Unilateral high bifurcation of brachial artery
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Abstract
Introduction
Brachial artery, the principal artery of the arm, usually divides at the level of neck of radius into two branches. This article reports a case of unilateral high bifurcation of the brachial artery.

Case report
We report a case of high division of the brachial artery at the level of insertion of the coracobrachialis muscle. Further course of the ulnar and radial artery after reaching the forearm was usual.

Discussion
This variation, though not very uncommon, occurs in the embryo due to persistence of the upper portion of the radial artery arising from the brachial artery proximal to the origin of the ulnar artery followed by failure of development of the new connection of the radial artery with the brachial artery at the level of origin of the ulnar artery.

Conclusion
High division of the brachial artery has a profound applied importance especially in the field of vascular surgery and radiology, and the possibility of this variation should be borne in mind before any vascular surgery in the region of the forearm or while interpreting arteriograms of the upper limb.

Introduction
The brachial artery usually begins as a continuation of the axillary artery at the distal border of tendon of teres major and ends at about a centimetre distal to the elbow joint at the level of neck of radius by dividing into radial and ulnar arteries. Variations in arterial patterns of the upper limb in adult human bodies have been frequently observed either in routine dissections or in clinical practice. A case of such a variation with its embryological basis and clinical significance is presented and discussed.

Case report
During routine dissection for medical undergraduates at our institute, an unusually high origin of radial artery, that is brachioradial artery, was observed in the left arm of an adult male cadaver of approximately 60 years of age. The radial artery arose at the level of insertion of the coracobrachialis muscle (Figures 1 and 2). Profunda brachii, superior collateral and inferior collateral arteries arose from the brachial artery after the origin of radial artery (Figure 3). The brachial artery continued as ulnar artery in the forearm. Further course and branching patterns of the radial and ulnar arteries in the forearm and palm were usual. The right arm revealed no unusual vascular observations.

Discussion
In the upper limb bud, the axis artery is derived from the lateral branch of the seventh intersegmental artery, that is subclavian artery (Figure 4). The proximal part of the main trunk of this artery forms axillary and brachial arteries and its distal part persists as anterior interosseous artery and deep palmer arch. Radial and ulnar arteries are last to appear in the forearm from the axis artery, that is brachial artery. Initially, the radial artery arises more proximally than the ulnar artery. Later, it establishes a new connection with the main trunk at or near the level of the ulnar artery. The upper portion of its original stem usually disappears to a large extent. Persistence of the upper portion of the radial artery arising from the brachial artery proximal to origin of the ulnar artery followed by failure of development of the new connection of the radial artery with the brachial artery at the level of origin of the ulnar artery causes this type of anomaly.5

Diagnostically, this variation may disturb the evaluation of arteriography images and can have serious implications in orthopaedic, plastic

Figure 1: Radial artery arising at a higher level in the left arm. TM, teres major muscle; CBM, coracobrachialis muscle; PBA, profunda brachii artery; RA, brachial artery; SUCA, superior ulnar collateral artery; MN, median nerve.
Incidences of brachioradial artery in earlier studies are depicted in Table 1. There were no statistical differences in the sides, that is left or right, and sexes in any of these studies.

Figure 2: Origin, branching of brachial artery and course of radial artery in the left forearm. AA, axillary artery; BA, brachial artery; BRA, brachioradial artery; RA, radial artery; UA, ulnar artery.

Figure 3: Usual branching of brachial artery just distal to elbow joint into radial and ulnar arteries in right arm. BA, brachial artery; RA, radial artery; UA, ulnar artery; RRA, recurrent radial artery.

Figure 4: Lateral branch of seventh intersegmental artery in embryo from which subclavian artery develops.
Case report

Table 1. Incidence of high origin of radial artery, that is brachioradial artery, as reported by earlier workers

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n, sample size; BRA, total incidence of brachioradial artery; %, incidence of brachioradial artery in percentage. Cited from Anatomy for Surgeons by Hollinshead

Conclusion
Variations in arterial pattern of the arm and forearm are not uncommon. These variations have an embryological basis and need to be taken into consideration while analysing angiograms and planning surgeries in the upper extremity.

References