



Median and Ulnar Nerve Repair Using Sural Nerve Graft: A Case Report

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Abstract: Most peripheral nerve injuries (PNI) are caused by trauma. Upper extremities are most likely to get injured, and the radial nerve is the most common part in upper extremities to be affected. There are different surgical options available to repair PNI. We reported a 48-years-old male consulted to the Neurosurgery Department for right upper limb weakness and numbness. He had history of laceration due to iron sheeting in the right arm. There was an irregular scar, weakness on right lower arm with hypesthesia, but no neurovascular distal (NVD) abnormalities were found. Further examination showed claw hand. EMG examination revealed total lesion of the right median and ulnar nerve, partial lesion of the right radial nerve with the lesion at wrist level, possibly neurotmesis according to Seddon Classification. Initial debridement, suturing, and repairing of radial artery and flexor carpi ulnar tendon were performed. The patient was then diagnosed as total lesion of the right median and ulnar nerve, partial lesion of the right radial nerve, post repair right ulnar and radial artery and flexor carpi ulnar tendon repair with the planning of nerve graft with no complication under monitoring. The patient was scheduled for sural nerve graft procedure. Early nerve repair or reconstruction is needed even though it only results in incomplete recovery for months to years. The sural nerve is great either in diameter or length which can be a huge source for the grafting of nerve and revealed good outcomes. Recent study showed incomplete recovery especially seen when the patient could not fully clench his hand and his thumb did not move properly during the movement. In conclusion, sural nerve graft is an appropriate choice for peripheral nerve injuries with more benefits included. Prognosis depends on how early the treatment performed and how severe the lesion is.

Keywords: median nerve; sural nerve; peripheral nerve injury; nerve repair; nerve grafting

INTRODUCTION

Peripheral nerve injuries are the injury conditions of nerves, mostly caused by trauma with varying symptoms based on severity and what nerves involving in.^{1,2} There are some classifications of nerve injury such as the Seddon and Sunderland Classification.¹ Peripheral nerve injuries (PNI) are about 2.8% of all trauma patients.³ This condition is not a life-threatening case, but the decreasing quality of life (QoL).²

The most used method for closing this gap of the nerve is autologous nerve grafting. The sural nerve is a huge source for a nerve graft in terms of acceptable diameter and length.² Some studies revealed the successful performance of nerve grafting in the case of ulnar or median nerve injuries.^{4,5}

The study aimed to describe a case of total lesion of the right median and ulnar nerve, partial lesion of the right radial nerve, post repair right ulnar and radial artery, and flexor carpi ulnar tendon repair with the planning of *nerve graft* with no complication.

CASE REPORT

A-48-years-old male consulted at neurosurgery outpatient department for right lower arm weakness and numbness since February 1, 2022. He had a history of laceration by iron sheeting in the right lower arm. The initial debridement and suturing have been carried out and repair of the radial artery and repair of the flexor carpi ulnar tendon was performed on February 2, 2022.

On examination, he was conscious and well oriented. There was an irregular scar, apparently healed. There was weakness on right lower arm with hypesthesia but neurovascular distal (NVD) is still good. Claw hand (+), drop hand (-), opposition test (-), thumb test (-) (Figure 1). There are no abnormalities in lower arm x-ray (Figure 2). EMG examination revealed total lesion of the right median and ulnar nerve, partial lesion of the right radial nerve with the lesion at wrist level, possibly a neurotmesis according to Seddon Classification.

Patient was then diagnosed as total lesion of the right median and ulnar nerve, partial lesion of the right radial nerve, post repair right ulnar and radial artery and flexor carpi ulnaris tendon repair with the planning of nerve graft with no complication under monitoring.



Figure 1. Clinical Findings



Figure 2. X-Ray of the left lower arm showed no abnormalities

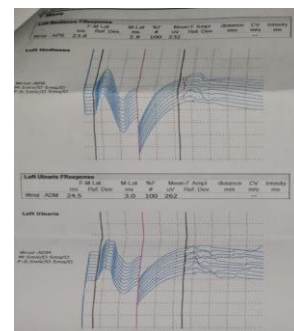


Figure 3. EMG revealed total lesion of the right median and ulnar nerve, partial lesion of the right radial nerve with the lesion at wrist level, possibly a neurotmesis according to Seddon Classification

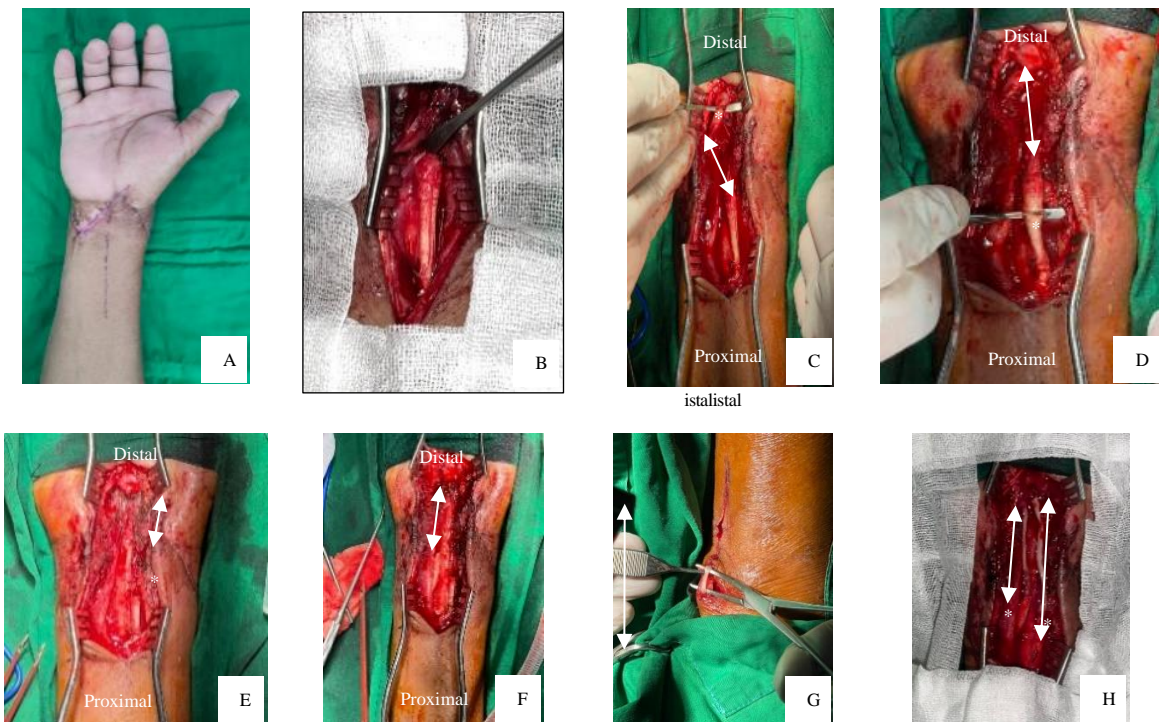


Figure 4. Intra-operative procedure. A. Incision design; B. Identification of right median nerve; C. Asterisk sign showed distal part of median nerve; D, E. Asterisk sign showed proximal part of median nerve; F. Identification of right ulnar nerve; G. Sural nerve graft harvesting; H. One and two asterisk sign showed post graft of ulnar and median nerve, respectively. Arrow sign showed the distance between severed nerves

In recent study showed incomplete recovery especially seen when the patient has not been able to fully clench the hand and the thumb does not move properly during the movement.

Discussion

This case report is about a 48-years-old male with right lower arm weakness and numbness, and trauma history. The result of the lower arm x-ray is good. EMG examination was performed and revealed a total lesion of the right median and ulnar nerve, partial lesion of the right radial nerve with the lesion at wrist level, possibly a neurotmesis according to Seddon Classification.

Based on Seddon Classification, nerve injury is classified as neurapraxia, axonotmesis, and neurotmesis. Neurapraxia means focal segmental demyelination while axonotmesis means axon damage. Neurotmesis is complete nerve transection which was the same level as Grade V-VI in Sunderland Classification and results in complete functional loss.^{1,6} This classification is important to inform about how good the prognosis of the injury is. Complete recovery by surgical intervention may be expected in neuropraxia and axonotmesis, but not in neurotmesis.⁶ Other consideration is about the time of grafting. Early nerve repair or reconstruction is needed even though it only results in incomplete recovery for months to years.⁷

The patient was diagnosed with a median, radial, and ulnar nerve injury and underwent autograft nerve repair. A sural nerve graft was chosen based on some reasons. The sural nerve is great either in diameter or length which can be a huge source for the grafting of nerve.² The use of vein graft is usually reserved for small and less functional nerves with small nerve gaps. This vein graft was performed such as in digital sensory nerves with less than a 3 cm gap.⁸

Another consideration is about recent studies revealed good outcomes after grafting with the sural nerve. Young et al study⁴ revealed the improvement of sensory function for their patients which grafted in case of ulnar nerve injuries compare to non-grafted patients but the motoric function is as good as following nerve repair. A study by Padilla-Retta et al⁵ showed the use of autologous sural nerve graft to correct the secondary median nerve injury proved to be successful

in a patient with peripheral nerve injury after 20 days with follow-up at 6 months.

CONCLUSION

The sural nerve graft is a great choice for peripheral nerve injuries with more benefits included. Prognosis depends on how early the treatment performed and how severe the lesion is. This case report showed incomplete recovery in motoric movement.

Conflict of Interest

The authors affirm no conflict of interest in this study.

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