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COMPARISON OF TREATMENT OF UNSTABLE INTRA ARTICULAR FRACTURES OF DISTAL RADIUS WITH LOCKING PLATE VERSUS NON- LOCKING PLATE FIXATION

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Abstract:

Introduction: Unstable intra articular fractures of distal radius are frequently being managed with open reduction and internal fixation. Of late in some biomechanical studies locking plates have been shown to be better in terms of maintenance of radiological parameters in comparison to non-locking plates. We conducted this study to know whether this biomechanical superiority of locking plates is converted in to better clinical outcomes.

Materials and methods: This study was conducted at orthopaedic department KIMS hubli. All patients of age group 18-65 years with intraarticular fractures of distal end radius were close reduced and casted. All patients who did not achieve acceptable reduction or lost reduction at first follow up visit within one week were advised ORIF and those willing were included in study after taking written consent

Results: The change in radiological parameters from immediate post op to latest at two year in locking plate group was not significant for radial height, radial tilt, volar tilt, but ulnar variance whereas in non-locking plate there was significant change in radial height, volar tilt, ulnar variance but no significant change in radial inclination. In clinical and functional outcome no significant difference was found at two year follow up.

Conclusions: Locking plates maintain the radiological parameters better than non-locking plates but functional outcome are same for both plates at

two year after surgery.

Key words: Unstable intra-articular, Distal radius, Locking, Non-locking plate

Introduction

Fractures of distal end of radius are common. They occur in elderly as a result of weakened osteoporotic bones but in young they are due to high energy trauma leading to intraarticular involvement.¹⁻³ Knirk and Jupiter reported a 65% prevalence of post-traumatic arthrosis after intra-articular fracture of distal end of radius in forty three young adults and demonstrated a strong correlation between residual articular incongruity and osteoarthritis.^{4,5} It is also known that extra articular malalignment can lead to decreased gripstrength and endurance as well as limited motion and carpal instability. In high demand young adults to avoid posttraumatic joint arthrosis intra-articular fractures should be anatomically reduced.^{6,7}

To achieve anatomical reduction methods of treatment involving open reduction and internal fixation with volar plates are being preferred.^{8,9} Volar locked plating has gained vast popularity for treatment of both extra and intra articular fractures of distal radius due to its favourable functional and radiological outcome this study is with the hypothesis that locked plates are better than non-locking plates in maintaining radiographic parameters and functional outcome in intraarticular fractures of distal radius.¹⁰

Subjects And Methods

This study was conducted at orthopaedic department KIMS hubli. All patients of age group 18-65 years with intraarticular fractures of distal end radius were close reduced and casted. All patients who did not achieve acceptable reduction or lost reduction at first follow up visit within one week were advised ORIF and those willing were included in study

after taking written consent.

Criteria used to determine unacceptable reduction were

- radial height shortening of >5 mm,
- radial inclination on postero-anterior film <15,
- intraarticular step off >2 mm,
- dorsal tilt >15 and volar tilt >20

Patients having open fractures, concomitant upper extremity injury, patients with bilateral wrist fractures, those who were managed surgically more than two weeks after injury and patient with multi-organ or head injury, were **excluded** All patients were operated within 2 weeks of injury. Consecutive patients were alternately allocated to locking plate group and non-locking plate group. Total 60 patients (30 in each group) were included in study between November 2013 and February 2017. Mean age was 36.1 years. 75% patients were in age group 25-45 years. Overall 66% patients had their dominant extremity involved in this series. Mechanism of injury included bike riding (44 cases) fall (9 cases) sports (5 cases) automobile accident (2 cases)

Surgical Technique

Standard volar approach of Henry was used. Linear incision lateral to flexor carpi radialis retracting brachioradialis and radial artery laterally flexor carpi radialis along with median nerve medially. Pronator quadrates was exposed and ncised at its radial insertion.¹¹ Fracture site exposed after retracting pronator quadrates ulnarly.^{12,13}

Follow Up

Patients were kept in below elbow slab for one week. Followed by removable volar splint for 3weeks.

Immediate post op X-rays were done. At latest followup patients were evaluated with X-rays, clinical parameters. Immediate postoperative radiographs were compared to those at final follow up (at twenty four months). Range of motion of wrist and grip strength was evaluated by same external observer who made radiographic measurements. Grip strength was measured with Jamar dynamometer and compared with that of contralateral hand. All patients were evaluated with scoring systems.

Clinical Outcome

There was no statistical difference between two groups for active range of motion and grip strength

Comparison of Clinical Outcomes

	Locking plate	Non-locking plate
Flexion	75.2	71.6
Extension	77.2	74.5
Pronation	67.5	66.7
Supination	89.6	87.6
Radial deviation	80.3	77.3
Ulnar deviation	76.9	76.0
Grip strength	73.1	73.3

Radiological Results

The change in radiological parameters from immediate post op to latest at two year in locking plate group was not significant for radial height, radial tilt, volar tilt, but ulnar variance whereas in non-locking plate there was significant change in radial height, volar tilt, ulnar variance but no significant change in radial inclination. In clinical and functional outcome no significant difference was found at two year follow up.

Locking plate



Non locking plate



Conclusion

There was no significant difference between locking plate and non-locking plate in terms of clinical outcome. However radiological parameters were better maintained by locking plates over the period of two years. No complications were specific to any study group. Pain over plate was exclusively seen in locking plate group (only 2 cases).

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