



ORIGINAL RESEARCH PAPER

Anatomy

INCIDENCE OF THE THIRD HEAD OF THE BICEPS BRACHII IN THE UTTAR PRADESH POPULATION

KEY WORDS: Biceps brachii, muscle and Third head.

Dr. Purna Jagdish	MBBS, MD, Assistant Professor, Department of Anatomy, K.D. Medical College Hospital and Research Center, Mathura-281406
Dr. Vivek Parashar*	MBBS, MD, Assistant Professor, Department of Anatomy, K.D. Medical College Hospital and Research Center, Mathura-281406 *Corresponding Author
Dr R. K. Ashoka	Professor and Head, Department of Anatomy, K.D. Medical College Hospital and Research Center, Mathura-281406

ABSTRACT

Biceps brachii is a dual headed flexor muscle of flexor compartment of upper arm, originates proximally with a long head from supraglenoid tubercle and short head from coracoid process of scapula. Our aim was to elucidate the incidence and morphological features of the third head of the biceps brachii muscle. Out of 30 cadavers, we found the three headed biceps brachii unilaterally in four male cadavers, one belonging to the left side and three to right side. The third head was observed in four cadavers, bringing its overall incidence to 13.33%. While the short and long head had a normal origin, in three cases the third head originated near the insertion of the coracobrachialis and at the origin of the brachialis and in both cases it goes and merges with the remaining two heads and inserted into the posterior part of radial tuberosity. One was thicker as compared to the rest. In fourth case it originates along with the long head of biceps brachii and then the third head crosses the musculocutaneous and median nerve in the middle of arm and then finally its tendon goes and inserts into the deep fascia of the arm.

Introduction:

Biceps brachii, a muscle of anterior compartment of arm has been described as having a long head originating from the supra-glenoid tubercle and glenoid labrum and a short head from the coracoid process of the scapula. The two heads join to form a common bicipital tendon distally, and insert into the posterior rough part of radial tuberosity and a bicipital aponeurosis which merges with the deep fascia of forearm.¹ Some aponeurotic and tendinous fibers go and insert into the bicipital aponeurosis.² Biceps brachii is the most common muscle to show anatomical variations in its morphology and number of heads.³ Most frequent is the presence of third head and sometimes it may have four to seven heads.³⁻⁴ The incidence of third head of biceps brachii varies from 0.18% to 21.5% in different populations.⁵ However, as many as seven heads of the biceps brachii have been reported, the most common one being the third head.⁶ Some authors⁷ have tried to trace the functional aspect of these extra heads by the abnormal movements which they can produce and others⁶⁻⁸ have tried to draw clinical implications like the head being mistaken for a tumour or suspecting that it produces compression symptoms. So, the aim of the present study was to elucidate the incidence and morphological features of the third head of the biceps brachii muscle.

Material and Methods:

The present study was conducted in the Department of Anatomy, K.D. Medical College Hospital and Research Center, Mathura. The study was carried out on 30 cadaveric upper limbs. Dissection of the front of arm was done. A longitudinal incision was given at the anterior aspect of the arm from the acromion process of scapula to a point 2.5 cm below the level of elbow joint. A horizontal incision was given at both ends of the longitudinal incision. Subcutaneous fat was removed from both superficial and deep fascia and a biceps brachii muscle was looked for. After appropriate dissection extra heads with their origin and insertion were looked for and photographed.

Results and Discussion:

The present study was conducted in the Department of Anatomy, K.D. Medical College Hospital and Research Center, Mathura. Out of 30 cadavers, we found the three headed biceps brachii unilaterally in four male cadavers, one belonging to the left side and three to right side. The third head was observed in four cadavers, bringing its overall incidence to 13.33%. While the short and long head had a normal origin, in three cases the third head originated near the insertion of the coracobrachialis and at the origin of the brachialis and in both cases it goes and merges with the other two heads and inserts into the posterior part of radial tuberosity. One was thicker as compared to the rest. In fourth case it originates along with the long head of biceps brachii and then the third head crosses the musculocutaneous and median nerve in the middle of arm and then finally its tendon goes and inserts into the deep fascia of the arm.

Biceps brachii muscle frequently shows variations in its number of heads and morphology.⁹ Absence of either short head or long head of biceps brachii is very rare.¹⁰ No cadavers with absent short or long head of biceps, were found in our study. Sreedevi and colleagues found two cases where biceps was having an extra head.² In both the case she found that the third head was arising from the humerus at the insertion of coracobrachialis, and it goes and attaches to bicipital aponeurosis. In first case she also got fourth head which was also arising from the humerus at the insertion of coracobrachialis and also from the tendinous insertion of deltoid muscle and it goes and joins the under surface of main muscle just above the elbow joint.¹ In our study we got the origin from the same place in two cases but they both got inserted to the two other heads of biceps brachii. Shashikala and Ashwini found one case of three head of biceps brachii. They found that the third head of biceps brachii arose from upper third of humerus at the V shaped insertion of deltoid muscle. It coursed and merged with other two heads to form common tendon and was inserted on posterior part of radial tuberosity.¹¹ We encountered two similar cases in our study.

The average length of the third head in the present study was 12.8 cm, which was virtually same as that which was described by Kosugi et al¹² in their study i.e. 13 cm. Bapat found a third head of biceps brachii which was originating from the deltopectoral fascia at the lower end of deltopectoral groove and it goes and fuses with common belly formed by the long and short heads of the muscle.¹³ In our study we could not record such a finding.

The biceps brachii is known for its powerful flexion at elbow and



Fig.1 Shows the third heads of biceps brachii (BB)

supination of forearm. Presence of the supernumerary heads of biceps brachii would increase its kinematics. Therefore from the applied anatomical point of view, its third head increases its power of flexion and supination.¹⁴ The supernumerary heads of biceps brachii may cause compression of the neurovascular bundle of the anterior compartment of arm depending on their attachments and course of fibers. These abnormal fibers may cause entrapment of the median nerve and cause nerve compression syndromes.¹⁵

Conclusion:

In conclusion, the accessory heads of the biceps brachii have great clinical importance for surgeons, orthopedic surgeons, anesthesiologists, neurologists and anatomists. Awareness of the morphological variants of biceps muscle delivers better pre-operative evaluation, safe surgical intervention within the arm and better postoperative results.

References:

1. Johnson D, Ellis H. Pectoral girdle and upper limb. Gray's anatomy, 39th edition, Elsevier Churchill Livingstone. 2005:853.
2. Sreedevi G, Devi SS, Krupadanam K, Anasuya K. Bilateral occurrence of additional heads of biceps brachii – A case report. Int J Res Dev Health 2013;1:195-9.
3. Nakatani T, Tanaka S, Mizukami S. Bilateral four headed biceps brachii muscles: the median nerve and brachial artery passing through a tunnel formed by a muscle slip from the accessory head. Clin Anat 1998;11:209-12.
4. Asvat R, Candler P, Sarmiento EE. High incidence of third head of biceps brachii in south African population. J.Anat. 1993;182:101-4.
5. Cheema P, Singla R. Low incidence of the third head of the biceps brachii in the North Indian population. Journal of Clinical diagnostic and research. 2011;5 (7):1323-1326.
6. Nakatani T, Tanaka S, Mizukami S. Bilateral four-headed biceps brachii muscles: The median nerve and the brachial artery passing through a tunnel which is formed by a muscle slip from the accessory head. Clin. Anat. 1998; 11: 209-12.
7. Sweiter MG, Carmichael SW. Bilateral three headed biceps brachii muscles. Anat. Anz. 1980; 148: 346-49.
8. Sargon MF, Tuncali D, Celik HH. An unusual origin for the accessory head of the biceps brachii muscle. Clin. Anat. 1996; 9: 160-62.
9. Bergman RA, Thompson SA, Afifi AK. Catalogue of human variation. Munich: Urban and Schwarzenberg. 1984;27-30.
10. Rodriguez NM, Vazquez T, Choi D, Parkin I, Sanudo JR. Supernumerary humeral heads of the biceps brachii muscle revisited. Clin Anat. 2003;16:197-203.
11. Shashikala RL, Ashwini SJ. Case report: Third head of biceps brachii muscle: A case study. Biomed Res 2011;22:387-9.
12. Kosugi K, Shibata S, Yamashita H. The supernumerary head of the biceps brachii and the branching pattern of the musculocutaneous nerve in Japanese. Surg. Radiol. Anat. 1992; 14: 175-85.
13. Bapat RV. A third head of biceps brachii muscle. Int J Biol Med Res 2014;5:3919-20.
14. Kumar H, Das S, Rath G. An anatomical insight into the third head of biceps brachii muscle. Bratisl.Lek.Listy. 2008;109:76-8.
15. Warner JP, Palleta GA, Warren RF. Accessory head of the biceps brachii, case report demonstrating clinical relevance. Clin. Ortho. Res. 1992;280:179-81.