Capitellar Fractures – Is ORIF Necessary?

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INTRODUCTION

Capitellar fractures constitute <1% of all elbow injuries. They occur almost exclusively in adults and are more common in women. Capitellar fractures are caused by shearing forces anterior to the centre of the capitellum. Capitellar fractures are classified according to their pattern of injury. Type 1 fractures are two part coronal plane injuries; type 2 injuries are chondral sleeve type injuries; type 3 injuries are highly comminuted, unreconstructable fractures; and type 4 injuries involve a large fragment extending beyond the capitellum into the lateral condyle proper. Treatment of types 2 and 3 is usually with open excision of the fragments; occasionally it is possible to reattach the subchondral sleeve of a type 2 fracture. Type 4 injuries are treated by open reduction and internal fixation (ORIF). This paper looks exclusively at the treatment of type 1 injuries.

Unsuccessful treatment of these injuries results in intra-articular incongruity and early degenerative joint disease. Early papers on the outcome of closed reductions for these injuries reported poor results with closed methods of treatments. A paper published in 1996 by Ochner et al in the Journal of Trauma reported excellent results in 9 patients with closed reductions of type 1 capitellar fractures. McKee et al published in 1996 in the Journal of Bone and Joint Surgery a paper looking at the operative treatment of 6 patients with type 1 capitellar fractures. This paper by McKee also reported excellent results with operative treatment of these fractures. However, the reported results were superior in Ochner et al's group of 9 patients treated nonoperatively compared to McKee et al's group of 6 patients treated with open reduction and internal fixation.

This paper looks at the results of three consecutive patients treated by one of the authors (KC) with closed reduction. The purpose of this paper was to review the long term results of these three cases and compare these results to those published.

METHOD

Three consecutive patients treated with type 1 capitellar fractures were treated with a closed reduction under a general anaesthetic. All three patients were immobilised in a plaster at 90 degrees for 4 to 6 weeks post reduction.

Reduction of the fracture was achieved by hyperextending the elbow as the initial step. With the elbow hyperextended firm pressure was placed over the position of the fragment lying proximal to the capitellum by the surgeon's thumb. The elbow was then flexed trapping the fragment in position. Image intensifier was then used to confirm the reduction.

Two patients required only a single reduction maneuver to achieve anatomical reduction. One patient required a second reduction maneuver under the same anaesthetic to achieve an anatomical reduction.

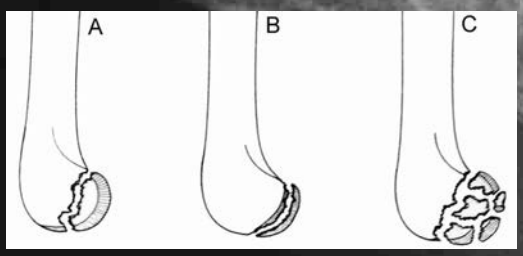
RESULTS

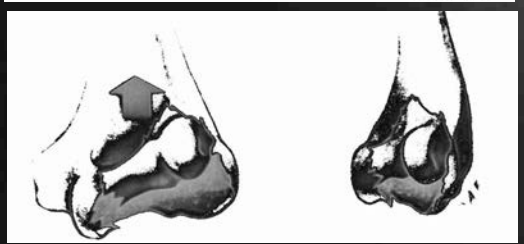
Average follow up was 34 months (range 28 – 38 months). All three fractures united. One patient, case 2, developed increased sclerosis in the capitellar fragment on the 2 month radiograph which was highly suggestive of avascular necrosis. Final radiographs at 35 months post injury demonstrate no evidence of avascular necrosis.

Two patients obtained a full return of range of motion when compared to the uninjured contralateral side. One patient, case 3, had a residual 15 degree fixed flexion deformity but had otherwise obtained a full return of range of motion.

All three patients had normal DASH scores at final follow up.

Classification





Type 1 fractures are two part coronal plane injuries; type 2 injuries are chondral sleeve type injuries; type 3 injuries are highly comminuted, unreconstructable fractures; and type 4 injuries involve a large fragment extending beyond the capitellum into the lateral condyle proper.

Case 1 - 11yo trampoline accident

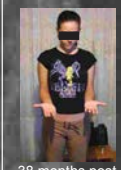

Initial xray

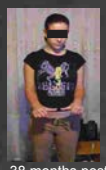

38 months post MUA lateral

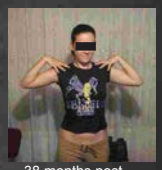

38 months post MUA AP

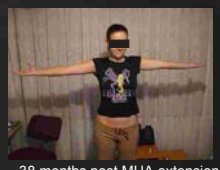

10 weeks post MUA flexion


10 weeks post MUA extension


38 months post MUA supination


38 months post MUA pronation


38 months post MUA flexion


38 months post MUA extension

Case 2 - 72yo, 120kg, Diabetic, fall at home

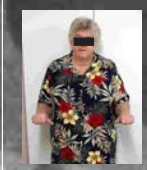

Initial xray

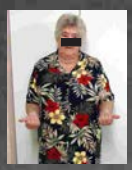

Post reduction xray

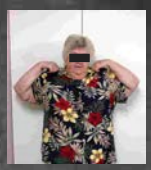

2 months post reduction AVN


35 months post MUA AP


35 months post MUA lateral


35 months post MUA supination


35 months post MUA pronation


35 months post MUA flexion


35 months post MUA extension

Case 3 - 50yo, fall off bicycle


Initial xray


Post reduction


28 months post MUA lateral


28 months post MUA AP


28 months post MUA supination


28 months post MUA pronation


28 months post MUA flexion


28 months post MUA extension

DISCUSSION

This group of three patients demonstrates that type 1 capitellar fractures can be treated very successfully with closed reduction and cast immobilisation. Three cases is too small a series to be able to make definitive conclusions from. However, the injury is extremely rare and large case series are not available in the literature the two papers published within the last 10 years on the subject had 6 and 9 patients. This group of patients is a consecutive series treated by a surgeon. The results are very good in this group of three patients and are superior to those presented in McKee's series of six cases treated with ORIF.

CONCLUSIONS

The authors propose that a closed reduction should be attempted when treating type capitellar fractures. If closed reduction achieves an anatomic reduction then the elbow should be immobilised in 90° flexion four weeks. Those fractures that do not reduce anatomically with a closed reduction should be openly reduced and internally fixed followed by an active mobilisation programme postoperatively.

REFERENCES

1. Ochner RS, Bloom H, Palumbo RC, Coyle MP. Closed Reduction of Coronal Fractures of the Capitellum. J Trauma 40:199-203, 1996.
2. McKee MD, Jupiter JB, Bamberger HB. Coronal Shear fractures of the distal end of the humerus. JBJSa 78:49-54, 1996

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