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Case report

INCOMPLETE FORMATION OF POSTERIOR CORD OF BRACHIAL PLEXUS: A CASE REPORT

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ABSTRACT

Brachial plexus is a network of nerves formed at the root of the neck to provide motor and sensory branches to the upper limb. The major contribution for this plexus is by the anterior primary rami of C5,6,7,8 and T1. The roots join to form the trunks which in turn divide into anterior and posterior divisions to form the cords. The knowledge of brachial plexus is important for the anaesthetists while administering brachial blocks. During routine dissection in a female cadaver aged 65 years, the posterior division of upper trunk fails to fuse with the posterior divisions of the middle and lower trunk and gives out four branches independently.

Keywords: Brachial plexus, Posterior cord, Radial nerve, Axillary artery.

INTRODUCTION

Brachial Plexus is a complicated network of nerves where the ventral primary rami of C_{5,6,7,8}, T₁ confluence at the root of the neck and then ramify to provide sensory and motor branches to the upper limb. The roots join to form the trunks, namely the upper trunk formed by the union of C₅ & C₆, the middle trunk formed by the continuation of C₇ root and lower trunk formed by the union of C₈ & T₁. This formation takes place in the interscalene space in the posterior triangle.¹ Each trunk gives off anterior and posterior divisions behind the clavicle to form three cords viz..., the lateral, medial and posterior cords. The three cords enter the axilla and are named according to their relation with second part of axillary artery. The

lateral cord is formed by the union of anterior division of upper and middle trunk, the medial cord is formed by the anterior division of lower trunk and the posterior cord is formed by the union of posterior divisions of all the three trunks.² The cords branch out to supply the flexor and the extensor compartments of upper limb. The branches which arise from the roots and the trunks are seen above the clavicle and these are called as supraclavicular and the branches which arise mainly from the cords are seen below the clavicle hence these are infraclavicular branches. The posterior cord provides the upper subscapular nerve, thoraco-dorsal nerve, lower subscapular nerve, axillary nerve and the continuation of the cord is the Radial

nerve. The upper subscapular, lower subscapular and axillary nerves convey fibers from C_{5,6} the thoraco-dorsal nerve conveys fibers from C_{6,7,8} and radial nerve conveys fibers from C^{5,6,7,8} & T₁¹

CASE REPORT

During routine dissection for I year MBBS in the department of Anatomy at Bangalore Medical College and Research Institute, Bangalore, during the exposure of axilla in a female cadaver aged 65years, it was noted on the left side that the posterior cord of brachial plexus was not formed completely and the branches originated independently from the posterior division of the upper trunk, the branches were traced and photographed.

The Posterior division of upper trunk conveying fibers from C₅ & C₆, failed to unite with the posterior division of middle and lower trunk. The posterior division of upper trunk provided four branches directly -upper subscapular, lower subscapular and axillary nerve, thus carrying fibers from C₅ & C₆, it also provided an additional branch which lies lateral to axillary nerve course downwards behind the subscapular artery which is called here, as the inferior division of radial nerve (fig1). The posterior divisions of middle trunk and lower trunk unite and immediately gives out the thoraco-dorsal nerve. Close to its origin it receives a communicating branch from the posterior division of upper trunk (fig2), the rest of the nerve then courses downwards in front of the subscapular artery to form the superior division of radial nerve. At the lower border of subscapularis muscle the two divisions of radial nerve unite to continue as the radial nerve thus comprising of fibers from C₅, 6,7,8, & T₁. The two divisions of radial nerve form a loop around the subscapular artery which is branch of third part of axillary artery. (fig2)

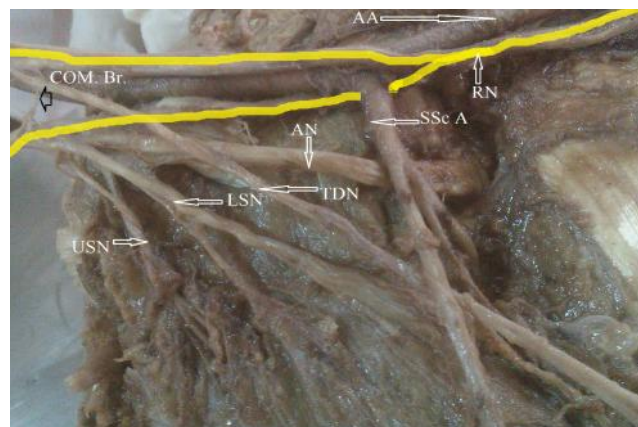


Fig 1: Four branches from the posterior division of upper trunk



Fig2: Showing thoraco-dorsal nerve (TDN) and superior division of radial nerve derived from the union of posterior divisions of middle and lower trunk.

Also seen is the thoraco-dorsal nerve receiving communicating branch (COM.Br) from the posterior division of upper trunk. (coloured yellow are the two divisions of radial nerve, pierced by the subscapular artery)

Abbreviations: Upper subscapular nerve (USN), Lower subscapular nerve (LSN), Axillary nerve (AN), and inferior division of radial nerve (RN) deep to subscapular artery

DISCUSSION

Posterior cord is formed by the union of the posterior divisions of upper, middle and lower trunks. The variations in the formation and branching patterns of brachial plexus are quite common and have been reported time and again by several authors. The variations can occur in the formation of trunks, divisions, cords, at the

level of branching or its relationship with the axillary artery; however the make-up of terminal branches remains unchanged.² The unusual formation may be attributed embryologically where the axons of the spinal nerve grow distally in different directions to reach the limb bud mesenchyme. Once these developmental variations are formed they persist post-natally and appear as variations in adulthood.² The radial nerve was formed by the posterior divisions of middle and lower trunk without any contribution from the upper trunk³. The posterior cord divided into two roots enclosing the subscapular artery and the roots fused to continue as radial nerve⁴. The radial nerve has two roots arising from the posterior cord the two roots unite to continue as radial nerve after clasping the subscapular artery⁵. Posterior cord is formed by the union of posterior division of upper and middle trunk without any contribution from lower trunk⁶.

CONCLUSION

The variations usually occur at the junction or separation of individual parts. Variations in nerves in their course or branching are prone for entrapment neuropathies. The close relationship of the variant nerves with the axillary artery may result in arterial compression leading to ischemic pain. The knowledge of these variations is useful for the neurosurgeons while managing axillary tumors, for orthopedic surgeons in treating upper limb fractures or for anesthetists in proper planning of brachial plexus blocks.

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