

Deformity Correction in Cubitus Varus-Our Experience

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Introduction: *Cubitusvarus or gun stock deformity of the elbow is the commonest complication following malunion of supracondylar fracture of the humerus in children .The normal carrying angle at the elbow, between three to seven degrees of valgus, is reversed into varus, resulting in a ugly deformity. Unfortunately it does not improve with remodeling even in a young child as it is not in the plane of normal movement (sagittal). We would like to share our experience in the surgical treatment of cubitusvarus.*

Aim: *To study the radiological and functional outcomes following corrective osteotomy in cubitusvarus deformities and to assess the outcomes of commonly used osteotomies.*

Materials and Methods: *Prospective study done between 2014-2017. Total number of patients in the study were 9. This study was performed under a protocol approved by our institutional review board. Data regarding physical and radiographic examinations were reviewed retrospectively using charts and radiographs. Age group of the patients under our study were 3-15 years. (3,15, 13,4,7,6, 4, 6, 5), mean age being 7 years. Boys were 6 in number and girls were 3 in number. Right side were 4 and left side were 5. All deformities resulted from malunion of distal humeral supracondylar fractures sustained by the patients when they were from 3 years to 15 years of age.*

The mean duration of presentation to our OPD with deformity were 20 months from the date of injury. The majority of cases, 7 underwent indigenous treatment in the form of splinting. In two cases cubitusvarus resulted from failed closed reduction and k wires fixation .Humeroulnar angle was measured in anteroposterior radiographs in full extension and supination.

The mean humeroulnar angle was measured to be 23 degrees of varus. The amount of correction required was decided based on the carrying angle of the normal side. There was no other restriction of movements other than the deformity in the coronal plane. There was a mean internal rotation deformity of 10 degrees measured by comparing the arc of rotations of the ipsilateral shoulder with the contralateral shoulder. None of the selected patients for osteotomy had a distal neurological deficit or myositis ossificans.

I. Treatment

7 cases underwent lateral closed wedge osteotomy and 2 patients reverse V osteotomy. The base of the lateral wedge of bone to be removed was measured on xrays with magnification markers after deciding on the angle of correction needed. K wires were used for operative stabilization after osteotomy in 7 cases. Plates (3.5 mm T buttress plate in 1 patient and 3.5 mm Reconstruction plate placed posterolaterally in 1 patient) were used in two cases. The patients in whom plates were used were 13 and 15 years old respectively (internal fixation with plates rather than Kirschner wires were preferred for older children). All cases were operated under GA and intraoperatively positioned in lateral position. Triceps splitting approach was used in all cases and ulnar nerve was subcutaneously released for safety and better exposure on the medial aspect. Above elbow slab was applied for 3-4 weeks. In patients where K wires were used for fixation, the wires were removed as an outpatient procedure at 4 weeks. Active mobilization of the elbow was started. All patients were followed up with biplanar x-rays at 3, 6 and 12 weeks. Clinically range of movements and carrying angle was measured with the goniometer. The final carrying angle was assessed when full extension was obtained.

II. Results and complications

Loss of reduction occurred in two cases one from the k wire group and one from the plate fixation group. A 15 years old girl had undergone plate fixation with posterolateral 3.5 mm reconstruction plate after reverse V osteotomy. At 6 weeks follow up it was noticed that there was a loss of correction with loosening of screws. Patient was advised a re-surgery but parents refused. Another child who had undergone K wires fixation after lateral closing wedge osteotomy had a persistent varus at follow up. Probably there was a loss of reduction or an inadequate intra-operative correction. Two patients developed "Z" deformity with functional impairment due to lateral condyle prominence. Parents were dissatisfied with the outcomes following "Z" deformity even though radiologically the humeroulnar angle appeared normal.

One patient developed septic arthritis of the elbow for which debridement was done. But the child later developed elbow stiffness. The remaining 4 patients had full range of movements with no deformity in the coronal plane.

III. Discussion

The corrective surgery is usually requested on cosmetic grounds only. The deformity is so awful that despite warnings about possible complications, parents still opt for surgical correction. As correction of cubitus varus is usually undertaken for cosmetic and not for functional disability, it should therefore be devoid of major complications and produce consistent results. The various osteotomies that have been described for cubitus varus, namely, pentalateral osteotomy, medial opening wedge osteotomy with bone graft, oblique osteotomy, step cut osteotomy, lateral closing wedge osteotomy held with screws and wires. Each method has its advantages and disadvantages and even the possibility of loss of correction. The other complications which threaten us include infection, loss of fixation, stiffness, iatrogenic nerve palsy, brachial artery injury or aneurysm, lateral condyle prominence ("Z" deformity). Whatever is the osteotomy which is performed during the surgery controversy lies in correcting the rotation of the distal fragment. Rotations usually do not produce deformity in the coronal plane. As a part of our study we observed that correction of hyperextension of the distal fragment is necessary for correcting the range of movements of the elbow. We also observed that the chances of implant failure in maintaining reduction is more when the profile of the bone is larger as seen in the older patients aged 13 and 15 years in our study. Loss of reduction occurs in older children. In spite of corrective osteotomy for cubitus varus the elbow sometimes gives poor cosmetic appearance due to bony prominence of the lateral condylar region. Although carrying angle is corrected still it gives poor cosmetic result. The cause of prominence is inherent in the design of the osteotomy. Excision of the wedge in a lateral closing wedge osteotomy leaves two fragments of unequal width. Hinging on the medial cortex while closing the osteotomy effectively shifts the distal fragments laterally. Since the axis of the forearm is shifted laterally in comparison with the axis of the humerus, a Z deformity develops which is usually very obvious in patients where large angular corrections are needed. The advantage of the reverse V osteotomy is that as the lateral base of the V is closed the lateral edge of the triangle is medially translated and fits into the proximal apex of the triangle. This prevents a Z deformity.

Conclusion-

Supracondylar corrective osteotomy for cubitus varus deformity is not a simple procedure as it is made out to be. In a significant percentage of patients, early loss of correction and other complications can occur resulting in dissatisfied parents. It is important to be well planned. The distal fragment must be medially translated to reduce the lateral condylar prominence and fixation must be strong enough to prevent loss of correction.

References

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Sample Cases

Case 1 Master J With C/O Deformity In The Left Elbow 8 Months Duration





Follow up:





Case 2: "T" Buttress Plate –Lateral Closing Wedge Osteotomy

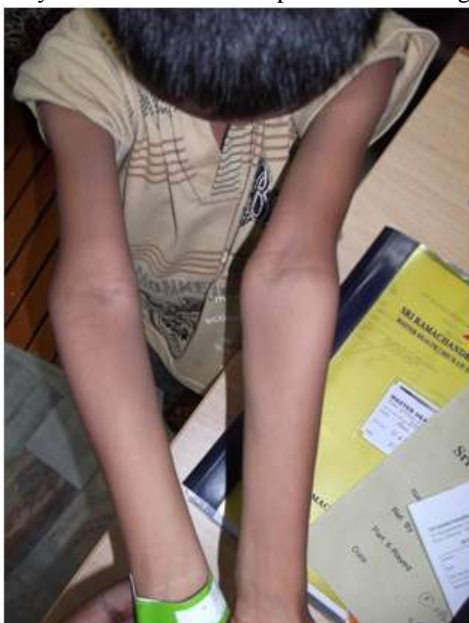


Pre Operative Tempelate



Post Op

Case 3 : “Z” Deformity- One Year Follow Up- Lateral Closing Wedge Osteotomy



Case 4: Loss Of Reduction Following Reverse V Osteotomy

