Research Paper

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Management of Cubitus Varus Deformity in Adolescents.

Medical Science

KEYWORDS : Cubitus varus deformity, lateral closing wedge osteotomy, k wire fixation

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ABSTRACT

Cubitus varus deformity is less common in present time because of the availability of technology like image intensifier for reduction and fixation .But at times we see few patients who were having the cubitus varus deformity and they are neglecting due to no functional limitation until they need cosmetic correction for marriage or job related issue. Usually it is said that for correction of the cubitus varus deformity in adolescent or adult patient, strong fixation of corrective osteotomy like plate or Illizarov is required to allow early mobilization but complications of these procedures are many like hardware prominence due to less muscle mass and frequent need of other surgery for implant removal resulting in unacceptable scar mark. Illizarov fixation has a long learning curve for deformity correction around elbow and it is associated with vascular or neurological complication. We are presenting the satisfactory cosmetic and functional results of time tested procedure like lateral closing wedge osteotomy fixed with 2-3 K wires in ten adolescent patients between 10 to 20 years of age which is the simplest procedure and commonly practiced by many orthopaedic surgeons.

Introduction: Cubitus varus deformity in children is commonly treated by lateral closing wedge osteotomy .Method of fixation usually includes k wires, screws with figure of eight wire, various type of plates , various type of external fixation and Illizarov.[1] Usually it is said that for correction of the cubitus varus deformity in adolescent or adult patient , strong fixation of corrective osteotomy is required to allow early mobilization but drawbacks of these procedures are hardware prominence due to less muscle mass and frequent need of other surgery for implant removal resulting in unacceptable scar mark and learning curve with Illizarov etc. We have selected lateral closing wedge osteotomy fixed with k wire because we are used to do same method frequently for cubitus varus deformity in children and it does not require wide exposure around elbow causing elbow stiffness.

Material and method. Ten patients of cubitus varus deformity in adolescents out of which 6 were male and 4 were females, had been corrected by lateral close wedge osteotomy between July 2007 to July 2015. The osteotomy was first fixed with two to three titanium K-wires which were passed through the lateral condyle and extended up to the proximal medial cortex. The mean age at the time of corrective surgery was 14.2 years (range 10 to 20 years).Deformity in the elbow was assessed by carrying angle formed between long axis of arm and forearm and was compared with normal elbow. It was measured by Anteroposterior and lateral radiograph of affected and normal elbow in identical position. Humero-ulnar angle was measured. Patients with more than 10 degrees varus angle were considered for corrective surgery because of the cosmetic unacceptability. There was hyperextension deformity with cubitus varus deformity in two cases. Rotation deformity was not taken into consideration.

After regional anesthesia, patients were taken in supine position and tourniquet was applied with keeping the arm on the side of the patients. Lateral skin incision of about 4 to 5 cm over subcutaneous border of bone was sufficient along the lower arm. Wedge of the osteotomy was calculated by adding the varus angle of affected elbow with normal valgus carrying angle of normal elbow. For example 10 mm wedge was selected for correction of 10 degree angle. Two k wires of 2 mm diameter were inserted into lateral condyle before the osteotomy and advanced just distal to the planned distal cut. Then we inserted two another K wire, distal one parallel to the joint line and another proximal wire with angle of desired osteotomy. Between these two K wires lateral wedge was removed piece meal and medial cortex was weakened by drill holes and both additional K wires were removed and in cases where there was hyperextension deformity, we took measured anterior wedge in addition to lateral wedge. Then osteotomy was completed by the forceful valgus stress with keeping elbow in 90 degree flexion and forearm in pronation and then two k wires were advanced up to medial cortex and in two cases additional third k wire was inserted for stability. It was compared clinically with other elbow in full extension. It was observed clinically that rotation was corrected with keeping the elbow in 90 degree flexion with forearm in pronation .Removed piece meal bone graft was used to fill the gap created after osteotomy. Above elbow plaster slab was applied in 90 degree flexion and full pronation and after two weeks stitches were removed and above elbow plaster cast was applied. At 6 weeks, plaster cast was removed and check radiograph was done to see status of union. Assisted active mobilization of elbow was started with K wire in situ. And limb was kept in arm sling. Patients were strictly instructed to avoid massage around elbow and forceful movement. At 8 to 10 weeks after radiological union of the osteotomy, K wires were removed and arm sling was discarded. Elbow mobilization was continued till full movement achieved under supervision of qualified physiotherapist. Further follow up was done up to 6 month. There was no neurological deficit in any patients pre and postoperatively. All the patients resumed their activity after 5 to 6 month of the surgery. All the patients were satisfied with their cosmetic results and elbow function was normal in all patients although two patients had restriction flexion after 100 degree due to anterior prominence of the correction and one patient had prominence of lateral condyle.

Figure1. Preoperative clinical photograph (a) showing cubitus varus deformity left elbow (b and c). Postoperative clinical photograph showing correction of the cubitus varus deformity and active mobilization of elbow with k wire in situ.

Figure2. Postoperative Anteroposterior radiograph (a) and lateral radiograph (b) showing radiological union and correction at 2 months follow-up

Discussion: There are various combinations of corrective osteotomy and fixation for cubitus varus deformity. These are lateral closing wedge osteotomy, medial opening wedge osteotomy [2], Three-dimensional osteotomy[3] ,step-cut osteotomy[4,5] and dom shaped osteotomy.[6,12]There are several methods of fixation to hold corrective osteotomy . These are k wires fixation, two screws with a figure of eight tension band wire, plate fixation, staples fixation, external fixation [7,8,9]and Illizarov fixation[10,11]. Osteotomies which require wide exposure to fix plates have added complications of large scar mark and limitation of movement if adequate physiotherapy is not done and need for their removal of plates because of prominence around the elbow. Dom osteotomy for rotation correction has several complications like inadequate correction, nerve palsy and vascular compromise. [12]

Internal roation is usually not required to be corrected as rotation is usually compensated by movement of the shoulder joint. [13,14]. It was clinically observed in our cases with existing rotation deformity that rotation was usually corrected during completion of the ostetomy with keeping the elbow in 90 degree flexion with forearm in pronation .The main concern of the patients in our study was the varus deformity of the extended elbow. Lateral closing wedge osteotomy is the simplest and easiest method and commonly practiced by majority of the orthopaedic surgeons. We did lateral closing wedge osteotomy with small incision and fixed with 2-3 k wire and applied casting for 6 weeks and then we started mobilizing elbow with assisted active exercise to avoid breakage of the K wires. After 8 to 10 weeks we had removed K wires after union of the osteotomy. We had limited our dissection proximal to the olecranon fossa to avoid stiffness in the elbow. We had taken measured wedge to correct varus deformity with multiple drilling of medial cortex with protection of ulnar nerve and completed the osteotomy with forceful valgus in 90 degree flexed elbow with full pronation and then we had not manipulated the osteotomy to avoid instability and accepted correction whatever we achieved. The osteotomy was fixed with advancing preplaced K wires. The remaining gap after correction filled with bone grafts taken from wedge of the osteotomy.

Conclusion: Judicious use of K wire fixation and casting for corrective osteotomy in cubitus varus deformity, even in late adolescent gives satisfactory cosmetic and function results.

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