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## Study of functional outcome of distal radial fractures treated by conservative and surgical methods

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### Abstract

**Back ground:** During the 2 years follow-up, we compared the functional outcome of distal radial fractures treated by different methods, 1.closed reduction and casting (CAST), 2.Closed reduction and 'K' wire fixation and 3. Open reduction and internal fixation (ORIF) with volar locking plate in elderly patients in a teaching hospital situated in a backward area of Chittoor -Andhra Pradesh.

**Patients and Methods:** Total 88 consecutive patients in the age groups of 40yrs to70yrs were included in our study. There were 64-female and 24-male patients. The mechanism of injury was fall in 66 patients [75%] and road traffic accidents in 22 patients [25%]. Majority of patients [60%] were treated by closed reduction & cast immobilisation method. 25% of patients were treated by closed reduction & 'K' wire fixation and 15% of cases were treated by open reduction & Internal fixation (ORIF) with volar locking plate. For treatment decision and documentation we followed AO classification. Objective and subjective functional results based on active range of motion, grip strength, disabilities of the arm, shoulder and hand (DASH) score, Patient related wrist evaluation (PRWE) score, visual analogue scale and radiographic assessment (dorsal tilt, radial inclination, radial shortening, fracture union and post-traumatic arthritis were assessed.

**Results:** At final fallow-up there was significant difference between the two groups of patients treated non-surgically and surgically for ROM, grip strength, DASH score and PRWE score. Pain level was significantly less for the patients in the CAST group in spite of clinical deformity present in 17% of patients for which the elderly were not complained. And no such deformity was seen in the 'K' wire and ORIF groups. We achieved excellent results in 35 patients [40%], good results in 22 patients [25%], fair results in 26 patients [30%] and poor results in 5 patients [5%].

**Conclusion:** Traditionally elderly patients should be treated non-surgically with closed reduction and POP cast under local anaesthesia or sedation. The unstable fractures can be treated with closed reduction and "K" wire fixation and POP cast. The ORIF with locking plate has limited value and beneficial in selected patients only. Functional outcomes are better with conservative treatment.

**Keywords:** Distal radial fractures, conservative and surgical treatment

### Introduction

The distal radial fractures are one of the most common injuries of the Musculo-skeletal system. These are typical fractures of relatively fit persons with osteoporotic bone. Traditionally these fractures in older individuals have been treated with closed reduction and POP cast immobilisation [1]. In unstable fracture patterns cast immobilisation fails to maintain the reduction until bone union and leads to mal-union in more than 50% of cases [2]. Some authors have recommended anatomic restoration of displaced and unstable distal radial fractures in younger individuals to achieve the best clinical results<sup>3</sup>. The old and frail individuals with low functional demands can accept to live with mild deformity and minimal dysfunction of the wrist [6].

The elderly patients with increasing life expectancy, the decision making between surgical or non-surgical approaches to treat these osteoporotic distal radial fractures is demanding [10, 11]. Most of the data is from treatments of much younger patients [8, 9]. There is unanimity in the literature concerning the fixed protocol of management of unstable intra-articular DRFs [4, 5]. When fracture reduction cannot be maintained with cast immobilisation, additional fixation is suggested.

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### Patients and Methods

Total 88 patients attended our hospital from August 2018 to June 2020 with distal radial fractures. These patients were managed conservatively and surgically and followed up for minimum 6 months, were taken up for the study after taking consent. Among 88 patients, in the age groups of 40yrs to 70yrs, 64 were female and 24 were male patients. The mechanism of injury was fall in 66 patients (75%) and road traffic accidents in 22 patients (25%). AO classification is followed for recording and planning the modality of treatment. Majority of patients-60 (68%) were treated by closed reduction and POP cast method, 16 patients (18%) were treated by closed reduction and K-wire fixation and 12 patients (14%) were treated by opened reduction and volar locking plate fixation.

The protocol we followed for non-operative treatment includes fracture reduction under local or short GA in emergency room and immobilisation with a below elbow POP slab and POP was kept for 6 weeks. We have not advocated above-elbow POP. Active and passive finger movements were encouraged from day one. We performed per cutaneous pinning for patients with more functional needs and with good bone quality. If the fracture fragments could not be reduced and maintained in POP cast alone, we did per-cutaneous pinning where pins are passed through the radial styloid or crossed pins through dorsal cortex and additional support given by POP cast. There were no pin-tract infection in our cases. The immobilisation and finger exercises were advised as in POP cast group. We performed internal fixation with volar locking plate in older patients with displaced fractures with more functional demands. The immediate post-op radiological pictures were satisfactory and with early return of range of movements in our patients. The final outcome was not satisfactory as per patients' feedback, probably due to fear of implant inside the body and need for second surgery in future.

During follow-up, check x-rays AP and lateral views were taken. Radial angle, palmar tilt, radial step and length were analysed. Pain and functional scores were graded according to PRWE and DASH scores. Functional grading was assessed based on Varus, valgus deformity, shortening, union of fracture and signs of osteo-arthritis. The final outcome was compared with other studies.

### Results

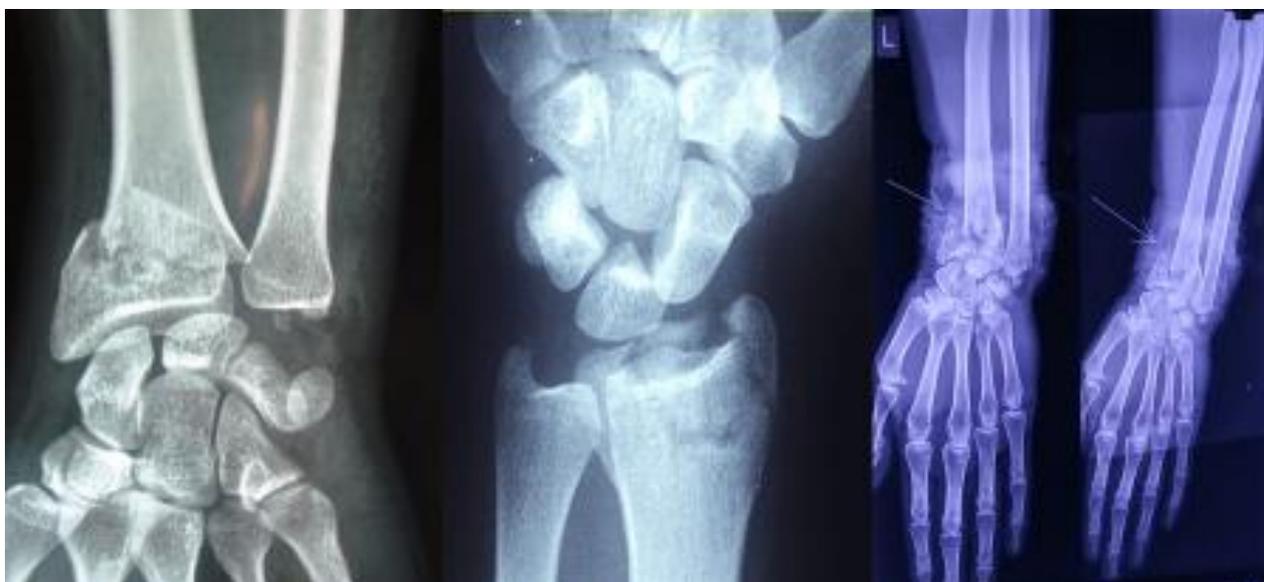
Excellent results were archived in 35 cases (40%) of which cast group-28, pin group-5 and ORIF group-2 patients. Good results were seen in 22 patients (25%) of which 15-cast group, 6-pin group and 1-ORIF. Fair results were seen in 26 cases (30%) of which cast group-17, pin group-6 and ORIF group-3. Poor results were seen in 5 (5%) patients of which pin group-3 and ORIF group-2. Excellent and good results are more among patients treated conservatively without any radiological parameters affected.

At the final follow up there was significant difference between the 3 groups for ROM, grip strength, DASH score and PRWE score. Pain level was significantly less for the patients in cast group in spite of obvious clinical deformity in 20% of cases.

### Discussion

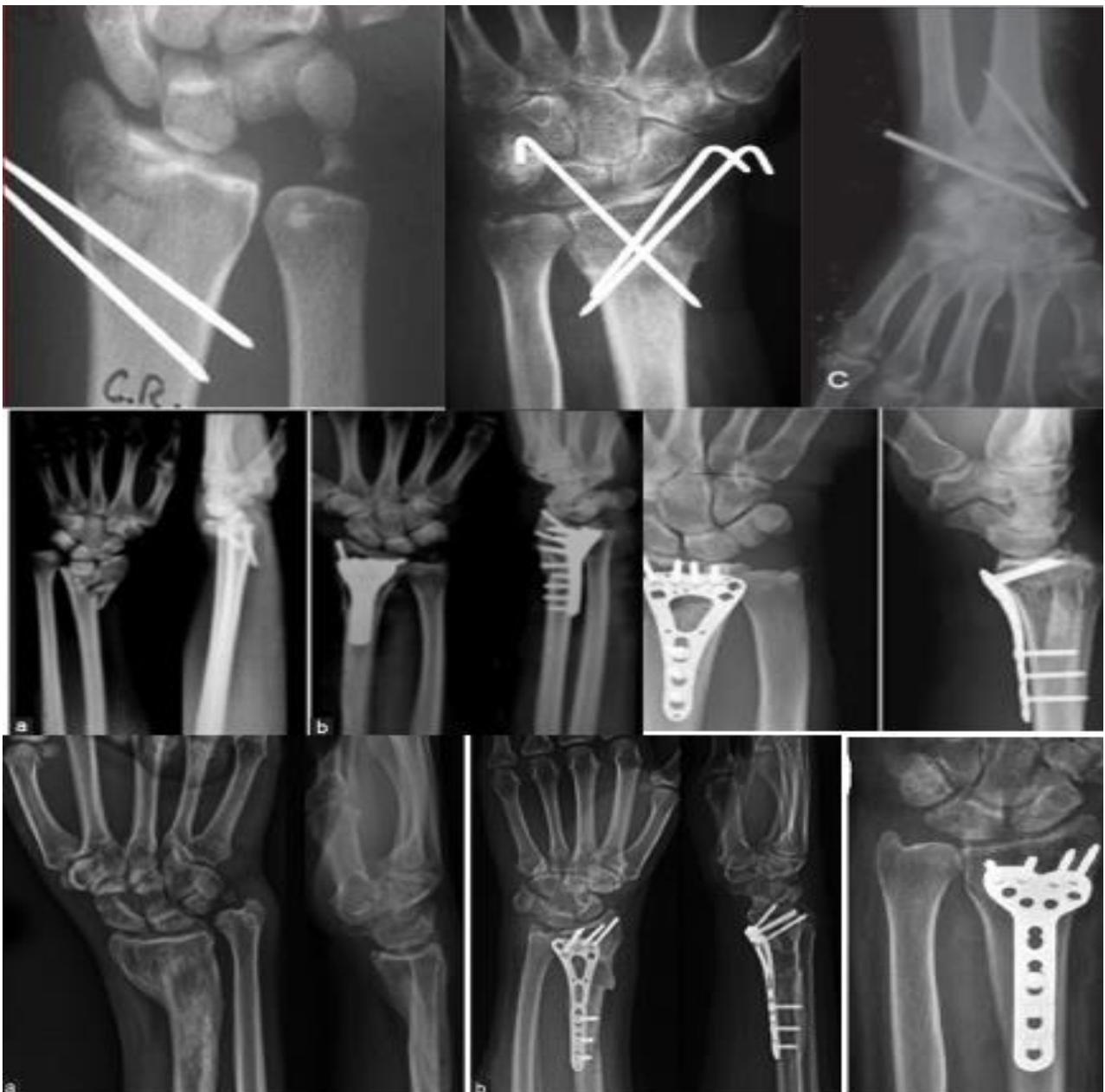
Distal radial fractures are one of the most common fractures treated in casualty department. Decreased bone mineral density, female gender, ethnicity, heredity and early menopause have all been showed to be risk factors. Good long-term out-come depends on many factors like patients' related factors, velocity of injury, fracture patterns and treatment given [11]. The first three factors are not in the control of surgeon. So the outcome may not be good and same for all the cases after the treatment. The functional and radiological outcome after management in our study depends on treatment methods and patient's functional needs. Young and Rayan<sup>6</sup> stated that there is no correlation between unsatisfactory radiological outcome and functional results as some of their patients developed radio-carpal arthritis, stiffness and pain. We have not encountered these complications in our cases.

Good outcome was present in minimally displaced and less comminuted fractures in patients managed conservatively, whereas the fracture pattern did not affect the outcome in surgical management. The radiological parameters considered in our study were loss of radial inclination, radial length, presence of intra articular step and malunion [11]. The range of movement was directly related to number of parameters affected in most of our patients. Most of the published studies were done with older individuals with less functional expectations. We had good patient satisfaction in older individuals with minimal radiological defects when compared to young and active individuals.





Pre – Treatment Radiographs



Post– Treatment Radiographs

## Conclusions

The treatment options are variable and depend on the patients willingness for the suggested mode of treatment in remote under literate areas. The elderly patients are neither willing for surgery nor for cast immobilisation. So orthopaedic surgeons are spending much time for counselling the patients and their relatives to accept for the best suitable mode of treatment. Stable and reducible fractures which do not redisplace in cast within first 10 days after reduction are treated non-operatively with satisfactory radiological and functional results. The final result is largely determined by the presence or absence of pain while performing daily living activities. In our patients pain level is significantly less in the group treated non-operatively. In the decision making process patients' age, comfort, pre-injury daily activity level, life style requirements and stage of osteoporosis should be considered

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