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Functional outcome following internal fixation of capitellum fracture in a young adult by Herbert screws- A case report

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Abstract

A 25 yrs old male presented to emergency with H/o motorcycle accident, injury mechanism being fall on outstretched hand with elbow in hyperextension. Post-injury patient complained of severe pain in left elbow region with loss of elbow flexion. On examination minimal swelling was noted at elbow with tenderness over lateral aspect. Radiographs of AP & Lat views revealed large capitellar fracture involving articular surface of lateral condyle. CT Scan was done to evaluate fracture in detail and also to rule out other injuries around elbow. On next day of admission open reduction and reattachment of large capitellar fragment was done with two headless screws {Herbert screws}. Post-op patient was followed for six months with Xrays. The initial loss of flexion improves over three month period with intensive physiotherapy. Terminal 20 degree of flexion was not achieved even after completion of 6 months duration but this loss of not of much functional or aesthetic significance

Keywords: capitellar fracture, elbow flexion, herbert screws, physiotherapy

Introduction

Background: Fractures of the capitellum involve the pure articular surface of the lateral condyle. The most commonly accepted mechanism of injury is shearing of the anterior articular surface of the lateral condyle by the radial head^[1]. If the fragment is small, it is hard to see on plain radiograph. Often CT or MRI scans are required to confirm diagnosis and plan operative fixation. Excising the fragment and open reduction and reattachment are the two most common forms of treatment. Closed reduction is not likely to be successful.

We are reporting a case of a 25-year-old male who presented with sizeable capitellar fracture involving articular surface of lateral condyle who underwent reattachment of fragment and fixation with two Herbert screws.

Case Presentation

A 25-year-old male presented to the emergency of our hospital with H/O fall on outstretched hand due to motorcycle accident. Post-injury he complained of pain over left elbow region with moderate swelling and loss of elbow flexion. On examination tenderness was noted on the lateral aspect of elbow with restriction in elbow flexion to 70 degrees. On investigation by Xray, he was found to have large fragment capitellar fracture involving the articular surface. CT scan was done to study the fracture pattern in detail and also to rule out other associated injuries.

The patient was informed about the injury and the need for open reduction and fixation. It was emphasized to the patient before onset of treatment that some range of motion may be lost regardless of the treatment method.

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Fig 1: Anteroposterior and lateral view {double arc sign}

Procedure

Under GA patient was positioned supine with the arm placed across the chest and surgeon standing. A well-padded sterile pneumatic tourniquet was applied. Open reduction of capitellar fracture was performed by an extensile lateral exposure in which a 10cm long curvilinear skin incision was given centered over lateral epicondyle and extending from the anterior aspect of the lateral column of distal end of humerus to approximately 2cm distal to the radial head [2, 3, 4]. After dissection through the subcutaneous tissues lateral column was palpated and forearm pronated to move radial nerve away from the surgical field. The common origin of wrist extensors, in conjunction with the anterior capsule, is elevated. With the elbow flexed, intracapsular retractors are placed deep to the brachialis and anterior capsule and over medial column facilitating exposure of distal humeral articular fracture fragments and radial head. The fracture site was debrided of hematoma and anatomical reduction was achieved under direct visualization. Under fluoroscopic guidance, provisional fixation was done with two thin K-wires {1.14mm}, and anatomic reduction was confirmed. Two headless cannulated screws {Herbert screws} were inserted over the guidewires in an anterior to posterior direction. A minimum of two screws is required in large fragments to ensure rotational control. Wound closure was done in a conventional manner and a well-padded dressing was applied. The duration of the procedure was around one hour.

The immediate postoperative active motion was encouraged over the soft dressing and patient was discharged on the 10th post-op day after suture removal was done. The patient was followed for 6 months duration with serial Xrays at 3wks, 6wks, 3rdmonth, 6th month. Immediate post-op elbow flexion was limited to 100 degrees, which improved over some time up to 120 degrees with intensive physiotherapy protocol followed for 6 months. Terminal 20 degrees of flexion could not be attained even after 6 months duration, though it was functionally acceptable for the patient to carry on his daily activities.

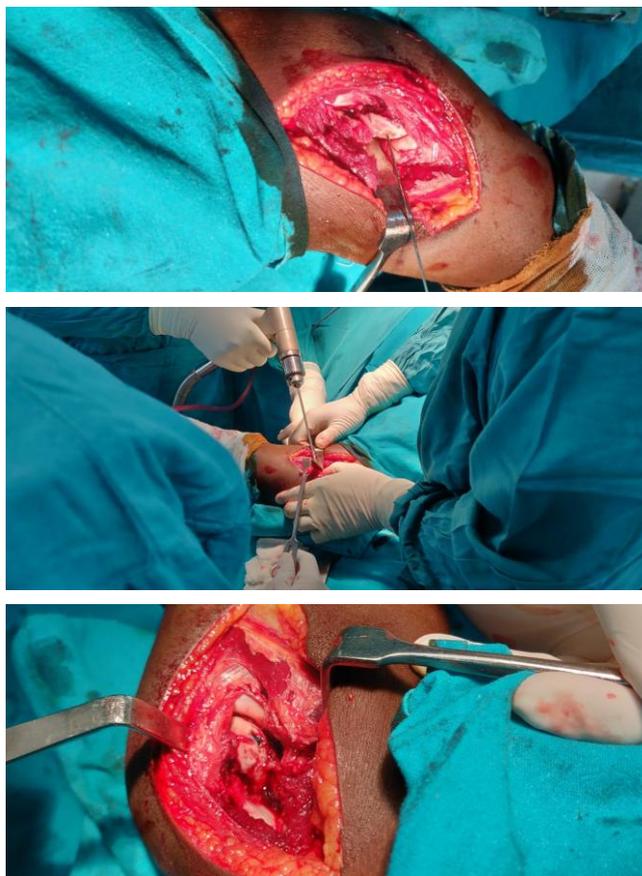


Fig 2: Intraoperative images



Fig 3: Fluoroscopic images



Fig 4: Postoperative X ray after 6 months

Discussion

Fractures of the capitellum are rare injuries, it is important to recognize a fracture of body of capitellum because, if untreated it can lead to a substantial disability with impaired elbow function. Resection of capitellum results in a poor outcome. This is due to restriction of motion and instability. Ochner reported, in 1996, successful outcome of closed reduction of coronal fractures of capitellum in nine cases with long term followup^[5]. In our case closed reduction was not attempted as it can lead to early arthritis with loss of motion of the elbow or instability of the elbow as it is usually a nonanatomical reduction.

Alvarez advocated excision of the fragment in 10 out of his 14 cases to prevent avascular necrosis^[6]. Fragment excision due to fear of avascular necrosis or redisplacement can lead to radio humeral osteoarthritis and instability of the elbow.

Various approaches were described, including lateral approach {Modified Kocher approach}, posterior approach with olecranon osteotomy. Many authors found olecranon osteotomy to be more useful if the trochlea also needs to be fixed. Various internal fixation methods have been described, including K-wires, 4mm cancellous screws, Herbert screws, absorbable polyglycolide pins. There are also reports of plate fixation of the fracture. K-wires do not provide enough stability for mobilization before fracture healing and also damage articular cartilage. In our case headless screws {Herbert screws} were used for fixation. Headless screws can have problems if the patients develop AVN or chondrolysis, because erosion of the radial head is a possibility due to exposed implants.

Grantham reported an elbow assessment based on stability, pain and range of movements, which is easy to follow^[7].

Excellent -normal stability, no pain, full range of movements
 Good- less than 10 degrees of instability, mild pain, less than 40-degree restriction of range of movement.

Fair - 10-15 degree of instability, moderate pain, 40-60 degree of loss of range of motion

Poor - 15 degrees or greater instability, troublesome pain, or 60 degrees or more loss of range of motion.

Conclusion

Capitellar fractures are less due to the rarity of the injury. The importance lies in prompt diagnosis by noting double arc sign

in lateral view Xrays of elbow and CT scan evaluation preoperatively. The results of fixation with headless Herbert screws through extended lateral kocher's approach are suitable as per Grantham elbow assessment. Good physiotherapy postoperatively has shown a better functional outcome.

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