

Case Report

BILATERAL VARIANT ORIGIN OF ULNAR ARTERY-A CASE REPORT

***Bhimai Devi N, Narasingarao B and Sunitha V**

Department of Anatomy

Maharajah's Institute of Medical Sciences, Nellimarla, India – 535 217.

ABSTRACT

Knowledge of variations in arterial pattern is important for clinicians. Variations are well documented. The superficial ulnar artery is a well known but rarely encountered abnormality. In the present case the ulnar artery took origin from brachial artery in cubital fossa and had a superficial course on the flexor muscles of the front of fore arm. Anterior interosseous and posterior interosseous arteries are given out by the radial artery in the cubital fossa. Superficial position of these vessels make them more vulnerable to trauma. It is important to the surgeons to prevent complications during surgical procedures.

Key Words: *Superficial Ulnar Artery, Anterior Interosseous Artery, Posterior Interosseous Artery, Brachial Artery*

INTRODUCTION

Amongst the arterial variations it is of immense importance as the knowledge of course of vasculature of fore arm is important to orthopedic surgeons, radiologists and cardiac surgeons. Variation and anomalous pattern of arterial system has been well documented, (Bergeman et al 1988, Tountas et al 1993). The variations and anomalous arterial system can be best explained on the embryological development of vascular plexus of the limbs (Jaurjus et al 1986). The superficial ulnar artery is well known for variations but very rarely encountered bilaterally (Anil et al 1996, Nakatani 1996). The superficial position of ulnar artery makes it more vulnerable to trauma and thus leading to hemorrhage. However, the accessibility of ulnar artery is accountable for easy cannulation whenever necessary. Commonly the superficial position of ulnar artery may be mistaken for a vein in such case such misinterpretation may lead to wrong interpretation of angiographic images of severe disturbances of hand irrigation during surgical process of fore arm. Patency of ulnar artery is very important for raising a free radial forearm flap in which case the blood supply of hand will be entirely dependent on ulnar artery. This has a lot of relevance in surgical procedures of forearm and hand. A reported incidence of 0.17 to 2% has been quoted by Srinivasulu Reddy and Venkata Ramana Vollala (2007). Clinical incidence of 9% also has been quoted in the literature. Devansh (1996) also emphasized the importance of superficial ulnar artery in the forearm flap surgery.

CASES

During the routine dissection on 60 year male cadaver, a rare bilateral variation of ulnar artery in the fore arm and aberrant origin of interosseous artery was observed. In both the limbs the brachial artery was terminated as ulnar and radial arteries in the cubital fossa in the normal way. However the ulnar artery took a different direction passing superficial to flexor group of muscles lying deep to antebrachial fascia and medial to ulnar nerve (Fig 1). The course of ulnar artery continued superficial to flexor retinaculum and bifurcated as superficial and deep branches and completed the formation of superficial and deep palmar arches. The other terminal branch of brachial artery, the radial artery gave origin to anterior and posterior interosseous arteries separately in the cubital fossa (Fig 2).

DISCUSSION

Bergman et al (1988) reported variations in the arterial system of upper limb. Amongst all the variations the superficial ulnar artery is of immense practical value for surgeons whose field of interest is trauma and pathology of upper limb, so as to minimize the iatrogenic complications. Number of authors have been described the variations in the higher origin of superficial ulnar artery.

Case Report

Kithsiri *et al.*, (2007) and Srinivasulu Reddy *et al.*, (2007) have reported superficial ulnar artery piercing brachial fascia and becoming superficial to antebrachial fascia and passed superficial in forearm. In the present case however, the ulnar artery is deep to antebrachial fascia but superficial to flexor group of muscles.



Fig 1: Showing ulnar artery superficial to all flexor muscles of forearm.

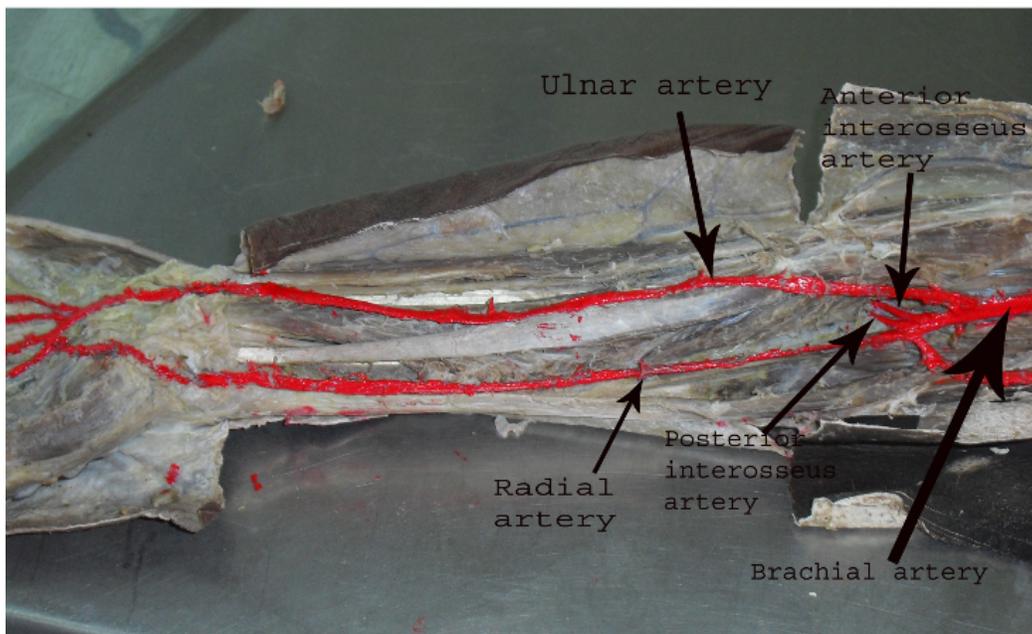


Fig 2: Showing the origin of anterior & posterior interosseus branches from Radial artery.

Embryology

A model of development of arteries of upper limb in 5 stages has been proposed (Senior 1926 & Singer). As per their model an axial system develops first while the other branches develop from the axial system. In the adult the axial system includes axillary artery, brachial artery, anterior interosseus artery. Median artery is a branch of anterior interosseus artery (stage 2). Afterwards ulnar artery makes its appearance from brachial artery. At stage 4 a superficial axillary artery developed and continued as radial artery. Regression of median artery and anastomosis of both brachial artery and superficial brachial artery and

Case Report

with regression of proximal segment of superficial brachial artery resulted in definitive radial artery. This has been unanimously accepted. Poteat (1986) modified Singer's model and proposed a via media of stage 2 and 3 making ulnar artery to appear in the arm. Rima Dada R. et al (2005 to 2008) also proposed 5 stages. These authors proposed that ulnar artery branches from brachial artery at stage 3. The present anomaly thus has been explained by the persistence of haemodynamic issue of superficial system over deep system at the origin of ulnar artery. Genetic inheritance is seemingly prevalent cause of such variations. All other factors like foetus in utero, first limb movement and unusual muscular development are additions (Poteat 1986).

Conclusion

Vascular anomalies of forearm tend to increase the likelihood of damage during surgery. The unusual course of ulnar artery and aberrant origin of interosseous arteries increase the vulnerability in different surgical procedures. As such it is of utmost important for all clinicians to have a watch of possible arterial variations in order to prevent complications during diagnostic and surgical procedures.

REFERENCES

- Anil A, Turgut HB and Peber T V (1996).** A variation of the superficial ulnar artery. *Surgical and Radiologic Anatomy* **18** 237-240.
- Bergman RA, Thomson SA, Affifi AK, Saadeh FA (1988).** *Compendium of human anatomic variations.* Urban and Schwarzenberg. Baltimore Munich
- Devansh (1996):** Superficial ulnar artery flap plastic and reconstructive surgery **97**(2) 420 to 426
- Jurjus A, Sfeir R, Bezirdijan R (1986).** Unusual variation of the arterial pattern of human upper limb. *Anatomical Record* **215**(1) 82-83.
- Kithsiri J Senanayake, Sujatha Salgado, Manjula J Rathnayake, Ranil Fernando and Kosala Somarathne (2007).** A rare variant of the superficial ulnar artery and its clinical implications: a case report *Journal of Medical Case Reports* **1** 128
- Latika Arora, Rima Dada R, (2005-2008),** Superficial ulnar artery- A Case Report *Indian Journal for the Practicing Doctor* **2**(3).
- Nakatani T, Tanaka S, M Inzubami S et al., (1996).** The superficial ulnar artery originating from the axillary artery. *Anatomischer Anzeiger* **178** (3) 277-279.
- Poteat WL(1986).** Report of rare human variation: absence of the radial artery *Anatomical Record* **214**; 89-95.
- Senior H.D(1926).** A note on the development of radial artery *Anatomical Record* **32** 220-221.
- Singer E(1993).** Embryological pattern persisting in the arteries of the arm. *Anatomical Record.* **55** 403-409.
- Srinivasulu Reddy, Venkata Ramana Vollala (2007).** Superficial ulnar artery- Development and clinical significance, *Jornal Vascular Brasileiro* 6 no. 3 Porto alegre.
- Tountas CHP, Bergman RA(1993).** Anatomic variations of the upper extremity. Churchill Livingstone, New York pp196-210.