



MORPHOLOGICAL STUDY OF VARIATION IN SUPERFICIAL PALMAR ARCH

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ABSTRACT Variation in the anatomical arterial anastomoses of the hand is frequently reported. The aim of this study is to establish the morphological features of superficial palmar arch-types (complete or incomplete), anastomotic pattern, variations and measurement of arch in relation to surface landmarks. The specimens of upper limb were obtained from the department of anatomy MGM Medical college Then morphological and morphometric features of superficial palmar arch were noted- In the present study the complete superficial palmar arch was present in 93.33% cases out of that ulnar-radial type (I) present in 60% cases and ulnar-median type(II) present in 33.33% cases and incomplete superficial palmar arch(III) was present in 6.67% cases .The knowledge of superficial palmar arch is important for surgical procedures of hand. Variations in the terminations of the radial artery & ulnar arteries are common. This anatomic study confirms the presence of collateral supply in hand.

KEYWORDS : superficial palmar complete arch, Superficial palmar incomplete arch

INTRODUCTION:-

The vascular patterns of the palmar arches and their interconnecting branches present a complex and challenging area of study. Improvements in microsurgical techniques have made a better understanding of vascular patterns study more validated. A classic superficial palmar arch is anastomoses along the palmar aspect. The superficial palmar arch is mainly fed by the ulnar artery, passing superficial to the flexor retinaculum, then curving laterally to form an arch, lying just deep to the palmar aponeurosis. About one third of the SPAs is formed by the ulnar artery alone; a further third is completed by the superficial palmar branch of the radial artery; and a third by the arteria radialis indicis, often a branch of the arteria princeps pollicis, or by the median artery [1, 2]. Variations among frequency of the pattern of the arch has been described by Coleman and Fazan as complete, incomplete and unknown "J" type [3, 4]. According to Adachi *in Keen*10, there are 3 types of superficial palmar arch. Type one "ulnar", which has a minimum or absent contribution of the radial artery; the second type is the "radio-ulnar" and the third is the "median-ulnar", in which the median artery is strong enough to irrigate the palm of the hand and to be part of the arch. This author also relates in his studies, that there is a very rare type of superficial palmar arch, where the median artery anastomoses with the radial artery, which has a minimum or absent contribution of the ulnar artery. This type can be called as "median-radial" [5].

MATERIALS AND METHODS:

It is Cross sectional study. The specimens of 30 upper limbs for this study were obtained from the Department of Anatomy, MGM Medical College, Kamothe, Navi Mumbai.

I had included embalmed cadavers for the study and excluded deformed, traumatized upper limbs from the study.

Procedure:

The dissection of palm was carried out according to Cunningham's manual [3]. Skin and subcutaneous tissue covering the flexor surface of palm to the base of digits were removed. The palmar aponeurosis were removed to reveal the superficial palmar arch after dissection of surrounding adipose tissue. The common digital arteries were dissected up to the base of digits.

Following morphological features were noted.

- Type of arch (complete or incomplete), type of vessel contributing for the formation of arch, presence of any variation.

OBSERVATIONS AND RESULTS:-

Table No.1- Showing the Percentage of Palmar Arch.

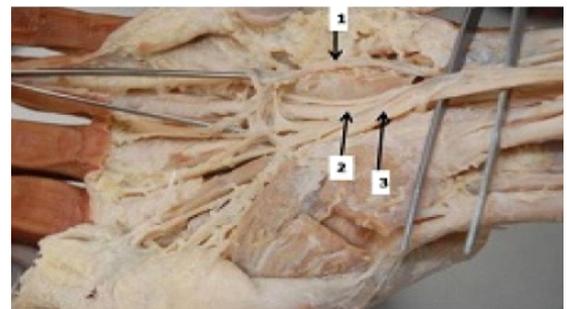
	Right	Percentage	Left	Percentage
Complete Arch	9	60	9	60
Incomplete Arch	3	20	1	6.67
Ulnar Median Complete Arch	3	20	5	33.33

30 hands were evaluated in total 15 on the right and 15 on left. A complete superficial arch was present in 26 palms. Out of that radio-ulnar type (I) present in 18 palms, 9 palms of right side and in 9 palms of left side. In these cases, the arch was completed by the ulnar artery and superficial branch of radial artery [fig-1]. Remaining 8 palms of the complete superficial palmar arch was present in 3 palms of right side and 5 palms of left side and in these cases the arch was completed by the ulnar and median artery [fig-2] and the incomplete superficial palmar arch was present in 3 palms of right side and 1 in left side [fig-3].

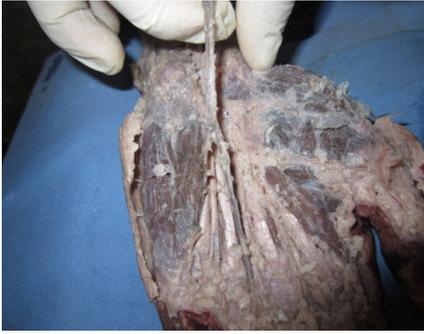
Figure-1 Showing the classical type (I) superficial palmar arch



Figure-2 showing ulnar- median type complete superficial palmar arch (1- ulnar artery, 2- median artery, 3- median nerve.)



[Fig-3] showing the incomplete superficial palmar arch



DISCUSSION:-

- The developmental reason for the anomalous superficial palmar arch in the present study can be explained as the persistence of anastomotic channel, which is seen in the embryonic life between superficial and deep palmar arches.
- A study of 200 hands by Loukas M et al. (2005) showed complete superficial palmar arch in 90% of cases and divided into five types, while the remaining 10% possessed an incomplete palmar arch [4].
- In type I- (40%), the SPA is formed by anastomosis of the superficial palmar branch of the radial artery to the ulnar artery.
- Type II (35%) is formed entirely of the ulnar artery.
- Type III (15%) is formed by anastomosis of the ulnar and median arteries.
- In the present study classical type- I complete superficial palmar arch was present in 60% in right side palms and 60% in left side palms. In these cases the arch was formed between the ulnar artery and superficial branch of radial artery.
- Type-II complete superficial palmar arch was present in 33.33% in left side palms and 20% in right side palms. In these cases the arch was formed between the ulnar and median arteries.
- Type- III in 6.66% cases the superficial palmar arch was incomplete.

CONCLUSION:-

- Variations in the terminations of the radial artery & ulnar arteries are common.
- Although the classic type occurs frequently, there is always a significant anastomosis between the radial & ulnar arteries in hand.
- This anatomic study confirms the presence of collateral supply in hand.

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