

## Case Report

# A rare case report of type IV capitellum fracture in a young female managed by a single Herbert screw fixation

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**Received:** 02 October 2020

**Accepted:** 11 November 2020

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### ABSTRACT

Isolated coronal shear fractures of capitellum are very rare, accounting for nearly 1% of all elbow fractures. There are various approaches and implants documented for management of such fractures. One of them is lateral Kocher's approach and Herbert screw fixation. Our case report is strengthening this approach and Herbert screw fixation and shows good short term functional outcome along with radiological union.

**Keywords:** Capitellum, Fracture, Herbert, Kocher, Elbow

## INTRODUCTION

Isolated coronal shear fractures of capitellum are very rare, accounting for nearly 1% of all elbow fractures. Usual mechanism described is an axial loading force to the capitellum through radial head in varying degrees of elbow flexion.<sup>1</sup> Bryan and Murray had described 3 types of coronal plane capitellum fractures. A fourth type involving a shear fracture of capitellum and most of lateral half of trochlea was added by Mckee et al to the classification system.<sup>2</sup>

Standard antero-posterior (AP) and lateral radiographs are taken where a double arc sign is pathognomic of this injury. Usually a 3-dimensional (3D) computed tomography (CT) scan is advisable to look for associated injuries and better preoperative planning.

Although in the past conservative treatment has been proposed, however in the current scenario open reduction and internal fixation is advocated to obtain articular congruity and early joint mobilization.<sup>3</sup> The complex nature and rarity of these intraarticular fractures makes exposure and fixation technically demanding.

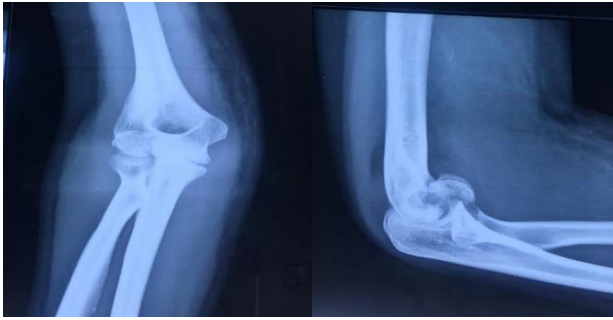
## CASE REPORT

A 30 years old female presented to our emergency department following a fall on outstretched hand with pain and swelling on her right elbow. Clinical examination revealed a diffuse swelling and limitation of flexion.

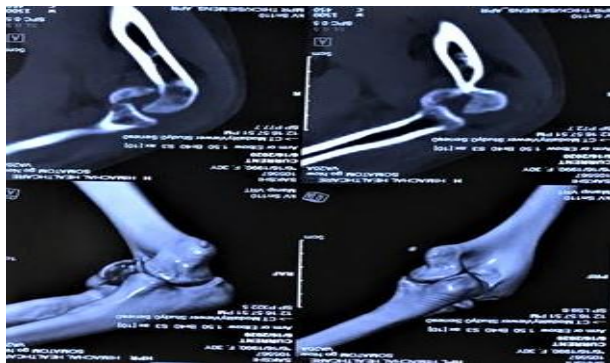
Radiographs taken in both AP and true lateral view showed a displaced fracture of the capitellum. A CT scan with 3D reconstruction was performed on the subsequent day which revealed a coronal shear type fracture of the capitellum extending upto the lateral trochlear ridge.

The patient was taken up for an open reduction through a standard lateral Kocher's approach and the fracture was fixed with a single Herbert screw in an anteroposterior direction. Fixation was found to be stable intra operatively in full range of motion with no sagittal plane instability.

Early range of motion exercises was started from post-operative day two and patient was followed up regularly in the outpatient department (OPD) at post-operative day six, two weeks, one month, three months and six months.



**Figure 1: Pre-operative AP and lateral radiograph depicting “double arc” sign.**



**Figure 2: Pre-operative 3D CT images.**



**Figure 3: Intraoperative fluoroscopy views.**



**Figure 4: Post-operative AP and lateral radiograph.**

## DISCUSSION

Coronal shear fractures of the capitellum are rare injuries occurring in adolescents and adults. It is more commonly seen in females than males.<sup>3</sup> Most common mechanism is

a fall on outstretched hand with the force being transmitted through the radial head.<sup>4</sup> 3 types of capitellum fractures were described by Bryan and Morrey with a type 4 fracture added by Mckee et al. A novel classification recognizing the significance of the lateral humeral column comminution in capitellum fractures was introduced by Dubberly: primarily involving capitellum with or without the lateral trochlear ridge (type 1), capitellum and the trochlea sheared off as one piece (type 2), and the capitellum and the trochlea fractured as separate fragments (type 3). Each type could be then further characterized with respect to the absence (A) or presence (B) of comminution.<sup>3</sup> More recently Zhang et al have divided these fractures into low, moderate and high fracture angle subtypes based on the angle subtended by the most distal part of lateral humeral column fracture line.<sup>5</sup>

An AP radiograph is not sufficient to diagnose these injuries and usually a true lateral view is necessary. However, a CT scan with 3D reconstruction is advocated to look for concomitant injuries and preoperative planning.

Treatment of capitellum fractures can be both conservative and operative. Ochner et al described good outcomes following a two-step closed reduction technique with the elbow in extension under anaesthesia.<sup>6</sup>

Operative treatment involves fragment excision, open reduction internal fixation, arthroscopic assisted fixation and total elbow arthroplasty in selected cases. Excision of fragment can lead to instability of the elbow and has shown to increase chances of radio-humeral osteoarthritis.<sup>7</sup> Open reduction internal fixation has shown to give good results.<sup>3</sup> Various approaches described include lateral (Kocher's), extensile anterolateral and posterior approach via olecranon osteotomy. Approach selection has been based upon fracture anatomy, method of fixation selected and surgeon's preference.

Fixation methods described include cancellous screws, Herbert screws, k wires and mini plates. Absorbable polyglycolide pins have also been reported in few case reports in children.<sup>8</sup> Suresh used 4 mm partially threaded cancellous screws inserted from posterior to anterior direction with good outcome.<sup>3</sup> Are et al demonstrated good outcomes using headless screws in a bilateral type 4 capitellum injury followed by early mobilization. They started rehabilitation from day two post-surgery with the elbow in a hinged brace.<sup>9</sup> In our case range of motion exercises were started from post-operative day-2 and broad arm sling was given for 1 month.

Commonly encountered complications include post-traumatic stiffness, reduced range of motion, arthritis and avascular necrosis of the capitellum. Heterotopic ossification has also been documented in few cases.<sup>10</sup> In our case full range of movement was gained at end of 6 month and radiological appearance of callous seen at end of one month. The functional outcome was good as per the mayo elbow performance score at the end of six months.

## CONCLUSION

To conclude, in agreement with the other studies, we believe open reduction internal fixation of capitellum using Herbert screws to be an acceptable modality for treatment of these injuries. A stable fixation followed by an early post-operative mobilization should be aimed for to achieve satisfactory functional outcome and reduce elbow stiffness.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: Not required*

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**Cite this article as:** David VK, Kumar A, Chittra. A rare case report of type IV capitellum fracture in a young female managed by a single Herbert screw fixation. *Int J Res Orthop* 2021;7:165-7.