Case Report

Entrapment of Brachial Artery and Median Nerve within the Brachialis Muscle – A Case Report

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Abstract

Brachial artery and median nerve is the main neurovascular bundle of the arm. They have close relationship throughout the arm. Their entrapment may result in neurovascular symptoms in the distal part of the upper limb. We report a rare entrapment of these structures in the arm within the brachialis muscle. The brachial artery and median nerve entered the substance of brachialis at the junction of upper and middle thirds of the arm(after a course of about 8 cm). They came out through the tendon of brachialis in the cubital fossa.They coursed within the brachialis muscle for about 10 cm. There were no other variations in the arm. Knowledge of this entrapment may be useful for the orthopedic surgeons since there is a high chance of involvement of the artery and the nerve in the supracondylar fractures of the humerus.

Keywords: Brachial artery, median nerve, brachialis, arm, entrapment

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Introduction

Brachial artery and median nerve form the main neurovascular bundle of the arm. They travel together till the cubital fossa. The brachial artery begins as the continuation of the axillary artery at the lower border of teres major muscle and terminates in the cubital fossa by dividing into radial and ulnar arteries. Median nerve is formed in the axilla by union of its medial and lateral roots coming from medial and lateral cords of brachial plexus, respectively. It accompanies the brachial artery till the cubital fossa. It leaves the cubital fossa by passing between the two heads of pronator teres muscle. Brachial artery is superficial throughout its course, covered only by skin and fasciae whereas the median nerve remains superficial with the company of brachial artery, till the cubital fossa. These two structures might get compressed at various levels by various structures. Compression of median nerve and brachial artery in the distal part of the arm by a muscle is a rare phenomenon. The compression might lead to neurovascular symptoms. A knowledge of these symptoms is essential for Neurologists and Orthopedic Surgeons. In this report, we discuss the possible entrapment of median nerve and brachial artery and the consequences of these entrapments.

Case Report

During our dissection classes for medical undergraduates, we observed a rare entrapment of brachial artery and median nerve in the arm. From their beginning till the junction between middle and lower thirds of the arm (about 8 cm), these structures had a normal course. At the junction of middle and lower thirds of the arm, they entered the brachialis muscle and ran distally, close to the shaft of the humerus (about 10 cm). They pierced the tendon of the brachialis muscle at the cubital fossa to enter the fossa. At the cubital fossa, the artery was medial to the tendon of biceps and the nerve was further medial to the artery. The brachial artery divided into its two

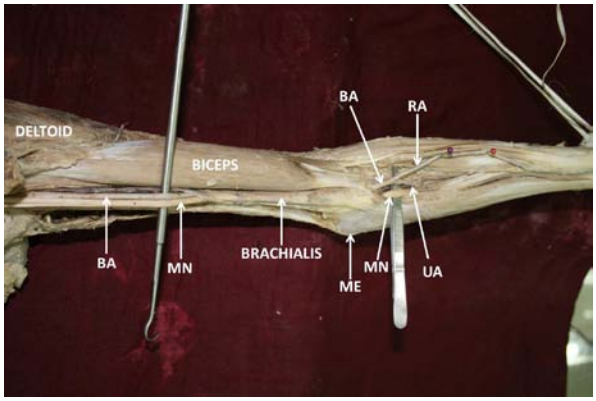

Figure 1: Dissection of left upper limb showing the entrapment of brachial artery (BA) and median nerve (MN) within the brachialis muscle. (ME – medial epicondyle; RA – radial artery; UA – ulnar artery)

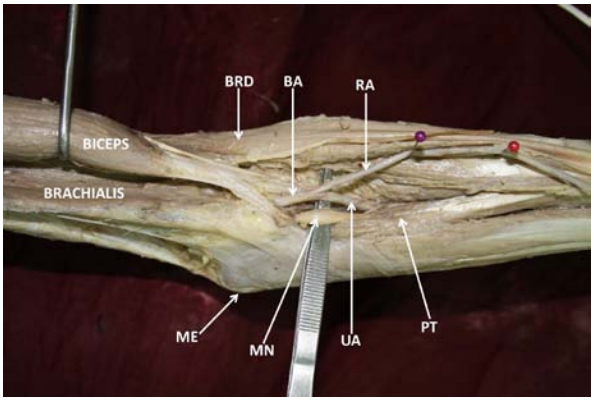

Figure 2: Closer view of the dissection of left upper limb showing the entrapment of brachial artery (BA) and median nerve (MN) within the brachialis muscle. (ME – medial epicondyle; RA – radial artery; UA – ulnar artery; BRD – brachioradialis; PT – pronator teres)

terminal branches; radial and ulnar arteries in the cubital fossa. The median nerve left the fossa by passing between the two heads of pronator teres muscle. This variation was observed in the left upper limb of and adult male cadaver aged approximately 65 years.

Discussion

Brachial artery and median nerve can get compressed by various structures at various levels resulting in sensory or motor symptoms. Generally, the artery and nerve escape from injuries in the fractures of humerus or dislocation of the elbow joint since they are separated from the humerus by the brachialis muscle. However, their variant course might predispose them to injuries or compressions. Entrapments of the artery and the nerve may be individual or combined. Pronator teres syndrome (1), carpal tunnel syndrome (2) and anterior interosseous nerve syndrome (3) are the well documented conditions of median nerve. Apart from these syndromes, many other structures compressing median nerve alone or brachial artery along with it have been reported. Melanie et al. (4) have reported a case where only median nerve passed through the brachialis muscle. The brachial artery was superficial to the muscle. Ligament of Struthers is a structure that could potentially compress the median nerve. One such case of compression of median nerve has been reported in the literature (5). Possible entrapment/compression of the median nerve by third head of bicep brachii has also been reported (6,7). Rodrigues et al. (8) have reported the compression of the median nerve by a tendinous arch of coracobrachialis muscle. Embryological basis of the variation can be explained as follows: The upper limb muscles develop from the mesenchyme of the lateral plate mesoderm opposite the lower six cervical and upper two thoracic segments. The mesenchyme differentiates into muscle and skeletal elements. The muscle mass takes shape before the skeletal elements form bones. During the formation of muscles, the various muscle primordia fuse to form a particular muscle. However, some primordia disappear as a normal event of development. If there is failure in degeneration of such primordia, we might find accessory muscles and entrapment of nerves and vessels (9,10).

It is very rare to see both median nerve and brachial artery passing through the brachialis muscle. In the literature one such case has been reported where the nerve and the artery passed through an additional slip of the brachialis muscle (11). The current case is unique because the median nerve and brachial artery passed through a normal brachialis; which means the nerve and artery are very close to the humerus. This could be a predisposing factor for neurovascular compressions or pull during the elbow movements. It might also make them vulnerable in the fracture of distal third of humerus (12).

Conclusion

The knowledge of current variation is very important for clinicians as the compression of brachial artery and median nerve by the brachialis may result in neurovascular symptoms in the distal part of the limb. It is also important for the Orthopedic Surgeons since the artery and the nerve are vulnerable in the supracondylar fractures of the humerus.

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