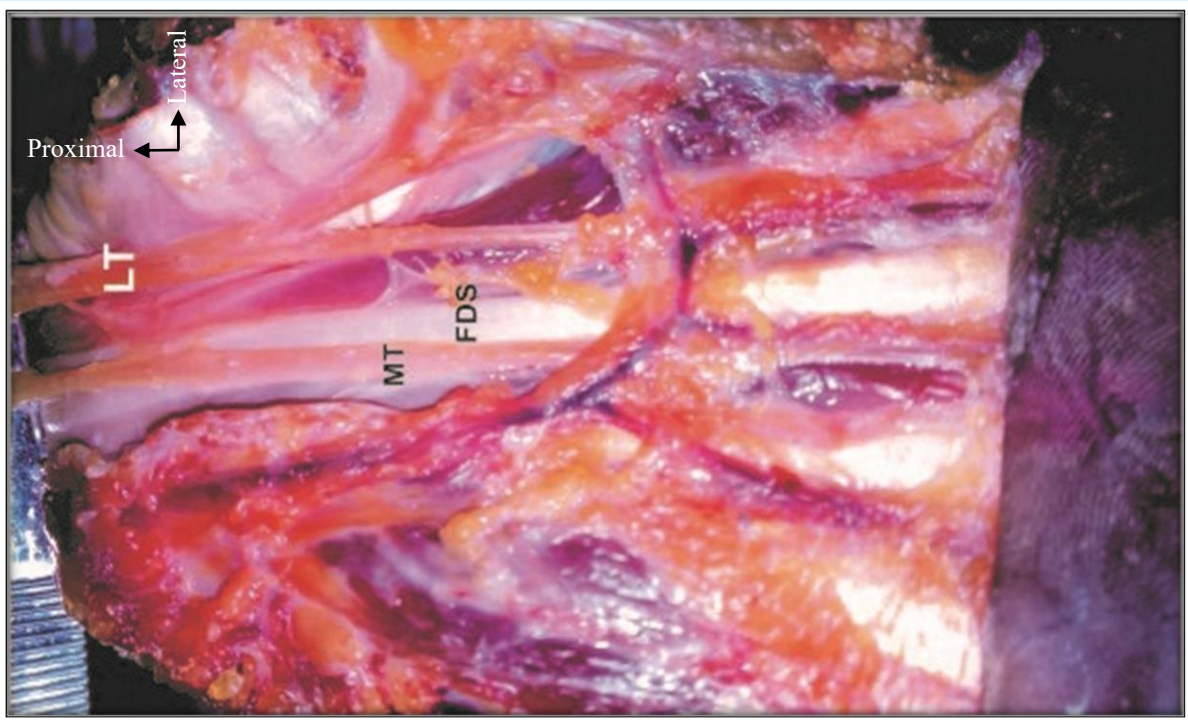

Figure 2: Figure 2: Anterior view of the bifid median nerve in the carpal tunnel. MT (Medial Trunk), LT (Lateral Trunk), FDS (flexor digitorium superficialis).

Table 1: Classification of the bifid median nerve according to its associated abnormalities

Group	Description	Prevalence of the associated abnormality	Presentation
I	Bifid median nerve without persistent median vessels or any other abnormalities	Very rare	Asymptomatic
II	Bifid median nerve with persistent median vessels without a pathology in the vessels or any other abnormalities	Common	Asymptomatic
III	Bifid median nerve with a pathology in the persistent median vessels	Very rare	Mass/CTS
	(a) Arteriovenous malformation	Very rare	Mass/CTS
	(b) Aneurysm	Very rare	Acute CTS or digital ischaemia
	(c)Thrombosis	Very rare	Mass
	(d)Venous malformation	Very rare	
IV	A bifid median nerve with each division passing through a separate carpal tunnel	Very rare	Usually asymptomatic
V	Anomalous muscles present between the two divisions of the nerve	Very rare	CTS
V1	The bifid median nerve is associated with aberrant nerve branches	Common	The aberrant branches themselves are asymptomatic

*according to according to Al-Qattam [4]; CTS, Carpal Tunnel Syndrome

part of the carpal tunnel; group 3 has a real division of the trunk of the median nerve within the carpal tunnel thus realizing the bifid median nerve; and group 4 shows the presence of accessory branches at the proximal part of the canal. The double median nerve is a rare anatomical variation that belongs to group 3. Its frequency of occurrence is estimated at 2.8% by Lanz [1], who described it in a series of 246 wrist dissections. He described it by emphasizing the proximal ante-brachial division of the nerve trunk. The level of the bifurcation differs according to literature; however, it occurs generally beside the superficial flexor muscle [1,2]. According to the work of Lanz [1], the two trunks of bifurcation are classically of equal size as in our observation. Other authors including Schultz [3] and Al-Qattan [4] reported that the areas of the transverse section of the duplication branches in the bifid median nerve should be different from each other. In this case, the calibre of the radial trunk is virtually similar to that of a normal median nerve.

The main anatomical abnormality that is often associated with the duplication of the median nerve is the persistence of the median artery of the wrist. This artery is an embryologic vascular structure that starts from the anterior interosseous artery and gradually regresses from the second month of pregnancy as the radial and ulnar arteries develop. The persistence of this artery, which is a vascular abnormality is often associated with the presence of a bifid median nerve [1,5,6]. According to Al-Qattan [4], the absence of this vascular abnormality as observed in the current study is very rare. This absence has also been found in other studies [7,8]. Some authors [9,10] reported the presence of a duplication of the carpal tunnel into two compartments for the two trunks of the bifid median nerve. We did not notice this variation on our subject. According to the type of anatomic variations associated with the bifid median nerve, the conditions are ranged into six groups by Al-Qattam [4]. According to the classification summarized in Table 1, abnormalities in groups 3 and 5, although rare, would lead to more clinical symptoms.

Conclusions

The bifid median nerve is an anatomical variation that rarely interests the wrist. However, being aware of this kind of abnormality is important to avoid nerve lesions during carpal tunnel surgery.

DECLARATIONS

Ethical considerations

Informed consent was obtained from the patient for this report. This report does not contain information that could lead to the traceability of the patient.

Consent to publish

All authors agreed to the content of the final paper.

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None

Competing Interests

No potential conflict of interest was reported by the authors.

Author contributions

JYE performed the surgery and conceived the report, acquired the data, drafted the manuscript, reviewed it, and approved the final manuscript for submission. SA, NJM, DM, NA, DA, JKI were involved in the conception, acquisition of data, drafting of the manuscript, reviewing, and approving the final manuscript for submission.

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Availability of data

All relevant information is provided in the manuscript. The published information is available from the corresponding author upon a reasonable request.

REFERENCES

1. Lanz U (1977) Anatomical variations of the median nerve in the carpal tunnel. J Hand Surg Am 2:44–53 . https://doi.org/10.1016/ S0363-5023(77)80009-9
2. Tubbs RS, Salter EG (2006) A rare finding of the median nerve in the forearm. Clin Anat 19:704–705. https://doi.org/10.1002/ca.20310
3. Schultz RJ, Endler PM, Huddleston HD (1973) Anomalous median nerve and an anomalous muscle belly of the first lumbrical associated with carpal tunnel syndrome. Case report. J Bone Jt Surg-Ser A 55:1744–1746. https://doi.org/10.2106/00004623-197355080-00019
4. Al-Qattan MM, Al-Zahrani K, Al-Omawi M (2009) The bifid median nerve re-visited. J Hand Surg Eur Vol 34:212–214 . https://doi.org/10.1177/1753193408089572
5. Gutowski KA, Olivier WA, Mehrara BJ, Friedman DW (2000) Arteriovenous malformation of a persistent median artery with a bifurcated median nerve. Plast Reconstr Surg 106:1336–1339 . https://doi.org/10.1097/00006534-200011000-00016
6. Wright C, Farlane I Mac (1994) Aneurysm of the median artery causing carpal tunnel syndrome. Aust N Z J Surg 64:66–67 . https://doi.org/10.1111/j.1445-2197.1994.tb02142.x
7. Ahn DS, Yoon ES, Koo SH, Park SH (2000) A prospective study of the anatomic variations of the median nerve in the carpal tunnel in Asians. Ann Plast Surg 44:282–287 . https://doi.org/10.1097/00000637-200044030-00006
8. Kessler I (1969) Unusual distribution of the median nerve at the wrist. A case report. Clin Orthop Relat Res 67:124–126 . https://doi.org/10.1097/00003086-196911000-00019
9. Amadio PC (1987) Bifid median nerve with a double compartment within the transverse carpal canal. J Hand Surg Am 12:366–368. https://doi.org/10.1016/S0363-5023(87)80005-9
10. Berry MG, Vijh V, Percival NJ (2003) Bifid median nerve: Anatomical variant at the carpal tunnel. Scand J Plast Reconstr Surg Hand Surg 37:58–60. https://doi.org/10.1080/alp.37.1.58.60