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Anatomical reduction and internal fixation of inappropriately treated transcondylar humerus with capitellum fracture

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Abstract

Transcondylar humerus with capitellum fracture represent <1% of all elbow fractures. Most of them occur after a fall onto an outstretched hand with the elbow in varying degrees of flexion. Since the capitellum fragment does not have a soft-tissue attachment, it can displace and interfere with joint motion. Successful management of distal humerus fractures depend on correct reduction of the fracture, reconstruction of the articular surface if needed, stability and rigidity of the fixation, and appropriate rehabilitation.

We present you a case of transcondylar humerus with capitellum fracture treated with improper reduction and k-wire fixation underwent revision surgery with k-wire removal, anatomical reduction and cannulated cancellous screw and k-wire fixation for medial condyle, two k-wire fixation for lateral condyle and two Herbert screws fixation for capitellum fracture.

Keywords: transcondylar humerus fracture, capitellum fracture, anterolateral approach to elbow

Introduction

Coronal shear fractures of distal humerus involving the capitellum are rare injuries with articular complexity ^[1], 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 may involve metaphyseal comminution of both columns and associated intraarticular injuries are common. Hahn first described a fracture of the capitellum in 1853 ^[2]. The classifications most commonly used for capitellum fractures are the descriptive Bryan and Morrey classification (modified by McKee *et al.*) and the Dubberley classification ^[3-6]. Previously, closed reduction and excision were the accepted treatment but now preference is for open reduction and internal fixation with an aim to provide stable and congruent joint with early range of motion of joint. Various approaches including extensile lateral, anterolateral and posterior approaches have been described in literature depending on the fracture pattern and complexity.

Good to excellent outcome have been reported with internal fixations and fair to poor results are noted in articular comminution with associated articular injuries. Various implants including head less compression screws, mini fragment screws, k-wires, bioabsorbable implants and columnar plating are advocated for reconstruction of these complex fractures. In spite of articular fragments being free of soft tissue attachments, the rate of osteonecrosis and osteoarthritis is reported very less after internal fixation. We present a case of transcondylar humerus fracture with capitellum fracture in 16 year old young male patient which was operated 1 month back outside our hospital with improper close reduction and k-wire fixation. Informed consent was taken from patient's guardians for this study.

Case presentation

A 16 year old patient presented to us after 1 month post operative of transcondylar humerus with capitellum fracture treated with k-wire fixation and above elbow slab immobilisation elsewhere.

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On examination, there was tenderness at both the condyles of humerus. There was no swelling or any features of inflammation/infection. Deformity and range of motion of elbow could not be assessed due to post op status and k-wires in situ.

Anterior-posterior and lateral radiograph of elbow (Fig 1) showed transcondylar humerus with capitellum fracture with improper reduction and k-wire fixation for lateral condyle. CT scan was showing ununiting fracture and improper reduction.



Fig 1: Xray showing improper reduction and fixation

Material and Method

After taking written and informed consent, the patient was submitted for surgery. Anterolateral approach (Fig 2) to elbow was taken and open reduction and internal fixation of medial condyle of humerus was done with one cannulated cancellous screw, one k-wire. Lateral condyle and capitellum were treated by two k-wires and two Herbert screws (Fig 5). Post operative above elbow slab immobilisation in mid prone position with elbow in 90 degrees flexion was given till suture removal. After removing sutures at post op day 12, above elbow cast was given for further 6 weeks.



Fig 2: Anterolateral approach to elbow



Fig 3: Fracture of capitellum

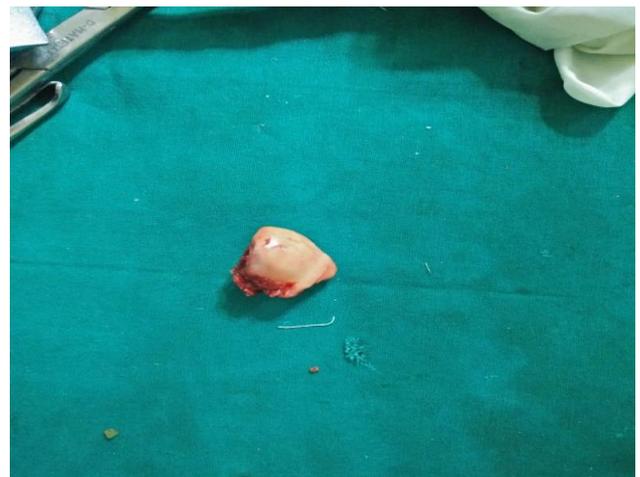


Fig 4: Fractured capitellum fragment



Fig 5: Immediate post operative fixation image

After 6 weeks post-op, k-wires were removed and mobilisation of elbow was started.



Fig 6: After k-wire removal

Patient was assessed at 1 month, 2 month, 3 month and 6 months post operatively.

Discussion

Transcondylar distal humerus with capitellar injuries are rare and complex in nature. These injuries result from axial loading of the capitulo-trochlear area by the forces transmitted through the radial head and could be associated with more complex distal humeral fractures and dislocation with concomitant ligamentous injuries. The complexity of these fractures in recent times has been better appreciated by digital imaging.

Open reduction and internal fixation provides anatomical reduction, stability and early mobilisation and has become preferred treatment. Closed reduction, immobilisation and fragment excision are known to be associated with poor outcomes. Operative treatment of capitellar fractures has also been shown to confer favorable clinical outcomes compared with nonoperative treatment and is therefore generally recommended in most cases^[8-17]. Failure of fixation or non-anatomic reduction leads to articular incongruity, post-traumatic arthrosis, stiffness and potential ulnohumeral instability. The intraarticular and complex nature of these fractures makes optimal surgical exposure and implants debatable.

Result

According to “ASES-E” criteria we have achieved excellent result. At the final follow up of 6 months patient had achieved full anatomical range of motion and there is no difficulty in daily routine activities.

Conclusion

From above method we are concluding that the transcondylar distal humerus with capitellar fracture is very rare and the suggested line of anatomical reduction and fixation technique is very effective for this type of fracture and it can be used in future to achieve good to excellent outcome.

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