"Case report: Variant two separate heads of biceps brachii muscle observed during routine dissection in K.J.Soumaiya Medical College,Mumbai."

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Abstract:

During routine dissection for undergraduate first MBBS students a variation was found in the right upper limb of a 70 year old male donated embalmed cadaver in the department of Anatomy of K.J.Somaiya Medical College, Sion, Mumbai, INDIA. The unusual separate short and long heads of the biceps brachii were observed. The short head originated from the tip of the coracoid process of the scapula. The long head originated from the supraglenoid tubercle of the scapula. The short head of the biceps brachii muscle got inserted into the radial tuberosity of the radius separately. The long head got inserted into the radial tuberosity and bicipital aponeurosis. The left upper limb of the cadaver was normal. Topographical anatomy and variations of the bicephs brachii muscle is clainically important for surgeons, orthopaedicians, radiologists and anaesthetists performing pain management therapies.

Key words: Biceps Brachii Muscle.

Background:

The biceps brachii is the muscle of the anterior compartment of the arm having two heads of origin proximally, a long head originating from the supraglenoid tubercle and glenoid labrum and a short head from the coracoid process of the scapula (**1**). This mode of insertion makes it an efficient and important supinator of the forearm. Biceps brachii has been stated as one of the muscles that shows frequent anatomical variations (**2, 3, 4, 5**). Some of its reported anomalies have been manifested as supernumerary fascicles that originate from the coracoid process, tendon of pectoralis major, articular capsule and head of the humerus or from humerus itself (**6**). Amongst these variations, the presence of a supernumerary fascicle arising from the shaft of the humerus, which is known as the humeral head of biceps brachii, is known to be the most common anomaly (**3, 7, 8**). Multiple supernumerary heads,i.e four to seven heads have also been reported to a lesser extent (**1, 3, 4, 5**).

High median nerve compression around the elbow joint has been described as resulting from a number of clinical and anatomical entities (**5**). As soon as the buds form, the ventral primary rami of the spinal nerves penetrate into the mesenchyme of limb bud. Immediately the nerves enter the limb bud, and establish intimate contact with the differentiating mesodermal condensations and the early contact between nerve and muscle cells is a prerequisite for their complete functional differentiation (**10**). Several signalling molecules and transcription factors have been identified which induce the differentiation of the dorsal and ventral motor horn cells The high percentage of anomalies as mentioned above emphasizes the complexities and irregularities of this anatomic region with regard to surgical approaches (**11**).

Knowledge of such variations is important for surgeons to perform surgical procedures in the axillary region and arm (**12**). Considering the high percentage of anomalies in the formation of median nerve and its paramount clinical importance, the present variations are documented. Variations in the formation and branching pattern of the brachial plexus

constitute an important anatomical and clinical entity and have been reported by several investigators (**13,14,15**). The median, musculocutaneous and ulnar nerves after their origin from the brachial plexus, pass through the anterior compartment of the arm without receiving any branch from any nerve in the neighbourhood (**16**). Although the communications between the different nerves in the arm are rare, those between the median nerve and musculocutaneous nerve have been described from nineteenth century (**17**). Knowledge of anatomical variation of these nerves at the level of upper arm is essential in light of the frequency with which surgery is performed in the axilla and the surgical neck of the humerus (**18**).

Case Report:

During routine dissection for undergraduate first MBBS students, variation was found in the right upper limb of a 70 year old male donated embalmed cadaver in the department of Anatomy of K.J.Somaiya Medical College, Sion, Mumbai, INDIA. The unusual separate short and long heads of biceps brachii were observed. The short head originated from the tip of the coracoid process of the scapula. The long head originated from the supraglenoid tubercle of the scapula. The sort head of the biceps brachii muscle got inserted into the radial tuberosity of the radius separately. The long head got inserted into the radial tuberosity and bicipital aponeurosis. The brachial artery and the median nerve ran in between the two heads throughout their course in the arm upto the cubital fossa. The musculocutaneous nerve was absent and all the muscles of the front of the arm were supplied by the median nerve. There were no associated arterial variation seen in the specimen. The left upper limb of the cadaver was normal. The photographs of the variations were taken for proper documentation and ready reference.

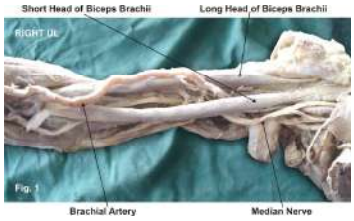

Figure - 1 : The photographic presentation of the two separate heads of biceps brachii muscle.

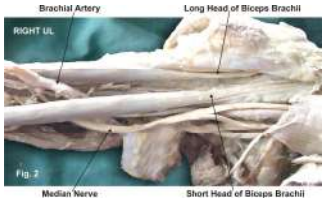

Figure - 2 : Photographic presentation of formation of the median nerve and absence of the musculocutaneus nerve.

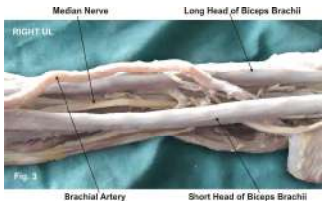

Figure - 3 : The photographic presentation of course of the median nerve and the brachial artery in between the two separate heads of the biceps brachii muscle.

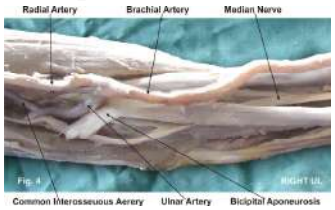

Figure - 4 : The photographic presentation of insertation of the long head of biceps brachii muscle into the radial tuberosity and the bicipital aponeurosis.

Discussion:

The variations of the incidence of the third head of biceps brachii were attributed to evolutionary or racial trends (**8**). Rodriguez-Niedenfuhr classified the supernumerary heads of biceps brachii muscle into three types depending upon their origin i.e. superior, inferomedial and inferolateral. In the present case the short head originated from the tip of the coracoid process and the long head from the supraglenoid

tubercle of the scapula. The brachial artery and the median nerve ran in between the two heads throughout their course in the arm upto the cubital fossa. Such type of variation is very rare and not found in literature. The communication between the musculocutaneous nerve and the median nerve have been classified in different types by Li Minor and Venieratos and Anagnostopoulou (**19,20**). Li Minor categorized these communications into following five types.

In the present case all the muscles of the front of the arm were supplied by the median nerve and the musculocutaneous nerve was absent i.e. Type V of Li Minor's Classification. Venieratos and Anagnostopoulou (**20**) also described three different types of communication between musculocutaneous and median nerve in relation to coracobrachialis muscle.

The knowledge of such variation is important during surgical corrections in the arm as well as in diagnosing the nerve impairments. Furthermore, it has been mentioned that any variant nerve with an abnormal origin, course and distribution is prone to accidental injuries (**21**). From anatomical standpoint it can be presumed that the presence of two separate heads may increase the power of flexion and supination of the forearm (**22**).

Conclusion : The presence of such type of variations are clinically important for surgeons, orthopaedicians, radiologists and anaesthetists performing pain management therapies on the upper limb & it is concluded that variations in branching pattern of cords of brachial plexus are a rule rather than exception.

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