

Hahn-Steinthal fracture

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ABSTRACT

Coronal shear fractures of the distal humerus involving capitellum and trochlea are rare injuries account for less than 1% of elbow fractures. Isolated fracture of the capitellum is rare. These are rare fractures with articular complexity and are technically challenging for management. With better understanding of the anatomy and imaging advancements, the complex nature of these fractures is well appreciated now. These fractures involve metaphyseal comminution of lateral column and associated intraarticular injuries are common. We present clinical and radiological data on a single case of a fracture capitellum. We came across a 15 year adolescent male who sustained an isolated Hahn steinthal type of fracture. It was treated by open reduction internal fixation with herbert screws and additional K wires to supplement metaphyseal comminution. The elbow was immobilized for 4 weeks. The patient regained full range of motion 12 weeks postoperatively. We reiterate that anatomical reduction and internal fixation is the right way to treat this injury.

Keywords: Capitellum, Hahn Steinthal fragment, Open reduction & internal fixation.

INTRODUCTION

Fractures of the capitellum are rare and represent only 1% of the elbow fractures^{1,2}. Isolated capitellum fractures occur in children above 12 years and middle aged. The mechanism of injury is fall on outstretched hand and semi flexed elbow which causes axial loading of the capitellum by forces transmitted through the radial head^{3,4}. Bryan and morrey classified these fractures into three fracture patterns. Type I, or the Hahn -Steinthal fracture is a shear fracture involving large fragment of the capitellum in the coronal plane. Type II, or the Kocher-Lorenz fracture which involves shell of articular cartilage with a thin layer of bone. Type III are comminuted fractures.

Many methods of treatment have been described for the fracture like closed reduction and casting, excision and open reduction and internal fixation with various devices like K- wire, Herberts screws, cannulated-cancellous screws, and biodegradable screws^{5,6}.

This study describes the treatment and outcome of using herbert screws in treatment of Type 1 capitellum fractures.

CASE REPORT

15 year old right hand dominant adolescent male presented to the casualty with pain and swelling of the left elbow following fall on an outstretched hand. On examination lateral condyle was tender. There were no neurovascular deficits. Movements of the elbow were restricted and painful. Temporary sling was applied with injectable pain-killers. Radiograph of the left elbow including Antero-posterior and lateral views showed an isolated coronal split in the capitellum, Hahn-Steinthal or Type 1 Bryan and Morrey fracture. (Fig. 1). Open reduction and internal fixation was planned. A posterolateral Kochers approach was used to visualize the fracture. The anconeus muscle was elevated subperiosteally. The capsule and annular ligament were incised and joint visualized. The fracture hematoma was evacuated, coronal split in the capitellum identified and fractures edges were freshened. Capitellar fracture reduced and two Herbert screws



Fig. 1



Fig. 2



Fig. 3



Fig. 4

Figure 1 pre op x ray, Fig 2,3,4 pre op CT images showing coronal shear fracture capitellum : Hahn-steinthal fracture

were passed across the fracture from anterior to posterior. Metaphyseal comminution in the region of olecranon fossa was fixed with 2 k wires medially and 1 laterally.

Throughout the procedure the forearm was kept pronated to displace posterior interosseous nerve anteriorly. The lateral ligamentous structures was repaired and tissues were closed in layers. Postoperative X-ray showed good fracture reduction and fixation. Above elbow slab was applied for 3 weeks after which mobilization was begun under the supervision of a physiotherapist. Patient was followed up at 6 weeks, 3 months, k wires were removed at 6 weeks Radiograph at 3rd month showed well united fracture. Full range of elbow motions regained at 3 months followup



Fig. 5

Fig. 6

Fig. 7



Figure 8

Figure 5,6,7 Intraoperative Images. Figure 8 immediate post op x ray



Fig. 9

Fig. 10

Fig. 11

Figure 9-1month followup x ray, figure 10-6weeks, figure 11-3months post operative x ray.

DISCUSSION

Type 1 or Hahn-Steinthal fractures are rare, accounting for 1% of elbow fractures. The fracture is clinically characterized by pain, minimal swelling and tenderness on the lateral aspect of elbow. Lateral radiographs show a displaced semilunar fragment detached from the humeral condyle. Various treatment methods are described for capitellum fractures

in literature, like closed reduction and plaster immobilization, excision, open reduction and internal fixation with various devices like K-wires, cannulated-cancellous screws, Herberts screws, bio-degradable implants and acutrak headless compression screws.

Closed reduction and casting has resulted in limitation of movement due to prolonged immobilisation, post traumatic osteoarthritis due to articular incongruity and lateral instability⁷. Excision of the articular fragment as a primary treatment in Hahn-Steinthal fractures should be avoided because it may cause radio-humeral osteoarthritis and instability⁸.

Open reduction with internal fixation is the treatment of choice as it provides stable osteosynthesis and joint congruity and allows early mobilization. In our case, we used Herbert screws perpendicular to the fracture line directed from anterior to posterior, which provided excellent compression at the fracture site. Implants can be removed once the fracture heal. Biodegradable screws have disadvantages of loss of fixation and in case of Avascular necrosis or chondrolysis removing the screw may be difficult.

There was no evidence of infection or avascular necrosis in our study.

CONCLUSION

A displaced type 1 capitellum fracture must be anatomically reduced and fixed, which will allow stable osteosynthesis and early mobilization

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