

Case Report

Radial nerve neurotmesis in closed humeral shaft fracture: unusual case

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ABSTRACT

Radial nerve neurotmesis constitutes a major problem in the treatment of closed fractures of the mid-shaft of the humerus. A case of radial nerve neurotmesis associated with a closed fracture of mid-shaft of the humerus is reported. Radial nerve neurotmesis was found at the fractured site. Early exploration of the nerve and primary internal fixation of the fracture was done which gave a satisfactory result.

Keywords: Closed fracture humerus, Radial nerve neurotmesis, Tinel's sign

INTRODUCTION

Radial nerve neurotmesis associated with closed fracture of the mid – shaft of the humerus is a rare presentation and constitutes a major problem. There is a rising incidence of humeral shaft fracture in advancing countries where the road condition and driving etiquette do not synchronize. It is estimated that 2,37,000 fractures of the humerus occur in the USA every year.¹ The radial nerve is injured in approximately 18% of humeral shaft fractures.² Fractures involving the distal third of the humerus are highly susceptible to radial nerve injury, whereas those involving the middle third are not.³ Radial neuropraxia is most commonly associated with a mid shaft humeral fracture, whereas neurotmesis of radial nerve is very rare.⁴ Early exploration of the radial nerve claim is technically easier and safer than a delayed procedure. Direct examination of the injured nerve clarifies the diagnosis and the extent of the lesion. Reduction of the fracture helps in reducing further neural damage from mobile bone ends. Early stabilization of the fracture reduces the chance of the nerve being enveloped by scar tissue and callus.⁵⁻⁷ we report a rare case of neurotmesis of the radial nerve with closed fracture middle third of shaft of the humerus.

CASE REPORT

A 28 years old adult male reported to our Emergency with U Plaster cast with history of road traffic accident two days prior to presentation. Initially he was treated elsewhere. He was examined without plaster and found to have the evidence of fracture of left humerus in the middle third with wrist drop, finger drop, thumb drop and numbness of first web space. There was not even a small bruise on his arm. He also had fracture of right clavicle. X-rays showed fracture humerus middle 3rd with small comminution on the medial side (Figure 1A). Nerve conduction study was not performed pre-operatively. He was investigated for anesthesia and surgery. Open reduction and internal fixation with plate osteosynthesis (Figure 1B) of both humerus and clavicle along with primary nerve suturing of the radial nerve (Figure 2B) were done on the 4th day following the injury after freshening the nerve ends and mobilization of distal part of the nerve. Neurotmesis was a per-operative incidental finding and was documented (Figure 2A). He started developing positive Tinel's sign at the back of thumb, dorsum of the radial two and half fingers and hand from the 11th post-operative day.



Figure 1: (A) Shows comminuted fracture of left middle third of humerus; (B) Post op picture after fracture reduction and internal fixation.

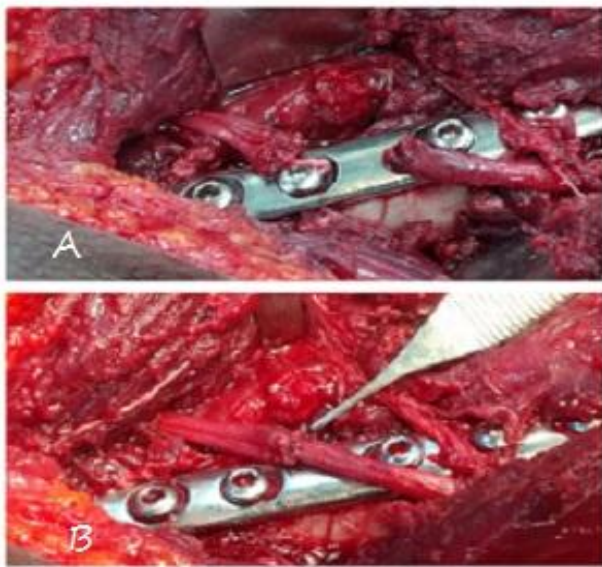


Figure 2: (A) Per-operative picture showing neurotmesis of radial nerve; (B) Per-operative picture after radial nerve repair.

DISCUSSION

Radial nerve neurotmesis associated with closed comminuted fracture of the middle shaft of the humerus is a very rare presentation. Radial nerve palsy is most commonly seen in transverse (21.2%) and spiral fractures (19.8%) compared with oblique (8.4%) and comminuted (6.8%) fractures.⁴ Injury to the radial nerve can cause significant disability and a thorough clinical examination is important following humeral fracture. Inability to extend the wrist and fingers associated with loss of function of the brachioradialis and extensor carpi radialis longus and brevis are an indication of radial nerve injury. Early exploration of the nerve and internal fixation of this fracture is recommended. Several unique anatomical features make the radial nerve particularly vulnerable to injury when humeral shaft occurs. The nerve is intimately

related to the humerus in the middle third of the shaft, separated by only a thin layer of triceps muscle. When fracture occurs at the middle shaft of the humerus, the bone ends can easily lacerate, contuse, or entrap the radial nerve. In closed injuries, the radial nerve is intact in the majority of cases and prognosis for complete or near complete recovery is good.^{2,8-13} Early surgical exploration in a closed injury may be indicated when radial nerve neurotmesis is suspected in a comminuted middle shaft of the humeral fracture with associated loss of radial nerve function.¹¹ Primary repair has been recommended if it can be performed without significant tension. Tension free repair and freshening up nerve ends before suturing offers better results. Where there is extensive laceration of the nerve, sural nerve grafting offers good functional recovery in about 26 months.¹⁴

CONCLUSION

The current case, to our knowledge is first reported case of Radial nerve neurotmesis associated with closed fracture of the mid – shaft of the humerus. In the case discussed here, there was early appreciation of Tinel’s sign, probably because of early exploration and primary nerve repair. Hence we believe that early surgical repair and fracture stabilisation is technically easier and safer to achieve nerve recovery and fracture union early.

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