Case Report

A Case of Brachial Biceps with Bilaterally Abnormal Bundles of Origin and Insertion

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Summary: This report describes a case of brachial biceps with bilaterally abnormal bundles of origin and insertion which was encountered during the dissection of an 86 year-old Japanese female cadaver in the anatomical laboratory of Kanazawa Medical University.

There was an accessory head and tail in the brachial biceps of the right upper arm. The accessory head (Caput tertium) arose from the fibrous capsule of the shoulder joint and pectoralis major tendon. In caput tertium, the head was attached to the internal front part of the venter of caput breve. The accessory tail arose from the medial rear part of the venter of caput breve. This tail was separated into the medial and lateral tendons. The medial tendon was mainly attached to the caput ulnae in the pronator teres and the fibrous capsule of the elbow joint. The lateral tendon surrounded the rear side of the biceps tendon. There were an accessory head and tail in the brachial biceps of the left upper arm. The accessory head (Caput tertium) arose from the fibrous capsule of the shoulder joint and pectoralis major tendon. This head was attached to the front part of the junction of the two ordinary heads of the brachial biceps. The accessory tail arose from the medial rear part of the venter in the caput breve and was separated into the medial and lateral tendons. The medial tendon was attached mainly to the caput ulnae of the pronator teres, and the medial intermuscular septum and the fibrous capsule of the elbow joint.

Findings

In the right upper arm, there were brachial biceps with the abnormal bundles of origin and insertion. This report describes a case of brachial biceps with bilaterally abnormal bundles of origin and insertion.
tendonous origin. After this head separated from the pectoralis major tendon it became myofibrous. The caput tertium lay between the caput breve and longum in the front part of the brachial biceps. The caput tertium was attached to the caput breve, it lay in close proximity to the front part of the junction of the two ordinary heads of the brachial biceps. The length of the caput tertium was 188.0 mm, the maximum width of the venter was 1.5 mm, its maximum thickness was 2.5 mm and the length of myofibrous was 91.0 mm. The accessory tail was of muscular origin, arising from the medial rear part of the caput breve in the brachial biceps. It was located on the medial side of the caput breve. This bundle was separated into medial and lateral tendons and it was found between the brachial biceps and the brachial. The medial tendon was attached mainly to the anterior and posterior of the caput ulnare in the pronator teres, and the fibrous capsule of the elbow joint. The lateral tendon surrounded the rear side of the biceps tendon. The accessory tail measured 173.0 mm in length, maximum width of the venter was 1.5 mm, its maximum thickness was 5.5 mm and the length of the myofibrous was 71.5 mm. The abnormal bundles of the accessory head and tail were supplied by the musculocutaneous nerve.

In the left upper arm, there were brachial biceps with abnormal bundles in the accessory head and tail. (Figs. 5, 6, 7 and 8) The accessory head (caput tertium) arose from the fibrous capsule of the shoulder joint pectoralis major tendon with a tendonous origin. After this head separated from the pectoralis major tendon it became myofibrous. The caput tertium lay between the caput breve and longum in the front part of the brachial biceps and was attached to the front part of the junction of the two ordinary heads of the brachial biceps. The length of the caput tertium was 142.0 mm, the maximum width of the venter was 1.5 mm, its maximum thickness was 3.5 mm and the length of the myofibrous was 102.0 mm. The accessory tail arose from the medial, the rear part of the caput breve in the brachial biceps with muscular origin. Its location lay on the medial side of the caput breve. This bundle was separated into medial and lateral tendons. The medial tendon was attached to the bicipital aponeurosis. The lateral tendon was attached to the caput ulnae of the pronator teres, the proximal end of the medial intermuscular septum and the fibrous capsule of the elbow joint. We couldn’t find the nerve that supplied the abnormal bundles of the accessory head and tail.

Discussion

The occurrence of the accessory head in the brachial biceps has been reported by many investigators. Some of them applied the statistics of variation for a comparison among races. The frequency of appearance of accessory heads in the brachial biceps has been shown to be 16.0 ± 0.70% for observed numbers of upper arms in Japanese. The number and frequency of appearance of the accessory heads in Japanese are summarized in Table 1. Adachi (1910) and Groenroos (1903) suggested that the accessory head originated from somewhere along the line which passed through the capsule of shoulder joint, the lesser tubercle and the zone between the insertion of coracobrachialis and the origin of the brachialis. In the present case, accessory heads of the right and left upper arm arose from the capsule of shoulder joint and pectoralis major tendon. This portion was included on the origin line that Adachi (1910) and Groenroos (1903) suggested as the origin of the accessory head in the brachial biceps. These heads were attached to the front part
Table 1. Numbers and frequency of appearance of arms with accessory heads in the brachial biceps

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Observed number of arms</th>
<th>Number of arms with accessory head</th>
<th>Frequency of appearance of arms with accessory head</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adachi et al.</td>
<td>1900</td>
<td>212</td>
<td>41</td>
<td>19.3 ± 2.71</td>
</tr>
<tr>
<td>Koganei et al.</td>
<td>1903</td>
<td>309</td>
<td>44</td>
<td>14.2 ± 1.98</td>
</tr>
<tr>
<td>Adachi</td>
<td>1910</td>
<td>887</td>
<td>163</td>
<td>18.4 ± 1.30</td>
</tr>
<tr>
<td>Shiraki</td>
<td>1934</td>
<td>128</td>
<td>28</td>
<td>21.8 ± 3.64</td>
</tr>
<tr>
<td>Furuizumi</td>
<td>1934</td>
<td>100</td>
<td>26</td>
<td>26.0 ± 4.38</td>
</tr>
<tr>
<td>Miyazawa</td>
<td>1956</td>
<td>154</td>
<td>22</td>
<td>14.2 ± 2.82</td>
</tr>
<tr>
<td>Ko et al.</td>
<td>1958</td>
<td>84</td>
<td>12</td>
<td>14.3 ± 3.82</td>
</tr>
<tr>
<td>Takeuchi</td>
<td>1960</td>
<td>174</td>
<td>11</td>
<td>6.4 ± 1.86</td>
</tr>
<tr>
<td>Abe et al.</td>
<td>1981</td>
<td>146</td>
<td>20</td>
<td>13.7 ± 2.85</td>
</tr>
<tr>
<td>Kosugi et al.</td>
<td>1984</td>
<td>518</td>
<td>68</td>
<td>13.1 ± 1.48</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>2712</strong></td>
<td><strong>435</strong></td>
<td><strong>16.0 ± 0.70</strong></td>
</tr>
</tbody>
</table>

of the venter in the brachial biceps on the right side and in the front part of the junction of the two ordinary heads of the brachial biceps on the left side. Miyazawa (1956) observed the same accessory head of the present case in 4 out of 23 cases (17.4%) occurring in the upper arm with an accessory head. Ko et al. (1958) observed the same in 5 out of 17 cases (29.4%), Adachi (1910) in 16 out of 123 cases (13.0%), and Higashi et al. (1984) in 18 out of 75 cases (24.0%). There were very few reports indicating brachial biceps with abnormal bundles on the accessory tail. As far as we know brachial biceps with an accessory tail has been reported by Frohse et al. (1908), Fujita (1957) and Ko et al. (1958). However, we are not satisfied by these reports in that there were no detailed observations. Fujita (1957) reported that the accessory tail arose from the caput breve in the brachial biceps, and was attached to the brachial. Ko et al. (1958) reported that the accessory tail arose from the caput breve in the brachial biceps and it was not clear where the accessory tail was inserted into the brachial biceps. Frohse et al. (1908) reported that the accessory tail was attached to the ulna, pronator teres and flexor carpi radialis. Frohse et al. (1908) reported that the accessory tail was attached to the tuberositas ulnae. In this case, the accessory tail arose from the caput breve in the brachial biceps, was attached to the caput ulnae in the pronator teres and surrounded the biceps tendon on the right side and further attached to the caput ulnae in the pronator teres and biceps aponeurosis. On the other side, there have been reports concerning the position of the head-insertion into the brachial biceps. The accessory head attached to the posterior medial part brachial biceps-insertion usually originates from corpus of humerus. Variations in the accessory head-insertion in the brachial biceps were as follows: Murakami et al. (1968) observed an accessory head attached to the biceps aponeurosis. Takeshige et al. (1960) observed an accessory head that arose from the corpus numberus, and attached to the biceps aponeurosis. These brachial biceps with an accessory head did not have biceps aponeurosis. Frohse et al. (1908) observed
an accessory head that arose from the corpus of humerus, and attached to the biceps aponeurosis and the pronator teres. In the present case, the accessory tail in the left upper arm originated from the caput breve in the brachial biceps, and was primarily attached to the biceps aponeurosis and the pronator teres. This accessory tail was very similar in location and insertion to Frohse’s case. From the abnormal cases as described above, we surmised that there was a relationship between the accessory tail of the present case and the accessory head that arose from corpus humerus. We were very interested in this case and desired to research the development of the accessory head in the brachial biceps.

References

PLATES
Explanation of Figures

Plate I

Fig. 1. Schematic drawing of the right upper arm having an accessory head and tail with abnormal bundles in the brachial biceps

Fig. 2. Medialis aspects of the upper arm

Fig. 3. Origin of the caput tertium in the branchial biceps accessory tail

Fig. 4. Insertion of the accessory tail into the branchial biceps

abbreviations: A: abnormal bundle arrow: tendonous origin of caput breve B: caput breve (m. biceps brachii) BR: m. brachialis L: caput longum (m. biceps brachii) LT: lateral tendon (abnormal bundle) M: n. medianus MT: medial tendon (abnormal bundle) P: m. pectoralis major U: caput ulnare (m. pronator teres)
Plate II

Fig. 5. Schematic drawing of the left upper arm having an accessory head and tail with abnormal bundles in the brachial biceps

Fig. 6. Anterior aspects of the upper arm

Fig. 7. Insertion of an accessory tail into the brachial biceps (medial tendon)

Fig. 8. Insertion of an accessory tail into the brachial biceps (lateral tendon)

abbreviations: A: abnormal bundle AP: aponeurosis musculi bicipitis brachii B: caput breve (m. biceps brachii) BR: m. brachialis L: caput longum (m. biceps brachii) LT: lateral tendon (abnormal bundle) M: n. medianus MT: medial tendon (abnormal bundle) P: m. pectoralis major S. septum intermusculare branchii mediale U: caput ulnare (m. pronator teres)
Brachial Biceps with Abnormal Bundles

Plate II