

The Outcome of Supracondyler Fractures of Elbow Joint Treated during Different Periods of Time by Different Techniques in District Population

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ABSTRACT

Objective: To assess the outcome of supracondyler fractures of elbow joint treated by different techniques to assess their complication in different hands and to create awareness in public and treating doctor to highlight the results of such injuries and their complications.

Place and duration of study: The study was conducted during period of 2006 to August 2010 in orthopedic department of Allama Iqbal Memorial Hospital Sialkot.

Material and method: Total 179 patients were included in this study from 200 to 2010 at Allama Iqbal Memorial Hospital. The patients were divided into two groups, Group A consist of 55 pts who directly came to hospital after trauma and were operated between 1-3 days of injury. Group B which was further sub divided into to two groups, group B (1) consist of 56 pts who were initially treated by quakes and presented after 10 to 15 days of injury and were also operated, Group B (2) consist of 86 pts who were also treated by quakes and later on at Allama Iqbal Memorial Hospital with conservative treatment by free medication, range of movement exercises and extensive physiotherapy. Total 111 patients were operated and open reduction with k, wire fixation was done. All patients (179) were evaluated clinically and radiologically by modified Gartland's classification both pre-operatively and also post operatively and post operatively by modified frayn's criteria to assess the overall rating of supracondylar fractures.

Results: Sixteen patients presented with compartment syndrome, Twelve were operated four refused surgery. Six patients presented with established gangrene of forearm. four were operated and above elbow amputation was done two patients refused surgery and went to other district / Quake. Complications after different modes of treatment were noted which included infection stiffness of elbow joint, VIC; myositis, ossificans, anterior, interosseous nerve injury, spasm of brachial artery. Patient presented with neurological complications after trauma were relieved after treatment and those presented after quacks treatment had long term complications

Conclusion: Early surgical intervention produce excellent results. The results were disappointing if operated late as chance of arm and elbow stiffening and infection due to already existing underlying subclinical infection because of dirty quake dressing were higher. we noted that there was no difference in respect to postoperative x-ray in terms of reduction of fracture or good result the soul reason in our opinion is illiteracy and casual attitude of parents who never follow the instructions of doctor for follow-up therefore we recommended that treating doctors should realize the importance of parents and patient counseling, outcome of such injury and prevention of complications.

Key words: Supracondyler fracture, operative technique, quake treatment,

INTRODUCTION

Supra condylar fracture is a fracture of the distal end of humerus above the epicondyle. It is common in children and is rare in adults. It is the most common fracture seen in the orthopedic outdoor pts accounting for 50 - 70 % of all fracture around the elbow joint. These fractures are often associated with long term complications like malunion, Compartment syndrome, VIC and neurovascular complication, and if

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treated in wrong hands patient may end up with gangrene with loose of forearm. Children usually fall with outstretched hands. The non dominating extremity is most commonly involved. These are about 60% of all children fractures and are common in 7yrs of age as this is the period of maximum laxity. Therefore when the children try to prevent him during fall the elbow hyperextend and during this process olecranon struck against the metaphysis of bone producing typical hyperextension injury. Extension type is most common 95 %, whereas flexion type is 5% of supracondyler fracture. Various treatment option have been discussed in literature for type 2

and type 3 supracondylar fracture based on Gartlands classification are closed reduction with long arm cast or back slab. The elbow joint may be flexed or straight, Dunlop skin traction olecranon traction, but these methods have been reported to have complications (Hering JA, Flaynn, J.C, Chai, wilkin, Dunlop, warlock, smith, shannon FJ and Gordon)

Current method of supracondylar fracture is based on Gartlands classification. The standard method of treatment reported by different authors is reduction of fragment and pin fixation. There are further studies reported by different authors regarding open or closed reduction, and percutaneous pin fixation i.e., or lateral pin fixation, medial and lateral pin fixation. The two column pin fixation have been reported to have ulnar nerve injury by various authors. (Arino reported 21 %, Flayn 5 %, and Chai 15 % ulnar nerve injury. The two column pin fixation provides better stabilization but some report that lateral column pin fixation was as rigid as the two column pin fixation.

In district population, majority of the patients go to the quakes for treatment with great belief so we conducted study to assess the outcome of early surgical intervention of those patients presented directly to the hospital, Patients first treated by quakes and operated later-on, than to those patients who were not operated and were treated by conservative methods at hospital after quake treatment.

MATERIAL AND METHODS

The study was conducted from 2006 to August 2010 in patients who presented in emergency or in the outpatient department of Allama Iqbal Memorial Hospital. Total 179 patients were included in this study there were 131 males and 49 females patients, with an average age range between 4 ½ to 10 years .we lost 15 patients during follow-up and were excluded from the study. Fractures was caused by fall from height with an outstretched hand or from road traffic accidents. Majority of the patients (165) had closed fractures, whereas 14 patients had open fracture with bone protruding out of the wound. All patients were evaluated clinically in respect to swelling, ecchymosis, deformity, bruising and neurovascular insult, compartment syndrome, open and closed injury and radiologically with respect to displacement of fragment and pad of fat sign.

These patients were divided into two groups Group A include (55) patients who came to the hospital in the emergency directly after trauma and were operated between 1 to 3 days after injury.

Group B include 124 patients who were further subdivided into two groups. Group B1 consist (56) patients who were first treated by quakes and presented after 10-15 days of quake treatment, these were also operated as patients in group A. Group B2 included 86 patients who reported in the outpatient department after two weeks of quake treatment, these patients were not operated and were managed conservatively with vigorous Physiotherapy, Range of Movement exercises, Nsaids along with patient and parents aconsulling.

In open fracture where bone was protruding out of the wound, the fragment was reduced through the same wound and percutaneous fixature with two cross k-wires was done and after thorough debridement, wound was closed and pop back slab was applied in all operated cases.

In 95 patients operated both lateral and medial pillar reconstruction was done through two cross k wires. In 13 patients lateral and middle column fixation was done through by 2 to 3 lateral Kwires through lateral approach.

Closed reduction and percutaneous pinning was done in 12 patients. 15 patients had gross swelling in which back slab pop was applied and were operated after few days. 16 patients treated by quakes had developed compartment syndrome of which 12 were operated and fasciotomy was done, wound was left open initially and then was closed later-on on after 8 - 12days of surgery. 4 patients refused surgery and went to the quakes again. 8 patients presented with established gangrene of forearm after simple supracondylar fracture of elbow that was treated by quakes due to tight bandage. We did an above elbow amputation in six patients; two patients again refused surgery, inspite of the obvious critical condition and went to other districts to other quakes with the hope that he will save their forearm.

All operated cases were given a preoperative IV bolus dose of antibiotic followed by two day of injectable antibiotic and then oral antibiotic for 5 days. Neurovascular assessment was done preoperatively and immediately postoperatively and after one week of interval. Patients were evaluated both clinically and radiologically on follow-up after one, two, three, four and six weeks then after one year. In both Group A and B1 the kwire was removed three to four weeks of surgery we also preformed gentle manipulation of the elbow joint just before removal of the kwire, and concluded that this improves the elbow function and prevents stiffness, Clinical evaluation included passive range of movement, measurement of carrying angle, wasting of muscles, neurovascular status, superficial and deep infection, and pin tract infection. Clinical evaluation and results were graded

according to modified frayn's index criteria and results were evaluated.

RESULTS

These results were evaluated according to modified fraynns criteria as follows. Assessment of group A patients based on modified Fraynns criteria and overall rating



Simple type 1 S/c # treated by quake ended up in gangrene

Complications	Group A	Group B1	Group B2
Infection Superficial	4	2	7
Deep	3	4	2
Pin tract infection	3	4	0
Neurological: Ulnar	3	4	12
Radial	0	0	0
Interioious	0	3	6
Compartment syndrome	2	3	11
Volksman ischaemic contracture	0	0	22
Elbow Stiffness	6	8	27
Wasting of forearm	3	5	21
Myotsitus ossificans	4	3	14
Vascular	0	0	0
Cubitus Varus	3	4	27
Cubitus Valgus	0	0	12
Malunion	0	0	17
Nonunion	0	0	0

Nature of injury	n=	E	G	F	P
Gartland's Type two fractures	8	5	3	0	0
Gartland's Type three fractures	27	19	3	3	2
Flexion type s/c fracture	6	3	1	1	1
Open compound fracture	14	7	2	2	2

E: Excellent G: Good, F: Fair, P: Poor

Assessment of group B1 patients based on modified Fraynns criteria and overall rating (n=56)

Nature of injury	n=	E	G	F	P
Gartland's Type two fracture	13	8	2	2	1
Gartland's Type three fracture	27	12	6	6	3
Flexion type s/c fracture	16	6	3	3	4

E: Excellent, G: Good, F: Fair, P: Poor

Assessment of group B2 patients based on modified Fraynns criteria and overall rating (n=86)

Nature of injury	n=	E	G	F	P
Gartland's Type one fracture	18	1	4	6	7
Gartland's Type two fractures	22	0	3	4	15
Gartland's Type three fractures	28	0	2	2	24
Flexion type s/c fracture	18	1	2	4	11

E: Excellent, G: Good, F: Fair, P: Poor



Open Supracondylar fracture with bone protruding out of the wound anteriorly

So we concluded that majority of the patients who presented directly to the hospital after trauma with regular follow-ups post operatively showed that even compound fracture fall between excellent and fair group whereas those patients who initially went to quakes for treatment and operated later on fall between fair and good criteria and those pts who were initially treated by quake and showed up later and were managed conservatively at hospital fall in poor group criteria inspite of best efforts. No revision surgery was required in pts of group A pts and group B1. Whereas in B2 pts cubitus varus deformity was present in 27patients in which corrective osteotomy was preformed later on. The results of these osteotmies are not included in this study.

DISCUSSION

Supra condylar fractures are the most common fractures in children's and require dedicated treatment in order to save the future of our children. In civilized countries this job is done by specialized personals that are well trained in treating such injuries. But unfortunately in our country especially in district population these injuries are mostly managed by both untrained peoples and quakes. Due to inadequate and non professional behavior of professional people who are not skilled in their job. District peoples develop faith in quakes and ends up in disaster; we have seen poor results with lifelong disability in children not only in type 1 gartlands fracture but also in cases in which there was no fracture just swelling of elbow joint and due to quake treatment they ended up in permanent disability.



Different treatment option have been described in literature along with their advantages and disadvantages in gartland type 2 and type 3 supracondylar fracture. The current treatment is closed or open reduction followed by pin fixation which may be from lateral side or from both lateral and medial side. Supra condylar fractures have been

reported to have neurovascular injuries also. The damage to the ulnar nerve can cause weakness of the wrist flexors and adduction, finger spread and flexion of the distal phalynx of the fifth digit (little finger). These motor weekness finding are also associated with sensory alteration on the ulnar side of the ring and fifth finger. Median nerve injury results in the weakness of the flexor muscles of hand and loss of two point sensation of thumb and index and ring finger. The most commonly injured nerve is the anterior interossious nerve injury which is the branch of the median nerve and results in forearm pain followed by weakness of hand with no sensory deficit. Radial nerve injury results in the weakness of the thumb, fingers and the wrist extensors in addition the altered sensation is found in the web space between the thumb and the index finger so by just a clinical examination we can assess the distal neurological status i.e the dorsal web space (radial nerve), Palmer index finger (median nerve) and little finger (ulnar nerve).



Open Supracondylar fracture with bone protruding out of the wound anteriorly.

After clinical examination flexion and extension should not be allowed to patients as it can aggravate the neurovascular insult. The displacement and type of fracture is based on xray AP and lateral view. In normal lateral xray elbow joint, the anterior pad of fat is seen as it is located in coronoid but posterior pad of fat is not seen as it is located in deep intra condylar fossa (olecranon) but after injury as there is leakage of blood and marrow into the joint capsule, so this elevate the pad of fat which is seen as elevated lucent line as anterior humoral line in lateral x-ray as Thron sign and posterior pad of fat is displaced posteriorly. The displacement of distal fragment predicts the nature of fracture ie distal fragment anteriorly (flexor type) and posteriorly extensor type. Moreover the displacement of fragment also predicts the type of nerve injury i.e.

posterolateral distal fragment displacement increases the risk of median nerve and anterior interosseous nerve injury. posteromedial distal fragment increases chances of radial nerve injury, whereas ulnar nerve injury is commonly associated with flexion type of supra condylar fractures.

The rate of iatrogenic ulnar nerve injuries associated with cross medial and lateral pin fixation has been reported to be 0 -6 % by (Skaggs, Chai, Flaynn, Brown, Lyons, Rasool, Zaltz, Kasser) while Royce and wind reported that ulnar nerve injuries was more commonly present. Although ulnar nerve injuries recover most of the time, But Rasool MN, Ramachandran, Birch and Eastwood reported several cases of permanent ulnar nerve injuries Skaggs at all reported that even making an incision over medial epicondyle in an effort to save the ulnar nerve dose not ensure safety of this nerve.

In our study we operate 111 cases and had no iatrogenic ulnar nerve injury. This injury was present in 7 patients preoperatively which was also recovered during due course of time in group A and in B1 group patients. In group B2, 12 patients presented with ulnar palsy. All seven pts of group A and B1 recovered but only 3 patients of group B2 were recovered and 9 patients had permanent ulnar palsy. In our opinion wrong manipulation, tight bandage and external splintage with wood or foot was the cause of this neurological insult.

Excessive swelling, echymosis of elbow joint, increasing pain, cold hand with poor perforation suggests the development of compartment syndrome, and if compartment syndrome is not taken care properly it may progress to volkman ischaemic contracture leading to fixed flexion deformity of the elbow joint, pronation of forearm, flexion at wrist joint, and extension of meta carpophalangeal joint. In our study we have sixteen patients presented with compartment syndrome. We operated 12 pts and saved all of them from developing volkman contracture; Four pts refused surgery and went to quake to other districts.

Dunlop 1939 and dodge 1972 reported high incidence of cubitus varus deformity after s/c #fracture of elbow joint Etiology of varus deformity is controversial (Sri s 1939, Ailken's 1943, Larwerance 1956, smith 1960). But it is also agreed that main reason of cubitus various deformity is medial angulation (Mann 1963) rather than growth disturbance. Incidence of cubitus varus is also based in position in which elbow joint is mobilized it is higher more than 60% if elbow joint is fixed in 90% flexion and forearm in supination (Ailken's 1943).

Chances of cubitus varus is also high if shoulder joint is also immobilized with elbow joint (Madson 1955) inadequate correction of medical

collapse is also one of the factor resulting in cubitus varus deformity. Ailiken's et all has suggested that completely dislocated supra condylar fracture that becomes significantly rigid with callous formation. should not be manipulated as delayed open reduction carries high risk of producing myotitis ossificans in 85% of patients The treatment of choice for these fracture is to let the fracture heal and to asses later on if corrective osteotomy is required. In our study we noted 34 patients having cubitus varus deformity. The incidence of the deformity was higher in group B2 patients.

CONCLUSION

1. Early correction of deformity within 3 to 5 days produces excellent results as compared to delayed operative procedure.
2. The surgical operation should be done by skilled orthopedic surgeon who is trained in treating such injuries. Whereas other professionals should not operate such cases in order to save the child's future.
3. Patient and parent consulling is essential and it is their duty of treating surgeon to make them realize the depth of injury and the possible future complications if proper follow-up and instructions are not followed. Even the best radiological produce results may end up in poor grade if proper instructions and follow-up is not observed.
4. Kwire should be removed early after 3 -4 weeks and we recommend gentle manipulation prior to the removal of k wire and noted good results in these patients.
5. Shoulder joint should not be immobilized with elbow joint.
6. Mass level awareness programs should be started against quakes and unskilled peoples to highlight the outcome of such injuries in order to prevent our future generations.

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