VOLUME - 13, ISSUE - 10, OCTOBER - 2024 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Surgery

A RARE CASE REPORT OF A HAND SURVIVAL

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ABSTRACT The primary source of arterial blood supply to the hand is from radial and ulnar arteries. At least one of these is required for hand survival however sometimes in their absence the collateral circulation alone provides the essential palmar circulation. We describe here a rare case where both arteries got damaged, whole muscle mass and both bones of forearm got lost as a result of crush injury but hand though functionless, survived.

KEYWORDS : collateral circulation, radial artery, ulnar artery

INTRODUCTION:

Primary arterial circulation to the hand comes from the superficial and deep palmar arches arising from the radial and ulnar arteries [1]. Either radial or ulnar artery needs to be patent distal to the elbow to maintain hand viability [2]. According to case reports limb viability can occasionally be maintained even when both radial and ulnar arteries are ligated or damaged likely from aberrant vascular anatomy or collateral blood flow [3,4,5]. we are here presenting a case where hand survived in the absence of any clear source to account for blood flow in the palmar arches.

Case Presentation:

We describe a case of 12 years old female who presented to us with her right hand abnormally attached with elbow. There was history of road side accident leading to crush injury of right arm when she was 5 years old. She gave history of debridement followed by a pedicled abdominal flap as her treatment. No record was available.

On examination the right hand was hanging from elbow with just a solid tube-like structure of soft tissue. No pulsation was palpable at wrist. There was loss of sensations. There was loss of active movement at all the joints of hand. The patient was using a splint as a support to keep the hand from hanging down. This nonfunctional hand was serving a cosmetic purpose only. There was a grafted area on the abdomen indicative of some abdominal flap done in the past in an effort to salvage the upper limb.

Radiological examination showed the presence of radius and ulna in the proximal part but they were absent in that soft tissue pedicle between the proximal forearm and hand.

Colour Doppler study showed absence of radial, ulnar and interosseous branches of brachial artery. Few blood vessels with low velocity blood flow were seen reaching distal end of the soft tissue connecting hand (PSV range from 6-10 cm/sec). In hand low velocity blood flow was detected in palmar arches, common digital arteries and proper digital arteries (4-8 cm /sec).

A

B

Figure A. Hand attached to the elbow with a pedicle Figure B. radiograph showing absent bones in the pedicle. Radius and ulna present only in the proximal part of fore arm.

DISCUSSION:

The brachial artery divides into the radial and ulnar artery at the level of the radial head. The radial and ulnar artery provide most of the blood supply of the hand. Additional circulation may come from the median artery or the interosseous arterial system [1]. Accessory radial artery, persistent median artery (8.0%-27.1%), and other unnamed anomalous branching have been described in the literature [6]. In a retrospective study of 77 patients, amputation rate was 39.3% when both arteries were ligated for damage control versus less than 5% if only one artery was ligated [7]. Amputation rate was found more than 35% if both radial and ulnar arteries are injured in various studies [3,8,9].

A case of a young male with an injury to both radial and ulnar arteries whose hand remained viable from collateral pathways despite delayed repair was presented by Sahil Patel et al [10]. In the absence of a clear source to account for the blood flow through palmar arch the patient's hand remained viable through collateral blood flow.

In the present case imaging showed no clear source to account for the blood flow through the palmar arch, the patient's hand has remained viable through collateral blood flow. In patients without arterial disease, contribution from minor forearm arteries can be sufficient for hand perfusion in the setting of ulnar and radial artery transection [6].

The interesting point about our case is that there is absence of both bones. There is no muscle mass and a tubelike structure of skin and subcutaneous tissue is representing the forearm which makes this case a rare. The hand is surviving on scant blood supply and serving the purpose of a prosthetic hand only. The reconstructive options to provide a functioning hand and forearm did not seem possible in this particular case.

CONCLUSION:

At least one of radial and ulnar artery is required for hand survival but sometimes the collateral blood flow is able to manage the hand survival.

Source Of Support: none Conflicts of interest: none
Informed consent has been taken from the patient

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