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Mini-open reduction and percutaneous K- wire fixation of neglected Type - III supracondylar fracture of humerus in a 9-year-old: A Case Report

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ABSTRACT: Supracondylar fracture of the humerus is the most frequent fracture in the first decade of life.A variety of methods of treatment for displaced fractures (Gartland type 3 and many of the type 2) has been recommended including closed reduction and immobilization or open reduction stabilized by Kirschner(K) wires.The Treatment is controversial and often technically difficult for type 3 fractures as complications are common like Cubitus varus. There are no guidelines for mini-open reduction and fixation of a neglected fracture.
The author reports a case of 9-year-old patient who presented at clinic with 22 days old neglected Gartland type III supracondylar humerus fracture on clinicoradiological evaluation. He had bony hard pointing swelling felt in cubital fossa along with tenderness, maintained three bony point symmetry and restricted range of motion ranging from 70 to 95 degree of flexion without any neurovascular deficit.
We performed mini-open posterior straight incision and broke the callous (callostasis) through the same opening with help of k-wire and 5 no osteotome. Part of callous was being removed and reduction was being held with two lateral K-wires under guidance of image intensifier. During postoperative period patient did develop a radial nerve neuropraxia which fully recovered in one months' time.Follow up x ray after 6 weeks and 3 months showed progressive bone healing. Patient had complete union without any pain with full range of motion but with increased Baumann's angle to 85 to 90 degrees.
Werecommend that a neglected case of delayed presentation like our case is rare in orthopedic clinics, which can be managed with miniopen reduction and percutaneous k wire fixation. Treatment of type III Gartland fractures must be weighed against the outcome achieved by aggressive (open reduction, excision of callous and frequent manipulation) and less aggressive like our mini-open technique or conservative management.

Keywords: Supracondylar humeral fracture, percutaneous pinning, K wire nerve, Gartland's classification

I. INTRODUCTION:

Supracondylar fracture of the humerus is the second most common fracture in children (16.6%) and the most frequent before the age of seven years in the first decade of life.[1,2]A variety of methods of treatment for displaced fractures has been recommended including closed reduction and immobilisation,[14,5,15-20] traction by various methods[21-23] and closed[25-32] or open reduction[33-36] stabilized by Kirschner(K) wires. The Gartland type 3 displaced and many of the type 2 supracondylar fractures are stabilized with Kirschner (K) wire fixation after reduction.[1,4]

However, the Treatment is controversial and often technically difficult for type 3 fractures as complications are common. The supracondylar fracture of humerus demand great respect in treatment because if it is not treated properly it may give rise to many complications such as Volkmann's ischemic contracture, neurovascular injury, myositis ossificans, stiffness of elbow and malunion.[35] Cubitus varus is the most frequent problem with a mean incidence of 30% in the series reviewed by Smith.[3]This deformity is due to medial tilting of the distal fragment, associated with rotation.[3]It does not remodel with growth,[5-7] is not progressive and is not due to physeal injury.[6]Injury to any of the three major nerves around the elbow occurs in 6% to 16% of cases.[8] The radial pulse is absent in about 3% after reduction of thefracture.[9]Volkmann's ischemic contracture is rare, with an incidence of 1.1 in 1000,[9] but is still seen.[11-13]

Stiffness of the elbow may occur, particularly after repeated manipulation and the use of the posterior approach for open reduction. In most cases, however, there is improvement with time and the functional result is not greatly impaired.[6-7]

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The radial and anteriorinterosseous nerves are thought to be those most commonly involved by the fracture itself [13,8] while iatrogenic damage most often affects the ulnar nerve.[37,38,4]Several studies have suggested that 86% to100% of these nerve injuries are neurapraxiaswhich resolve spontaneously within sixmonths, with the mean time to recovery beingbetween two and three months.[8,37]

II. CASE REPORT:

A 9-year-old male came to our outpatient clinic 3 year back with stiffness, pain, swelling, deformity, inability to flex or extend the left elbow after a fall 22 days prior. On examination there was a bony hard pointing swelling felt in cubital fossa along with tenderness, maintained three bony point symmetry and restricted range of motion ranging from 70 to 95 degree of flexion(fig:1) in left elbow without any associated neurovascular injury. Clinicoradiological evaluation, there was a severely displaced Gartland type III supracondylar humerus fracture of left elbow with exuberant periosteal reaction and callous formation (fig:2,3). After complete evaluation, analysis of history, examination and radiological assessment we decided to do mini-open surgery on the patients left elbow.

Fig 1

Fig 2

Fig 3

On table assessment of elbow under anaesthesia showed no mobility at fracture site. During surgery, we approached posteriorly for mini-open straight incision (fig 4) at fracture site after image intensifier identification of the level. We split the triceps tendon for one centimeter and Subsequently we broke the callous through the same opening with help of k-wire and 5 no osteotome. Part of callous was being removed to achieve satisfactory reduction which was beingheld with two lateral K-wires (fig5,6) under guidance of image intensifier. After adequate hemostasis, layers were closed anatomically.

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Fig 4 **Fig 5** **Fig 6**

Thereafter the limb was maintained in an above elbow slab. Improvement was followed up in every 15 days. During postoperative period patient did developed radial nerve neuropraxia (Fig9)which fully recovered in one months' time (fig 10). Followup x ray after 6 weeks (fig 7,8) showed progressive bone healing process with Range of motion was 15 to110 degree. At 3 months follow up, patient had good union (Fig 11,12) without any pain with full range of motion but with increased Baumann's angle to 85 to 90 degrees. He had full range of movements at his elbow.




Fig 7 Fig 8 Fig 9 Fig 10

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Fig 11

Fig 12

III. CONCLUSION:

To conclude, closed reduction and percutaneous k wire fixation along with open reduction and k wire fixation are the accepted treatment for the displaced supracondylar humerus fracture in children when done at appropriately, which gives more stable fixation, better anatomical reduction with negligible complication.

Although a neglected or delayed presentation like our case is rare in orthopedic clinics, we still expect some patients with the above clinical presentation in Indian scenario. While dealing with such cases, it is prudent to assess patient preoperatively, address concern of family about possible outcomes and complications such as nerve injury, vascular injury and myositis ossificans.

In conclusion, from our case we recommend miniopen reduction of fracture supracondylar humerus and percutaneous k wire fixation is the viable option in delayed presentation of Gartland type III cases. However, parents concern should be addressed for possible nerve injury, vascular injury and myositis ossificans. Treatment of type III Gartland fractures must be weighed carefully against the outcome achieved using aggressive (open reduction and excision of callous and frequent manipulation) and less aggressive like our miniopen technique or conservative management.

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