

Syrian war shrapnel injury: cubital nerve defect grafting during humanitarian surgical mission. Clinical case presentation

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Abstract: Background and aim of this clinical case presentation is to reveal the importance of early nerve injury diagnosis and surgical treatment in war wounded patients.

Methods. The author treated patients in Amman Charity Hospital were among different plastic surgery cases where limb nerve injuries with nerve grafting indication. The presented case was treated with autologous sural nerve graft.

Results were evaluated at 3 months after the surgery and revealed detectable nerve conductivity at the Electromyography test.

In conclusion, in cases with delayed nerve repair surgical treatment in war wounded patients, the vascularised nerve graft can be a better solution for nerve defect surgical treatment.

Keywords: NERVE injury, axonotmesis, war wounded patient, sural nerve graft, microsurgery, ulnar claw.

CASE REPORT

Acute and chronic war wounded Syrian refugees from Zaatari camp and the Syrian battlefields are directly admitted in Amman Al Maqqased Charity Hospital every day.

Among patients treated by the author during November 2015 Humanitarian Mission was a left cubital nerve defect due to a bomb explosion injury.

Peripheral Nerve injury described by Sunderland classification can be: neuropraxia as the lowest degree of nerve injury in which is affected only the nerve conduction and no disruption is done. The second degree is axonotmesis where the axon is damaged but the surrounding tissue remains healthy (1). The most severe form of nerve lesion is

neurotmesis where both the surrounding tissue and the axones are disrupted (2).

Patient's surgical and medical history

Female patient, 42 years injured 8 month prior to surgery. Immediately after the explosion the patient received first aid surgical assistance: wound cleaning and direct closure.

The patient felt on the first postoperative day that she completely lost the tactile sense on 4th and 5th fingers on her injured left hand.

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During the healing process, the wound infection and sutures opening occurred and the patient was treated with antibiotics and wound dressings until the wound has completely closed.

Two months after the injury she was examined and diagnosed with post traumatic cubital nerve injury.

Clinical and paraclinical information

The patient presents left cubital nerve chronic palsy with "ulnar claw" appearance and extensive (12 cm) longitudinal scar on the palmar aspect of the forearm (Figure 1). The metacarpophalangeal joints of the 4th and 5th fingers are extended and the interphalangeal joints of the same fingers are fixed in extension.

Figure 1: Left hand war injury with antebraial wound and hypothenar region muscular atrophy.



Figure 2: Ulnar claw hand aspect with insufficient flexion of the 4th and 5th finger's interfalangial joints.



The claw is most obvious when the patient is asked to

flex all fingers: the 1st and 3rd digits are flexing due to intact medial nerve innervation and the 4th and 5th ones are remaining extended because of high cubital nerve injury (Figure 2).

The final diagnosis is clarified by dorsal and hypothenar regions denervation and atrophy and by Electromiography testing which reveals the left ulnar transmission is completely disrupted at the scar site (Figure 3).

Figure 3: The dorsal aspect at the cubital denervated hand with muscle atrophy.



The nerve injury is grade 5 according to Sunderland's system.

Surgical method

Clinical practice and research on nerve injury treatment indicates that the primary surgical repair during the first week is required. If the nerve is disrupted on more than 2 cm length the sural nerve graft must be done.

The surgery was performed under general anesthesia using an interfascicular microsurgical nerve suture technique.

The partial scar excision was done and fibrosis was devided.

Cubital nerve was found being disrupted on 10 cm length at the medial 1/3 of the forearm. After debridement and neurolisis due to myeline degenerative process, the gap real size was 14 cm long (Figure 4).

The autogenous sural nerve grafting was decided to

be done.

The right 18 cm long sural nerve graft was harvested and a cable graft designed to bridge the gap (Figure 5).

Figure 4: Cubital proximal and distal nerve stump after surgical debridement.

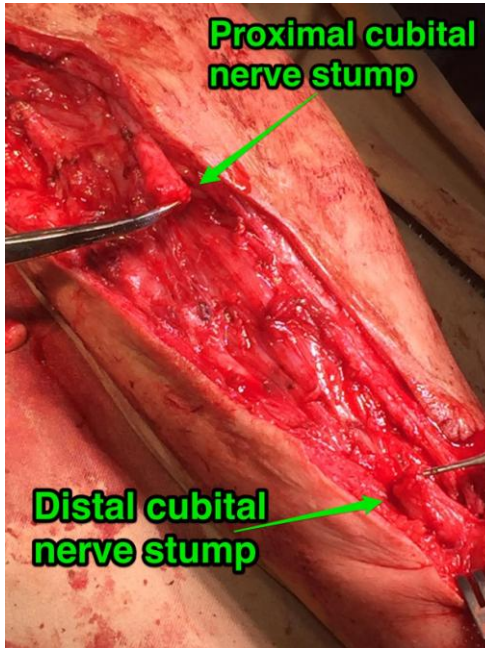


Figure 5: Right Sural nerve graft harvested.



The microsurgical sutures were done at the

both nerve ends to achieve nerve connections with separate nonabsorbable 7-0 sutures (Figure 6).

Skin suture and hand splinting was done.

The patient's evolution was favorable under antibiotic therapy for 7 days with no wound closure complications.

Results

After 3 months of kinetotherapy and electrotherapy the nerve conductivity was evaluated as being detectable at the lowest level by Electromiography test. No sensitivity or lightning in the 4th and 5th fingers was detected.

Figure 6: Sural nerve graft sutured on site.



Continued hand therapy rehabilitation is indicated and, 6 and 12 months postoperative evaluation by Electromiography and two point discrimination tests are mandatory at each following checkup.

DISCUSSION AND CONCLUSION

The nerve injury repair should undergo in most of the cases on the emergency surgical treatment basis.

In neurotmesis cases the immediate surgical repair attitude (one week) is the preferred approach for nerve defect treatment in order to obtain a high

sensitive and motor functions recovery rate (3).

In chronic palsy (lasting > 3-4 months) associated with muscle weakness, atrophy, surgical outcome is less certain. The duration of palsy and muscle weakness are key factors influencing the prognosis (4).

No conservative treatment can be done in such cases just bridging segmental nerve defect with autogenous nerve graft or decellularized nerve allograft and nerve tubulisation in repairing defects less than 5 cm (5).

In present case the grafting was done 8 months after surgery – this may lead to a less motor recovery but

sensitive recovery still can be a good one 6 months after continuous hand rehabilitation(6-8). This demonstrates that 3 months after surgery the cubital nerve conduct was detected even at the lowest level.

In war areas where patients cannot seek specialized medical attention immediate after the injury and their nerve palsy is diagnosed later on, a vascularized nerve grafting should be considered as a clinical alternative for nerve reconstruction if sensitive sense it is not improved after nerve grafting.

Further research comparing late nerve grafting versus vascularized nerve grafting must be done.

References:

1. Omar Medina, Gabriel A. Arom, Michael G Yerosian, Frank A. Petrigliano, David R. Mc Allister, Vascular and nerve injury after knee dislocation. A sistematic review.
2. Hart A M, Terenghi G, Kellerth JO, Wilberg M. Sensory neuroprotection, mitochondrial preservation and therapeutic potential of N acetyl-cysteine after nerve injury. *Neuroscience*. 2004; 125:91-101
3. Tuncel U, Turan A, Kostakoglu N. Acute closed radial nerve injury. *Asian J Neurosurg*.2011; 6: 106-109
4. S.E. Mackinnon " New directions in peripheral nerve surgery", *Annals of Plastic Surgery*, vol. 22, no. 3, pp. 257-273, 1989
5. P. Konofaos and J.P. van Halen, " Nerve injury repair by means of tubulisation: past, present and future" , *Journal of Reconstructive Microsurgery* , vol.29, no. 3, pp.149-164, 2013
6. E.Furkan Karabekmez, A.Duymaz, S.L. Moran "Early clinical outcomes with the use of decellularized nerve allograft for repair of sensory defects within the hand", *Journal of American Association for Hand Surgery* 2009; 4:245-249
7. Yang M, Rawson JL, Zhang EW, Arnold PB, Lieawever W, Zhang F "Journal of Reconstructive Microsurgery , 2011, 27(8):451-460
8. T.Hasegawa, S. Nakamura, T. Manabe, Y.Mikawa " Vascularized verve grafts for the treatment of large nerve gap after severe trauma to an upper extremity", *Archives of Orthopaedic and Trauma Surgery*, 124, 3, pp 209-213