

Research Article

PERSISTENT MEDIAN ARTERY

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ABSTRACT

A variation in the arterial patterns in humans is a common observation. Diagnosis of such variations would be of immense value to various disciplines of medical science like Plastic surgery, Traumatic hand surgery, Imaging radiology, Interventional cardiology, cardiothoracic surgery and vascular surgery. In the present study spanning two academic sessions of the IMBBS dissection (2011-2013) a 50 year old male cadaver showed a palmar type of Persistent Median artery which completed the superficial palmar arch running deep to the flexor retinaculum and supplying the hand along with medial contributor of the Superficial palmar arch which is the ulnar artery.

Key Words: *Persistent Median Artery, Arterial Patterns, Flexor Retinaculum and Superficial Palmar Arch*

INTRODUCTION

Variations of the arterial patterns in the upper limbs have been reported by several investigators in anatomical study due to their high incidence. The Axis artery of the upper limb is the lateral branch of 7th inter-segmental artery along the ventral axial line which terminates as a capillary plexus in the developing hand; with the regional demarcation of the main trunk into three parts as proximal (axillary), middle (brachial) and distal (anterior interosseous) arteries. Latter, a median artery develops from the anterior interosseous artery and courses along with the median nerve communicating with the palmar plexus subsequent to the development of ulnar and radial arteries which contribute to the formation of superficial and deep palmar arches respectively this median artery regresses. This presents as a slender arteria nervii mediana disappearing into the substance of the median nerve. However an incidence of 8% of a larger persistent median artery into adult life was reported by Lippert (1885). Eid (2011) reported two cases of unilateral PMA with variation in the level of the origin of the median artery which persisted into the adult life. In the present study a careful dissection of forearms of 25 cadavers during the (2011-13) academic years could identify one case of unilateral PMA. George (1996) reported a 50% incidence of PMA amongst the 60 South African neonates in which the study was carried out which, is comparatively a very high incidence. Jones (1988) attributed PMA to be another aetiological factor responsible for carpal tunnel syndrome and pronator syndrome.

MATERIALS AND METHODS

The present study was done on 25 cadavers who include 50 upper limbs during 2011-2013 in the Department of Anatomy, Maharajah's Institute of Medical Sciences, Nellimarla, Vizianagaram. The age of the prebalmmed cadavers of either sex ranged from 30 to 60 years as per the records. Dissection of the upper limbs of both sides was performed following cunninghum's manual of practical Anatomy. In the left forearm of a 50 year old male cadaver a large artery was found to be completing the superficial palmar arch on the radial side instead of the radial artery with the ulnar artery. Further dissection was performed by dividing refecting the flexor retinaculum, the superficial palmar arch was exposed its branches were traced and communication with the deep palmar arch was also verified.

Observations

It was found that the superficial palmar arch is being formed by the ulnar artery on the medial side and is being completed on the radial aspect by a large artery. This large artery was entering the palm through the carpel tunnel underneath the flexor retinaculum. The artery completing the superficial palmar arch was

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traversing over the median nerve in the hand. Hence further dissection was performed and was found that this large artery was originating high up in the middle third of the forearm.

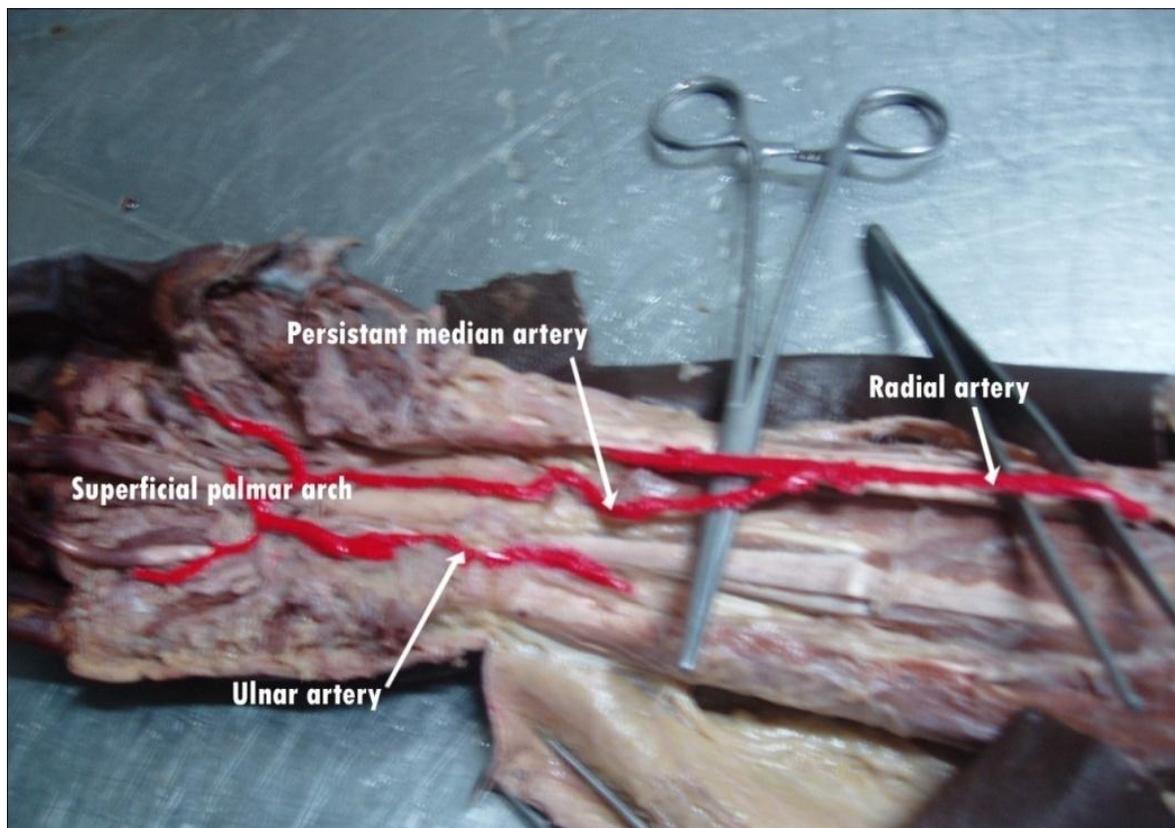


Figure 1: Showing the Persistent Median Artery, ulnar artery, radial artery and superficial palmar arch

The Radial artery was present in its normal course in the distal forearm. Then it passed over the distal half of the forearm and wound round the lateral end of the radius into the anatomical snuff box. Thereafter it gave off the radialis indicis and the princeps pollicis arteries and entered the palm between the two heads of the first dorsal interosseous muscle to form the deep palmar arch.

The medial 2^{1/2} fingers were supplied by the ulnar component of the superficial palmar arch while the radial 2^{1/2} fingers were supplied by the Persistent median artery through common palmar and proper digital branches.

An artery was given off in the middle of the forearm from the radial artery which accompanied the median nerve which completed the superficial palmar arch. This is the persistent median artery. This study confirms the persistence of the median artery into the adult life (Fig. 1).

DISCUSSION

As the development of the arteries of the upper limbs would be from multiple and plexiform sources and involves a lineage of successive emergence of principal arteries, anastomoses and periarticular networks and functional dominance followed by regression of some parts anomalies of forelimb are fairly common. Some of the anomalous patterns are due to divergence in the mode and proximodistal level of branching; presence of unusual compound arterial segments; aberrant vessels connecting other principal vessels, arcades of plexuses and vessels occupying exceptional tissue planes Patricia Collins (1992). George (1996) studied arterial patterns of forearms of 60 South African neonates to conclude a probability of

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44.7% per forearm when compared to 27.4% per forearm in the adults of the same community and he opined this to be an additional artery supplying the hand which can be used as an arterial graft. Coleman *et al.*, (1961) found complete arches in 78.5% of the cases and incomplete arches in the remaining 21.5% in the 650 cadavers the author studied. This formed a major underlying factor in the aetiology of digital ischaemia. Eid (2011) reported an incidence of 4% of PMA in the 50 cadavers he dissected. The author found both the types of PMA that is the Palmar type in which the PMA takes origin in the middle part of the forearm while in the Ante brachial type where PMA originates from a higher level as one of the branches of the radial artery along with the posterior interosseous artery and ulnar artery. Himabindu (2012) reported a unique incomplete superficial palmar arch where the non-contributing radial artery has a communicating loop with the PMA. Jones (1988) attributes PMA to be the aetiology for the carpal tunnel and pronator syndromes due to the compression effect of PMA on the median nerve underneath the flexor retinaculum. The present study showed an incidence of 4% of PMA and unilateral persistence of the median artery coinciding with the observations of Eid (2011) who also reported two types of PMA but the present study showed only one type that is the palmar type where the PMA is derived from the radial artery in the Middle third of the forearm. Unlike as Himabindu (2012) who observed an incomplete superficial palmar arch and a small communicating loop between the radial artery and PMA, in the present study, a complete type of superficial palmar arch was found and PMA taking a direct origin from the radial artery was observed which followed a normal course (Fig. 1).

Conclusion

Existence of such arterial variations in the upper limb though common knowledge of their existence would help determine the approaches by reconstructive Plastic and vascular surgeons of the hand. To plan their surgeries in conditions such as traumatic injuries of the hand, carpal tunnel and pronator syndromes (if the primary aetiology for the compression is confirmed). Radiologists and Intervention Cardiologists will find such a PMA incidence as an added advantage in selected cases while harvesting the artery for a coronary graft provided these variations were diagnosed in each patient prior to the procedure as a routine.

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