Result of Open Reduction and Herbert Screw Fixation in Late Presentation of Capitellar Fractures in Adults

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ABSTRACT

Background: Capitellar fractures are rare intra-articular injuries of the distal humerus, accounting for nearly 1% of elbow fractures (1). Timely fixation is recommended to restore joint congruity and allow early mobilization (2). In many settings, especially in developing countries, presentation may be delayed due to missed diagnosis or late referral (3). The management of such late cases remains challenging.

Introduction: This study evaluates the functional and radiological results of late-presenting capitellar fractures treated surgically by open reduction and Herbert screw fixation.

Results: Among 35 adult patients, all fractures united by 10-14 weeks. Functional outcomes by Mayo Elbow Performance Score (MEPS) were Excellent in 17 (49%), Good in 12 (34%), and Fair in 6 (17%). No patients had a poor outcome. Complications occurred in 6 cases (17%), including 5 with postoperative stiffness and 1 with degenerative arthritis.

Conclusion: Anatomic reduction with Herbert screw fixation in late-presenting capitellar fractures provides reliable union and favorable functional results, although stiffness remains a common complication.

Keywords: Capitellar fracture; elbow; fixation; Herbert screw; late presentation

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INTRODUCTION:

Capitellar fractures, though rare, represent an important subset of distal humeral fractures, accounting for approximately 1% of all elbow fractures [1]. They typically result from a fall on the outstretched hand, with axial loading transmitted through the radial head onto the capitellum [2]. The injury pattern is intra-articular, and disruption of the articular congruity often leads to long-term disability if not managed appropriately.

Several classification systems have been proposed, including the Bryan and Morrey system [3], its McKee modification, and the Dubberley classification [4]. The Dubberley system, which accounts for posterior comminution and trochlear involvement, is particularly useful in predicting prognosis.

Diagnosis may be delayed due to the subtle nature of fracture lines on standard radiographs [5]. Computed tomography (CT) is often necessary for definitive diagnosis and surgical planning. Missed or late-diagnosed cases are not uncommon, especially in resource-limited regions, where patients present weeks after the injury [6].

The treatment of choice for displaced capitellar fractures is open reduction and internal fixation (ORIF), with the aim of restoring articular congruity, allowing early mobilization, and preventing stiffness [7]. Herbert headless compression screws provide stable fixation and maintain the smooth articular surface, permitting early rehabilitation [8]. However, evidence is limited regarding outcomes in patients who present late, often beyond two weeks after injury, where fibrosis and cartilage damage complicate management [9].

This study evaluates the functional and radiological outcomes of Herbert screw fixation in late-presenting capitellar fractures, focusing on union rates, functional outcomes, and complications.

MATERIAL AND METHODS

This retrospective observational case series was conducted at a tertiary care center. A total of 35 patients aged 18 years or older, who presented two weeks or more after sustaining a capitellar fracture, were included. Patients with open fractures requiring staged fixation, pathological fractures, or polytrauma were excluded.

All patients underwent preoperative imaging including radiographs and computed tomography for fracture characterization. Fractures were classified using the Dubberley classification [4].

Surgical technique: A lateral approach was used in all cases. Fragments were exposed, soft tissues carefully preserved, and reduction achieved under direct vision. Provisional fixation was performed with K-wires, followed by definitive fixation with Herbert headless compression screws, typically inserted anterior-to-posterior. Associated injuries were addressed as necessary. Postoperatively, early mobilization was encouraged.

Outcome assessment: The primary outcome measure was the Mayo Elbow Performance Score (MEPS). Secondary outcomes included radiographic union, range of motion (ROM), and complications. Statistical analysis included descriptive measures.

RESULTS

A total of 35 adult patients were included. The mean age was approximately 38 years, with a nearly equal male-to-female distribution. All fractures united radiographically by 10-14 weeks. The functional results based on MEPS were Excellent in 17 patients (49%), Good in 12 patients (34%), and Fair in 6 patients (17%). No patients had a poor outcome. The mean flexion-extension arc was 120°, and pronation-supination averaged 160°.

Complications were observed in 6 patients (17%). The most frequent was stiffness (5 cases), followed by degenerative arthritis (1 case). No cases of heterotopic ossification, avascular necrosis, or wound infection were identified.

DISCUSSION

The current series demonstrates that open reduction and Herbert screw fixation can achieve reliable union and satisfactory functional outcomes even in patients presenting late after a capitellar frac-

Figure 1:
Distribution of MEPS outcome categories (n=35).

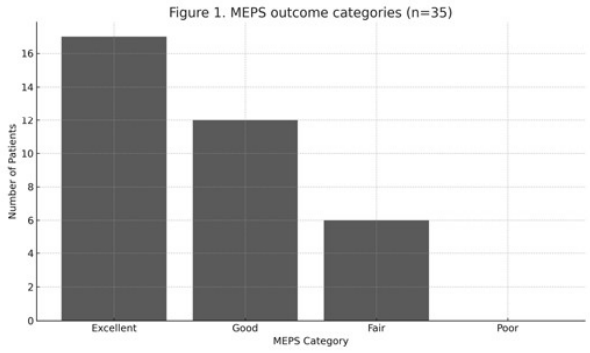
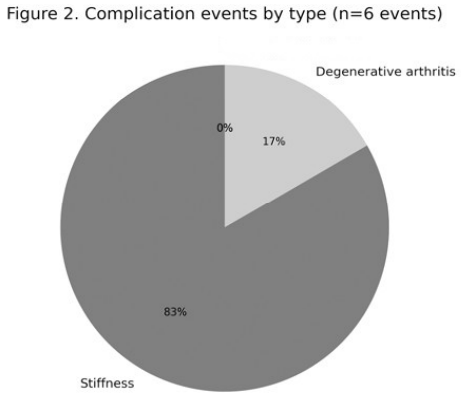


Figure 2.
Complication events by type (n=6).



ture. Our results showed that 83% of patients achieved good-to-excellent outcomes (MEPS ?75), consistent with published data.

Dubberley et al. [1] reported union and good-to-excellent function in most cases, although their cohort included patients treated acutely. Similarly, Tanr?verdi et al. [2] documented satisfactory results in 86% of cases managed with headless compression screws. In our delayed series, union was universal, and functional results mirrored these findings, indicating that even late fixation can be effective.

Keshkar et al. [3] specifically investigated delayed fixation and found that outcomes remained acceptable when Herbert screws were used. Our findings corroborate these results, suggesting that a delay of more than two weeks does not preclude surgical intervention.

Stiffness was the most common complication, seen in 14% of our patients, a finding echoed in other series [4,6]. Early mobilization and adherence to rehabilitation protocols are key to minimizing this complication. Degenerative arthritis, seen in one case, likely reflects articular cartilage damage at the time of injury or incomplete restoration of congruity.

Alternative fixation strategies, such as adding a posterior buttress plate, have been proposed for Dubberley type B fractures [5]. In our series, Herbert screws alone provided sufficient stability, although some residual stiffness was noted. Biomechanical studies also support the use of headless screws, showing superior compression and articular preservation [8].

The strengths of this study include its focus on delayed presentation and use of a standardized fixation method. Limitations include its retrospective design, modest sample size, and relatively short follow-up. Long-term outcomes, particularly with respect to post-traumatic arthritis, require further evaluation.

CONCLUSION

In adults presenting late with capitellar fractures, Herbert screw fixation following anatomical reduction provides reliable fracture union and favorable functional recovery. Despite the challenges of delayed presentation, good-to-excellent outcomes can be achieved in the majority of cases. Stiffness remains the most frequent complication, underscoring the importance of early postoperative rehabilitation.

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