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Ligamentotaxis in the Intraarticular and Juxta Articular Fracture of Wrist

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Abstract: *The juxta-articular and intra-articular fracture of distal radius is a common fracture around wrist joint. The treatment by external fixation using the principle of ligamento-taxis by which the longitudinal distraction force is converted to a compressive force to achieve good congruity of the wrist joint. Hence, the present study was taken up to find out the efficacy of the procedure in 116 cases of which 100 cases the external fixture is applied. The results from radiological and clinical evaluation is compared with other studies.*
Keywords:*Ligamento-taxis, Intra-articular, fracture of wrist*

I. Introduction

Wrist is important for both mobility and stability of the upper limb, particularly in the movement of hand. Considering the facts of the anatomical architecture the functional capability and vulnerability of any type of fracture of distal radius requires special and meticulous attention during the management. A deformed wrist considered to be a bad hand from the functional point of view for which it is rather ruled that the mobility should be restored of the joint along with necessary stability. The two parodoxial management seems to be coupled with ligamento-taxis. As a rule, any internal fixation with minimal exposure has got inherent tendency to perpetuate some amount of stiffness in the vicinity of infliction. That is why the ligamentotaxis in the juxta articular and intraarticular fractures where the possible skeletal integrity can be maintained adequately with maximum mobility having least external infliction to the soft tissue and adopted as an early total care in the injured limb.

II. Aim

To analyse the outcome of ligamentotaxis in the juxta articular and intraarticular fractures of wrist.

III. Materials & Methods

The study was conducted in the Department of Orthopaedics, M.K.C.G. Medical College, Berhampur, Odisha from 2009 to 2014 was a prospective and retrospective study. We include all stable and unstable fractures of distal radius with intra-articular combination with or without other limb injury. The study group comprises of 116 patients, 80 patient had unstable fracture of the wrist both simple and compound injury, rest 36 patient had stable compound fracture. Out of 116 patients, after evaluation 6 patient were not fit for anaesthesia and 10 patients refused for external fixation. Amounting to total 16 patients who were treated by cast immobilisation and window dressing, forms the control groups. The study group of 100 patients were first radiologically assured and planning was done. In the compound fractures, the wound debridement, wound toileting and culture swab was given top importance. All the patients were managed within 48 hours of injury under anaesthesia. Reduction of fracture and insertion of schanz pin were done under image intensifier.

Two sets of Schanz pin of dimeter 3.5 mm for radius and 2.5 mm for metacarpal were chosen. For metacarpal 1st pin is placed at junction of head and neck while the 2nd pin is at the maximum flair of the base. In the radius the dorsolateral plane as close as possible to the fracture side and the 2nd pin is placed proximally 6 to 8 cm distance from the previous one. After manual traction with satisfactory reduction, then the external fixation device is applied. The post-operative care like check X-ray after 10 days and daily pin tract dressing was done. The external fixator device are removed after 7 to 8 weeks post-operatively.

IV. Result

Of 116 cases, who are taken up for the study, 100 patient (86.2%) were subjected to external fixation and 16 (13.8% were treated by close manipulation. We had no serious intra-operative complication except 2 cases have neuropraxia less than 72 hours.

Early Complication

Post-Operative Complications upto 2 weeks	No. of Cases	Percentage
Pin tract infection	8	6.80
Pin loosening	14	12.60
Change of Pin site	14	12.60
Loss of reduction	18	15.51
Oedema	24	20.68
Bleeding	2	1.72
Wound infection	12	10.34
Entrapment of tendon	0	0
Nerve Complication	2	1.72

Late Complication

Type of Complication	No. of Cases	Percentage
Shoulder stiffness	4	3.45
Elbow stiffness	8	6.90
Fingers stiffness	16	13.80
Carpal tunnel syndrome	--	--
Nerve injury	--	--
Arthritis	5	8.60
Osteomyelitis	--	--
Sudeck's Osteodystrophy	--	--

Clinical And Radiological Evaluation

Clinical Evaluation	Study Group	Control Group	Radiological Evaluation	Study Group	Control Group
Excellent	72	0	Grade-I	66	0
Good	16	4	Grade-II	20	6
Fair	8	6	Grade-III	4	6
Poor	4	6	Grade-IV	2	6

The subjective evaluation, we found 36 patients came under excellent category of the demerit point of system and 66 patient came under Grade-I of Lidstrom X-ray evaluation. The congruity of wrist joint that was achieved during reduction at the operative table played a significant role in the evaluation of the patients.

V. Discussion

As Rhinelander stated that every physiological healing of any injury vascularity is the biological basic and stability is the biomechanical basic. Considering the above facts, the mechanical once carries more precedence and vascularity is beyond any bodies control. To achieve a good stability in such complex facture the external fixation is the ultimatum within the region of bony anatomy of distal radius in terms of reduction of bony fragment and maintenance of reduction and good outcome after union of fracture.

The external fixator is very much ideal and universally accepted in maintenance of the length, as well the axis in compatible with plaster cast immobilisation. In our study, of 116 patients in study group,10% (10cases) out of which re-manipulation in 5% (5 cases) given satisfactory result, but in the control group 50% (8 cases) there is loss of reduction who were maintained by cast immobilisation. The secondary and additional procedures like K-wire fixation, bone graft and plate fixation done for 5 patients who have failed in manipulation with the external fixation in situ. However, the result of outcome also depends on the nature of compound fracture.

In 116 cases of this series, no case developed osteomyelitis. However, the pin tract infection was 6.8% which is little higher than other studies. This can be attributed to the personal hygienic status of the patient, use of antibiotic and pin site care. The role of K-wire can not be kept aside which behave as a monofilament fibre with less vulnerability to infection.

Pin anchorage is the prime importance since it is the link between the patient and the fixator. The present series shows 12.6% loosing of the pin while the other studies do not depict any such observation. The rate of pin loosening can be possible due to (1) younger age due to normal bones which provides firm anchorage (2) pin was self-drill and self-tapschanz pin provides stable fixation, (3) mechanical drill with less rotations / min have less wobbling effect which lessen the incidence of loosening of the pins.

In the present series, we encountered a few cases of elbow shoulder and wrist stiffness, it is agreed up with Edward et al, 1994, that since elbow and shoulder are fixed in external fixator. It could be easily avoided with natural activity and exercise.

Grip power is another silent functional aspect which depends upon the movement of the small joints along with the controlled action of extrinsic and intrinsic muscles of hand. The present series reveals 56% of

grip strength compared to 60% by Stanley et al (1983) and Greenland et al (1987). This shows that the result is gratifying and dignifies the worthiness of application of fixators in such cases.

Ligamentotaxis, converting longitudinal distraction forces into compressive forces in transverse axis as a result of which, it facilitates union of the facture bone in periarticular juxta articular and intra-articular area. Since the compressing force makes the area stable, thus movement is being allowed around with the fixator in situ leading to a mobile hand as an end result.

VI. Conclusion

From our study, it is concluding that, the result is comparable with other studies as we achieve good to excellent result. The external fixator has defined unique beneficial role in respect to wound toileting and reduction of the fracture with good movement of joints especially with intra and juxta articular fracture with all this beneficial effects in the total care of wound.

References

[1]. Agee JM. External fixation -Technical advances based upon multiplaner ligamentotaxis. Orthop Clin North Am. 1993; 24: 265

[2]. Chan BK, Leong LSC, Low CO, See HF. The use of the external fixator in the treatment of intra-articular fractures of the distal radius. Singapore Med J. 1999; 40(06): 234-9.

[3]. Deshmukh SC, Kumar D, Mathur K, Thomas B. Complex fracture-dislocation of the proximal interphalangeal joint of the hand. Results of a modified pins and rubbers traction system. J Bone Joint Surg (Br). 2004 Apr;86(3):406-12.

[4]. Lipton HA, Wollstien R. Operative treatment of intra-articular distal radius fractures. Clin Orthop. 1996; 327: 110-124.

[5]. Altissimi M, Antenucci R et al. Long term results of conservative treatment of fractures of the distal radius. Clin Orthop. 1986; 206: 202--210.

[6]. Bartosh RA, Saldana MJ. Intraarticular fractures of the distal radius: A cadaveric study to determine if ligamentotaxis restores radiopalmar tilt. J Hand Surg (Am). 1990; 15: 18-21.

[7]. Klien W, Dee W, Rieger H et al. Results of transarticular fixator application in distal radius fractures. Injury. 2000; 31(suppl 1): 71-77.

[8]. Reynolds PR, Beredjklian PK. External fixation of distal radius: Do benefits outweigh complications? Current Opinion Orthop. 2001; 12(4): 286-289

[9]. Vidal J, Buschayret C. et al. Treatment of articular fractures by "ligamentoxatis" with external fixation in Brocker A.F. and Edwards C (Edn.). External fixator the current state of the art "William and Wilkins Baltimore, 1978.

[10]. Leung KS, Shen WY et al. Ligamentotaxis and bone grafting for communited fractures of distal radius. JBJS, Vol. 71B, No. 5, Sept. 1989.

[11]. Dennis E. Foster, Joshpe A Kopa. Up date on external fixators in the treatment of wrist fractures: Clinical Orthopaedic Related Resource, Vo. 164, March, 1986.

[12]. Arora J, Kapoor H et al. Closed reduction and plaster cast immobilization Vs external fixation in comminuted intra-articular fracutres of distal radius. Ind Jour Ortho, 2004, 38(2), 113-117.

[13]. Boparai RPS, Boparai RS et al. Role of ligamentotaxis in management of comminuted intra/juxta articular fractures. Ind Jour Ortho, 2006, 40(3): 185-187.