



Repair of Radial Nerve with Sural Nerve Graft: Less Often Complication of Supracondylar Humerus Fracture

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Abstract

Neurological problems following supracondylar fractures are clinically challenging problem. Neurological damage has been reported about 10-20% of pediatric supracondylar fractures. Nerve injury caused by primarily directly damage of the fracture fragments, excessive stretching, entrapment of nerve in fracture line, or iatrogenically. Radial nerve injury is at least often seen by rate of %21 after supracondylar humerus fractures. Neural injuries of pediatric patients have mostly recover spontaneously. But in case of nerve defect; nerve grafting is needed for repair.

Keywords: Radial nerve, supracondylar humerus fracture, sural nerve graft

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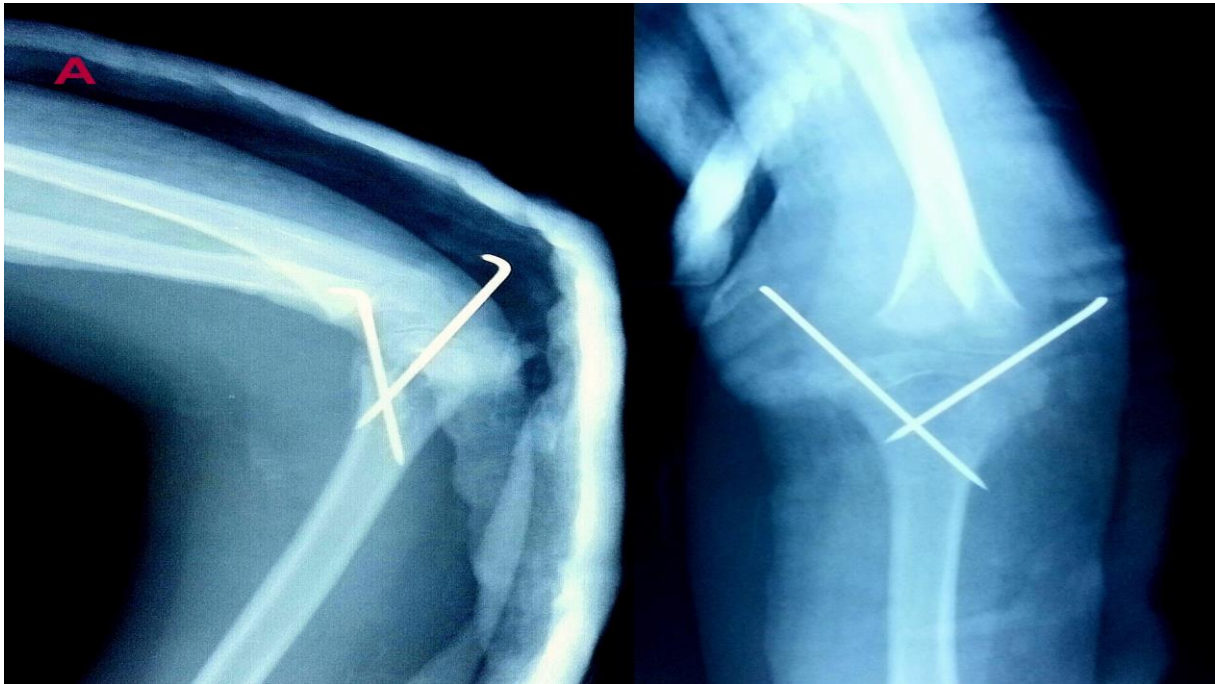
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Introduction

Supracondylar humerus fractures anatomically described as the fractures of the olecranon fossa at the proximal region of the distal humeral condyle; account about 50% of elbow fractures in children and most common between ages 3-10 and boys [1]. Neurological injuries have been reported about 10-20% in supracondylary humerus fractures in children; nerve injuries could occur primarily due to direct damage of fracture fragment, excessive stretch of nerve, entrapment of nerve on fracture site or iatrogenic [2]. Most commonly injured nerve is anterior interosseous nerve (55%); followed by ulnar (25%) and radial(21%) nerve, and it has been reported that radial nerve injury occurs due to medial separation in extension type fractures [1]. In this case report, we present a case of patient with radial nerve injury which was treated secondarily with sural nerve graft after cycling accident.

Case report

Eight years old girl patient had been admitted to our emergency department with pain and open wound in right elbow after cycling accident. Patient had Gustillo-Anderson type II open fracture in right elbow. In physical examination; there was open wound about 3 cm on lateral condyle. Patient had no extension on wrist and thumb and had hypoesthesia in dorsal radial first web of hand. Both radial and ulnar pulses were palpable. On surgical exploration, a neurotmesis type radial nerve injury was found. Fracture was treated with open reduction and fixation with K-wires both medial and lateral side (Figure A). Primary repair of radial nerve was not deemed appropriate because of skin, muscle and soft tissue damage due to open fracture [7] so secondary nerve repair had planned and radial nerve defect was repaired with autogenous sural nerve graft under a surgical microscope with sutures and fibrin glue three months later from first surgery (Figure B). No any functional limitation of upper extremity was found on comparison the uninjured side after six months postoperatively (Figure C).



Figures: Postoperative PA and lateral radiographs of elbow(a), Illustration of elbow preoperatively and sural nerve graft accomplished (b), Wrist and thumb functional positions of 3 years postoperatively (c).

Figure A



Figure B



Figure C

Discussion

Nerve injuries can occur due to trauma or iatrogenic after pediatric supracondylary humerus fractures. Seddon classified nerve injuries into three types in his classification for peripheral nerve injuries. Neuropraxia is total motor paralysis accompanied by lesser extent loss of sensory and sympathetic function. This condition occurs due to demyelinated local bloc in compression injuries. Axonotmesis is loss of axonal integrity accompanied by small amount of endoneurial tubular injury. In this type of nerve injury; functional recovery depends on time required for axonal regeneration and reinnervation of distal part. Neurotmesis is complete laceration of nerve. In this type of injury, self healing should not be expected and nerve repair should be performed [4]. Nerve injuries associated with supracondylary humerus fractures in children are usually in neuropraxia type. But there was a neurotmesis type nerve injury in our case.

According to intervention time; the intervention in first 24 hours refers to primary repair ; 1-7 days refer late primary repair and 1 week after injury refers to secondary repair [6].

Secondary nerve repair is more appropriate to avoid possible complications due to adhesions caused by tendon, bone and vascular injuries in addition to nerve injuries [5,6]. We preferred secondary repair in our case because of open fracture and soft tissue damage. Autograft was used because of 3 cm nerve defect. Functional recovery after radial nerve repair in high energy radial nerve injuries are usually unsatisfactory [3]. In the literature, it has been reported

radial nerve injuries with more than 6-8 cm defects have worse outcomes [3]. If defect is existing in radial nerve injuries, repair with sural nerve graft usually gives good results especially in short segment injuries as in our case. In our case, we obtained satisfactory result in a patient with radial nerve injury with 3 cm defect repaired with sural nerve graft 6 months after surgery

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