Case Report / Olgu Sunumu

Variation of Musculocutaneous Nervi Branching to Median Nerve and not Piercing Corocobrachialis Muscle; Case Report

Nervus Medianus'a Dal Veren ve Musculus Corocobrachialis'i Delmeyen Nervus Musculocutaneus Varyasyonu; Olgu Sunumu

Yusuf SEÇGİN [1], Halil Şaban ERKARTAL [2], Nesibe YILMAZ [1]

[1]Karabük University, Faculty of Medicine, Department of Anatomy, Karabük, TÜRKİYE
[2]İstanbul Okan University, Faculty of Medicine, Department of Anatomy, İstanbul, TÜRKİYE

Abstract

The fifth and sixth (and sometimes the fourth) cervical spinal nerves merge to form the superior trunk, and the superior trunk and the anterior part of the median nerve merge to form the fasciculus lateralis. Fasciculus lateralis is divided into two branches as lateral cord and musculocutaneous nerve. The musculocutaneous nerve pierces the corocobrachialis muscle muscle and then travels between the brachialis muscle and the biceps brachii musculus. Variations in anatomical structures are common. However, nerve variations occur more rarely in these structures. These variations are anatomically and clinically important. This case report was detected during routine dissection of a male cadaver in the Department of Anatomy, Karabuk University Faculty of Medicine. For dissection, the fossa axillaris, arm and forearm of both upper extremities were dissected. During dissection, it was found that the musculocutaneous nerve in the left upper extremity continued without piercing the corocobrachialis muscle and gave a connecting branch to the median nerve. There are limited case studies on this nerve variation and studies show that this variational condition is important for surgical operations in this region. Therefore, this study is important for both surgical and clinical sciences.

Keywords: Musculocutaneous nerve, Corocobrachialis muscle, Median nerve, Variation

Öz

Beşinci ve altıncı (bazen de dördüncü) servikal spinal sinirler birleşerek truncus superior'u, truncus superior ile nervus medianus'un ön bölümü de birleşerek fasciculus lateralis'i meydana getirir. Fasciculus lateralis'te radix lateralis ve nervus musculocutaneus olmak üzere iki dala ayrılır. Nervus musculocutaneus'da musculus corocobrachialis kasını deler ve sonrasında musculus brachialis ile musculus biceps brachii arasında seyreder. Anatomik yapılarda varyasyonlar gözüken bir durumdur. Fakat bu yapılar içerisinde sinir varyasyonları daha nadir olarak ortaya çıkmaktadır. Bu varyasyonlarda anatomik ve klinik açıdan önemlidir. Bu olgu sunumu Karabük üniversitesi Tıp Fakültesi Anatomi Anabilim dalı'nda yer alan erkek kadavranın rutin diseksiyonu sırasında tespit edildi. Diseksiyon için her iki üst extremitenin de fossa axillaris'i, kol ve ön kol bölgesi diseke edildi. Diseksiyon sırasında sol üst extremitede yer alan nervus musculocutaneus'un musculus corocobrachialis'i delmeden devam ettiği ve nervus medianus'a birleştirici bir dal verdiği bulundu. Bu sinir varyasyonu ile ilgili sınırlı vaka çalışması bulunmakta olup çalışmalar bu varyasyonel durumun bu bölgedeki cerrahi operasyonlar için önemli olduğunu göstermektedir. Bundan dolayı bu çalışma hem cerrahi bilimler için hem de klinik bilimler için önem arz etmektedir.

Anahtar Kelimeler: Nervus musculocutaneus, Musculus corocobrachialis, Nervus medianus, Varyasyon

Corresponding Author / Sorumlu Yazar

Dr. Yusuf SEÇGİN
Karabük University, Faculty of Medicine, Department of Anatomy, Karabük, TÜRKİYE

E-mail: yusufsecgin@karabuk.edu.tr

Received / Geliş tarihi: 13.02.2025

Accepted / Kabul tarihi: 19.03.2025

DOI: 10.35440/hutfd.1639234

This study was presented as an oral presentation at the 10th International "Artemis" Scientific Research Congress held on 29-30 november 2024.

Introduction

The fasciculus lateralis branch of the plexus brachialis usually divides at the infraclavicular level (lower level of the musculus pectoralis minor) into two branches, the lateral cord of the median nerve (MN) and the musculocutaneous nerve (MCN). The lateral cord of the MN is thick and the MCN is thin. The thin MCN pierces the corocobrachialis muscle and innervates the brachialis muscle and biceps brachii muscles. It then superficialises just above the epicondylus lateralis and continues as cutaneous antebrachii lateralis nervi (1-3).

Nerve variations in the upper extremity are important for invasive interventions in this region and for the evaluation of symptoms related to nerve variation (4, 5). Because anaesthetic blocks, trauma, nerve transpositions, vascular surgeries, surgical procedures applied in this region may damage the median nerve and loss of limb function may occur (6).

Connecting branches between MCN and MN are encountered during routine dissection by anatomists and have been reported by many researchers (7).

The aim of this study is to present a case report of a connecting branch between MCN and MN and to emphasise the importance of this variational condition.

Case

This case report was found during routine dissection of an adult male cadaver in Karabük University Faculty of Medicine, Department of Anatomy. For routine dissection of the cadaver;

1. The skin, adipose tissue and fascia in the pectoral region, shoulder region, arm and forearm were dissected.
2. Superficial veins were dissected.
3. Pectoral muscles were dissected.
4. Biceps brachii muscle was dissected.
5. Fossa axillaris was dissected.
6. Plexus brachialis and its vessels were dissected.

During dissection, it was observed that the MCN in the left upper extremity continued its course without piercing the m. corocobrachialis and gave a connecting branch to the MN (Figure 1).

Discussion

Variations in the course and branching of the plexus brachialis are common and these variations are important in surgical interventions (8-10). One of these variations is the connecting branch between MCN and MN. The formation of this connecting branch is a congenital condition. Muscles develop from the mesenchyme in the intrauterine period and the axons of the spinal nerves grow distally and reach the mesenchyme. During this process, some variational conditions may occur (10).

Nerve variations between MCN and MN are anatomically classified into 5 types. In type 1, there is no connecting branch between MCN and MN. In type 2, part of the lateral cord merges with the MCN and gives a connecting branch to the MN distally. In type 3, the lateral cord merges with the MCN and gives a branch distally to the MN. In type 4, the lateral cord merges with the MCN and then reaches the MN. It then follows the MN for some time and then leaves the MN as a lateral branch. In type 5, the MCN is absent. The connecting branches between MCN and MN are also classified into 3 types. In type 1, the connecting branch is proximal to the corocobrachialis muscle. In type 2, the connecting branch is distal to the corocobrachialis muscle. The connecting branch and MCN do not pass through the corocobrachialis muscle (5, 10-12).

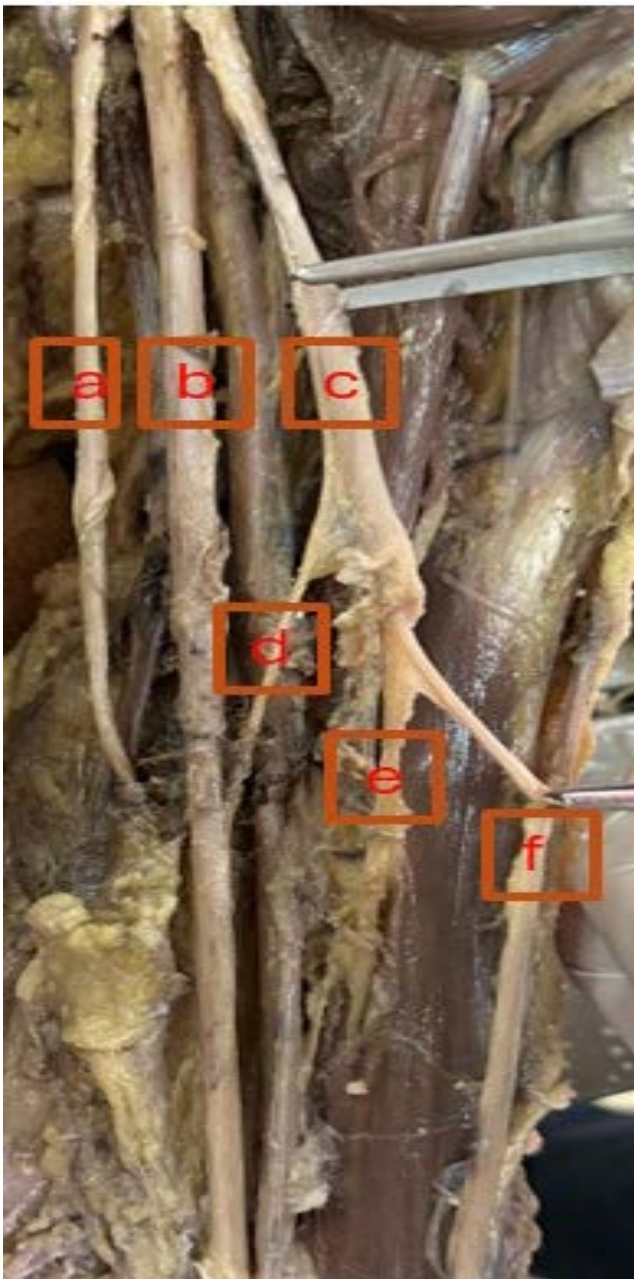

Figure 1. Connecting branch of the musculocutaneous nerve to the median nerve (a: ulnar nerve b: median nerve c: musculocutaneous nervi d: joining branch, e: brachial branch, f: cutaneous antebrachii lateralis nervi)

Venieratos and Anagnostopoulou studied 79 cadavers and found 22 connecting branches between MCN and MN in 16 of them. Of these, 6 were found to be bilateral. According to the classification of the joining branch between the MCN and MN, 9 of them were found as Type 1, 10 as Type 2 and 3 as Type 3 (13). Basar et al. In their study on a 42-year-old male cadaver, they found a connecting branch between the MCN and the MN with a length of 8 cm and a diameter of 3 mm (14). Sarikcioglu et al. In a 60-year-old male cadaver, they found a connecting branch between MCN and MN on the left side (15). Choi et al. In their study on 138 cadavers, 14 branches with fusion between MCN and MN, 53 branches with one connecting branch, 5 branches with 2 connections, 1 branch with both fusion and 1 branch were found (16).

Conclusion

The connecting branches between MCN and MN are important for surgeons, anaesthetists and orthopaedists in the treatment of upper extremity pain, surgical interventions, regional anaesthesia applications. In addition, these connecting branches are important in anatomical variational studies. In conclusion, we believe that this case report will contribute to anatomists, surgeons, anaesthetists and orthopaedists.

Acknowledgements

The authors would like to express their endless gratitude to the body donors and their families who have made great contributions to the science of anatomy.

Ethical Approval: *The authors confirm that they have complied with ethical guidelines for cadaveric studies.*

Author Contributions:
Concept: Y.S, H.Ş.E, N. Y.
Literature Review: Y.S, H.Ş.E, N. Y.
Design : Y.S, H.Ş.E, N. Y.
Data acquisition: Y.S, H.Ş.E, N. Y.
Analysis and interpretation: Y.S, H.Ş.E, N. Y.
Writing manuscript: Y.S, H.Ş.E, N. Y.
Critical revision of manuscript: Y.S, H.Ş.E, N. Y.
Conflict of Interest: *The authors have no conflicts of interest to declare.*
Financial Disclosure: *Authors declared no financial support.*

References

1. Larrotta DRB, Porras PLF, Acuña LEB, Ballesteros D, Forero P, Ballesteros L. Anatomic variations in relation to the origin of the musculocutaneous nerve: absence and non-perforation of the coracobrachialis muscle. Anatomical study and clinical significance. Int J Morphol. 2018;36(2):425-9.
2. Ertürk H, Şanlı OC, Öztürk K, Kastamoni Y. Nervus Musculocutaneus' un Oluşum Varyasyonları. Uludağ Üniversitesi Tıp Fakültesi Dergisi. 2023;49(3):361-5.
3. Apaydin N, Şen T, Bozkurt M, Elhan A. Nervus musculocutaneus' un Dallanma Paterni ve Klinik Önemi. Turkiye Klinikleri Journal of Medical Sciences. 2009;29(2):464-8.
4. Ghosh B, Dilkash MNA, Prasad S, Sinha SK. Anatomical variation of median nerve: cadaveric study in brachial plexus. Anatomy & cell biology. 2022;55(2):130-4.
5. Beheiry EE. Anatomical variations of the median nerve distribution and communication in the arm. Folia morphologica. 2004;63(3):313-8.
6. Encarnacion M, Nurmukhametov R, Barrientos RE, Melchenko D, Goncharov E, Bernard E, et al. Anatomical variations of the median nerve: A cadaveric study. Neurology International. 2022;14(3):664-72.
7. Uzun A, Seelig LL. A variation in the formation of the median nerve: communicating branch between the musculocutaneous and median nerves in man. Folia Morphologica. 2001;60(2):99-101.
8. Bala A, Sinha P, Tamang BK, Sarda RK. Anatomical variation: Median nerve formation–A case vignette. Journal of Clinical and Diagnostic Research: JCDR. 2014;8(6):AD03.
9. Soubeyrand M, Melhem R, Protais M, Artuso M, Crézé M. Anatomy of the median nerve and its clinical applications. Hand Surgery and Rehabilitation. 2020;39(1):2-18.
10. Radunovic M, Vukasanovic-Bozaric A, Radojevic N, Vukadinovic T. A new anatomical variation of the musculocutaneous and the median nerve anastomosis. Folia morphologica. 2013;72(2):176-9.
11. Pacholczak R, Klimek-Piotrowska W, Walocha JA. Absence of the musculocutaneous nerve associated with a supernumerary head of biceps brachii: a case report. Surgical and radiologic anatomy. 2011;33:551-4.
12. Kocabiyik N, Yalcin B, Yazar F, Ozan H. An accessory branch of musculocutaneous nerve joining median nerve. Neuroanatomy. 2005;4:13-5.
13. Venieratos D, Anagnostopoulou S. Classification of communications between the musculocutaneous and median nerves. Clinical Anatomy: The Official Journal of the American Association of Clinical Anatomists and the British Association of Clinical Anatomists. 1998;11(5):327-31.
14. Basar R, Aldur M, Celik H, Yüksel M, Tascioglu A. A connecting branch between the musculocutaneous nerve and the median nerve. Morphologie: bulletin de l'Association des anatomistes. 2000;84(266):25-7.
15. Sarikcioglu L, Coskun N, Ozkan O. A case with multiple anomalies in the upper limb. Surgical and Radiologic Anatomy. 2001;23:65-8.
16. Choi D, Rodríguez-Niedenführ M, Vázquez T, Parkin I, Sañudo JR. Patterns of connections between the musculocutaneous and median nerves in the axilla and arm. Clinical Anatomy. 2002;15(1):11-7.