Case Report

Superficial tortuous brachial artery — a case report

Abstract

Variations of the upper limb arterial system are well documented. An accurate knowledge of the usual and variant arterial anatomy of the axillary and brachial arteries is important for the clinical procedures and vascular radiology. In this article we are reporting a case of superficial tortuous brachial artery. During routine dissection of a male cadaver at the Department of Anatomy in the Dr. D. Y. Patil Medical College, the left brachial artery was found to be tortuous. On further dissection it was seen that the superficial brachial artery was arising from the third part of the axillary artery proximal to the origin of the posterior and anterior circumflex humeral arteries. At the lower border of teres major, the axillary artery was continuing as main brachial artery. The ulnar collateral artery was a branch from the main brachial artery. The brachial artery continued in the cubital fossa finally ending as muscular branches. Median artery of the forearm was arising from the superficial brachial artery, which was accompanying the median nerve. The superficial brachial artery finally divided into ulnar and radial arteries of the forearm.


Key words [superficial] [tortuous] [brachial artery] [variation]

Introduction

A superficial brachial artery (SBA) is defined as an artery running superficial to the median nerve. It may replace the main trunk or may be accompanied by an equally important trunk running deep to the median nerve.

Variations in the arterial pattern of the upper limb are commonly encountered in routine dissections, and the SBA is one of the major variations [1–3]. According to the literature, its frequency and branching pattern vary among ethnic groups.

The SBA originates from the axillary artery and runs superficial to the median nerve [4]. The presence of the SBA can be hazardous because it is very vulnerable to injury [5]. An accidental intra-arterial injection via the SBA can cause thrombosis or gangrene, leading to amputation of the arm or fingers [6]. Conversely, the SBA can be used as a feeding artery to a free flap from medial arm skin [7].

Considering these possible complications and benefits, investigations of the arterial pattern in patients’ arms before any invasive procedures may be helpful in avoiding iatrogenic injury or in using an SBA for some procedures. Doppler ultrasound imaging or angiography can assist healthcare providers in treating patients with an SBA. Whether those devices are available or not, anatomical knowledge of the SBA is essential.

Case Report

During routine dissection of a male cadaver, of unknown age and ethnicity, the left brachial artery was found to be tortuous.

It was observed that the superficial brachial artery was arising from the third part of the axillary artery proximal to the origin of the posterior and anterior circumflex humeral arteries (Figures 1, 2). On following it in the arm, it was observed that at the lower border of teres major, the axillary artery was continuing as main brachial artery. The ulnar collateral artery was a branch from the main brachial artery. The brachial artery continued in the cubital fossa finally ending as muscular branches. Median artery of the forearm was arising from the superficial brachial artery, which was accompanying the median nerve. The superficial brachial artery finally divided into ulnar and radial arteries of the forearm (Figure 3).
Arey is of the view that anomalous blood vessels may arise due to [8]:

- The choice of unusual paths in primitive vascular plexus.
- The persistence of vessels normally obliterated.
- The disappearance of vessels normally retained.
- Incomplete development.
- Fusions and absorption of the parts usually distinct.

In normal morphogenesis, the SBA is not an erroneous variation but an essential blood vessel. The SBA is an important vessel in fetal life for replacing or supporting the definitive brachial artery. Rodríguez-Baeza et al. suggested that the hemodynamic predominance of certain arterial segments during development determines whether the SBA will remain [9].

The SBA emerges from the axillary artery during stage IV of upper limb vascular development. It is joined to the axillary artery via several deep branches at the level of the axilla, upper arm, and elbow. A surviving SBA will have one of three possible outcomes:

- The SBA may overtake the territory of the definitive brachial artery.
- It may form a parallel artery to the deep brachial artery.

**Discussion**

**Ontogeny**

Arey is of the view that anomalous blood vessels may arise due to [8]:

- The choice of unusual paths in primitive vascular plexus.
- The persistence of vessels normally obliterated.
- The disappearance of vessels normally retained.

![Figure 1](image1.png)

**Figure 1.** Photograph showing the origin and course of the superficial brachial artery (B). (A: branch passing between the cords of brachial plexus; C: anterior and posterior circumflex humeral arteries; D: deep brachial artery; E: axillary artery)

![Figure 2](image2.png)

**Figure 2.** The superficial brachial artery (A) is arising from the axillary artery. The axillary artery then gives anterior and posterior circumflex humeral arteries (C), and finally continues as the deep brachial artery (B).

![Figure 3](image3.png)

**Figure 3.** The superficial brachial artery (D) turns tortuous and continues in the cubital fossa, superficial to the median nerve (F). The deep brachial artery (E) breaks into two branches. One continuing in the cubital fossa (C) and the other (B) accompanied by the ulnar nerve (A) passes with it behind the medial epicondyle.

![Figure 4](image4.png)

**Figure 4.** Superficial brachial artery (A) gives the median artery of the forearm (B). Finally it breaks into its 2 terminal branches, the radial artery (C) and the ulnar artery (D).
Superficial tortuous brachial artery

- It can disappear as it turns into small cutaneous blood vessels.

Generally the SBA arises from the axillary artery between the contributions of medial and lateral cords of brachial plexus to median nerve, which was the finding in this case. Also it was lying lateral to the deep brachial artery before dividing into radial and ulnar arteries in the region of elbow. This type of division had been earlier described by Anson [10].

The median artery of the forearm was an additional finding in this case. Previous studies had generally shown that the SBA was ending by dividing into radial and ulnar arteries. But in this case it was found that a median artery of the forearm was also present, which was arising before the SBA divided into its terminal branches.

Embryology

During development of the blood supply of the upper limb, the brachial artery continues and gives the radial and the ulnar arteries. Under certain conditions the superficial branch arises. The fate of the later can be varied. But most commonly it gives the two terminal branches i.e. the radial and the ulnar.

Conclusion

The superficial brachial artery was the main continuation in the forearm in this case. So an occlusion of this artery would lead to complete occlusion in the forearm and gangrene. Being superficial it may be mistaken for a vein and thus may be mistaken for intravenous cannulation or intravenous injection. Also it will be useful for cutaneous flaps.

References


