Abstract

Variations of the musculocutaneous nerve and median nerve at the level of brachial plexus are common. During our routine dissection, we observed two branches communicating between the musculocutaneous nerve and median nerve in a fifteen-year-old female cadaver right upper limb. The first connecting branch originated from the musculocutaneous nerve, and was curved medially to join the median nerve. The second connecting branch came from the lower segment of the first connecting branch, and was curved laterally to join the musculocutaneous nerve. The two connecting branches formed into a "T" shape to link up the musculocutaneous and median nerves. In the same limb, we also observed an anomaly of median nerve that it had a common origin with the ulnar nerve. This type of variations of the nerves is rare to see and should be considered prior to traumatic evaluations and reconstructive interventions.

INTRODUCTION

Variations of the brachial plexus and its terminal branches are not uncommon. Anastomosis between the musculocutaneous nerve (MCN) and the median nerve (MN) are certainly the most common and frequent variations observed among the branches of the brachial plexus [1,2]. Many papers in the literature have demonstrated that variations in brachial plexus branching have implicating clinical and surgical importance [3-6].

Most commonly, the median nerve has two roots from the lateral (C5,6,7) and medial (C8,T1) cords, which embrace the third part of the axillary artery and unite anterior or lateral to it. The median nerve enters the arm at first lateral to the brachial artery. Near the insertion of coracobrachialis it crosses in front of the artery descending medial to it to the cubital fossa without receiving any other branch. The musculocutaneous nerve (C5,6,7) comes from the lateral cord as one of the terminal branches opposite the lower border of the pectoralis minor and usually pierces the coracobrachialis and descends laterally between the biceps brachii and brachialis to the lateral side of the arm [7-10].

Any anomalous pattern of the musculocutaneous nerve and the median nerve is related to embryological development. Knowledge of such variations is important for surgeons to perform surgical procedures in the axillary region and in the upper arm [11]. Usually, one connecting branch between the musculocutaneous nerve and median nerve is observed frequently. Two branches, however, are rarely reported. Two branches, together with the anatomy of the median nerve's origin, are never reported before. This case under review here is directed toward such anatomical variations of nerve ends of the musculocutaneous nerve and the median nerve. And awareness of the possible variations between musculocutaneous and median nerves is important to both anatomists and clinicians.

CASE REPORT

We report unusual unilateral variations between the musculocutaneous and median nerves that were found during the dissection of the arm of a 15 years old female formalin-fixed cadaver. Gross dissection was performed in the customary fashion. After observation of the relationships to whole MCN, the specimen of variations was measured with vernier caliper. Accidental injury of musculocutaneous nerve was ruled out as no incision or injury marks were observed on the skin of the arm.

In the presented case (Figure 1), the musculocutaneous nerve originated from the lateral cord but had two connecting branches with the median nerve. The first connecting branch emanated from the musculocutaneous nerve before the point where it pierced the coracobrachialis muscle and was 45.73 mm distal to the lower edge of the pectoralis minor muscle. This branch was relatively thick (1.65 mm in diameter) and curved medially to join the median nerve 90.37 mm distal to the origin of the median nerve. Its length was 64.18 mm. The musculocutaneous nerve's diameter before sending out the first branch is 1.41 mm and after sending out the first branch is 1.41 mm. The median nerve's diameter before accepting the first branch was 2.45 mm and after was 3.57 mm. The second connecting branch came...
from the lower segment of the first branch (55.19 mm distal to the origin of the first branch) after piercing the coracobrachialis muscle and joined the musculocutaneous nerve 154.50 mm distal to the lower edge of the pectoralis minor muscle. This branch was smaller (0.64 mm in diameter) and its length was 55.39 mm. The musculocutaneous nerve’s diameter before accepting the second branch is 1.41 mm and after is 1.75 mm. From the view of traffic pattern and nerves’ diameters, the two connecting branches are not directly connected to the two nerve trunks, but formed into a “T” shape to link up the musculocutaneous nerve and median nerve. Another anatomy is that the median nerve and ulnar nerve share a common origin from the lateral and medial cords. The common origin was 19.26 mm long. The left side of the cadaver was normal and there were no vascular anomalies on either side.

**DISCUSSION**

Communication between the musculocutaneous and median nerves has been reported by many authors. In a study by Prasada Rao and Chaudhary [12] on 24 upper arms, communication from the musculocutaneous nerve to the median nerve was observed in 33% of cases. Kerr [13] found that a branch from the musculocutaneous nerve to the median had been reported in 8.1% to 36.19% of different series and estimated its incidence as somewhat less than the 24% found in his series. Conversely, anastomotic branches arising from the median nerve and then joining the musculocutaneous nerve are rare, being found in only 5% of cases [3]. In all cases, to our knowledge, this variation in our case has never been reported in previous studies.

In our case, there are two connecting branches between musculocutaneous and median nerves. The first connecting branch originated from the musculocutaneous nerve, curved medially to join the median nerve. The second connecting branch came from the lower segment of the first connecting branch, curved laterally to join the musculocutaneous nerve. The two connecting branches formed into a “T” shape to link up the musculocutaneous and median nerves. The “T” shape communication between musculocutaneous and median nerves is considered as a remnant from the phylogenetic or comparative point of view. From a clinical point of view, such variations are of great importance during flap dissections, post traumatic evaluations of the arm or peripheral nerve repair. After trauma to the arm, when the median nerve seems to be surgically intact, the fibers coursing out from the nerve to the muscles of the arm may be damaged, as surgeons know that the median nerve does not supply any muscular branch of the arm. During flap dissections, unexpected damage could also occur to the musculocutaneous nerve [14]. A more precise knowledge than that found in classical anatomical texts is necessary for clinical investigation, and the surgical treatment of peripheral nerve injury [15]. Surgeons should be aware of these nerve anomalies. The anastomoses existing between musculocutaneous and median nerves may affect the results of surgery in nerve grafting and partial neurotomy of musculocutaneous nerve. The electromyographic response to stimulation and bony landmarks are used to guide the surgeon. Thus, this case report of the unusual course and branching pattern of the musculocutaneous nerve, together with the anomalies of the median nerve, is clinically important for surgeons, orthopaedicians, and anaesthetists performing pain management therapies or regional anaesthesia to the upper limb.

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**REFERENCES**


