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Third Head of Biceps Brachii: A Case Report

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Abstract

The Biceps brachii muscle is known to show variations in the number of heads. Various types of variations have been associated with the proximal attachment of Biceps brachii muscle .The Biceps brachii muscle is one of the muscle of anterior compartment of arm. It has two heads, short head and long head. This is a case report on supernumerary and variant head of proximal part Biceps brachii muscle in male adult cadaver. This third head of Biceps brachii was noted unilaterally. The findings were reported and compared with the studies of other eminent authors. In conclusion, the present study of anatomical variations of the biceps brachii muscle in the arm may contribute to a better developmental understanding and surgical approach

Key words: Biceps brachii muscle, third head, variation, musculocutaneous nerve.

Introduction

The biceps, also biceps brachii (Latin for "two-headed muscle of the arm"), is a large muscle that lies on the front of the upper arm between the shoulder and the elbow. The biceps brachii is a long, fusiform muscle that acts on both the shoulder and elbow joints, principally aiding in flexion and supination of the forearm [1.] It is the only flexor muscle of the arm which crosses the shoulder as well as the elbow joint. As Biceps brachii muscle has two heads as long head and a short head. The Biceps brachii muscle is innervated by the musculo-cutaneous nerve and supplied by muscular branches of the brachial artery

Origin The long head originates from the supra glenoid tubercle of scapula and from the glenoid labrum and the tendon is intracapsular. The short head originates from the tip of coracoid process of the scapula along with the origin of corachobrachialis.[2]

Insertion Both heads expand into fusiform bellies which lie side by side and do not join until about 7 cm above the elbow joint, where a flat tendon is formed. The tendon passes through the cubital fossa, undergoes twisting so that the anterior surface becomes lateral and is inserted into the posterior part of the radial tuberosity; a bursa separates the tendon from the anterior part of the tuberosity. Before insertion, the medial border of the tendon presents a fibrous expansion, the bicipital aponeurosis, which extends downward and medially across the brachial artery and is attached to the upper part of the subcutaneous posterior border of the ulna by way of deep fascia of the fore-arm.[3]

Nerve supply The biceps shares its nerve supply with the other two muscles of the anterior compartment. The muscles are supplied by the musculocutaneous nerve. Fibers of the fifth, sixth and seventh cervical nerves make up the components of the musculocutaneous nerve which supply the biceps. [4]

Arterial Supply Muscular branches of brachial artery.[5]

Action- The muscle crosses three joints ("three joint muscles") viz: shoulder, elbow and superior radio-ulnar joint.[6] It can therefore act on all of them. Biceps is a strong supinator when the fore arm is flexed. All the screwing movements are done with it. It is a flexor of the elbow. The short head is a flexor of the arm and the long head prevents upward displacement of the head of the humerus. In short biceps flexes the forearm at elbow joint, supinates fore-arm at radio- ulnar joints, and flexes arm at shoulder joint

Case Report

During routine dissection in Department of Sharir Rachana, Jammu institute of ayurveda and research, Nardani, Jammu. We encountered biceps brachii muscle with three heads in a 60 year old male cadaver in the left upper limb. The third head of biceps brachii was arising lateral to insertion of coracobrachialis with a tendinous part. The third head was supplied by branch of

musculocutaneous nerve. Third head was merging with the short and long head tendons just above the cubital fossa therefore these three heads were having a common tendon for their insertion.

Images showing short, long & third head of Biceps Brachii

Fig no 1 -long and short head of biceps brachii

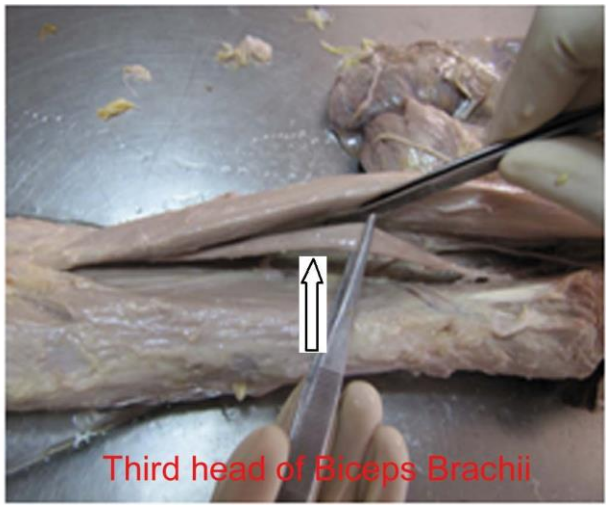

Fig no 2- Third head of Biceps Brachii

Embryological Development

Muscles of front of arm develop from myogenic precursor cells that arise from ventral dermomyotome of somites. Molecular changes occurring in these precursor cells induce muscle development. Muscle regulatory genes like Pax 3 and Myf5 are activated and transcription factors like Myo D, myogenin an myogenic regulatory factors are expressed. Further growth of muscle occurs by fusion of myoblasts and myotubes and later is invested by connective tissue.[7] Embryological studies by Testut described the variation as portion of brachialis muscle where its distal insertion has been translocation from ulna to radius. This supports the hypothesis of functional adaptation.[8]

Discussion

Biceps brachii muscles present wide range of variations. They can manifest as a cluster of accessory fascicles arising from coracoid process, pectoralis minor tendon or articular capsule of humerus .[9] Williams PL reported the incidence of this variation to be as much as 10%. The third head arises from the superomedial aspect of brachialis .[5] Asvat et al observed that the third head of Biceps brachii originated from the humeral shaft either inferior to in common with the insertion area for the coracobrachialis or in common with the brachialis muscle. They also observed a dual origin in which medial fibers originated from the short head of Biceps and lateral fibers from the deltoid fascia. They reported an incidence of 21.5% in their study group consisting of blacks [10] which is similar to our observation. Rai R et al stated that the occurrence of a third head of Biceps brachii muscle is relatively rare in Indian population. They have observed origin of third head of Biceps from anteromedial aspect of lower part of the humeral shaft. Incidence was 7.1%.8 Kosugi et al observed that the supernumerary head of Biceps arose from the humerus between the insertion of coraco-brachialis and upper part of origin of brachialis and from medial intramuscular septum. They have also reported that in few cases, the Biceps brachii was seen to be arising from the tendon of pectoralis major, the deltoid, the articular capsule or the crest of greater tubercle of the humerus.[9]

Among the reports of various studies on the origin of the Biceps brachii the occurrence of supernumerary head has been the most prevalent variation within numerous reported cases of supernumerary heads of Biceps brachii muscle, the third head of Biceps brachii was most common. A prevalence range of 7.5% of 18.3 has been reported for the third head of biceps.[9]

Emeka, Emmanuel [11] reported unilateral third head of Biceps was lying between the long and short heads. The third head was running within the capsule of shoulder joint along the bicipital groove to pick origin from supraglenoid tubercle of the scapula. [10]In present case the third head of biceps present in between the long and short head and it has its origin from lateral to insertion of coracobrachialis arising with a tendinous part and it is served by musculo cutaneous nerve. Knowledge of such variation may be important for surgeons and Orthopedician operating on the arm and clinicians diagnosing the nerve impairment.[7]

Conclusion

Knowledge of variations in anatomy is important to Anatomists, Radiologists and Surgeons and has gained more importance due to the wide use and reliance on computer imaging in diagnostic medicine

The additional head may cause neurovascular compression and may be mistaken for bone tumors due to the bulk of the muscle in the arm. The knowledge about the supernumerary head and its nerve supply is important for clinicians for selective motor nerve blocks and to treat the nerve impairments, the surgeon should be aware of this anatomical variation during the surgical

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