

Clinical Significance Of Accessory Superficial Ulnar Artery – A Case Report

¹Dr. S.Priyadharshini, ²Dr. CHNV Bharath, ³Dr. P. Bapujij, ⁴Dr. V. Nagaguhan

¹Professor, ^{2,4}Assistant Professor, ³Professor and HOD,

^{1,2,3}Department Of Anatomy, ⁴Department Of Biochemistry,

^{1,3}Alluri Sitaramaraju Academy Of Medical Sciences, Malakkapuram, Eluru, West Godavari

²Government Medical College, Eluru,

⁴All India Institute Of Medical Sciences, Mangalagiri Guntur

*Corresponding Author:

Dr. S.Priyadharshini

Professor, Department Of Anatomy, Alluri Sitaramaraju Academy Of Medical Sciences,
Malakkapuram, Eluru, West Godavari

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Major arterial variation in upper limb have been reported in 11- 24.4% of the individuals and may have significant clinical implications. The overall incidence of superficial ulnar artery was between 0.67% and 9.38%. The presence of Accessory Superficial Ulnar Artery is due to persistence of SUA proximal to the anastomotic connection between SUA and brachial artery. Detailed knowledge of these variations is needed for anaesthetists, orthopedician, plastic surgeon and cardiologist before planning any procedure in the upperlimb to prevent unwanted complications.

Keywords: Superficial ulnar artery, Brachial artery, Intra arterial injection

Introduction

A Even for experienced anaesthetist, identifying a superficial blood vessel as an artery or vein is not always easy. It has been recommended that by means of palpation one can differentiate artery from vein (1). Several anaesthetists suggests that the absence of pulsation is an unreliable sign as tourniquet application causes partial occlusion of arterial blood flow in many cases (2,3). Once intra-arterial cannulation has occurred, indicators include pulsatile retrograde flow of blood, intense pain on injection of drugs and cutaneous signs of distal ischaemia. Anaesthetists should be aware of common anatomical variations to prevent intraarterial cannulation and also for early detection if it occurs.

Variations in the major arteries of the upper limb are estimated to be present in up to one fifth of people, and may have significant clinical implications. Superficial ulnar artery (SUA) is an uncommon

variation in which the ulnar artery arises directly from axillary or brachial arteries and throughout its course remains superficial to the flexors of the forearm. Anaesthetists, Orthopedician, Surgeons and Plastic surgeons should be aware of this variations.

Case Report

Methodology

During the routine educational dissection study for the practical demonstration of the first year medicine students in the year 2023, we found this unique variation in the right upper limb of a 60 year old female cadaver in the department of Anatomy, ASRAM medical college, Eluru. The cadaver was examined and does not have any pathological lesion, traumatic lesions or surgical procedure in the axilla, arm, forearm and hand.

Observation

The superficial ulnar artery is an uncommon variation. In the present case, the accessory SUA was given from the brachial artery at the level of distal arm. It then descends along the arm superficial and medial to the median nerve (fig 1). In the cubital fossa, the artery was superficial to the bicipital aponeurosis and was crossed by median cubital vein. In the forearm the artery runs obliquely downwards in the venteromedial aspect superficial to the forearm flexor muscles over the antebrachial fascia to reach the distal third of the forearm, and lies lateral side of ulnar nerve (fig 2). The artery then passed superficial to the flexor retinaculum where it divided into two terminal branches. The superficial branch anastomosed with the superficial palmar branch of the radial artery to complete superficial palmar arch (fig 2), whereas deep branch completes the deep palmar arch with the radial artery.

The brachial artery had a usual course in the arm and at the level of neck of radius it divided into the radial and deep ulnar artery (Figure 4). The radial artery had its usual course and branching pattern. The deep ulnar artery gives ulnar recurrent and common interosseous branches and finally passed deep to flexor muscles of forearm. The left upper limb also had similar type of course and variations.

Discussion

Major arterial variation in upper limb have been reported in 11- 24.4% (4) of the individuals. The overall incidence of superficial ulnar artery was between 0.67% and 9.38%.

The bilateral presence of superficial ulnar artery is even more rare. One such case was presented by Yazar et al (5) who showed that SUA originated from axillary artery and brachial artery in left and right sides respectively, but in our case it originates from the brachial artery on both sides.

Like superficial radial artery, SUA also lies in close association with basilic vein and superficial throughout its course and likely to get injured during unintended vascular procedure in patients with difficult venous access and forearm surgeries. In our case SUA was superficial to the bicipital aponeurosis which may leads to accidental intraarterial injection and strain in certain angiographic procedures(6)

The presence of Accessory SUA like in our present case where it is superficial throughout, gives

satisfactory alles test before performing free forearm flap but when get accidentally ligated while rising radial flap leads to compromise of circulation in hand (7), but on the other hand it is beneficial to the surgeons as it supplies forearm flap.

Embryological Basis

Poteat WL [1986] modified the Singer's model of development. He proposed that the ulnar artery develops like the radial artery [a 'Superficial Ulnar Artery system' of high origin, which anastomoses with the deep artery before the proximal segment atrophies]. Poteat explains the presence of this accessory SUA as the persistence of the embryological vessels due to a hemodynamic predominance of the superficial over deep arterial system at the origin of the ulnar artery (8,9). The anastomotic connection between the brachial and superficial ulnar artery become the ulnar artery and proximal part of SUA disappears normally.

Based on the above theory, we can conclude our case report that the presence of accessory superficial ulnar artery is due to persistence of SUA proximal to the anastomotic connection between SUA and brachial artery.

Conclusion

Anatomical variation of major arterial system of upperlimb causes severe circulatory disturbances if ignored clinically. Detailed knowledge of these variations is needed for anaesthetists, orthopedician, plastic surgeon and cardiologist before planning any procedure in the upperlimb to prevent complications

References :

1. Lirk P, Keller C, Colvin J, et al. Unintentional arterial puncture during cephalic vein cannulation: case report and anatomical study. *Br J Anaesth* 2004; 92: 740–2
2. Duggan M, Braude BM. Accidental intra-arterial injection through an 'intravenous' cannula on the dorsum of the hand. *Paediatr Anaesth* 2004; 14: 611–12
3. Ghouri AF, Mading W, Prabaker K. Accidental intra-arterial drug injections via intravascular catheters placed on the dorsum of the hand. *Anesth Analg* 2002; 95: 487–91

4. Uglietta JB, Kadir S. Arteriographic study of variant arterial anatomy of the upper extremities. Cardiovasc Intervent Radiol.1989;12:145-48.
5. Yazar F ,Ozan H, Aldur MM. An unusual variation of the superficial ulnar artery. Surg Radiol Anat. 1999;21:155-57.
6. Chin KJ, Sing K: The superficial ulnar artery- a potential hazard in patients with difficult venous access. Br J Anaesth 2005, 94(5):692-693
7. Fatah MF, Nancarrow JD, Murray DS [1985]. Raising the radial artery forearm flap: the superficial ulnar artery 'trap'. Br J Plast Surg. 38:394-5.
8. Poteat WL [1986]. Report of rare human variation absence of radial artery. Anat Rec. 214:89-95
9. Singer E [1933]. Embryological pattern persisting in the arteries of the arm. Anat Rec. 5:403-9.