

Management of neglected Type I Capitellar Fracture in 14 years old patient: Case report

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Abstract

Introduction: In children Capitellum fractures are very rare. In a series of 2000 elbow fractures in children Marion J et al could find only one capitellum fracture. These injuries are caused by fall on an outstretched hand with axial load transmitted through the radius with elbow extended or semi-flexed. When not treated properly these injuries can lead to painful stiff elbow and long term functional disability because of the intra-articular nature of the injury.

Case Presentation: 14 years old patient with 10 days old fracture capitellum (Type I- Hahn steintal) initially mismanaged by parents and quack was operated after taking written informed consent from the parents regarding possible complication like post-op elbow stiffness and avascular necrosis of fragment because of delayed presentation. Open reduction and internal fixation was done using two headless herbert’s screws using kocher’s lateral approach. Surprisingly patient regained near normal range of motion with 12 weeks.

At six month follow patient has no pain with normal range of motion.

Discussion: Fractures of Capitellum are rare in children with slight female predominance because of association of cubitus valgus and cubitus recurvatum. Most of literature suggests that Type I and Type II fractures are amenable to fixation. Good to excellent out-comes have been achieved in most patients who have undergone ORIF for these injuries. But most of the studies suggest that fractures with comminution and medial extension have poor results after ORIF.

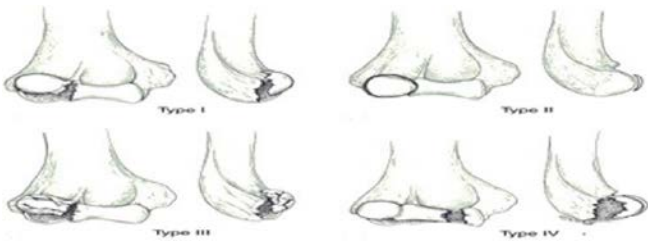
Conclusion: These injuries are very in children. Early recognition and proper surgical management can give good functional results. Even in neglected type I injuries good results can be obtained with anatomical reduction and fixation.

Keywords: Capitellum, Range of motion, Children,

Introduction

In children Capitellum fractures are very rare¹. In a series of 2000 elbow fractures in children Marion J et al could find only one capitellum fracture². Most of times

patients have associated injuries like fracture of proximal radius in about 31% of case, Lateral collateral ligament injuries in about 40% of cases^{3,4,5}. Many patients have associated unstable elbow injuries^{3,5}. Capitellum fractures compromise only 1% of all injuries around elbow^{1,6}. Bryan and Morgan¹ classified these injuries into four types. Type I (Hahn-Steinthal) large fragment of articular surface of capitellum, often involving the articular crest of trochlea. Type II (Kocher-Lorenz) cartilaginous fragment with minimal subchondral bone attached – uncapping of the condyle. Type III (Broberg-Morrey) is comminuted fracture of capitellum. Type IV (McKee) Shear injury of capitellum in coronal plane involving both capitellum and trochlea.



These injuries are caused by fall on an outstretched hand with axial load transmitted through the radius with elbow extended or semi-flexed, this results in the generation of shearing forces in the coronal plane, the fractured fragment is always displaced anteriorly because of location of capitellum on the lateral condyle^{3,5,6,7}. Because of complex distal humeral anatomy and growing physis capitellum fractures are often missed in the emergency room hence a true lateral xray and comparison with the opposite elbow should always be done⁷. When not treated properly these injuries can lead to painful stiff elbow and long term functional disability because of the intra-articular nature of the injury^{2,5,7}. There are different treatment options like closed reduction, excision of the unreconstructable fragment, but these procedure lead to suboptimal long term results^{4,5}. Open-reduction and

internal fixation with head-less Herbert's screw or cannulated cancellous screws gives better long term functional out-come^{5,8,9}.

Case Presentation: 14 years old patient with history of trauma to left elbow due to fall from 15 feet height reported to emergency ward 10 days after trauma with history of pain and inability to use left upper limb in day to day activities. Initially patient was mismanaged by his parents by local massage for first 3 days after that he was taken to local quack who had applied strapping around elbow. But because of persistent pain patient was brought to our hospital, after removing strapping conditioning of the limb was done, distal neuro-vascular status was normal with diffuse swelling around left elbow with decreased and painful range of motion. Patient was sent for Radiographic examination with AP and lateral views of left elbow. X-rays revealed big osseous fragment of left capitellum grossly displaced which was classified as Hahn-Steinthal (type I) fracture of capitellum. CT scan with 3-D reconstructional images showed fracture capitellum involving the lateral trochlear ridge (Dubberly type I). Limb was kept elevated and finger movements were advised. Parents were explained prognosis regarding stiffness and avascular necrosis of the fragment because of late presentation to hospital after injury and mismanagement by quack. Before surgery written informed consent was taken from the parents. Patient was operated on 3rd day of admission under GA and pneumatic tourniquet was used. Fracture was approached using Kocher's lateral approach to the elbow. Capitellum fragment was seen containing good amount of sub-chondral bone, posterior dissection was kept minimum articular surface was reduced under vision and temporarily fixed with k-wire. Reduction was checked under image intensifier. Fixation was done

using two Herbert's screw passed from posterior to anterior. Tourniquet was removed before closure complete Hemostasis was achieved wound closed antiseptic dressing applied. Long arm Slab was applied with elbow in 90 degree of flexion. At two weeks Slab was removed and ROM Exercises were started. Patient was followed two weekly up-to 6 weeks, then monthly and final follow-up was done and six months. At Six months Patient was satisfied with the surgical procedure with painless functional range of motion. Range Of motion ranged from 15 degrees of extension lag to 110 degrees of flexion, with 60 degrees of supination and 50 degrees of pronation.



Figure 1 : Pre-operative x-ray and CT scan of patient showing Type-I capitellum fracture



Figure 2: Open reduction via lateral approach and provisional K-wire fixation



Figure 3: AP and lateral Xray of same patient after ORIF

Discussion

Fractures of Capitellum are rare in children with slight female predominance because of association of cubitus valgus and cubitus recurvatum^{2,10}. These injuries are rare in children less than 10 years because of open physis, once capitellar physis gets fused by the age of 12 -13 years distal humerus gets subjected to shear forces^{2,7}. Andrew L et al describes advantage of antero-lateral approach over direct lateral approach, these include direct visualization of fracture reduction and implant insertion, again this approach does require release of extensor mechanism¹¹. Direct lateral approach has advantage to address associated injuries like proximal radial fractures, lateral collateral ligament injuries⁵. Most of literature suggests that Type I and Type II fractures are amenable to fixation^{12,13}. In his series Lett's described 7 patients having capitellar fractures with average age of the patients 14.7 years¹². 5 of these patients were managed surgically and all had good functional outcome with good functional range of motion^{11,12}. Good to excellent out-comes have been achieved in most patients who have under gone ORIF for these injuries. But most of the studies suggest that fractures with comminution and medial extension have poor results after ORIF^{11,12,13,14}. Multiple fixation methods have been described based on type of fracture and number of fracture fragments. Good compression can be achieved by countersunk headless screw passed perpendicular to fracture line either posterior-anterior or anterior-posterior direction⁷. In type II and Type III if fragments are small and cannot be fixed with any of the fixation methods excision should be done¹⁶.



Figure 4 : 3 months AP and Lateral view of same patient

Conclusion

These injuries are very in children. Early recognition and proper surgical management can give good functional results. Even in neglected type I injuries good results can be obtained with anatomical reduction and fixation.

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