



Replantation of an Amputated Dominant Right Upper Hand - Case Report

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Abstract

Introduction: Upper limbs are of huge importance in the humans life. Traumatic limb loss is considered a burden on the amputee life therefore Replantation is the most valuable solution even if with less functions than normal.

Aim of the Study: Is to prove that Replantation of amputated upper limb is of a great value and better done with a dedicated multidisciplinary team.

Patient and Methodology: We had one patient with traumatic amputation of right upper limb and Replantation was done by orthopedic, vascular and plastic surgeons under general anesthesia. Follow up for 2 months was done and the patient is currently under follow up.

Conclusion: Although the success rate of replantation is very high, the functional outcome following major limb replantation is often disappointing. Preoperative, operative and postoperative steps should be considered and done in sequence with dedicated replantation team to reach the maximum functional regain to facilitate the victim's life again and help him to live dependent with accepted motor power and sensation.

Keywords: Replantation; Limbs; Lifestyle

Introduction

Upper extremity amputation is a lifestyle problem and often not life threatening but causes disfigurement that affect the psychological and social networking of the victim. The hand importance is not only for the body shape and sensitivity, but also for work and daily activities that are done routinely in the everyday practice [1].

Recent prostheses are sufficient for the ready porn people without one limb or more. But when taking in consideration the traumatic limb loss an extra mile should be considered in the trial to regain normal life. Even with the most recent modalities nothing is compared to the natural limb gifted by God.

Therefore, we try to save the natural limb by all measures in cases of traumatic amputations even if with less functions, worse shape and less motor power and sensations [2].

Along with having high success rates more than three quarters of the cases, But the proper functions may be affected in many cases and not reaching the satisfying rates [3].

Cornerstones for the best results are divided into three phases. The first one is preoperative selection of the patient and preoperative preparation and sanitization. The second phase is the operative one including competent surgical steps with proper sequence along with cooperation of the surgical team. The third phase is the follow up phase and rehabilitation with specialized physiotherapist to regain the maximum function of the limb [3-5].

The case

A.K. 21 -year-old male patient with no past medical history. He presented with traumatic amputation of the right hand at 11:45 pm on 31 December 2021.

- **His vital signs:** B.P 90/50, H.R 110, Temp 36.6.
- **Lab:** Hb 8 gm, TLC 15, Plt. 230, INR 1.1, Normal KFT, Negative HCV and HBV.
- **Pre-operatively:** We started stabilization of the victim and 2 wide gore cannulas were inserted followed by 4 packed RBCs units and 4 FFP were transfused.
- **Operative data:** Under G.A. primary decontamination was done, followed by sterilization and draping. Orthopedic surgeon started by wire fixator for alignment from 3rd metacarpal bone to capitate then lunate then to the shaft of the radius. Then wrist external fixator was put.

Vascular surgeon then identified the radial artery ends, trimming was done and direct anastomosis by proline 6-0 was done. After declamping the non-identified distal end of the cephalic vein and ulnar artery was visualized, so direct repair and anastomosis of the cephalic vein ends by proline 6-0 was done followed by ulnar artery direct anastomosis and repair was also done by proline 6-0.

Plastic surgeon then repaired ulnar nerve followed by median nerve repair, along with repairing flexor digitorum profunda of the little, ring, middle and index fingers by modified Kessler repair using 6-0 sutures. Washing again was done before closure of the skin by direct simple sutures by proline 3-0.

Postoperative: the patient was extubated after 4 hours and was vitally stable with good lab results. He was put on empirical parenteral antibiotics and full dose anticoagulant.

Follow up was done every 12 hours for 4 days then daily for one week and he was vitally stable with viable limb and intact radial and ulnar pulse. He complained of mild pain that was relieved by analgesics.

On the 11th he had trauma in the same limb that caused moderate edema and developed compartmental syndrome in the hand that was relieved by fasciotomy and hand elevation and anti-edematous medications.

After 2 weeks he started hyperbaric oxygen sessions (30 session) in 48 days.

The patient is kept under close observation and regular follow-up of distal pulses. He is pain free in the follow up visits.

Discussion

In agreement with Lloyd MS., *et al.* The mode of trauma of the amputated limb may be very severe causing a life-threatening condition that need ATLS implication to maintain the not only the viability of the limb but also the victim's life which is the main issue in this condition. Blood loss is a main concern that must be restored to maintain good circulation of the victim with blood and fluid resuscitation. After stabilization of the case irrigation and primary debridement is a crucial point.

In contrast to Wilhelmi BJ., *et al.* we didn't necessitate bone shortening (e.g., proximal row corpectomy) to avoid nerve and vein grafts as we had enough segment of both nerves and veins to direct anastomose them. Overall, the arteries, veins and nerves were repaired and many tendons as possible. All flexor digitorum profundus have been repaired, But the rest of flexors and extensors tendons were postponed to a revision session. In general, replantation results usually reach high success rate when the lesion is at the wrist level.

Hoang NT., *et al.* suggested bone stabilization is performed using 2 or 3 Kirschner wires, but we placed only one wire fixator for alignment from 3rd metacarpal bone to capitate then lunate then to the shaft of the radius, then wrist external fixator was put.

Mollski., *et al.* suggested main arteries and more than three of large veins to be anastomosed in interrupted fashion using 9-0 or 10-0 sutures, but we repaired the arteries with 6-0 sutures and only the cephalic vein was repaired. Also, many patients present with this type of hand injury require vein grafts to be used to accommodate the lost segments of the vessels to have them repaired without losing the length of the limb. but we did direct repair without vein grafts and kept the same length of the limb because of the quality of vessels before the anastomoses were good and with no lost segments.

Studying the anatomy of the limb by hard is the key for the best outcome. Although some authors suggest removal of the FDS tendons of the digits to avoid tendon adhesion between it and the flexor digitorum profundus (FDP) tendons, we repaired it for better chance of the patient mobility of the hand.

Authors concluded that using of epineural technique with 9-0 sutures in the primary repair of the nerves will have the best

outcomes, we did this put with 6-0 sutures. The last crucial step is the tension free skin closure. Otherwise, approximation of the skin edges is done, and skin graft or flap is planned to close the raw area without any tension sutures to maintain the viability of the skin and minimize skin loss and necrosis., fortunately we had enough skin to close it directly tension free with 3-0 sutures

At postoperative recovery, the room's temperature is very important as blood flow will decrease in cold temperature due to vasospasm, arm elevation to the heart level is very important too as putting the hand in declined position will affect the venous circulation causing edema that was the major complication that faced us causing compartmental syndrome that was released by fasciotomy.

Anticoagulation is generally recommended. Sympathetic blocks have been considered in some replantation patients at specific risk points. ischemia is the most common cause of replantation failure, accounting for more than half of the failures. Revascularization with all means is the most important step in the complication management journey to keep the limb viable. Even re-intervention is considered if all conservative means failed, and this happens in about half of the complicated ischemic limbs. Venous congestion and edema are failure causes that should be suspected even if they occur with less extent. Conservative treatment for venous problems is used first. otherwise, fasciotomy or re-exploration are considered.

Conclusion

Although the success rate of replantation is very high, the functional outcome following major limb replantation is often disappointing. Preoperative, operative and postoperative steps should be considered and done in sequence with dedicated replantation team to reach the maximum functional regain to facilitate the victim's life again and help him to live dependent with accepted motor power and sensation.

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