

## CASE REPORT

## AN UNCOMMON VARIATION IN THE FORMATION OF TRUNKS OF THE BRACHIAL PLEXUS – A CASE REPORT

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### ABSTRACT

Brachial plexus is the nerve plexus which gives innervation to the upper limb. Variation in the formation of brachial plexus is often reported. But variation in the trunk stage of brachial plexus is very rare. In this case report, we report an unusual variation in the formation of trunks of brachial plexus found in an elderly male cadaver during routine dissection. The upper trunk of brachial plexus was normal. The middle and lower trunks fused to form a common trunk. This was observed bilaterally. The upper trunk divided into anterior and posterior divisions. The common trunk divided into three divisions, anteromedial, anterolateral and posterior. The anterolateral division of common trunk joined with the anterior division of upper trunk and formed the lateral cord. The posterior division of common trunk joined with the posterior division of upper trunk and formed the posterior cord and the anteromedial division of common trunk continued as medial cord. The branches arising from the cords were normal.

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### INTRODUCTION

The brachial plexus is the nerve plexus supplying the upper limb. All the structures in the upper limb receive innervations from it. There are five stages in the formation of brachial plexus. The roots of brachial plexus arise from the ventral rami of spinal nerves C5, C6, C7, C8 and T1. The C5 and C6 roots join to form the upper trunk, the C7 root forms the middle trunk and the C8 and T1 roots form the lower trunk. The trunks soon divide into anterior and posterior divisions respectively. The anterior divisions of the upper and middle trunks form the lateral cord and the anterior division of the lower trunk forms the medial cord and the posterior divisions of all the three trunks unite to form the posterior cord. The branches arise from the roots, trunks and cords supply the upper limb.

The roots of the brachial plexus lie deep to the scalene muscles of the neck and they exit in between the scalene muscles into the posterior triangle of the neck to form the trunks. The divisions formed in the posterior triangle from the trunks run in the cervico axillary canal behind the clavicle, will form the cords in the axilla. The cords are related to the second part of axillary artery. The branches of the cords are given off in the axilla (1).

Variations in the formation of brachial plexus are common and often reported. They are commonly seen in the branches, but variations are uncommon in the trunks and cords.

In this case report, we present an uncommon variation in the trunks of brachial plexus which was not found to be reported before.

### CASE REPORT

During routine dissection at the Department of Anatomy, PSG Institute of Medical Sciences and Research, a variation in the formation of the trunks of right brachial plexus was observed in an elderly female cadaver.

The upper trunk was found to be normal. The middle and lower trunks were found to be fused and formed a common trunk (Fig-1).

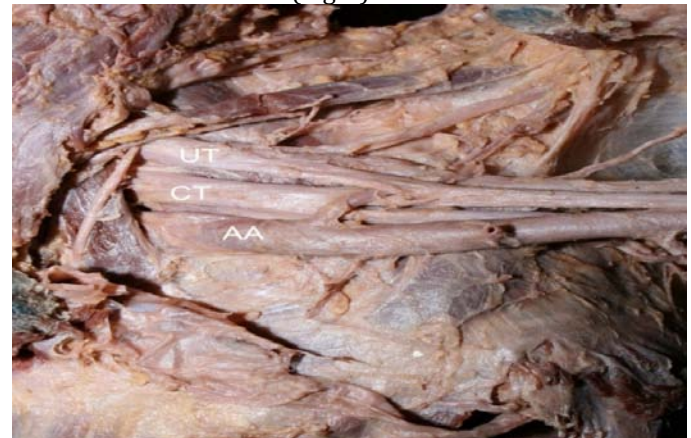


Fig -1: Shows the normal upper trunk and the common trunk with axillary artery. UT- Upper trunk, CT- Common trunk, AA- Axillary Artery.

The upper trunk divided into anterior division and posterior division. The common trunk divided into three divisions, anteromedial, anterolateral and posterior (Fig-2).



Fig-2: Shows the formation of cords of brachial plexus. UT- Upper trunk, CT- Common trunk, AA- Axillary Artery, LC- Lateral cord, MC- Medial cord, PC- Posterior cord.

The anterolateral division of the common trunk joined with the anterior division of the upper trunk and formed the lateral cord. The posterior divisions of the common trunk and upper trunk joined to form the posterior cord. The anteromedial division of the common trunk continued as the medial cord. The branches arising from the cords were found to be normal (Fig-3). The cords maintained their relation to the second part of axillary artery. Formation of brachial plexus in the left side was found to be normal.



Fig-3: Shows the upper and common trunks with the branches of brachial plexus. UT- Upper trunk, CT- Common trunk, AA- Axillary Artery, AN- Axillary nerve, MCN: Musculocutaneous nerve, MN- Median nerve.

## DISCUSSION

Since brachial plexus is a union of nerve roots which has several stages in its formation, variations are quiet common. It is widely reported in the literature.

Nayak S et al, (2005) reported a case of absent middle trunk. According to his report, the upper trunk divided in to two divisions which acted as upper and lower trunks and further divided in to anterior and posterior

divisions. These divisions along with the divisions of lower trunk formed the cords like a normal brachial plexus (2).

Prakash et al, (2006) also reported absence of middle trunk. In his report, he stated that the upper and lower trunks divided in to anterior and posterior divisions. The anterior division of upper trunk continued as lateral cord, anterior division of lower trunk formed the medial cord and the posterior divisions of both the trunks united to form the posterior cord(3).

James et al, (2009) reported a case where there was absence of superior trunk. In his case the roots C5 and C6 instead of forming superior trunk divided in to anterior and posterior divisions independently. But their anterior divisions fused with the anterior division of middle trunk to form lateral cord and their posterior divisions fused with the posterior divisions of middle and inferior trunks to form posterior cord. The rest of the brachial plexus was found to be regular (4).

J.M. Gabriel et al (2013) found variations in the formation of trunks of brachial plexus. In his report, he stated that the superior trunk was formed by nerve roots C5 and C6, the middle trunk was formed by C7 and C8 and the inferior trunk was formed by T1 alone. Out of these trunks only superior and middle divided in to anterior and posterior divisions but the inferior trunk did not form any divisions and continued as medial cord. The anterior divisions of superior and middle trunks formed the lateral cord and their posterior divisions formed the posterior cord (5).

Rajan KS et al (2013) reported fused middle and lower trunks. He found the formation of upper trunk from C5 and C6 roots was normal in both sides. The C7, C8 and T1 roots joined to form a single trunk, the lower trunk bilaterally. The lower trunk divided further in to three divisions namely upper anterior, lower anterior and posterior. The upper anterior division fused with the anterior division of upper trunk to form the lateral cord, the lower anterior continued as medial cord and the posterior divisions of upper and lower trunks joined to form the posterior cord (6).

In our present study, report we found the variation similar to the findings of Rajan K S et al. The fused middle and lower trunks formed anteromedial, anterolateral and posterior divisions. The anterolateral division joined with the anterior division of upper trunk to form the lateral cord and the anteromedial division continued as medial cord. The posterior divisions of the common trunk and upper trunk formed the posterior cord. The branches from the cords were normal. This report is different since it is unilateral. We also found from our study as well as from the literature that the branches arising from the brachial plexus always adhere to the normal pattern irrespective of the variations in the formation of trunks and cords. This will ensure the root value of the different nerves supplying the upper limb which has a definite pattern of dermatomes and myotomes.

## CONCLUSION

Brachial plexus is one of the very important nerve plexus of human body. Injury to the brachial plexus can occur during birth trauma like Klumpke's palsy, traumatic shoulder injuries, or during surgical exploration of cervical lymph nodes for carcinoma (1). Knowledge regarding variations in the trunk formation will be helpful for clinicians in diagnosing clinical conditions and also to avoid injuring brachial plexus during surgical procedures.

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