

Case Report on Anatomical Variation of Musculotendinous Slip of Biceps Brachii Muscle

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Abstract: *Biceps Brachii muscle is the dominant muscle of the anterior compartment of the arm. The muscle has a two-head origin and is inserted into the rough posterior area of radial tuberosity along with a broad expansion, the bicipital aponeurosis. The biceps brachii muscle is one of the most variable muscles in the body showing variant morphology and attachments. During routine cadaveric dissection we came across a variation on the left side of upper limb. The origin of short head of biceps brachii was in the form of a musculotendinous slip. This particular anatomical variation is important for a clinical perspective as it will help in minimizing injury to neurovascular structures and also during repair surgery of proximal biceps tendon rupture.*

Keywords: Case report, Biceps Brachii muscle, musculotendinous slip, variation

1. Introduction

The anterior compartment of the arm consists of three muscles, the biceps brachii (BB), brachialis and coracobrachialis muscle. The short head of the biceps brachii originates from the tip of coracoid process of the scapula whereas the long head from the supraglenoid tubercle of the scapula.^[1] Insertion of biceps brachii consists of two components- the radial tuberosity and bicipital aponeurosis.^[2,3] The muscle is supplied by the musculocutaneous nerve.^[4] The primary function of the biceps brachii is flexion of the elbow and supination of the forearm.^[5] Biceps brachii muscle is subjected to different morphological variations in relation to number of heads, variations in origin and insertion.^[6] Proper knowledge about these variations will be useful for better planning of surgical procedures for repairing the biceps tendon ruptures. Skillfully identifying the course and orientation of the attachment will support the surgeons in determining the size of the tear.^[7]

1.1 Embryology

Mesodermal somites are responsible for differentiation into myoblasts which gives rise to various muscles of upper limb during week 5. The anterior condensation gives rise to biceps brachii and other muscles. During intrauterine life, abnormal splitting may give rise musculotendinous variations.^[8]

Variation: Through different articles, it was observed that biceps brachii muscle can have various characteristics like number of bellies, attachments.^[9,10]

1.2 Musculotendinous Landmark of Arm^[11]

The elevated tendon of biceps brachii can be held between two fingers and thumb and the sharp upper margin of bicipital aponeurosis can be felt anteriorly and medially.

a) Attachments^[12]

The short head takes origin from tip of coracoid process and the long head from the supraglenoid tubercle of scapula. The tendon gives off a broad medial expansion, the bicipital aponeurosis, which goes medially across the brachial artery to fuse with deep fascia over the origins of the flexor muscles of the forearm.

b) Relations^[13]

Proximally – Pectoralis major and deltoif
Distally- fasciae and skin
Medially – coracobrachialis and brachial vessels
Laterally – deltoid and brachioradialis.

c) Vascular Supply^[14]

The main vessels supplying the biceps brachii are superior or inferior ulnar collateral artery, subscapular artery, axillary artery and the profunda brachii artery.

d) Innervation^[15]

The nerve supplying biceps brachii muscle is the musculocutaneous nerve which arises from the lateral cord of the brachial plexus. Later, it continues as the lateral cutaneous nerve of the forearm.

e) Action^[16]

The action of Biceps brachii is supination, especially in rapid or resisted movements. It does flexion of the elbow with the forearm supinated.

f) Clinical Anatomy: Testing^[17]

With the forearm supinated, biceps brachii can be tested by palpating its fibres during elbow flexion against resistance. The bicep jerk reflex by hammer is used to stimulate the stretch receptors which are supplied by C5 nerve.

2. Materials and Methods

During routine dissection of left upper limb according to standard guidelines of a formalin-fixed approximately 70 year-old male cadaver, biceps brachii muscle was cleaned. Dissection began with the removal of the skin and superficial fascia from the area of the shoulder and anterior and medial side of the arm and the anterior side of the forearm. The next stage included visualisation of the lateral, medial and posterior cords of the brachial plexus, and visualisation of both BB, coracobrachialis, and brachialis muscles. The origin, insertion and nerve supply of biceps brachii muscle was observed and noted for any variation. Both side biceps brachii muscle was verified and found difference in origin of the muscle.

3. Result

Right side biceps brachii muscle was normal and origin and insertion was as per mentioned in the most of the Anatomy books. We came across a variation in the left side biceps brachii muscle. Variate musculotendinous slip of short head of biceps brachii of left side which was found arised from tip of coracoid process. The area was cleaned and was photographed.

4. Case Report

An anatomical variation of the tendon of Biceps Brachii Muscle was observed during dissection of a formalin-fixed male cadaver of about 70 years of age. The dissection was done in the dissection hall of the Anatomy Department of our Institute in the month of June 2024.

In the dissection of left arm, normally the short head of biceps takes origin from the tip of the coracoid process and long head from supra glenoid tubercle. We observed Right side biceps brachii muscle was normal origin and insertion as per mentioned in the most of the Anatomy books. In the present case, left side the insertion was normal, but the origin was in the form of musculotendinous slip passing through the bicipital groove.



Figure 1: Right side -normal origin and insertion

5. Discussion

Previous studies on variations of Biceps Brachii muscle:

Through various article reviews it was noted that biceps muscle is characterized by different variations in the type of attachments, like one tendon, two-band tendon and three band shape tendons^[18]

Another morphological variation noted was the number of origin i.e., number of head of biceps ranging from 3 to 7 heads.^[19]

These variations have no adverse effect on arm function

Thus, anatomical, embryological and functional considerations of the skeletal system along with its morphology and variations and associated structures would provide a clinical strategy for diagnosis and management of the upper limb disorders thereby minimizing the neurovascular injuries.

Surgical Consideration^[19]

For conditions affecting the proximal aspect of the long head of the biceps tendon, the following treatments can be considered:

- 1) Physical therapy with proximal biceps stretching and strengthening exercises
- 2) Pharmacologic treatment with nonsteroidal anti-inflammatory drugs

Clinical Significance^[20]

- 1) Rotator cuff tear
- 2) Injury to the musculocutaneous nerve results in weakness of supination (biceps) and flexion (biceps and brachialis) of forearm and loss of sensation on the lateral side of forearm.
- 3) Biceps tendonitis – Recurrent microtrauma to the tendon overuse and repetitive overhead activities. Sports such as baseball, tennis, swimming or lifting weights.
- 4) Proximal Biceps tendon rupture

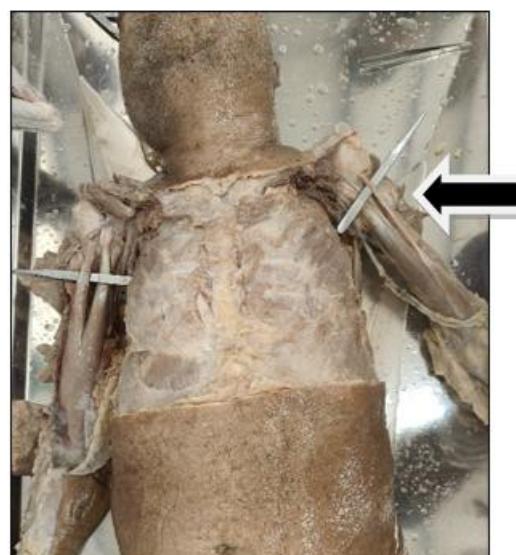


Figure 2 (b): Left side musculo-tendinous origin of Biceps Brachii muscle

6. Conclusion

The knowledge of the variant morphology of biceps may facilitate pre-operative diagnosis and management of upper limb diseases and other injuries. Such variations may also cause compression of the adjacent neurovascular structures. This particular variation is important for clinical perspective i.e, proximal biceps repair surgery of biceps tendon rupture for the surgeon to be careful during the procedure.

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