

## Case Report

# A variation of superficial palmar arch formed alone by ulnar artery: a case report

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### ABSTRACT

Superficial palmar arterial arch is an arterial arcade, which is a dominant vascular structure of the palm. It is defined as the anastomoses between the superficial branch of the ulnar artery and the superficial palmar branch of the radial artery. The superficial palmar arch completed by anastomosing with one of the branches of radial artery, i.e. with arteria radialis indicis, arteria princeps pollicis, arteria nervi mediana. The present study reporting a variation of superficial palmar arch which is formed alone by superficial branch of ulnar artery and it is also giving branches to radial side of index finger and to the thumb. Normally the branch to the radial side of index finger receives branch from superficial terminal branch of radial artery and it is known as arteria radialis indicis. The ARI was given by ulnar artery from the terminal part of radial side along with the princeps pollicis branch. The knowledge of variations of the vascular arches warrants the surgeons while performing surgeries on hands, such as arterial repairs, vascular graft applications.

**Keywords:** Superficial palmar arch (SPA), Ulnar artery (UA), Common digital arteries (CDA) Proper digital artery (PDA)

### INTRODUCTION

The superficial palmar arch is a linkage between the superficial palmar branches of ulnar and radial arteries. The SPA is an arterial arch between superficial palmar branch of ulnar artery mainly and it anastomoses with the one of the branches of radial artery on radial side of the hand i.e. arteria radialis indices with arteria princeps pollicis or trunk of the superficial branch of radial artery or with arteria nervi mediana or with median artery which accompany the median nerve.<sup>1</sup> The ulnar and radial arteries provide most of the blood supply to the hand. The SPA gives four palmar digital arteries, the most medial palmar digital artery supplies the medial margin of the little finger so that it is termed as proper palmar digital

artery. The remaining three palmar digital arteries known as common digital branches. Each one divides into two proper digital branches to the adjacent sides of little and ring finger, ring and middle finger, middle and ulnar side of index finger by passing through inter digital clefts.

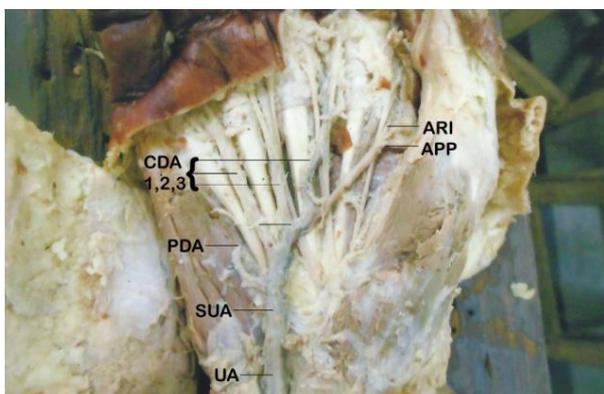
The radial side of index finger and adjacent sides of thumb supplied by the branches of radial artery, the anastomoses between the radial and ulnar arteries in SPA and deep palmar arches play very important role through collateral circulation in diseases and traumatic conditions of palm.

The knowledge of frequency of anatomical variations of the palmar arches is very important for safe surgical procedures on the hand.

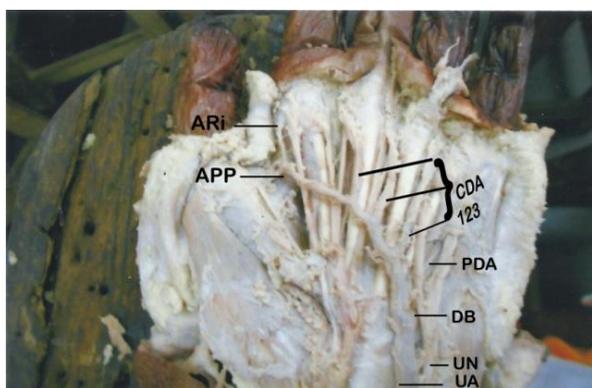
## CASE REPORT

The present variation was observed during the dissection classes for the medical undergraduate students (2014-15 Batch) in the month of October 2014, In a 70 years old female cadaveric hands which belongs to table no. 5 of the dissection hall. In the present case the (SPA) was formed exclusively by superficial branch of the ulnar artery, without forming anastomosis with the branches of radial artery.

The ulnar artery entered in to the palm superficial flexor retinaculum at the distal border, it gave a deep branch and continued as SPA but it was an incomplete arch, occupying normal position, supplied palmar aspect of all the fingers. It gave a proper digital branch to medial side of little finger, three common digital branches to medial four finger by dividing in to 2 digital branches and then it further continued to 1<sup>st</sup> web space and one more common digital artery which supplied the radial side of index finger and the thumb, this digital artery dividing in to APP and ARI. The superficial branch of radial artery was small and terminated by nourishing the thenar muscles. The communication between radial artery and ulnar artery was by completion of deep palmar arch through the deep branch of ulnar artery, which maintains the collateral circulation of the hand. The same pattern was observed in the left hand.



**Figure 1: Right hand showing SPA with UA alone.**



**Figure 2: Left hand showing SPA with UA alone.**

## DISCUSSION

According to Gellman et al., the SPA classified in the two types and they are: 1) complete variety, 2) incomplete variety. The complete variety arch there will be an anastomosis between radial and ulnar vessels. In the incomplete variety anastomosis is absent.<sup>2</sup> The SPA which is formed by the linkage between superficial palmar branches of radial and ulnar arteries is not always the most commonly observed morphology.<sup>3</sup> The incomplete SPA was observed by Loukas, Holdman and Holdman in 10% of cases.<sup>3</sup> The incomplete arches reported in 16% of cases by Patnaik, Kalsey and Singla<sup>4</sup> the same observation reported by Al-Turk and Metcalf.<sup>5</sup> The incomplete forms of SPA is 21.47% cases by Coleman And Anson.<sup>6</sup> Ikeda et al. in their study reported 3.6% incomplete forces.<sup>7</sup>

Tagil et al. noticed that the most consistent incomplete form was the ulnar artery alone forming SPA which was seen in 20% of subjects.<sup>8</sup>

Janvski et al. studied 500 hands and reported 75% of them are complete forms of SPA, remaining 25% are incomplete forms of Spa.<sup>9</sup>

The knowledge of the variations of the arterial arch patterns of the hand is crucial for safe surgical procedures performed on the hand. The surgeons should aware of this kind of variation while performing surgical interventions for arterial repairs, vascular graft applications, because in most of the traumatic conditions and surgical procedures the SPA plays an important role. Techniques like Doppler's ultra sound, modified allen test, pulse oximetry and arterial angiography can be used to identify vascular patterns of the palm. In the present case, the communication of arteries only by deep palmar arch. In cases of ulnar side palmar injuries may damage the ulnar artery which causes interference of adequate blood flow to the entire superficial structures of the palm and it may leads to ischemia and ultimately leads to inefficient movements of fingers

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