Variable Presentation of Brachioradialis Muscle During Radial Artery Forearm Free Flap Harvest—An Accessory Distal Belly

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Introduction

Brachioradialis muscle has a proximal muscle belly and distal tendinous insertion. The muscle can present with variable anatomy which may or may not be clinically significant. Radial artery forearm flap is most commonly used soft tissue flap for micro vascular reconstruction of post oncological oral defects. We describe a case in which variable anatomy of the brachioradialis muscle was noted incidentally during the harvest of radial artery forearm free flap.

Case Report

A 37 years old man with carcinoma of the tongue was posted for near total glossectomy, bilateral neck node dissection followed by radial artery forearm free flap reconstruction. The non dominant left upper limb was selected and preoperative assessment of the limb revealed no neural or vascular abnormality. After identifying the pedicle vessels and delineating the

skin paddle, the flap was raised from distal to proximal aspect. The radial artery was identified in its normal anatomical location between the tendons of brachioradialis laterally and flexor carpi radialis medially. After raising the flap for a short distance, we unexpectedly found that the proximal portion of the tendon of the brachioradialis was replaced by muscle. After raising the flap further, it was apparent that this aberrant muscle inserted into the tendon of the more proximal, principal muscle belly of the brachioradialis. As the dissection continued, the principal belly of the brachioradialis was better exposed for full anatomical orientation. Considering the distally found muscle as an anatomical variation, the dissection was completed and the flap was raised (Fig. 1). The superficial branches of the radial nerve emerged in to the forearm from under the proximal tendinous part and coursed distally over the aberrant, super numerary muscle in to the hand (Fig. 2). The skin paddle site was covered with split skin graft and rest of the wound was closed primarily. Post operatively there were no functional, neural or vascular deficits.

Discussion

The brachioradialis muscle is primarily a flexor of the elbow joint with the forearm in neutral position. Its ability to pronate and supinate is associated with returning both a fully supinated or pronated forearm to neutral position. It has proximal muscle part which originates from the upper aspect of the lateral supracondylar ridge of the humerus and a distal tendinous part which is attached to the dorsolateral aspect of the distal radius. The muscle is innervated directly by the radial nerve and receives vascular supply from the radial recurrent branches. Though flexor by function, phylogenetically the muscle belongs to the dorsal compartment. Variations of brachioradialis from normal anatomy are well

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Fig. 1 The second aberrant belly of the brachioradialis being pointed with forceps. The muscle has its attachments within the tendon of the proximal normal belly. The harvested flap is present adjacently (before release of tourniquet)

described and few of them are significant from clinical point of view. The variations are absence of the muscle, double headed origin, accessory muscle and multiple tendinous insertions [1–5]. The most common variation noted during cadaveric dissection was an accessory brachioradialis muscle which when present, clinically acts as a supinator rather than a flexor. The second common variation noted was the division of the tendon in to multiple slips in the distal forearm before insertion and these slips might insert at multiple different levels. Branches of the superficial part of the radial nerve might be entrapped between these slips resulting in neurological symptoms clinically known as wartenberg syndrome. Other anatomical variations include attachments with muscle bellies of adjacent muscles such as deltoid, brachialis, biceps, extensor carpi radialis longus and abductor pollicis longus. Very rarely the muscle may be absent or digastric where it has two bellies in which

Fig. 2 The superficial branches of the radial nerve are intact and are found traversing above the second belly. The completely detached flap lies adjacently (after release of tourniquet)

the distal belly may be attached to radius or ulna. In this case, the finding of an additional belly was incidental and it did not have any significance with the intended surgical procedure or the outcome. The distal belly had its origin from the surface of the tendon of the brachioradialis and inserted within the same tendon and therefore it has to be considered that its functions were synchronous with the primary muscle belly. As the distal attachment was within the tendon, this anatomical variation could not be called as digastric variation because a digastric muscle is really a muscle in continuity connected by a tendinous junction. Therefore we prefer to name it as a supernumerary or accessory muscle belly of brachioradialis. A variety of anatomical variations of the vascular structures have been described and are more significant and critical to the successful harvest of a radial artery forearm free flap [6–8]. Nevertheless, recognition of the anomalies of muscular structures is also important for proper anatomical orientation and safe harvest. To the best of our knowledge this is the first report of an additional belly of brachioradialis muscle described during the harvest of radial artery forearm free flap.

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