Introduction

The biceps brachii muscle is typically described as originating with a long head from the supraglenoid tubercle and with a short head from the coracoid process. The two heads then join to form a common tendon, attaching on the radial tuberosity. In addition, the tendon contributes to the bicipital aponeurosis, an aponeurotic expansion continued into the antebrachial fascia.1,2

Supernumerary heads of the biceps brachii muscle have been widely studied regarding their origin, insertion, size, innervation and racial differences. The most frequent variation of the biceps brachii is its supernumerary heads. During our routine dissection studies, we encountered supernumerary head of the biceps brachii muscle on two cadavers. Additionally, the supernumerary heads had abnormal attachments. We think that such variations should be kept in mind during surgical and diagnostic procedures.

Case Report

During our routine dissection studies we encountered two cases with variant formation of the supernumerary head of the biceps brachii muscle.

Case 1

The case was a 57-year-old male cadaver. The supernumerary head was a bulky muscle belly and originated from the medial lip of the intertubercular groove (Figure 1a). Then it laid downward just medial to the tendon of the long head and conjoined to the fibers of the short head at the middle third of the arm. The short and
supernumerary heads united to form a great part of the biceps brachii muscle. The long head originated from the normal attachment site and located lateral to the short and supernumerary heads. Tendon of the long head united to the tendon of the other two heads. The attachment of the common tendon was normal in every aspect.

Case 2

The case was a 45-year-old male cadaver. The supernumerary head was a bulky muscle belly and originated from the lateral lip of the intertubercular groove (Figure 1b). When it was encountered, insertion of the pectoralis major muscle had already been cut during dissections performed by our students. Then it laid downward just lateral to the tendon of the long head and conjoined to the fibers of the short head at the middle third of the arm. Origination and progress of the short head was normal in every aspect. It was just main difference that short and supernumerary heads united to form a great part of the biceps brachii muscle.

The long head of the biceps brachii muscle originated from the supraglenoid tubercle and laid in the intertubercular groove. It was in a vertical position and covered by the two conjoined heads (short and supernumerary heads). At first sight, it was difficult to see the muscle fibers of the long head, splitting of interval between the short and supernumerary heads revealed the muscle fibers.

Figure 1. Photographs of the cases showing supernumerary head of the biceps brachii muscle.

a: Case 1 (Right side). AH: accessory head of biceps brachii muscle; BT: tendon of the biceps brachii muscle; CP: coracoid process of scapula; LF: bicipital aponeurosis (lacertus fibrosus); LH: long head of biceps brachii muscle; M: median nerve; SH: short head of biceps brachii muscle; Arrows: tendon of the supernumerary head of biceps brachii muscle.

b: Case 1 (Left side). AH: accessory head of biceps brachii muscle; B: brachial artery, BT: tendon of the biceps brachii muscle; Cb: coracobrachialis muscle; CP: coracoid process of scapula; LF: bicipital aponeurosis (lacertus fibrosus); LH: long head of biceps brachii muscle; M: median nerve, Mc: musculocutaneous nerve; SH: short head of biceps brachii muscle, U: ulnar nerve; Arrows: tendon of the supernumerary head of biceps brachii muscle.
belly. The long head was fully separated from the con-
joined heads. The musculocutaneous nerve and nutrient
branches of the brachialis artery situated between the
long head and conjoined heads. The long head united to
the most distal fibers of the supernumerary head and
contributed to the common tendon of the biceps brachii
muscle. The common tendon inserted on the radial
tuberosity and an aponeurotic expansion, bicipital
aponeurosis, continued into the antebrachial fascia of the
forearm.

In both cases, the biceps brachii muscle and its super-
numerary head were innervated by branches of the mus-
culocutaneous nerve and were supplied with blood by
small muscular tributary of the brachial artery.

Discussion

Supernumerary heads of the biceps brachii muscle
have been widely studied regarding their origin, inser-
tion, size, innervation and racial differences.1,3,7-11
Supernumerary heads of the biceps brachii muscle have
been described as part of either a three, four, or five-
headed biceps brachii muscle.2,6,8,12-20 Recently,
Rodriguez-Niedenfuhr et al.1 studied on a series of 350
arms and classified the supernumerary heads of the
biceps brachii into three different types: superior, infero-
medial, and infero-lateral humeral head. They found five
cases (1.5%) with supernumerary head originated from
the surface of the humerus between the lesser tubercle
and the attachments of the coracobrachialis and
brachialis muscles and fused with the muscular fibers of
the short head of the biceps brachii muscle at its union
with the long head. Additionally, Nayak and
Krishnamurthy18 reported that supernumerary head of
the biceps brachii muscle and long head originated from
the deltoid and pectoralis major muscles. Schoenleber
and Spinner17 found that supernumerary head of the
biceps brachii and long head originated from the deltoid
muscle itself.

The presence of supernumerary heads of the biceps
brachii muscle has been associated with variations of the
surrounding muscles. El-Naggar and Zahir15 described
that a two bellies of the coracobrachialis muscle associat-
ed with a third head of the biceps brachii muscle, although
the coracobrachialis muscle was found to have
a normal origin, short head of the biceps brachii muscle
had separate bellies.

The presence of supernumerary heads of the biceps
brachii muscle has been associated with variations of the
musculocutaneous nerve.6,14 The musculocutaneous
nerve or its connection with the median nerve usually
passed deep to the supernumerary head but may also pass
superficial to it or have no relationship to it at all.15
Besides, there was no variation in the origin and distribu-
tion of the musculocutaneous nerve, a supernumerary
head covered to the customary long head, as observed in
our case, contradicts the theory of Hyrtl,21 who suggest-
ed that the presence of supernumerary medial heads was
due to the musculocutaneous nerve piercing the
brachialis muscle and producing a supernumerary sepa-
rate head.

Embryologically, during the fifth week of develop-
ment, mesoderm invades the upper limb bud to further
condense into ventral and dorsal muscle masses. The tri-
ceps and biceps musculature is derived from the dorsal
and ventral muscle masses of the upper limb bud, respec-
tively. It would be during this period of development
that accessory muscles may have formed.16 Shah and
Shah22 reported a unique case with a bilateral quadricip-
tal biceps brachii muscle comprised by long, short, third
(humeral) heads, and a fourth (capsular) head. For fourth
head, they suggest that it might be a portion of the
embryonic long head, which had failed to become intra-
capsular.

Variations of the heads of the biceps brachii muscle
have clinical importance.1,2 Supernumerary heads may
confuse surgeons during shoulder operations1,23 or cause
compression of neurovascular structures.1,2 Therefore,
surgeons should be aware of this anatomical variation in
surgical procedures.16,19

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References


Correspondence to: Levent Sarıkoğlu, PhD
Department of Anatomy, Akdeniz University, Faculty of Medicine, 07070 Antalya, Turkey
Phone: +90 242 249 69 52; Fax: +242 227 44 82, 227 44 95
email: sarkinoglui@akdeniz.edu.tr, sarkinoglul@yahoo.com

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