



An aberrant tendo-aponeurotic extension of biceps brachii muscle: a possible factor for neurovascular compression in the antebrachium

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Abstract

Anatomical variations of biceps brachii muscle pertaining to its manner of insertion are rare and seldom reported. Compression neuropathy of superficial branch of radial nerve and partial obstruction of radial artery owing their etiology to a variant insertion manner of biceps brachii is exceptionally unique. In this report, we attempt to describe an accessory tendo-aponeurotic slip of the biceps brachii which traversed across the forearm to join the medial border of extensor carpi radialis longus muscle. During its course it crossed superficial to the proximal part of radial artery and the superficial branch of radial nerve, possibly compressing them. This report not only provides a precise working knowledge to clinicians and surgeons, but also encourages further scope of detailed anatomical study of insertion variations of biceps brachii.

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Introduction

Biceps brachii is described as a superficial muscle in the anterior compartment of the arm. It is a flexor of the elbow joint and a powerful supinator of the forearm. Standard anatomical textbooks describe the muscle as arising by two heads, a long and a short head arising from the supraglenoid tubercle and coracoid process of scapula, respectively. The two heads form a common belly proximal to the elbow joint and insert as a rounded tendon at the posterior aspect of the radial tuberosity. This tendon has a broad and flat medial expansion, the bicipital aponeurosis, which is reinforced by the antebrachial fascia inserts on the upper part of the posterior ulnar border [1]. Contemporary anatomical research is replete of a spectrum of variations in the origin of biceps brachii muscle in context to its topography and supernumerary heads [2, 3]. Variations of the insertion pattern of the distal biceps tendon and its aponeurosis are rarely addressed in research works [4]. In this report we attempt to describe an extremely rare and unique deviation of the insertion pattern of biceps brachii muscle. In addition to its usual tendinous and aponeurotic insertion sites, the muscle presented an additional extension to join the extensor carpi radialis longus (ECRL) muscle. This anatomical variant is particularly significant in compression

syndromes of the neighboring vessels and nerves and also in tendon repair surgeries.

Case Report

A modified insertion pattern of biceps brachii muscle was observed in the right upper limb of a 72-year-old male cadaver, during routine cadaveric dissection for undergraduate students at N.R.S. Medical College, Kolkata. The biceps brachii was found to take origin from the usual described osseous sites. The muscle belly continued in the anterior aspect of arm and close to its insertion, it split into a rounded distal tendon and a flattened bicipital aponeurosis. The tendon inserted in the posterior aspect of the radial tuberosity, while the aponeurosis was found to insert in the upper part of the subcutaneous posterior border of ulna through the antebrachial fascia. The unique deviation in the present case was the presence of a third aberrant tendo-aponeurotic slip of insertion of the biceps brachii. This was seen arising from the point of bifurcation of the muscle belly into the tendon and aponeurosis. This aberrant tendo-aponeurotic band measured 9.4 cm in length and 0.2 cm in width. It extended distally and joined the medial border of ECRL at a point 18.9 cm proximal to the radial styloid process (Figure 1).

Another interesting feature was noted during studying the topographical details of the accessory band. It superficially crossed the proximal part of the radial artery, the distal end of the biceps tendon itself, and most significantly the superficial branch of the radial nerve (SBRN). The remaining muscular and neurovascular architecture of the antebrachium of the same and contralateral upper limb conferred to standard anatomical descriptions.

Discussion

Atypical insertion pattern of biceps brachii muscle is seldom reported. Accessory tendinous or aponeurotic slips are further rare. Previous studies report a separate fascicle from the biceps brachii which later continued as a tendinous slip to compress the median nerve and the brachial artery in the region of the cubital fossa and distally merged with the fascia covering the flexor carpi ulnaris muscle [5]. The present report assumes an exceptional uniqueness in the fact that the aberrant slip of biceps brachii is tendo-aponeurotic. It traversed laterally crossing the superficial branch of radial nerve and proximal part of brachial artery and finally fused with the medial border of FCRL. Studies describing such course and variation of a supernumerary insertion of biceps brachii have not been encountered despite extensive search of contemporary research work. Duplication of distal tendon of the biceps brachii where both tendons gain insertion at different sites on the radial tuberosity and termination of the muscle distally as only its aponeurosis instead of tendon are other documented observations [6, 7].

The SBRN is positioned normally at a vulnerable site for compression, lying superficial covered by neither muscle nor fat. Several studies mentioned various anatomical variations

of brachioradialis muscle compressing the SBRN between its two slips [8, 9]. The rare aberrant slip of insertion of biceps brachii; as reported in the present case; can prove to be another unusual compounding factor resulting in compression neuropathy of the SBRN. This might lead to varying magnitudes of paresthesia and pain on the radial aspect of hand and thumb, thus restricting the ability of gripping movements on the affected side [10].

The additional tendo-aponeurotic slip of biceps brachii was also observed to cross the proximal part of the radial artery superficially. Partial obstruction of the artery may result in ischemic symptoms as well as an alteration in the radial pulse, which otherwise might lead to clinical misinterpretation. Thus a precise beforehand awareness of such relevant anatomical aberrations might prevent pitfalls in clinical and radiological diagnosis.

The present report also evokes a possibility of a change in the kinematics of contraction of biceps brachii, altering the movements of elbow and superior radio ulnar joints to a relevant extent. Furthermore this accessory insertion slip may result in adverse mal/displacement of bone fragments in a fracture affecting the vicinity of the elbow joint. Apart from all its disadvantages, such additional slips of insertion often provide a very effective aid for reconstructive procedures in consequence to injuries of the distal biceps tendon.

References

- [1] Standring S, ed. *Gray's Anatomy. The Anatomical Basis of Clinical Practice*. 40th Ed., Edinburgh, Churchill & Livingstone—Elsevier. 2008; 825–828.
- [2] Govindarajan A, Meenakshisundaram J. Additional head of biceps brachii in elderly female cadaver. *Int J Anat Var (IJAV)*. 2011; 4: 112–114.
- [3] Schoenleber SJ, Spinner RJ. An unusual variant of biceps brachii. *Clin Anat*. 2006; 19: 702–703.
- [4] Fogg QA, Hess BR, Rodgers KG, Ashwood N. Distal biceps tendon anatomy revisited from a surgical perspective. *Clin Anat*. 2009; 22: 346–351.
- [5] Paval J, Mathew JG. A rare variation of the biceps brachii muscle. *Indian J Plast Surg*. 2006; 39: 65–67.
- [6] Daimi SR, Siddiqui AU, Wabale RN, Gandhi KR. Additional tendinous insertion of biceps brachii: a case report. *Pravara Med Rev*. 2010; 2: 16–18.
- [7] Spinner RJ, Carmichael SW, Spinner M. Partial median nerve entrapment in the distal arm because of an accessory bicipital aponeurosis. *J Hand Surg Am*. 1991; 16: 236–244.
- [8] Dhuria R, Mehta V, Roy S, Suri RK, Rath G. Clinico-anatomical report of a rare anomalous disposition of brachioradialis: a possible site for compressing superficial branch of radial nerve. *Clin Ter*. 2011; 162: 235–237.
- [9] Surendran S, Bhat SM, Krishnamurthy A. Compression of radial nerve between the split tendon of brachioradialis muscle: a case report. *Neuroanatomy*. 2006; 5: 4–5.
- [10] Ehrlich W, Dellon AL, Mackinnon SE. Classical article: Cheiralgia paresthetica (entrapment of the radial nerve). A translation in condensed form of Robert Wartenberg's original article published in 1932. *J Hand Surg Am*. 1986; 11: 196–199.

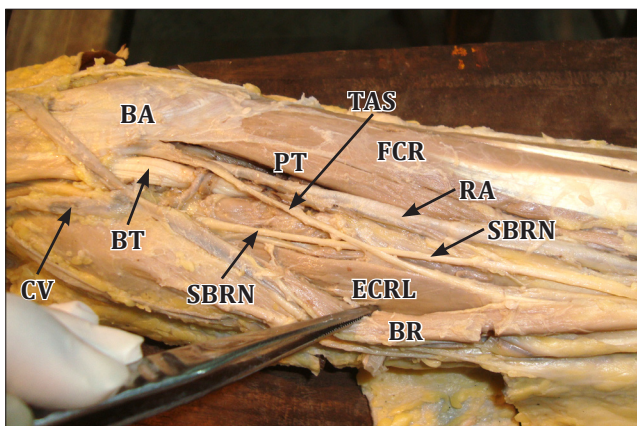


Figure 1. Dissection of right upper limb showing variant anatomical structure. (**BR**: brachioradialis; **ECRL**: extensor carpi radialis longus; **CV**: cephalic vein; **BT**: biceps brachii tendon; **BA**: bicipital aponeurosis; **RA**: radial artery; **SBRN**: superficial branch of radial nerve; **TAS**: tendo-aponeurotic slip; **PT**: pronator teres; **FCR**: flexor carpi radialis)