

HIGH ORIGIN OF ABERRANT ULNAR ARTERY – A CASE REPORT

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ABSTRACT

Variation in upper limb vessels are common and knowledge of these variations is important as for as orthopedic surgeons, vascular surgeons, plastic surgeons, radiologists and anatomists. High origin of ulnar artery is a rare variation where the artery takes origin either from axillary artery or from brachial artery in axilla or arm correspondingly and runs a superficial course in the forearm and ends by participating in the formation of superficial and deep palmar arch in the hand. During routine anatomy dissection for undergraduate students we found a case of high origin of unilateral superficial ulnar artery (SUA), which took its origin from axillary artery in left upper limb of a 70 year old male cadaver. In the present journal review of literature regarding anatomy, embryology, & clinical significance of anomalous artery is discussed.

Keywords: orthopedic, ulnar artery, axilla, palmar.

INTRODUCTION

The subclavian artery becomes continuous as the axillary artery as it passes over the first rib. The axillary artery later becomes continues as brachial artery at the lower border of the teres major muscle, brachial artery courses in the flexor compartment of the arm, reaches cubital fossa and at the neck of radius gets terminates by dividing into radial and ulnar arteries. The ulnar artery arising from the cubital fossa passes obliquely downwards and medially deep to the ulnar heads of pronator teres and later covered by the flexor carpi radialis, Pal-

maris longus and flexor digitorum superficialis in the upper half of the forearm. In the lower half of the forearm it courses between flexor digitorum superficialis laterally and flexor carpi ulnaris medially being covered by the skin, superficial fascia and deep fascia. The artery enters the palm by passing through the canal formed between the flexor retinaculum and its medial superficial slip, lateral to the pisiform bone. At this level artery gets terminates by dividing in to superficial and deep branches which ends by involving in the for-

mation of superficial and deep palmar arch respectively¹.

Superficial ulnar artery (SUA) is defined as the ulnar artery, which branches from either axillary artery or from the brachial artery, it courses superficially in the forearm over the flexor muscles and coexist with a brachial or superficial brachial artery that branches into either, radial and common interosseous artery or less frequently into radial and ulnar arteries^{2, 3, 4, 5}. The frequency of the presence of

Case report:

During routine anatomical dissection for undergraduate students, we observed a case of high origin of unilateral SUA in left upper limb of a 70 year old male cadaver. The SUA got originated from the infrapectoral part of axillary artery above the level of insertion of deltoid muscle to the humerus. The SUA coursed medial to the brachial artery in the plane between biceps brachii and brachialis in the arm. At the cubital fossa the aberrant artery located medial to the median nerve and passed deep to the bicipital aponeurosis. Later in the forearm the artery was in a superficial plane over the pronator teres, flexor carpi radialis, Palmaris longus and flexor digitorum superficialis. The artery placed between tendons of flexor digitorum superficialis laterally and flexor carpi ulnaris medially in the lower one third of the forearm. Further it courses in the wrist through a canal between flexor retinaculum and its medial superficial slip, where it terminated by dividing into superficial and deep branches which later involved in the formation of superficial and deep palmar arches respectively.

this anomalous artery ranges from 0.17% to 2.00 %^{2, 6, & 7}.

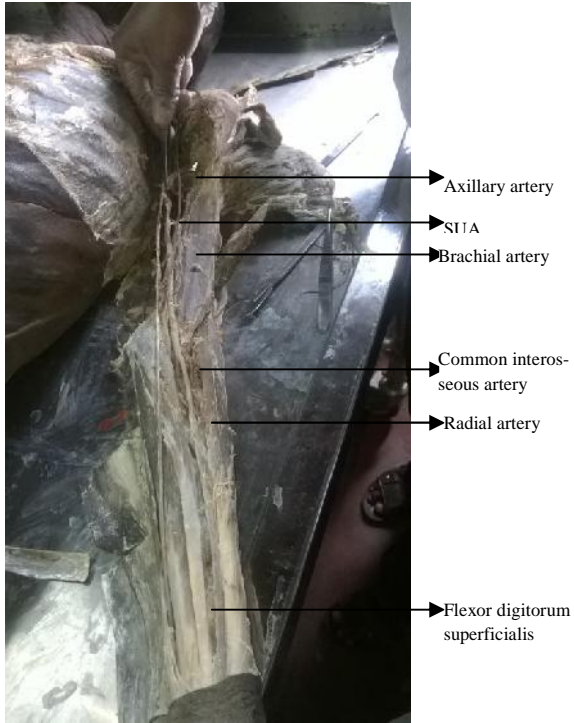
Variation in the upper limb arterial pattern is common, high origin of ulnar artery from axillary artery and its superficial course in the forearm, is considered to be a rare variation with clinical significance⁴. This report presents a case of unilateral SUA with discussion regarding embryological description and clinical implication of such variation.

After the origin of SUA, the axillary artery continued as brachial artery which got terminated by dividing into radial and common interosseous arteries in the cubital fossa.

DISCUSSION

Variation in arterial pattern of upper limb are well documented and considered quiet common as they have an incidence of upto 20%^{8, 9, 10, 11}, and incidence of SUA ranges from 0-9.38% (table 1), however incidence of SUA arising from the axillary artery is reported to be 0.17% to 2.00% (table 2)².

The superficial course of ulnar artery is considered to be clinically significant which will be at risk during trauma and intravenous cannulation. This may also lead to accidental intra-arterial injections and difficulties in angiographic procedure¹². It may also at high risk of damage during forearm reconstructive surgeries using flaps. Free forearm flaps based on the radial artery may damage the SUA and cause ischemia of the hand.



Further knowledge of SUA is also important in following clinical interventions-

1. When treating a rupture of the distal bicipital tendon an orthopedic surgeon should be aware of this atypical blood vessel¹³.
2. This is important in patients who require surgical intervention because of a thrombosed forearm artery and poor collateral circulation¹³.
3. A SUA may complicate intravenous drug administration with disastrous results^{14, 15}.
4. The artery may be mistaken for a persistent median artery¹⁶.
5. The SUA can cause misinterpretation of incomplete angiographic images^{14, 17}.

Table 1: Overall incidence of SUA²

Author (year)	Samples	Incidence	%
Quain (1844)	422	29	6.87
Gruber (1867)	700	20	2.86
Breme (1899)	388	7	1.8
Muller (1903)	100	2	2
Adachi (1928)	1198	8	0.67
Miller (1939)	480	0	0
Hazlett (1949)	188	6	3.19
McCormack et al. (1953)	750	17	2.27
Weatherby (1956) (still born)	451	3	0.67
Weatherby (1956) (cadaver)	408	10	2.45
Fuss et al. (1985)	200	3	1.5
Unglietta and Kadir (1989)	100	1	1
Rodriguez-Beaza et al. (1995)	160	8	5
Devash (1996) (cadaver)	32	3	9.38
Devash (1996) (patient)	76	7	9.21
Fedel and amonoo-Kuofi (1996)	144	2	1.39
Nakatani et al. (1998)	150	1	0.67
Rodriguez-Niedenfuhr et al. (2000)	158	8	5.06

Rodriguez-Niedenfuhr et al. (2001)	150	7	4.67
Latha et al. (2002)	100	1	1

Table 2: Incidence of SUA originating from axillary artery²

Author (year)	Samples	Incidence	%
Gruber (1867)	700	4	0.57
Breme (1899)	388	1	0.26
Muller (1903)	100	1	1
Adachi (1928)	1198	2	0.17
Hazlett (1949)	188	3	1.6
McCormack et al. (1953)	750	7	0.93
Fuss et al. (1985)	200	1	0.5
Unglietta and Kadir (1989)	100	1	1
Rodriguez-Beaza et al. (1995)	160	2	1.25
Rodriguez-Niedenfuhr et al. (2001) (Embryos)	150	3	2
Rodriguez-Niedenfuhr et al. (2001) (Cadaver)	384	4	1.04

In plastic surgeries, however if preoperatively this anatomical variant artery is diagnosed, then a reliable flap can be designed over the SUA and it will be quick and easy to raise¹⁸.

Developmentally upper limb bud is initially supplied by a vascular plexus derived from four or five consecutive inter-segmental branches of the dorsal aorta. In the early period of development, the seventh cervical inter-segmental branch enlarges and becomes consolidated as axis artery to the developing upper limb. The axis artery gives rise to subclavian, axillary, brachial, and common interosseous arteries. Other arteries of the upper limb develop as branches of axis artery^{19, 20}. Reason for SUA as in present case may be due to ulnar artery establishing connection with axis artery in the axilla and the bifurcation of brachial artery into radial and common interosseous arteries may be due to the posterior interosseous artery arising from the axis artery

just distal to the connection of radial artery with the axis artery in the cubital fossa and the continuation of axis artery between radial and posterior interosseous arteries being the common interosseous artery.

CONCLUSION

High origin of ulnar artery and its superficial course in forearm is a rare variation with significant clinical importance. Knowledge of this variant artery is not only important for anatomists but also for clinicians, surgeons, radiologists, paramedical staff and nursing staff because of chances of injury to this artery will be at higher end during cannulation and intravenous injections.

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