CASE REPORT
A case of connected superior and middle trunks of the brachial plexus or with abnormal upper trunk

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Abstract
During treatment of tumors of nerve sheaths, such as schwannomas and neurofibromas, neurosurgeons should be aware of variations and aberrant formations of brachial plexus. Variations of the branches of brachial plexus are common, but its variations in the level of the roots and trunks are rare. Variations regarding lower trunk were founded more frequent in previous studies. An unusual variant of the brachial plexus was found unilaterally during routine dissection of a 75-year-old male cadaver. It was observed that middle trunk was connected to superior trunk. Deep cervical artery originating from subclavian artery passed between C6 and C7 roots. Similar variations in the brachial plexus were not observed on the contralateral side. In available literature, only two similar bilateral cases were reported. The details of this variation and its clinical significance were discussed. Knowledge about these rare variations in the trunks is very useful in surgical practice and anesthesia.

Keywords: brachial plexus, abnormal upper trunk, anatomical variation.

Introduction
Understanding the anatomical variations of brachial plexus is important for clinicians and anatomists. This is important for diagnosing unexplained clinical cases during surgical procedures to the neck and axillary region. The importance of these variations for regional anesthesia blocks was stressed by Orebaugh SL and Williams BA, and many variations of brachial plexus have been reported [1].

Clinical anatomy of these variations has been discussed in many cadaveric reports [2, 3].

Useful knowledge regarding the formation and pattern of the brachial plexus was reported in recent studies [2, 3, 4, 5].

A variation was reported where upper trunk was formed by the union of ventral rami of C5, C6 and C7 nerves [6].

The fifth and sixth rami unite as the upper trunk; the eighth cervical and first thoracic rami as the lower trunk; the seventh cervical ramus becomes the middle trunk [7].

Connection with upper trunk was detected 3.6% in observed 55 cadavers [4].

We report a brachial plexus case where abnormal upper trunk was formed by C5, C6 and C7 roots, middle trunk was absent or connected to superior trunk.

Materials, Methods and Results
Variation of the brachial plexus was observed on the left side of 75-year-old male cadaver during routine dissection.

Discussion
Brachial plexus usually was formed by the union of the ventral primary rami of the spinal nerves, C5–C8 and T1, the so-called “roots” of the brachial plexus. The roots of the brachial plexus lie between the scalenus anterior and medius muscles [7]. Additionally, Matejcik V et al. reported incidence of the variation where the fusion occurs between upper and middle trunks as 3.63% [4].
Figure 1 – An abnormal upper trunk of the brachial plexus and its branches were shown in right side of the cadaver. AUT: Abnormal upper trunk; LT: Lower trunk.

An extensive study by Uysal II et al. showed that lower trunk not being formed in 9% of cases where anterior part of C8 and the anterior branch of the T1 nerve formed medial cord [5]. Their case has clinical importance in relation with upper trunk injuries of the brachial plexus (Erb–Duchenne’s palsy). Flexion of the elbow is dependent on C5, C6 fibers, while extension of the elbow is dependent on C7, C8 [8]. In addition, a patient with mild weakness in elbow extension and absent triceps jerk, consistent with a C7 radiculopathy was reported [9].

With assuming the upper trunk injury in the present case, different clinical manifestations from the classic Erb–Duchenne’s palsy may occur and mislead the clinicians.

In some cases, trunk divisions or cord formations may be absent in one or other parts of the plexus; however the makeup of the terminal branches is unchanged. The nerve fibers can be simply grouped differently and for example, sometimes impulses arise from the same place and can reach the same destination whether they go through one or two roots [8]. Furthermore, variation of brachial plexus with abnormal upper trunk of brachial plexus formed by C5, C6 and C7 roots is important rare situation. Variations of the brachial plexus formation are clinically significant for surgeons who perform surgical procedures in these regions [10].

Additionally damage to important structures surgical procedures can be minimized with an awareness of the possible anatomical variations.

Conclusions

Because the variations of the brachial plexus are frequent, knowledge of their different anatomical pattern is important for the surgical procedures of the neck and axillary region on or around these nerves or for the regional anesthesia.

References

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