*IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*
*e-ISSN: 2279-0853, p-ISSN: 2279-0861. Volume 12, Issue 1 (Nov.- Dec. 2013), PP 27-29*
*www.iosrjournals.org*

# Displaced Hahn-Steinthal fracture: a case report

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***Abstract:*** *Isolated fracture of the capitellum is rare. We present clinical and radiological data on a single case of fracture of capitellum. We came across a 62 year old woman who sustained an isolated Hahn-Steinthal type of fracture. It was treated by open reduction and internal fixation using cannulated cancellous screw. The elbow was immobilized for 3 weeks. Patient attained full range of movements at 3 months. We recommend that anatomical reduction and fixation is the appropriate treatment for these types of fracture.*
***Keywords****: Capitellum, Hahn Steinthal fragment, Open reduction & internal fixation.*

## I. 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 communited 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, cannulated-cancellous screws,Herberts screw and biodegradable screws[5,6].

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

## II. Case presentation

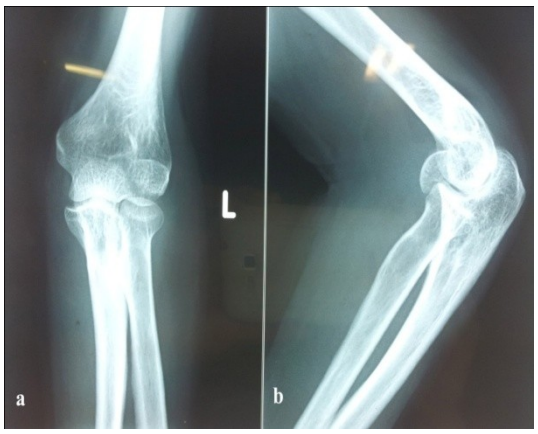


**Figure 1(a & b). Pre-operative radiographs showing the capitellum fracture in coronal plane (Haan Steinthal fragment).**

60 year old right hand dominant woman presented to the emergency room with pain and swelling of the left elbow following fall on 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. Double-arc sign was seen on the lateral x-ray. **(Fig. 1)**. Open reduction and internal fixation was planned. A postero-lateral 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

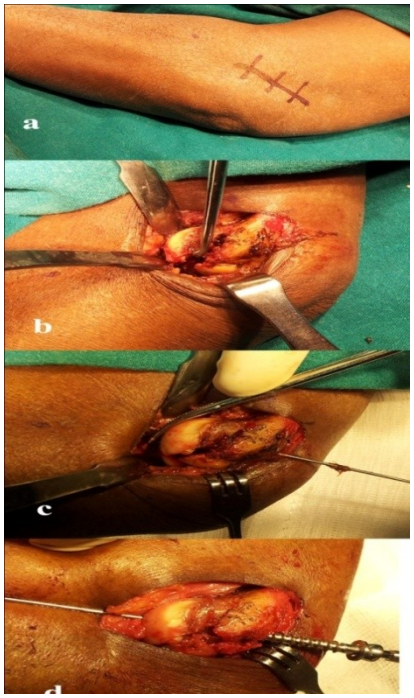


**Figure 2: Intraop photos showing skin incision (a), fracture reduction (b & c) and fixation (d).**

spilt in the capitellum identified and fractures edges were freshened. Throughout the procedure the forearm was kept pronated to displace posterior interosseous nerve anteriorly. No clamps or towel clips were used to reduce the fragment to avoid injury to the articular cartilage. Guide pin was passed from the posterior aspect of the lateral condyle to the centre of the capitellum anteriorly. Reduction checked under C-arm. After drilling a 4.0mm cannulated cancellous screw with washer was fixed. **(Fig. 2)**. Excellent compression was achieved with cannulated-cancellous screw. Care was taken to avoid damage to the articular cartilage while drilling and applying the screw. The lateral ligamentous structures was repaired and tissues were closed in layers. Intraoperatively, elbow range of movement was 0-140 degrees. Postoperative X-ray showed good fracture reduction and fixation **(Fig. 3)**. Above elbow slab was applied for 3 weeks after which mobilization was begun under the supervision of a physiotherapist. Patient was followed up at 6weeks, 3 months, 6 months and 9 months. At 6 weeks the movements were 20-110 degrees which improved to 5-135 degrees at the end of 3 months. Radiograph at 3rd month showed well united fracture, hence implant was removed. At 6th and 9th month patient was symptom free and radiographs did not show signs of avascular necrosis or osteoarthritis.

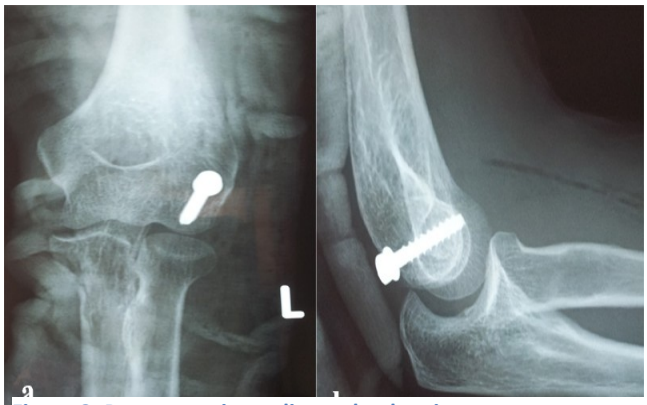


**Figure 3: Post-operative radiographs showing accurate anatomical reduction with the implant insitu.**

## III. Discussion

Type 1 or Hahn-Steinthal fractures are rare, accounting for 1% of elbow fractures. In our department only 2 cases were reported in the last 5 years. 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 immobilisaion,post traumatic osteoarthritis due to articular incongruity and lateral instability[7]. Excision of the articular fragment as a primary treatment in Hahn-Steinthal fractures should be avoided because it may cause radio-humeral osteoarthritis and instability[8].

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 cannulated-cancellous screw perpendicular to the fracture line directed from posterior to anterior, which provided excellent compression at the fracture site. It had no articular damage which allowed early mobilization. Implants can be removed once the fracture heals.

A cannulated-cancellous screw when placed perpendicular to the fracture line provides excellent compression, thus stable fixation.
Biodegradable screws have disadvantages of loss of fixation and in case of Avascular necrosis or chondrolysis removing the screw may be difficult. Cannulated-cancellous screws provide better compression than Herberts screw.
There was no evidence of infection or avascular necrosis in our study.

## IV. 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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