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Close reduction and casting versus operative treatment with volar plates for displaced distal radius fractures: A comparative study of outcomes and treatment costs

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Abstract

Background: A many of treatment option is available for distal radius fractures according to fracture type and bone quality. The goal of this retrospective study is to compare radiologic and clinical outcomes as well as the treatment costs between operative and conservative treatment of closed displaced distal radius fractures.

Material and Methods: From May 2016 to MAY 2017,120 patients with distal radius fractures,60 patients treated operatively with volar plates(ORIF),56 patients treated with close reduction and casting for 6 weeks, all patients were followed up at 6 months, and 1 years post injury. We reviewed rdiologic and clinical outcomes as well as treatment costs and then compared the two groups using (DASH) and MAYO scores.

Result: After 1 year observation with DASH and MAYO scores the functional outcomes did not differ (p<.0.06),but radiologic outcomes were all superior in ORIF group: radial inclination (5.7 vs 14.2) volar tilt(7.3 vs14.2) radial shortening (1.2 vs 5.3).There was difference in main treatment costs ORIF group (9513.25) vs (550.23) in nonoperative group.

Conclusion: ORIF with volar plates showed superiority in radiological outcomes over close reduction and cast immobilization but no difference in functional outcomes between the two groups. There fore we suggest that close reduction and casting is initially recommended because it is safer and has lower treatment costs.

Keywords: distal radius fracture, ORIF, cast, group

1. Introduction

Distal radius fractures are the most common orthopedic injuries. 50% of these fractures are intra-articular [1]. There are many different types of these fractures depending on mechanism of injury and bone quality, osteoporosis is a high incidence in old women so DEXA scan is recommended [2].

With these fractures the wrist also can suffer ligamentous injury causing instability to the carpus or distal radioulnar joint. These injuries are easily missed because the XRY may look normal [3].

Treatment of these fractures may be non-operative (close reduction and cast immobilization) or surgical such as percutaneous pinning, external fixation or ORIF technique witch become popular recently in relation to the use of volar locking plates [4 -7].

Our study aims to evaluate the clinical and radiologic outcomes at 1 year of displaced close intra-articular distal radius fractures treated with ORIF using volar locking plates versus close reduction and cast immobilization for 6 weeks.

2. Material and Methods

From May 2016 to May 2017, a total of 219 patients who presented to BADR General hospital in KSA. All patients written consent for their participation. Patients included in this study were more than 18 years old, with close displaced distal radius fractures classified as AO group B and C without any skeletal injury. We excluded open fractures, pathological fractures, patients delayed in presentation.

Of more than 10 days. The final number after exclusion is 120 patients, 64 treated operatively (Fig 1), and 56 patients nonoperative (Fig 2), the mean age was 63.2 in ORIF group and 65.1 in non-operative group. Male to female ratio was 28:36 and 22:34 in respective groups. Dominant wrist fracture was 53.7% in ORIF group and 51.3% in nonoperative group.

Patients in operative group admitted to the hospital and operated under plexus or general anesthesia and C arm fluoroscopy, surgery performed via a volar approach and using angle locking plates (Fig 1), XRY were taken after surgery, antibiotic IV given for 24 H after surgery, and patients discharge after 2 days. Active finger movements were advised and rehabilitation was initiated. Patients seen after 5 and 15 days.

Patients in non-operative group underwent close reduction and casting under sedation or local anesthesia. XRY were taken after reduction, 1week, 2week. Cast was removed after 6 weeks (Fig 2) and rehabilitation was initiated.

patients followed up for 1 year, and assessed for grip strength, wrist range of motion, functional outcomes were determined by using disability of arm, shoulder and hand (DASH) score and MAYO score.

Radiologic measurement were determined by : radical inclination, radical shortening, volar tilt angle. Clinical evaluation consists of 8 visits, ending with V8 after one year.

Fig 1: Pre-and post ORIF with volar plating

Fig 2: pre-and post close redaction (a,b,c,d) 1 month follow-up (e,f) 1year follow –up (g,h)

3. Result

All patients presented bone-uonion. Swelling inflammation and pain were observed in 3 patients in ORIF group, and 4 patients in nonoperative group. 5 patients of nonoperative group needed re-reduction, whereas no patient in operative group required revision surgery. One year after fracture both groups had an excellent or good result of 86 % of patients according to the Green and Obrien score. There were no difference in DASH score in both groups: ORIF group (17.2-18.4), and in nonoperative group (17.2 -18.4). The grip strength did not differ between the two groups (P=0.5667). No difference was found in range of motion between the patients in either group. Radiologic results was superior in ORIF group (P< 0.06): radial inclination (10.7 vs 14.2) volar tilt (7.3 vs14.2) radial shortening (1.2 vs 5.3). There was diffrerance in mean treatment costs ORIF group (9513.25) vs (550.23) in nonoperative group. Patient in ORIF group had superior number of days of medical leave (the mean 80.6 days) and it was lower in nonoperative group (46.7 days). ORIF group had more treatment costs (the mean 9513.25 RS) and in nonoperative group it was lower (the mean 543.50 RS)

4. Discussion

Distal radius fracture have a different types due to bone quality and mechanism of injury, so the options of treatment are different. Close reduction and cast immobilization is a simple, safe, available intervention, and has lower treatment costs. In contrast ORIF requires hospitalization and higher treatment costs, it has superior radiologic results but these biomechanical advantages not translate into better clinical outcomes {8}. In our study DASH score, MAYO wrist score, and range of motion (ROM) does not demonstrate any difference between ORIF and non operative treatment. This is supported by several studies: the ORCHID study [9-12]. comparing ORIF and close reduction and casting of AO type C: Distal radius fractures in the elderly showed that there are no significant difference between the two groups.

The advantages of ORIF include faster rehabilitation than non operative one. anatomical reduction of fracture fragments, stable rigid fixation successfully control shortening and angulated especially in osteoporotic bone [13]. The main indication of ORIF with volar locking plates is unstable, articular fracture, or sever osteoporosis bone [14].Whereas the main indication of close reduction is extra-articular fractures.

In conclusion, our study suggests that close reduction and casting for close distal radius fracture is initially recommended because there is no difference in the functional outcomes between patients treated non- operatively and ORIF although the superior radiographic outcomes in ORIF. The main difference is the treatment costs which is higher in ORIF.

5. References

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