

両腕に見られた浅上腕動脈の一例

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Superficial Brachial Arteries Observed in Bilateral Arms

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Abstract: We describe rare anomalies of the bilateral superficial brachial arteries in a dissected 69-year-old Japanese man in the gross anatomical course. The right and left superficial brachial arteries were observed to originate from the axillary artery, pass over the lateral root of the median nerve, course laterally and superficially to the median nerve, and split into the radial and ulnar arteries in the cubital fossa. The right brachial artery ended in the posterior aspect of the elbow. The left brachial artery ended in the anastomosis with the ulnar artery at the site opposite to the origin of the common interosseous artery. These arterial patterns can be explained by the existence, during the developmental process of the arteries of the arm, of a superficial brachial artery and an anastomotic branch between the superficial brachial and brachial arteries.

Key words: human gross anatomy, median nerve, brachial artery, ulnar artery, radial artery

Introduction

During routine dissections, we sometimes encounter anomalies of the principal arm arteries which have been already reported by numerous anatomists (Bergman et al., 1988). During the past decade, a few papers have also been presented on the anomalies of arm arteries; these include absence of the radial artery (Poteat, 1986), and the presence of a superficial brachial artery (Fuss et al., 1985) as well as a superficial ulnar artery (Ozan et al., 1994; Tohno et al., 1995; Nakatani et al., 1996). Herein, we describe a case in which we observed rare anomalies of the bilateral superficial brachial arteries originating from the axillary arteries, which split into the radial and ulnar arteries in the cubital fossa.

Observations

When we examined the body of a 69-year-old Japanese man who died of heart failure in the gross anatomical course in 1995, we encountered the anomalies.

The relations of the anomalous arteries to other structures are shown in the diagrams in Figs. 1a

and 1b. The right and left axillary arteries branched off the superficial brachial artery at the point where it passed between the roots of the lateral and medial cords of the brachial plexus to the median nerve (Figs. 1c, d). The right and left superficial brachial arteries passed immediately over the lateral root of the median nerve, and coursed laterally and superficially to the median nerve toward the cubital fossa. They gave off muscular branches to the coracobrachialis and biceps brachii. They divided into the radial and ulnar arteries in the cubital fossa (Figs. 1e, f). The right radial artery branched off the radial recurrent artery, but the left did not. The right ulnar artery branched off the ulnar recurrent and common interosseous arteries. The left ulnar artery gave off the radial recurrent, median and common interosseous arteries. Moreover, the left ulnar artery anastomosed with the end of the brachial artery at the site opposite to the origin of the common interosseous artery. The distal part of the anastomosis seemed to be equivalent to the ulnar recurrent artery. Both the radial and ulnar arteries showed their normal courses in the forearm.

The right axillary artery branched off the common artery of the subscapular, and anterior

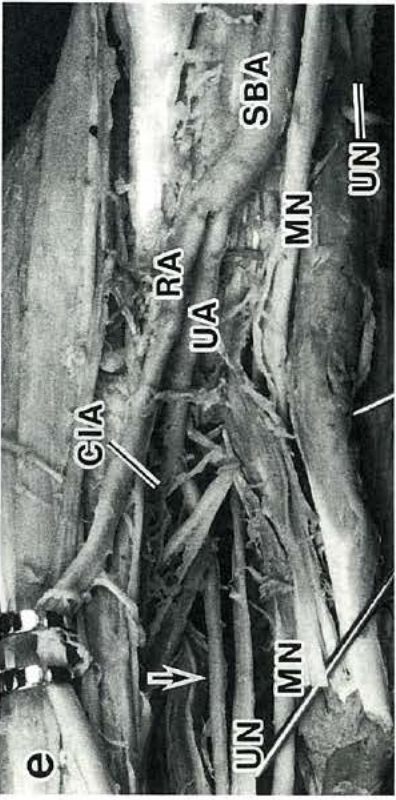
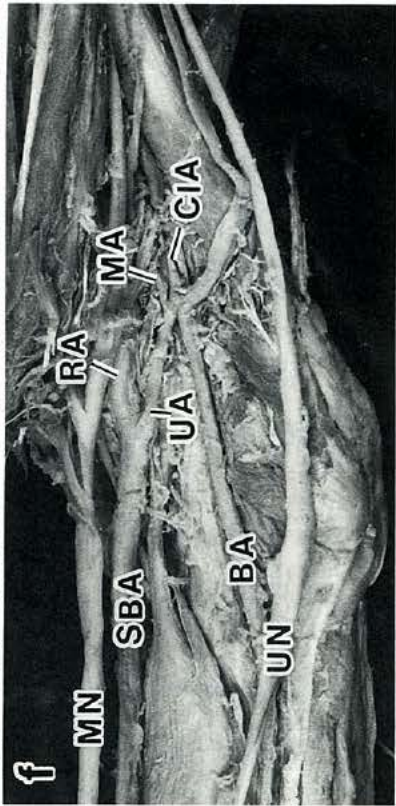
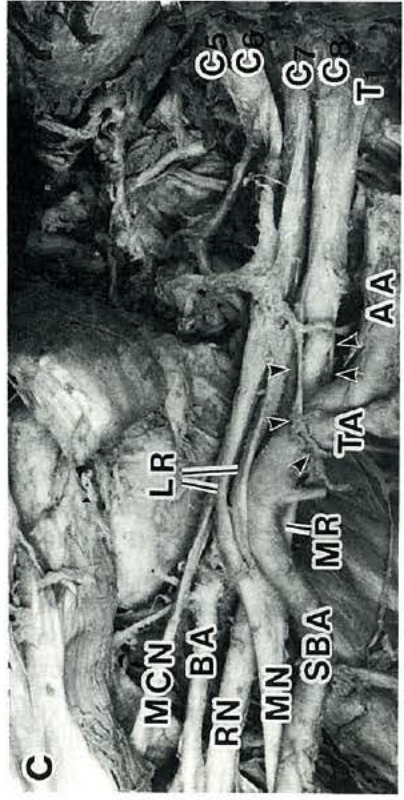
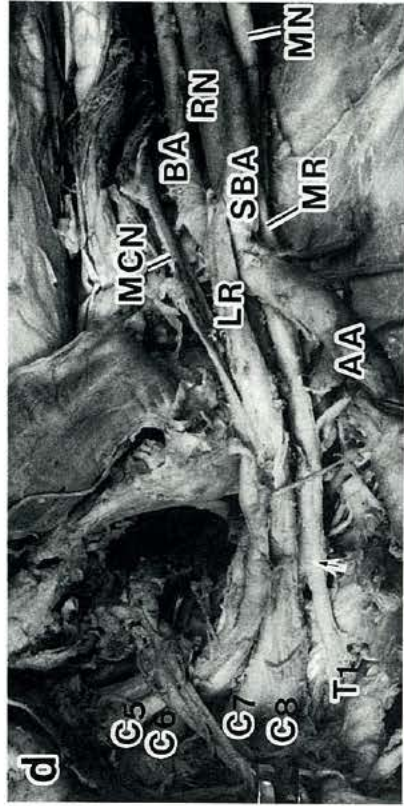
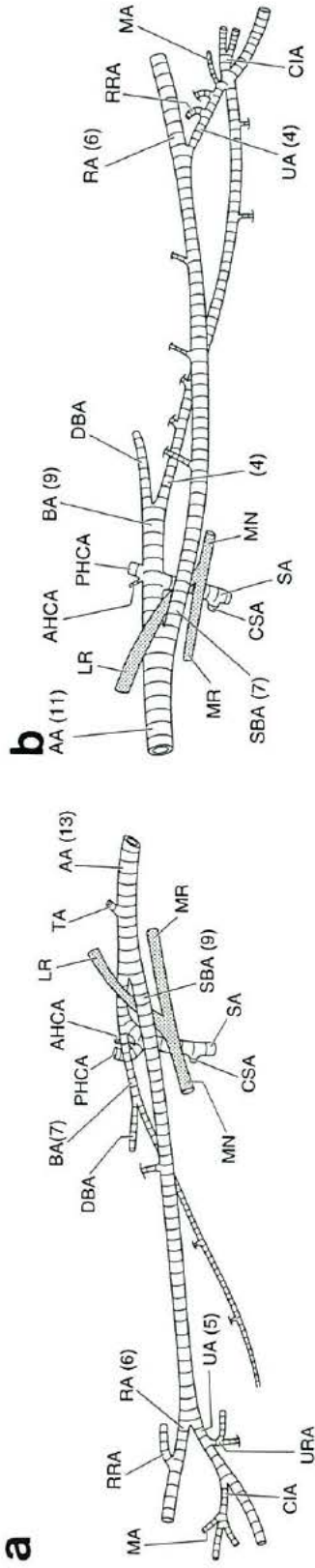


Fig. 1. a and b. These illustrations were drawn by using Adobe Illustration software. Numbers in parentheses indicate the diameters (mm) of the origins of arteries.

- a: This shows the relationship of the median nerve, the superficial brachial and brachial arteries in the right arm.
 b: This shows the relationship of the median nerve, the superficial brachial and brachial arteries in the left arm.
 c: A photograph of the right axilla. C5 and C6, C7, C8 and T1 form the superior, middle and inferior trunks of the brachial plexus, respectively. The median nerve is formed by the connection of two lateral and medial roots of the lateral and medial cords. Pectoral nerves form a loop (arrow heads) around the axillary artery and the origin of the thoracoacromial artery.
 d: A photograph of the left axilla. The superior, middle and inferior trunks of the brachial plexus are formed by C5 and C6, C7 and C8, and T1 alone, respectively. A branch of the middle trunk joins the inferior trunk (arrow).
 e: A photograph of the right cubital fossa. Since the pronator teres and flexor digitorum superficialis muscles are turned toward the ulnar side, the ulnar artery accompanying the ulnar nerve is observed (arrow).
 f: A photograph of the left cubital fossa. The origin of the antebrachial flexor muscle is separated and turned towards the radial side. The ulnar nerve is dislocated from the sulcus of the ulnar nerve.

Abbreviations. AA, Axillary artery; AHCA, Anterior humeral circumflex artery; BA, Brachial artery; C, Cervical nerve; CIA, Common interosseous artery; CSA, Circumflex scapular artery; DBA, Deep brachial artery; LR, Lateral root of median nerve; MA, Median artery; MCN, Musculocutaneous nerve; MN, Median nerve; MR, Medial root of median nerve; PHCA, Posterior humeral circumflex artery; RA, Radial artery; RN, Radial nerve; RRA, Radial recurrent artery; SA, Subscapular artery; SBA, Superficial brachial artery; T, Thoracic nerve; TA, Thoracoacromial artery; UA, Ulnar artery; UN, Ulnar nerve; URA, Ulnar recurrent artery.

and posterior humeral circumflex arteries, and then continued to the brachial artery. It split into the deep brachial artery, concomitant with the radial nerve, and the superior ulnar collateral artery, concomitant with the ulnar nerve, extended small branches to the branchialis and triceps brachii, and ended in the posterior aspect of the elbow. The inferior ulnar collateral artery was indistinct.

The left axillary artery gave off the subscapular artery and the common artery of the anterior and posterior humeral circumflex arteries, and then continued to the brachial artery. After branching off the deep brachial artery accompanying the radial nerve, it descended between the brachial and triceps brachii to the cubital fossa, where it ended in anastomosis with the ulnar artery (Fig. 1f). It accompanied the ulnar nerve before the nerve pierced the median intermuscular septum, similar to the superficial ulnar collateral artery, and then descended along the course of the inferior ulnar collateral artery to the cubital fossa. It supplied the brachial and triceps brachii via several small branches.

Discussion

The reported frequencies of a superficial brachial artery, which originates from the axillary or brachial arteries and splits into the radial and ulnar arteries, are 12% (12 of 100 arms) by Müller (1903), 16.5% (68 of 410 arms) by Adachi (1928), 0.2% (2 of 960 arms) by Miller (1939), 0.9% (7 of 750 arms) by McCormack et al. (1953) and 8.5% (17 of 200 arms) by Fuss et al. (1985). However, the reported incidences of a superficial brachial artery originating from the axillary artery are 3% (3 of 100 arms) by Müller (1903), 3.4% (14 of 410 arms) by Adachi (1928), 0.1% (1 of 960 arms) by Miller (1939), 0.1% (1 of 750 arms) by McCormack et al. (1953) and 4.5% (9 of 200 arms) by Fuss et al. (1985). Moreover, Adachi reported an incidence of 0.2% (1 of 410 arms) for a superficial brachial artery originating from the axillary artery coinciding with the brachial artery anastomoses with the radial or ulnar arteries. Therefore, the bilateral anomalous arteries observed in the present study are rare and unique in that they originate from the axillary artery, cross over the connection

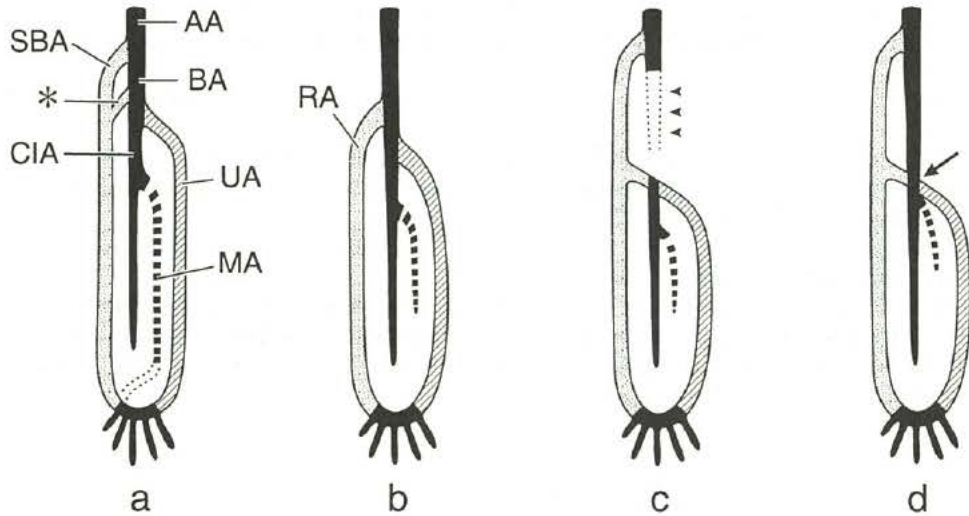


Fig. 2. Diagrams of a hypothesized process for the formation of the anomalous arteries. These are redrawn from Arey (1974).

a: The final stage of development for arm arteries. The asterisk indicates an anastomotic branch between the superficial brachial and brachial arteries.

b: Normal pattern of the principal arm arteries.

c: Pattern of the right arm arteries. The arrow heads indicate the site of disappearance of the distal part of the brachial artery.

d: Pattern of the left arm arteries. The arrow indicates the anastomotic point of the brachial and ulnar arteries.

between the lateral and medial roots of the median nerve, and finally form the radial and ulnar arteries in coincidence with the anastomosis between the right brachial artery and ulnar artery.

According to Singer (1933) and Poteat (1986), at the final stage of the development of arteries in the arm, the anastomotic branch between the superficial brachial artery and the brachial artery becomes enlarged to form, together with the distal portion of the superficial brachial artery, the radial artery: the proximal part of the superficial brachial artery atrophies correspondingly (Figs. 2a, b). Therefore, if the proximal part of the superficial brachial artery remains and the distal part of the brachial artery disappears, the right anomaly would be formed (Fig. 2c). On the other

hand, if the superficial brachial, brachial arteries and the anastomotic branch remain, the left anomaly would be formed (Fig. 2d). However, concerning the left anomaly, since the anastomotic part of the brachial artery with the ulnar artery courses as the inferior ulnar collateral and anterior ulnar recurrent arteries, it is possible for the distal part of the brachial artery to atrophy, and the inferior ulnar collateral and anterior ulnar recurrent arteries to become enlarged.

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両腕に見られた浅上腕動脈の一例

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1995年度の解剖学実習で69歳男性の両腕に浅上腕動脈を見いだした。左右の浅上腕動脈は腋窩動脈から起こり正中神経を乗り越えて肘窩へいたり、橈骨動脈と尺骨動脈に分岐した。右の上腕動脈は肘の後面に終わった。左の上腕動脈は尺骨動脈と吻合して終わった。その吻合部位は総骨間動脈の起始の対面にある。これ

らの血管パターンは腕の動脈の発生形式から、右は上腕動脈の末梢が消失し上腕動脈と浅上腕動脈の交通枝が残存したと考えられ、一方、左は上腕動脈や交通枝が共に残存したと考えられる。

Key words: 肉眼解剖学, 正中神経, 上腕動脈, 尺骨動脈, 橈骨動脈