Delayed nerve repair with epineural microsutures in traumatic radial nerve palsy: A case report

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ABSTRACT

Introduction: Traumatic radial nerve palsy is a condition that needs surgical management. Patients who neglect their symptoms or under-diagnosed on examination cause delays to their surgical treatment. Direct nerve repair with epineural microsutures is still the gold standard of surgical treatment for severe axonotmesis and neurotmesis injuries. In this article, we reported a case of nerve repair with epineural microsutures in traumatic radial nerve palsy.

Case presentation: A 14-year-old male complained cramps, tingling, and numbness of his left arm and he was unable to extend his left wrist and fingers after he got a left-arm injury 3 months ago. The electromyography (EMG) shown that left radial nerve lesion at left radial sulcus. Direct nerve repair is performed by epineural microsutures. Two weeks after surgery, we found improvement in the sensory process, but no improvement on the motoric process.

Conclusion: Direct nerve repair with epineural microsutures is an effective treatment for radial nerve injury, but the timing for surgery influencing the result of operation.

Keywords: Case report, delayed nerve repair, epineural microsutures, radial nerve injury, radial nerve palsy

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INTRODUCTION

Acute peripheral nerve injuries are one of the serious sequelae injury that can happen on extremities trauma. Traumatic peripheral nerve injury is a serious medical condition encountered in many of the injuries to the upper and lower extremities, and in 3–10% of patients. The average incidence of radial nerve lesions is approximately 11%. Wrist drop represents the most common presentation of radial nerve palsy.¹

Traumatic radial nerve palsy was one the main indication for surgical treatment. Patients who neglect their symptoms or under diagnosed on examination, cause delays to their surgery treatment. Direct nerve repair with epineural microsutures is still the gold standar surgical treatment for severe axonotmesis and neurotmesis injuries.²

CASE PRESENTATION

A 14-year-old male complained cramps, tingling, numbness on his left arm and unable to extend his left wrist and fingers after experienced left arm injury three months before. The sharp knife was accidentally stabbed on his left upper arm. On physical examination, we found paralysis of wrist and finger extensor. On Manual Muscle Test (MMT) scale, we found scale 0/5 on left wrist extensor, thumb extensor, and index finger extensor. Other myotome examinations were in scale 5/5 on MMT scale. Clinical picture of the patient can be seen in Figure 1. On the electromyography (EMG) examination showed left radial nerve lesion at left radial sulcus.

We started the operation by doing an incision at the radial sulcus and we found total radial nerve rupture Figure 2. Direct nerve repair was performed

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Figure 3. Two weeks after surgery, we noticed improvement of sensory ability. Patient did not feel any numbness or tingling sensation on his left hand. However, the motoric status was not improved yet.

DISCUSSION

The radial nerve is one of the 2 terminal branches of the posterior brachial plexus cord. The location is posterior to the axillary artery in the shoulder, and branching away from the axillary nerve proximal to the rectangular space before passing through the triangular space. The nerve runs laterally far to the head of the long triceps muscle and is located between the lateral head and triceps themed in a spiral groove. The radial nerve innervates the triceps before piercing the intermuscular lateral septum and enters the anterior compartment. After crossing the intermuscular lateral septum, the radial nerve releases 1 to 3 accessory branches to the half radial brachial muscle and a larger branch to the proximal brachioradialis lateral epicondyle, as well as branches to the anconeus and extensor carpiradialis longus (ECRL) muscles. When entering the forearm, the nerve divides into superficial sensory nerve (SRN) and posterior interosseous nerve (PIN). The PIN innervates the radialis brevis extensor carpi before passing under the Frohse arcade, the fibrous arch of the proximal aspect of the supinator muscle and then drops between the 2 supinator muscle heads. The PIN finally exits below the distal margin of the supinator muscle and divides it into 6 branches, giving motor innervation to the wrist and extensor digits and sensory branches of the terminal to the wrist capsule.

The characteristic of radial nerve injury is wrist reduction. The flexor tone surpasses the malfunctioning wrist extensor, and the hand is pulled into an unclear position. The wrist can be placed passively into the extension, but the patient cannot hold this posture, and the hand cannot be maintained in a functional position. In addition, finger and thumb extensions are lost, depriving the patient of the ability to open hands before starting the grip, and thus providing tasks that require coordinated manual agility is very difficult. If the lesion is far from the place of origin of the PIN, the ECRL function will be intact and the wrist will be pulled into a radial deviation with extension efforts.

The traditional treatment for peripheral nerve injuries is repair using microsurgical techniques, either by primary nerve suture, secondary (delayed) repair, or nerve graft. The surgical treatment for peripheral nerve injury is still a challenging and highly demanding procedure.

Sunderland in 1951 expanded the classification based on histology to include five injury grades, which broadly correspond to Seddon's three-level classification but with more accurate prognosis of outcomes in axonotmesis injuries. Sunderland grades I and II recover completely, grade III recover partially, and grades IV and V usually require surgical intervention. Sunderland grade I injuries are equivalent to neurapraxia. Sunderland grade II injuries have axonal damage but intact endoneurium and hence achieve full recovery. Sunderland grades III and IV will heal spontaneously with increasing degrees of scarring and incomplete recovery due to progressive damage to axons and connective tissue (endoneurium, or endo/perineurium). Scar creates a conduction block and if severe requires excision.
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and nerve reconstruction. Sunderland grade IV injuries usually require surgery due to damage to both axons and all levels of connective tissue (endo/peri/epineurium) with resultant extensive scarring. Sunderland grade V injuries correspond to neurotmesis.24

The primary nerve repair was conducted by end to end anastomosis using the microscope and fine monofilament 7.0, placed within the external epineurium, and posterior splint from upper arm to hand was applied.

Two weeks after surgery, we found improvement on the sensory process, but no improvement on the motoric process. Three months after surgery there is no improvement on the motoric process. Six months evaluation after surgery there is no significant improvement on the motoric.

Recovery after primary repair is faster than other methods. If there is an open injury with a clean sharp nerve transection, immediate repair can be done.1 In this case there was a delay for surgery due to under diagnosed in the examination at the first time the patient came to the emergency department.

CONCLUSION

Direct nerve repair with epineural microsutures is an effective treatment for radial nerve injury, but the timing for surgery influencing the result of operation.

CONFLICT OF INTEREST

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