

AN ANATOMICAL VARIATION OF SUPERFICIAL PALMAR ARCH AND ITS CLINICAL SIGNIFICANCE: A CASE REPORT

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SUMMARY

The familiarity of variations in vascular architecture of hand is helpful to surgeons, in microsurgical procedures precipitated by crush injuries of hand and in amputations. The efficiency of collateral circulation in hand is essential in certain peripheral vascular diseases like Raynaud's disease and in harvesting of the radial artery for coronary bypass graft. Variation in the formation of superficial palmar arch is common. We report a rare variation of equitable distribution of superficial palmar arch. Variations of the superficial palmar arterial arch are not uncommon. Allen's test, doppler ultra sound, arterial angiography pulse oximetry should therefore be used to assess the efficiency of collateral circulation before surgical interventions.

Keywords: Vascular anatomy; superficial palmar arch

INTRODUCTION

According to the classical description, superficial palmar arch (SPA) is formed by the continuation of superficial branch of ulnar artery into the palm, completed by a branch from radial artery. The SPA lies between palmar aponeurosis, long flexor tendons, lumbrical muscles and digital branches of median nerve (Peter, 1995). It is the principal source of arterial supply to the hand with additional vascularization from the median and interosseus arteries. A range of anatomical variations of superficial palmar arch have been reported by several authors. Few among these are the variation of superficial palmar branch of radial artery passing deep to the flexor retinaculum to form superficial palmar arch (Olave et al., 1997), absence of SPA (Ozkus et al., 1998), incomplete development of SPA (Bianchi, 2001). The variations of SPA are classified into complete and incomplete arches. The complete arch is again classified into five types. In type 1 the superficial palmar arch is formed by superficial palmar branch of radial artery and ulnar artery. In case of type 2 it is formed by entirely by ulnar artery, in type 3 it is

formed by anastomosis of ulnar and median arteries. In case of type 4 it is formed by joining of ulnar, radial, median arteries. In type 5 it is formed by branch from deep palmar arch (Loukas et al., 2005). We describe a case of a non-dominant SPA, superficial to the flexor retinaculum. The knowledge of possible vascular variations in the palm is useful for the success rate of hand surgeries.

CASE REPORT

During routine dissection, we observed an atypical formation of SPA in the left hand of a 60-year-old female embalmed cadaver. The ulnar artery entered the palm by descending in front of the flexor retinaculum. In the palm it gave a small deep branch, then continued distally and gave a digital branch to medial side of little finger, and terminated by giving two common palmar digital arteries to the spaces between the little, ring and middle fingers to supply adjacent side of these fingers. The superficial branch of the radial artery was larger; it entered the palm through the origin of thenar

muscles. In the palm it furnished a digital branch to the lateral side of thumb, and terminated by dividing into two common palmar digital arteries, which supplied the adjacent sides of thumb, index and middle fingers through their proper digital branches (Fig 1). Though there was a communication between the main trunks of the two arteries in the palm, they shared the equal responsibility in supplying the fingers without the formation of a typical superficial palmar arch.

DISCUSSION

Our case was not a dominant SPA, the superficial palmar branch of radial, ulnar artery divided into the common palmar digital arteries, it did not have a contribution from median artery or from deep palmar arch according to the description by Loukas et al., 2005. The classical SPA is found in 10%- 55% of the population (Ruengsakulrach et al., 2001; Ikeda et al., 1988). It is subdivided into ulnar dominant, radial dominant, equal dominant (Ikeda et al., 1988), entirely formed by ulnar artery (Vollala et al., 2009) and the SPA formed by ulnar artery and median artery (Vollala et al., 2005).

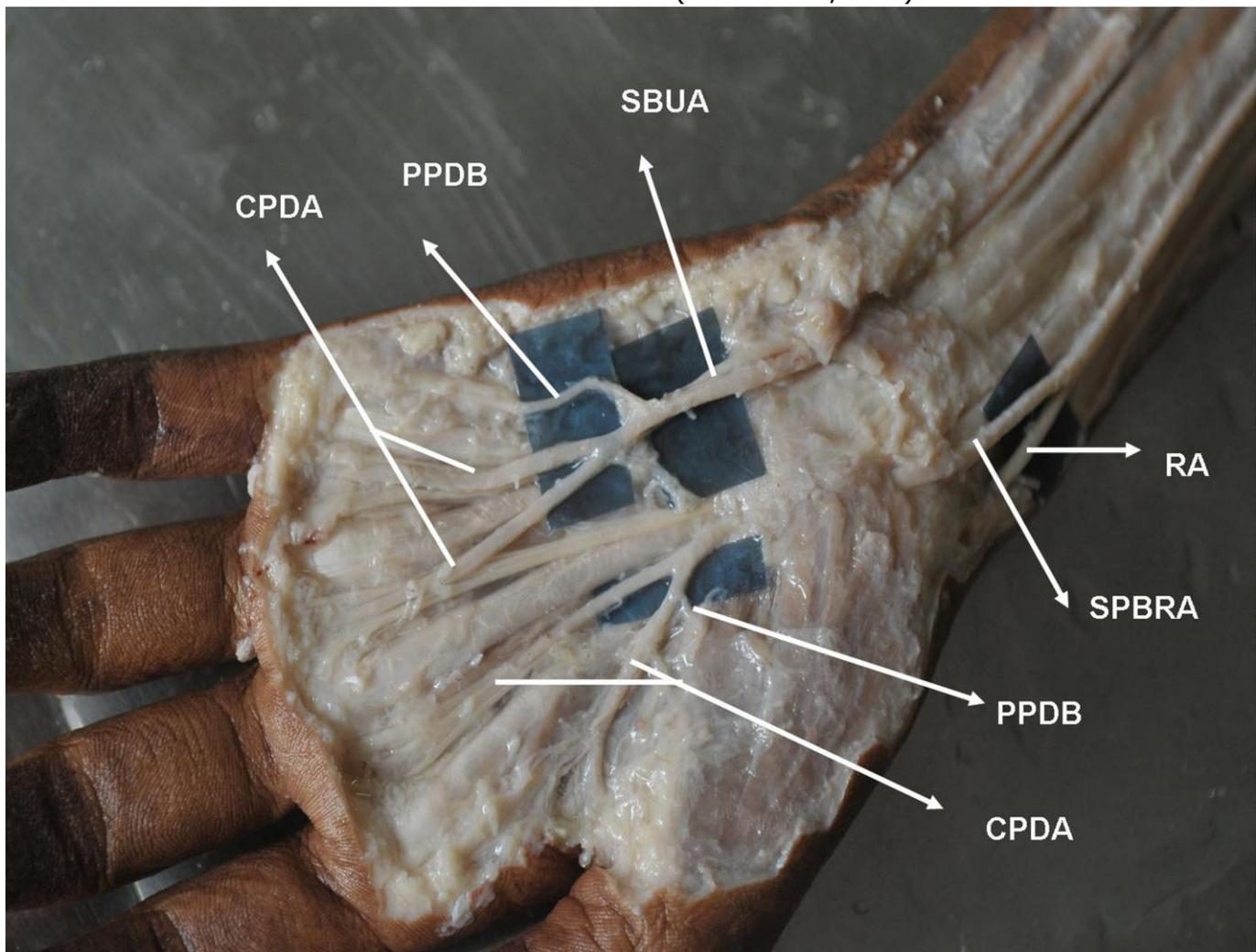


Figure 1: Showing the anomalous superficial palmar arch and its branches SPA, Superficial palmar arch; RA, Radial artery; SPBRA, Superficial branch of radial artery; PPDB, Proper palmar digital branch; CPDA, Common palmar digital arteries; SBUA, Superficial branch of ulnar artery.

Superficial palmar arch plays a principal role in microsurgeries following crush injuries of hand. It maintains the collateral circulation in case of obstruction of any of the arteries in hand. The plastic surgeons, hand surgeons should be aware of these variations before attempting surgical procedure like vascular repair, graft application. Recently, the artery of choice for coronary bypass graft is the radial artery. In case of classical SPA the radial artery can be harvested because the rich anastomosis between ulnar and

radial arteries can maintain efficient collateral circulation. But in some cases like ours, the radial artery cannot be harvested because the amount of anastomosis between radial and ulnar arteries is minimal, so the radial side of hand may suffer ischemia leading to gangrene. Allen's test, doppler ultra sound, arterial angiography pulse oximetry should therefore be used to assess the efficiency of collateral circulation before surgical interventions.

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