Three lateral roots of median nerve: a case report
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Abstract
Introduction
The median nerve is formed by the union of a lateral and a medial root from the lateral and medial cords of brachial plexus. Reports on the existence of variations in the formation, branching and communication of median nerve are seen in the literature. However, there are very few reports on the involvement of two additional lateral roots in the formation of the median nerve. Such variations are of considerable importance for surgeons, physiotherapists and other clinicians. The details regarding the formation of the median nerve, developmental considerations and its importance have been discussed here.

Case report
Apart from the normal roots, two additional lateral roots were given off from the lateral cord at the level of the second part of the axillary artery. These roots then coursed superficial to the axillary artery from the lateral to medial side to join the medial root, on the medial side of the axillary artery. The medial root then crossed on to the lateral aspect of the axillary artery, where it joined the third lateral root (LRMN 3) of MN given off from the lateral cord of the brachial plexus, to form the MN. The rest of the course of the MN was found to be normal.

Conclusion
Surgeons during surgeries of the axilla and physiotherapists during rehabilitation would require knowledge of such variations in the axilla, along with use for other clinicians too.

Introduction
The cords and branches of the brachial plexus are one of the major contents of the axilla, which lie in relation to the axillary artery (AA). Classically, the median nerve (MN) is formed by the joining of a single lateral root and a single medial root, given off from the lateral and medial cords of brachial plexus respectively. The lateral and medial roots of MN are located on respective sides of AA. The medial root of the MN (MRMN) crosses the AA superficially, to reach its lateral side and joins the lateral root (LRMN) to form the MN. This results in the formation of MN lateral to the AA. Then, until the lower third of the arm, the MN runs on the lateral aspect of brachial artery, where it crosses the medial side of the brachial artery and later becomes a content of the cubital fossa. Variations in the branching pattern of MN and its communications with musculocutaneous1–6 and ulnar nerves 7,8, splitting of the nerve are some to mention, that have been reported by many authors. This paper reports a case of three lateral roots of the MN.

Case Report
During a routine dissection of the axilla in an ~50-year-old male cadaver, three lateral roots and one medial root were observed to be involved in the formation of the MN. The two additional lateral roots (LRMN 1 and LRMN 2) of MN were given off from the lateral cord of brachial plexus (close to second part of AA). Both these roots coursed over to the medial side of the AA, superficial to it (Figure 1). These roots then joined the medial root on the medial side of the AA. The medial root then crossed on to the lateral aspect of the AA, where it joined with the third lateral root (LRMN 3) of MN given off from the lateral cord of the brachial plexus, to form the MN. The rest of the course of the MN was found to be normal.

Figure 1: The additional roots of median nerve. (AA, Axillary artery; LRMN 1, Lateral root of median nerve 1; LRMN 2, Lateral root of median nerve 2; LRMN 3, Lateral root of median nerve 3; MN, Median nerve; MRMN, Medial root of median nerve).

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Discussion

MN is one among the nerves that have been studied extensively and reported for the different kinds of formation, variations in communications\(^6\)–\(^1\) and altered course in the arm. During the search for literature, there were reports found which stated the communication to the MN from the musculocutaneous nerve\(^2\)–\(^4\). There were also reports regarding the ulnar nerve communications\(^5\)–\(^7\) to the MN. The MN is of considerable importance both from the clinical and as well as surgical point of view. This importance is due to the variant communications it shows in its course. Even though there are many case reports regarding its variant communications, it is seen that the additional roots involved in the formation of MN still remains to be a rare case found. There were a couple of reports regarding the existence of two roots in the formation of MN\(^8\)–\(^1\)5.

During development, around the 5th week, the mesodermal somites that are responsible for the development of the upper and lower limb muscles, migrate into the developing upper and lower limbs. The somites normally have individual spinal nerves for themselves. The root values of nerves supplying the developing muscles of the upper limb demonstrate that the muscles of the upper limb develop from multiple somites. Initially, the appropriate spinal nerves innervate into the mesenchyme as isolated ventral and dorsal branches. Soon after entering, these branches unite and form bulky ventral and dorsal nerves. Hence the radial nerve, which is formed by the joining of dorsal branches, supplies the extensor muscles. The median and ulnar nerves that are formed by the joining of ventral branches, supply the flexor muscles. The development of the musculature of the upper limb from different somites results in the complicated structure of the brachial plexus and any kind of variation from the normal formation of these muscles could possibly result in a variation in the formation of the nerves supplying those muscles. Even a slight change in the course of migration of the myotomes could result in changing the normal pattern of formation of brachial plexus. Since these variations are developmental, these could be known only when there is a particular symptom with respect to the variation or in conditions with respect to the structure in relation to such variations. These reports add to the knowledge of the variations in the formation of a MN and a better expectant approach for a surgeon or a clinician dealing with the contents of axilla.

Conclusion

Knowledge of such variations in the formation of MN would be of considerable importance for anatomists, radiologists, surgeons and clinicians, when they handle cases involving AA or MN or both, owing to the close proximity of the additional roots of MN with the AA.

References


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