CADAVERIC STUDY ON THIRD HEAD OF BICEPS BRACHII- INCIDENCE IN THE SOUTH INDIAN POPULATION

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ABSTRACT

BACKGROUND

Biceps brachii belongs to the flexor group of muscle in the arm. It is the only flexor of the arm which crosses the shoulder and the elbow joint. It has two heads long and short head which originates from the supraglenoid tubercle of scapula and coracoid process respectively. They together form a common tendon and are inserted into the radial tuberosity.

The aim of the present study is to observe the variations in the origin, insertion and additional heads of biceps brachii muscle.

MATERIALS AND METHODS

The present descriptive study was done on 50 adult formalin fixed cadaver limbs (n=100) consisting of 50 left and 50 right upper limbs, used for routine dissection and teaching purposes for the first-year medical students in the Department of Anatomy, PESIMSR College, Kuppam. The cadaver group consists of cadavers from South India.

RESULTS

The third head of biceps brachii was observed in one left upper limb of the 100 limbs and belonged to a male cadaver.

CONCLUSION

Third head of biceps brachii is a common variation with different incidence in different population. The incidence in the south Indian population is 1%, but still this variation cannot be neglected as it is clinically important for the clinicians to have knowledge of such variation.

KEYWORDS

Biceps Brachii, Incidence, Third Head, South India.

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BACKGROUND

The biceps brachii muscle belongs to the flexor group of muscle in the arm. It is the commonest muscle in the body to show variations with respect to its origin, insertion, nerve supply and number of heads. Usually, it has two heads long and short head originating from the supraglenoid tubercle of scapula and from coracoid process of scapula. The heads form a common tendon and are inserted on to the radial tuberosity. It mainly contributes to flexion and supination of the forearm; innervated by the musculocutaneous nerve and supplied by brachial and anterior circumflex humeral artery.¹

The knowledge of such additional heads and associated variations in the architecture of the surrounding region is important, they can produce clinical symptoms by comprising surrounding neurovascular bundle.²

Variations of third head of biceps may present as a group of accessory fascicles arising from the coracoid process, the pectoralis major tendon, head of humerus, articular capsule of humerus or from shaft of humerus itself.

The most common variation is a third head but four, five or even seven heads have been reported.³

MATERIAL AND METHODS

This descriptive study, Upper limb of the 50 cadavers, used for routine dissection from the Department of Anatomy, PESIMSR, Kuppam were observed for variations in origin, insertion and additional heads. The dissection procedure was as per the Cunningham's Manual of Practical Anatomy.

RESULTS

Figure 1. Third Head of Biceps Brachii Incidence being 1% was Observed in only One Upper Limb of the Left Side of a Male Cadaver

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Figure 2. Its Origin was from Anteromedial Aspect of Humerus just below the Insertion of Coracobrachialis and Superomedial to Brachialis. The Length was 13.5 cm.

Figure 3. It was Innervated by the Branch from the Main Branch of Musculocutaneous Nerve

Figure 4. It Descended and Merged with the Other Two Heads to Form a Common Tendon and Inserted to Radial Tuberosity

In the rest of the limbs, it presented with the usual routine presentation.

DISCUSSION

Different authors have reported the incidence of the additional heads of the biceps brachii to be between 0.18%-21.5% in different population.⁴⁻¹⁹ The incidence in the present study being 1% which fits in the range with the previous studies.

Sl. No.	Author	Incidence of Third Head of Biceps Brachii.
1.	Greig et al ^[4] South African black	21.5%
2.	Bergman et al ^[5] Chinese European white African black Japanese	8% 10% 12% 18%
3.	Khaledpour ^[6]	0.18%
4.	Higashi and Sone ^[7]	18.3%
5.	Kosugi et al ^[8]	12.5%
6.	Asvat et al ^[9] South African black South African white	20.5% 8.3%
7.	Williams et al ^[10]	10%
8.	Nakatani et al ^[11]	8%
9.	Neto et al ^[12] Brazilian white Brazilian black	20% 9%
10.	Kopuz et al ^[13] Turkish	15%
11.	Rincon et al ^[14] Colombian population	12.5%
12.	Ravindranath et al ^[15]	1.8%
13.	Rai et al ^[16]	7.1%
14.	Kumar et al ^[17]	3.33%
15.	Poudel and Bhattarai ^[18] Nepalese	12.5%
16.	Dr Prabhjot Cheema, Dr Rajan Singla ^[19]	2.3%
17.	Present study	1%

Table 1. Comparison of Incidence of Third Head of Biceps Brachii

According to the study done by Rai et al,¹⁶ with regard to the incidence in Indian population, it was reported to be 7.1%. In the present study, it is 1% which is low when compared to their study.

The study done by Dr. Prabhjot Cheema and Dr Rajan Singla¹⁹ on the incidence of third head of biceps brachii in north Indian population was 2.3%. In the present study, the incidence in the south Indian population is 1% which is less than theirs.

Sweiter and Carmichael²⁰ emphasised that the incidence of additional heads of biceps brachii is more on the right side reflecting the fact that there were more right-handed people than the left handed and that the muscle fibre developed with use. In the present study, the third head of biceps brachii was on the left upper limb, may imply that the cadaver could be a left-handed person.

Dr Prabhjot Cheema and Dr Rajan Singla¹⁹ in their study reported three cases of third head of biceps brachii and all the three were found in the left upper limb and the study was

done among north Indian cadavers. This finding is similar to the present study that the occurrence of the additional third head was from the left limb.

Asvat et al⁹ encountered the occurrence of the third head of biceps brachii more frequently in males. In the present study, the third head of biceps brachii was found in a male cadaver.

Kosugi et al⁸ in their study reported the average length of third head to be 13 cm. Dr. Prabhjot Cheema and Dr Rajan Singla¹⁹ in their study reported the average length of the third head to be 12.9 cm. In the present study, the third head that was found was measuring about 13.5 cm which is almost nearing the previously observed values.

The observed origin of third head of biceps brachii did not differ from that in the previously reported cases i.e. from the anteromedial surface of the shaft of the humerus, near the insertion of coracobrachialis and just above the origin of brachialis.⁹

In previous study by different authors, the accessory head was supplied by the musculocutaneous nerve,^{8,9} which is similar to the present study. In the present study, it is supplied by a branch from musculocutaneous nerve.

The variations of the biceps brachii muscle phylogenetically were explained as a remnant of a tuberculo-septate head that together with the short and long heads, is present in Hylobates, but is a product of regression in humans and anthropoids.²⁰

Sonntag²¹ in his study described the third head of biceps brachii as a remnant of the long head of coracobrachialis, an ancestral hominoid condition, particularly in those cases where the third head arose from the insertional area of the coracobrachialis-which is same as the present study.

CONCLUSION

A variation in the heads of the biceps brachii muscle has already been reported to cause compression of surrounding neurovascular structures. It leads to erroneous interpretation during routine surgeries.

The presence of third head of biceps brachii muscle might increase its kinematics and also will increase the power of supination and flexion.

Such variation is not rare and is interesting not only for anatomists but also to orthopaedic surgeons, plastic surgeons, traumatologists, physiotherapists, doctors dealing with sports medicine and radiologists.

The existence of such variation should always be kept in mind by these clinicians when dealing with their patients.

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