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A variation in the formation of the median nerve: communicating branch between the musculocutaneous and median nerves in man

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We encountered variation in the formation of the median nerve in a 66-year-old male cadaver during dissection of the upper extremity of 20 adult cadavers. The dissections were made at the Department of Cellular Biology and Anatomy, Louisiana State University Medical Center. The median nerve was formed by fusion of four branches, three of them coming from the lateral cord and one from the medial cord. The normal radix from the lateral cord followed a very close oblique course over the axillary artery. The first unusual radix to the median nerve had an anastomoses from the musculocutaneous nerve to the median nerve in the proximal part of the left arm. The second unusual radix also came from the musculocutaneous nerve after it had pierced the coracobrachialis muscle and then joined with the median nerve. These kinds of variations are vulnerable to damage in radical neck dissection and other surgical operations of the axilla and upper arm. The communicating branch can be explained on the basis of its embryologic development and also ought to be distinguished from the other nerve variations in the upper extremity. The aim of this paper is to provide additional information for the classification of previously found communications between the musculocutaneous and median nerves.

key words: median nerve, musculocutaneous nerve, communication, human anatomy

INTRODUCTION

Anomalies in the peripheral nerves and their connections are clinically important. The median nerve is one of the branches of the human brachial plexus [5]. In the normal brachial plexus, the median nerve is formed by union of the medial and lateral radixes. The medial radix comes from the medial cord, coming itself from the anterior branch of the lower trunk. The lateral radix originates from the lateral cord, coming itself from the anterior branches of the upper and middle trunks [1]. The musculocutaneous nerve, derived as a terminal branch end of the lateral cord, pierces the coracobrachialis muscle and runs downward and laterally between the biceps and the brachialis muscles to reach the lateral side of the arm. The musculocutaneous nerve is continued in the forearm as the lateral cutaneous nerve of the forearm [19].

Communications between the musculocutaneous and/or median nerves have been recorded previously by many investigators [2,4,7,8,10,11,13,17].

Formations and anomalies of the nerves of the upper limb have been well described by many au-

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thors [9,12,16,18,19]. Nerve variations of the upper limb are very important in routine surgery and during radical neck dissections where these abnormal branches are more prone to injury [3].

RESULTS

We observed an anomaly in the formation of the median nerve with additional anastomotic nerve branches between the musculocutaneous and median nerves in the left upper extremity in a 66-year-old male cadaver at the Department of Cellular Biology and Anatomy, Louisiana State University Medical Center in 1997. In this case, the median nerve was formed by the fusion of the four branches, three of them coming from the lateral cord and one from the medial cord. One of the branches coming from the lateral cord was the normal lateral radix (Fig. 1{3}) of the median nerve. One of the unusual branches originated 1.6 cm distal to the origin of the musculocutaneous nerve (Fig. 1{6}) and joined with the median nerve in the proximal arm. The musculocutaneous nerve, at the level of the lateral border of the coracobrachialis muscle, gave off another branch that also joined with the median nerve. The fusion of this communicating branch with the median nerve was 20 cm above the intercondylar line of the humerus (Fig. 1{7}).

DISCUSSION

As the embryonic somites migrate to form the extremities, they bring their own nerve supply, so that each dermatome and myotome retains the original segmental innervation. Throughout somite migration, some of the nerves come into close proximity and fuse in a particular pattern, forming a plexus early in fetal life [6]. Variations of the nerves of the upper limb may have clinical importance and it is important that they are reported at autopsy or during cadaver dissections. Anomalies in the formation of the cords were reported in 11 of the 175 brachial plexus examined by Kerr [9]. An abnormal brachial plexus was also observed in 2 of 350 upper extremity dissections by Walsh [18]. Some variations in the origin of the median nerve in 4 of 130 brachial plexuses have also been recorded by Uzun and Bilgic [16] and variation of the median nerve at the level of the brachial plexus has been described by Sargon et al. [15]. In one extreme case, a missing median nerve in the hand was reported by O'Neil et al. [14]. In this case, the median nerve was terminated in the forearm and all hand muscles were supplied by the ulnar nerve. This is a report of muscle response obtained with needle examination and not of dissection findings [14].

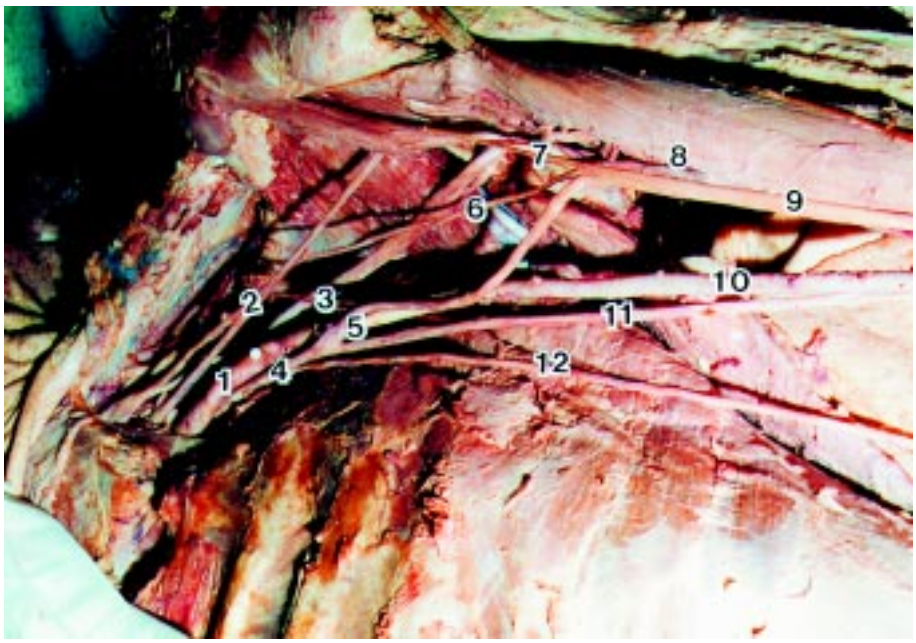

Figure 1. Variation in the formation of the median nerve. 1 — the axillary artery, 2 — the lateral cord, 3 — the lateral radix of the median nerve, 4 — the medial cord, 5 — the medial radix of the median nerve, 6 — the first communicating branch between the musculocutaneous nerve and the median nerve, 7 — a second communicating branch between the musculocutaneous and median nerves, distal to where the muscle cutaneous nerve passes through the coracobrachialis muscle, 8 — the musculocutaneous nerve, 9 — the median nerve, 10 — the brachial artery, 11 — the ulnar nerve, 12 — the medial cutaneous nerve of the forearm.

Kaus and Wotowicz [8] reported the anastomotic branch from the musculocutaneous nerve to the median nerve on both sides of cadaver. Kosugi et al. [10] worked supernumerary head of the biceps brachii and branching pattern of the musculocutaneous nerve in Japanese. In their study, they found communication between the musculocutaneous nerve and the median nerve in 43 out of the 75 limbs. The communicating branch ran from the musculocutaneus nerve to the median nerve in 24, from the median nerve to the musculocutaneous nerve in 12, in both directions in 5, or in another type of pattern in 2 out of 43 limbs. The coracobrachialis muscle was found to be innervated by a nerve branch originating from the lateral root of the median nerve, but not from the musculocutaneous nerve nor from the lateral cord of the brachial plexus [4]. Venieratos and Anagnostopoulou [17] studied 79 cadavers and classified three types communications between the musculocutaneous ¾ median nerves. They found 22 communications between the musculocutaneous and median nerves; type I: the communication was proximal to the entrance of the musculocutaneous nerve into the coracobrachialis muscle (9/22); type II: the communication was distal to the muscle (10/22); type III: the nerve as well as the communicating branch did not pierce the muscle (3/22). However, an anastomotic branch between these two nerves was observed in one case of the 175 plexuses examined by Kerr [9]. He observed and paid attention to the formation of the brachial plexus, not to the musculocutaneous and median nerves. Anomalies of the nerves of the upper limb are often accompanied by abnormalities of vessels. This type of variation in the formation of the cords in the upper part of the axilla has been described by Hollinshead [6], and was related to the subclavian and axillary arteries. In our case, the topography of the axillary vessels was normal.

The aim of this paper is to report two communications between the musculocutaneous and median nerves in the arm, discovered during a dissection course. Our paper may provide additional information for the classification of previously found communications between the musculocutaneous and median nerves. Such anatomical variations are important to note during clinical approaches where these communicating branches are prone to damage.

REFERENCES

1. April EW (1985) Anatomy. Harval Publishing Co, Toronto.
2. Eglseder WA, Goldman M (1997) Anatomic variations of the musculocutaneous nerve in the arm. Am J Orthop, 26 (11): 777–780.
3. Gacek RR (1990) Neck dissection injury of a brachial plexus anatomical variant. Arch Otolaryngol Head and Neck Surg, 116: 356–358.
4. Gumusalan Y, Yazar F, Ozan H (1998) Variant innervation of the coracobrachialis muscle and unusual course of the musculocutaneous nerve in man. Kaibogaku Zasshi, 73 (3): 269–272.
5. Hershman EB (1990) Brachial plexus injuries. Clin Sports Med, 9: 311–329.
6. Hollinshead WH (1982) Anatomy for surgeons. The back and Limbs. Harper & Row, Philadelphia.
7. Iwamoto S, Kimura K, Takahashi Y, Konishi M (1990) Some aspects of the communicating branch between the musculocutaneous and median nerves in man. Okajimas Folia Anat Jpn, 67 (1): 47–52.
8. Kaus M, Wotowicz Z (1995) Communicating branch between the musculocutaneous and median nerves in human. Folia Morphol (Warszawa) 54: 273–277.
9. Kerr AT (1918) The brachial plexus of nerves in man, the variation in its formation and branches. Am J Anat, 23: 285–395.
10. Kosugi K, Shibata S, Yamashita H (1992) Supernumerary head of biceps brachii and branching pattern of the musculocutaneous nerve in Japanese. Surg Radiol Anat, 14 (2): 175–185.
11. Le Minor JM (1990) A rare variation of the median and musculocutaneous nerves in man. Arch Anat Histol Embryol, 73: 33–42.
12. Miller RA (1934) Comparative studies upon the morphology and distribution of the brachial plexus. Am J Anat, 54: 143–175.
13. Nakatani T, Mizukami S, Tanaka S (1997) Three cases of the musculocutaneous nerve not perforating the coracobrachialis muscle. Kaibogaku Zasshi, 72 (3): 191–194.
14. O'Neil T, Giancarlo T, Spitzer AR (1990) The case of the missing median nerve. Muscle Nerve, 13 (9): 882–883.
15. Sargon MF, Uslu SS, Celik HH, Aksit D (1995) A variation of the median nerve at the level of the brachial plexus. Bull de I Assoc des Anatom, 79 (246): 25–26.
16. Uzun A, Bilgic S (1999) Some variations in the formation of the brachial plexus in infants. Tr J of Med Sci, 29: 573–577.
17. Venierotos D, Anagnostopoulou S (1998) Classification of communications between the musculocutaneous and median nerves. Clin Anat, 11 (5): 327–331.
18. Walsh JF (1877) The anatomy of the brachial plexus. Am J M Sci, 74: 387–428.
19. Williams PL, Warwick R, Dyson M, Bannister LH (1989) Gray's anatomy, Churchill Livingstone, London.