

Managing paediatric un-stable lateral condyle fractures of humerus with unburied Kirschner wires

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Abstract

Introduction: Lateral condyle fractures are one of the commonest injuries encountered in the emergency orthopaedics. The intra-articular nature of the fracture and the high incidence of non-union following fracture makes the open reduction and internal fixation as the treatment of choice. The ORIF has been reported successfully by various institutes as the method of choice using K-wire as the fixation tool. The complications related to the hardware are many. The complication related to buried K-wires are reported to be skin sloughing and back out of wire with the disadvantage of another admission at the time of removal. The un-buried K-wires are however easy to remove and do not require another admission. Present study was aimed to see the results following unburied Kirschner wire fixation of lateral condyle fractures in paediatric population.

Material and Methods: Fifty consecutive patients of lateral condyle fractures treated surgically with un-buried K wires were included in the study

Results: The mean age of the patient in our study was 6.5 years. Forty four percent in the age group 6-9 with 80% (n=40) male predominance. Left side was involved in 70% cases (n=35). Eighty six percent (n=43) had fracture while playing and rest had fall from height. As per the type of fracture, we had equal number in type II and type III (n=25 each). Fifty six percent patients had excellent results while forty four percent had good results on final follow up.

Conclusion: Our study depicts that un-buried K wires in lateral condyle fractures gives good results without need for second surgery. This is cheap, readily available and easy method of fixation.

Keywords: Lateral condyle fractures; k wire fixation; Unburied wires.

Introduction

Lateral condyle fractures are one of the commonest injuries encountered in the emergency orthopaedics. The incidence is around 16.9 percent of the distal humeral fractures.^(1,2,3) The intra-articular nature of the fracture and the high incidence of non-union following fracture makes the open reduction and internal fixation as the treatment of choice. The fixation method however may vary from open reduction and internal fixation to arthroscopic assisted internal fixation, the latter being considered in the arthroscopy centres.^(4,5)

The ORIF has been reported successfully by various institutes as the method of choice using K-wire as the fixation tool.^(6,7,8) The complications related to the hardware are many. Since this wire is being used in an intra-articular fracture as the stabiliser, the question of whether to bury it or not needs to be answered. The complication related to buried K-wires are reported to be skin sloughing and back out of wire with the disadvantage of another admission at the time of removal. The un-buried K-wires are however easy to remove and do not require another admission. Longer immobilisation of lateral condyle fracture as compared to supracondylar fractures has led many to think that the buried K wires are better than the un-buried k wires as the pull out can be prevented when patient is asked for range of motion exercises.⁽⁹⁻¹⁴⁾

We prospectively followed the surgically treated lateral condyle fractures which were fixed with un-buried K wires and were allowed early range of motion exercises.

Material and Methods

Fifty consecutive patients of lateral condyle fractures treated surgically with un-buried K wires were included in the study. After initial evaluation patients were diagnosed by X rays and followed using Jacob's classification.⁽¹⁵⁾ Two K wires of size 2mm were used and were bent at a finger breadth distance from the skin.

Results

The mean age of the patient in our study was 6.5 years, Range (02-13). Forty four percent in the age group 6-9 with 80% (n=40) male predominance. Left side was involved in 70% cases (n=35). Eighty six percent (n=43) had fracture while playing and rest had fall from height. As per the type of fracture, we had equal number in type II and type III (n=25 each). Eighty two percent were operated within 5 days and 18% after 5 days of injury. Average time of surgery was 30-40 minutes (36.2) Range of motion at the final follow up is given in Table 1.

Table 1

Range of motion in degrees	Flexion	Extension	Carrying angle
0-5	52%	90%	92%
6-10	24%	10%	8%
11-15	22%	0%	
15	2%	0%	

Table 2: Complications

Nature of complication	Percentage
Pin site infection	2%
Elbow stiffness	40%
Cubitus varus	10%
Cubitus valgus	2%
Lateral spur	68%
Hypertrophic scar	8%

Table 3: Final Scoring

Final result	Mitzer et al 2002 ⁽¹⁶⁾	Sungwook et al (2010) ⁽¹⁷⁾	Present study
Good	5 (29.4%)	59 (33.7%)	22 (44%)
Excellent	12 (70.6%)	116 (66.3%)	28 (56%)
Total cases	17	175	50

Discussion

Mean age in our study group was 6.5 years which is in accordance with other studies. Male to female ratio was 4:1 which is slightly higher than most studies. We attribute this sex incidence to that males being more agile, sporty and outgoing are susceptible to sustain a trauma. Left to right ratio in our study was 2.33: 1 which was in agreement with previous studies. The greater frequency of this fracture on the left side is due the fact that left arm which is non dominant is used to protect from fall, while right is usually occupied in some activity. Eighty six percent had fracture due to fall while playing and 14% due to FFH. This is in agreement with other studies. The comparison between our study and the other studies with respect to age, sex, and site is given in Table 4.

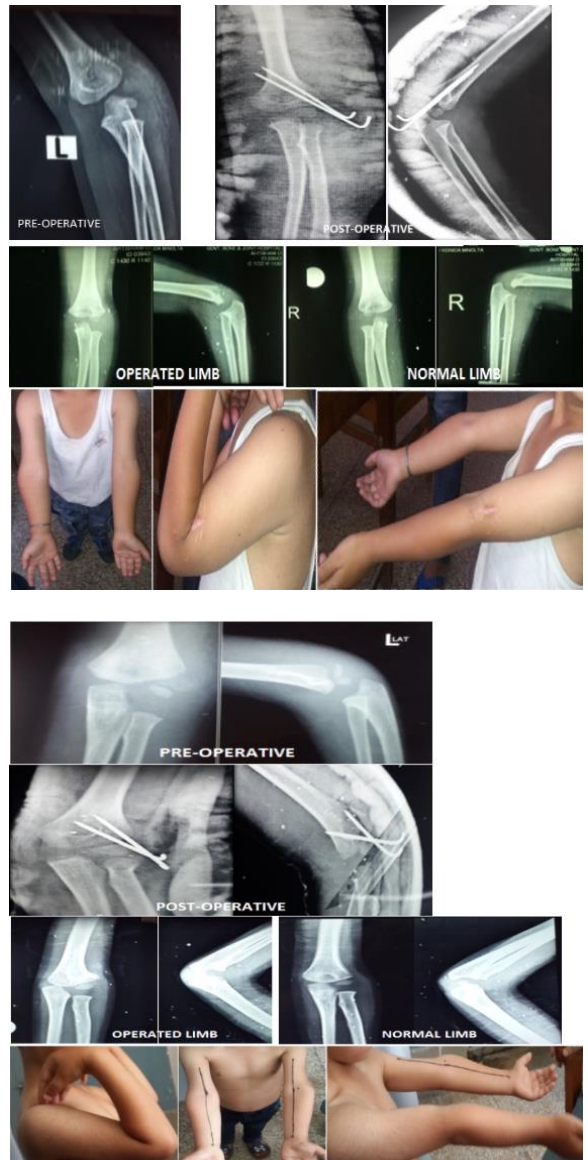


Table 4

	Hardacre ⁽¹⁾	Rutherford ⁽¹⁸⁾	Phillip ⁽¹⁹⁾	Francklaunay ⁽²⁰⁾	Song et al ⁽⁴⁾	Present study
Age range	1.5-14	2-13	1.5-13.5	1.3 -14.8	1.9-11.3	2-13
Mean	6.9	6.3	5.7	6.1	6.4	6.5
Ratio Male Female	3:1	1.4:1	2.47:1	1.85:1	2:1	4:1
Left / Right	1.74:1	1.12:1	4:1	1.16:1	0.8:1	2.33:1

Type of fracture: Song et al have mentioned the type II/type III fracture ratio of 0.37:1 however we had the ratio of 1:1. Also the interval of injury to intervention in their series was 2.4 while as it was 4.3 days in our study. Other parameters are in accordance with other studies.

The unburied K wires used in present study had the advantage that no second admission was required for the removal of implant. Range of motion exercises were started at six weeks and final follow up at 6 months.

In our study of fifty patients we observed an average flexion of 125 degree and average extension of 5.4 at the time of final assessment. This observation of ours is similar to Bernthal et al⁽²¹⁾ who noticed relative arc of motion of 90% of contralateral side at 6 months.

In our study average carrying angle of normal side was 10.26 degrees and of the injured side average carrying angle was 7.29. There was an average decrease in carrying angle of 2.36. Philip Thomas (2001) noticed average decrease of 1 degree of carrying angle, as compared to the contra lateral side. Sungwook et al (2010) noticed an average decrease in carrying angle of 5 degrees verses contralateral side. In our study we noticed 5 patients of relative cubitus varus and one patient of cubitus valgus.

Complications

Pin tract infection: In our study of 50 cases, one patient (2%) had pin tract infection which developed at the end of 6 weeks and resolved after removal of K-wire and oral antibiotic. This observation of ours is in conformity with others like Franck launay et al 2004 who observed 1 pin tract infection and Philp Thomas et al 2001 who also observed 1 pin tract infection which resolved after removal of k wire and oral antibiotics.

Elbow Stiffness: In our study of 50 patients 4 (8%) patients had elbow stiffness. The motion improved with time and at 6 months average arc of motion improved upto 90% of contralateral side this is in conformity with Franck launay et al 2004 and Bernthal et al 2011.

Cubitus Varus: In our study we noticed 5(10%) patients of relative cubitus varus which did not hamper in activities. This observation of ours is in conformity with study of Sung Wook et al 2010 who noticed 11(10.67%) cases of cubitus varus.

Cubitus Valgus: In our study we noticed 1(2%) patient of mild cubitus valgus. This is in conformity with study of Sung wook et al who noticed 2(1.94%) patients of cubitus valgus.

Hypertrophic Scar: In our study of 50 patients we noticed 4(8%) patients of hypertrophic scar which is in conformity with study of Sung Wook et al 2010 who noticed 7(6.8%) patients of hypertrophic scar.

Lateral Spur: We noticed 34 patients of lateral spurring which did not cause any functional abnormality. This is in conformity with study of Franck launay et al 2004 who noticed 42 (73.7%) patients with

lateral spurring and Sung Wook et al 2010 who noticed 87(78%) patients with lateral spurring.

In our study of 50 patients we noticed 28(56%) patients with excellent results and 22(44%) patients with good results. This observation of ours is in conformity with study of Mintzer et al 2002 who noticed 12 (70%) patients with excellent results and 5 (29%) patients with good results and Sung Wook et al who noticed 116(66.3%) patients with excellent results and 59(33.7%) patients with good results.

Conclusion

Our study depicts that un-buried K wires in lateral condyle fractures gives good results without need for second surgery. This is cheap, readily available and easy method of fixation.

Conflict of interest: Nil

Author's Contributions: All authors contributed equally.

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References

1. Hardacre JA, Nahigian SH, Froimson AI, et al. Fracture of the lateral condyle of humerus in children. *J Bone Joint Surg Am* 1971;53:1083-1095.
2. Landin LA, Danielsson LG. Elbow fractures in children. An epidemiological analysis of 589 cases. *Acta Orthop Scand* 1986;57:309-312.
3. Wigher mortenson and sven thonell; *acta orthop scand* 1991;62(2);154-15.
4. Song KS, Kang CH, Min BW, et al. Closed reduction and internal fixation of displaced unstable lateral condylar fracture of the humerus. *J Bone Joint Surg Am* 2008;90:2673-2681.
5. Carro LP, Golano P, Vega J. Arthroscopic-assisted reduction and percutaneous external fixation of lateral condyle fractures of the humerus. *Arthroscopy* 2007;23:1131-1134.
6. Ippolito E, Tudisco C, Farsetti P, et al. Fracture of the humeral condyles in children: 49 cases evaluated after 18 to 45 years. *Acta Orthop Scand* 1996;67:173-178.
7. Beaty JH, Wood AB. Fractures of the lateral humeral condyle in children. Paper presented at the annual meeting of the American Academy of Orthopedic Surgeons, January 18, 1985; Las Vegas, NV.
8. Speed JS, Macey HB. Fracture of humeral condyles in children. *J Bone Joint Surg* 1933;15:903-919.
9. Lateral condylar fracture and its many complications. *Orthop Rev* 1981;10:49-55.
10. Patel N, Weiner SD. Osteochondritis dissecans involving the trochlea: report of two patients (three elbows) and review of the literature. *J Pediatr Orthop* 2002;22:48-51.
11. Fontanetta P, Mackenzie DA, Rosman M. Missed, malunited, and malunited fractures of the lateral humeral condyle in children. *J Trauma* 1978;18:329-335.
12. Fahey JJ, O'Brien ET. Fracture-separation of the medial humeral condyle in a child confused with fracture of the

- medial epicondyle. *J Bone Joint Surg Am* 1971;53:1102-1104.
13. Ma YZ, Zheng CB, Zhou TL, et al. Percutaneous probe reduction of frontal fractures of the humeral capitellum. *Clin Orthop Relat Res* 1984;183:17-21.
 14. Sharma JC, Arora A, Mathur NC, et al. Lateral condylar fractures of the humerus in children: fixation with partially threaded 4.0-mm AO cancellous screws. *J Trauma* 1995;39:1129-1133.
 15. Jakob R, Fowles JV, Rang M, et al. Observations concerning fractures of the lateral humeral condyles in children. *J Bone Joint Surg Br* 1975;57(4):430-436.
 16. Mintzer CM, Water PM, Brown DJ, et al. Percutaneous pinning in the treatment of displaced lateral condyle fractures. *J Pediatr Orthop* 1994;14:462-465.
 17. Koh KH, Seo SW, Kim KM, et al. Clinical and radiographic results of lateral condylar fracture of distal humerus in children. *J Pediatr Orthop*. 2010 Jul-Aug;30(5):425-9.
 18. Rutherford A. Fractures of lateral humeral condyle in children. *J Bone Joint Surg Am*. 1985 Jul;67(6):851-6.
 19. Thomas D Phillip, Howard Andrew W, Cole William G et al. Three weeks of Kirschner wire fixation for displaced lateral condylar fractures of the humerus in children. *Journal of paediatric orthopaedics Sep/Oct 2001 vol. 21-issue 5:pp 565-569.*
 20. Franck Launay, Leet Arabella, Jacopin Samuel et al. Lateral humeral condyle fractures in children: A comparison of two approaches to treatment. *Journal of paediatric orthopaedics July/August 2004 vol. 24-issue 4:pp 385-391.*
 21. Brentthal NM, Hoshino CM, Dichter D et al. Recovery of elbow motion following pediatric lateral condylar fractures of the humerus. *J Bone Joint Surg Am*. 2011 May 4;93(9):871-7.