

CONSERVATIVE MANAGEMENT of EXTRAARTICULAR DISTAL RADIUS FRACTURES in ELDERLY ANDROW

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Abstract:

Extraarticular distal radius fractures in the elderly is a common problem. Many authors discussed treatment options including conservative and operative management. Conservative management yielded excellent functional results with high patient satisfaction without exposure to the surgical risks.

Keywords: *Distal radius fractures – Elderly fractures – Fragility fractures- Wrist fractures – osteoporotic fractures*

INTRODUCTION

In old patient, Wrist commonly fractures were arm fracture and representing about 2.5 : 10 / 1000 every 12 months (1, 2).

Despite of expecting outcome wrist fractures functionalities might not be devastating as for hip or vertebral fractures, where hand is fundamentally to performing basic and instrumental ever day activity, Many functional degrees affectations should expect few investigations exposed to that of hip fracture (3). Several evidences referred to association between fracture types and received treatments (4–8).

Aim of our work

Assess the Conservative management of wrist fractures and its outcomes on daily basic activities in geriatric population.

Pathophysiology of osteoporotic bone

Osteoporotic fracture occur spontaneously or minimal trauma resulting from day-to-day activity (9). Early discovering to impaired bone qualities are very crucial in preventing osteoporotic fracture. Several investigations were reported that, osteoporosis is under-diagnosed (10), and opportunities for starting bone modulating therapies pre osteoporotic fractures occurrences is missing up to 84% of patients (11). BMD up to 60% of variation in bone fragilities (13), which related to it is inability to depict differences in bone substances compositions and structure designs. All characteristics influenced on bone strength to large extent (14).

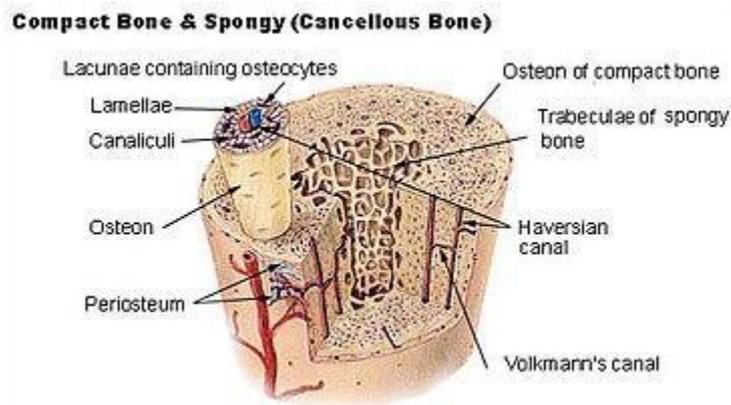


Fig.1 Bone structure

Trabecular bone mass and strength are reduced throughout osteoporosis, Scarce trabecular tissue which remains is more heterogeneous, with trabecular tissues region. (13)

Best fracture load predictors are measure of cortical bone mass, cortical area and cortical width.(14) Fracture risks in case who associate with certain geometrical feature. (14)

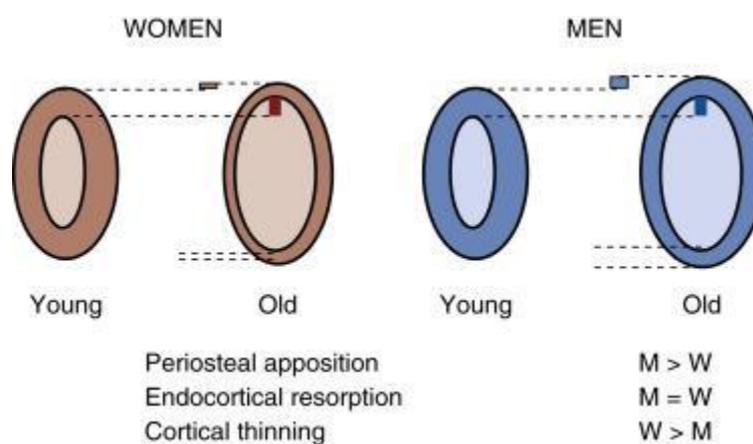


Fig.2 Cortical thinning in elderly

Epidemiology

Wrist fractures represented 8-10/ 1000 person per years (1) while with incidence of hip fracture represented 7 / 1000 person per years. (15) Wrist fractures commonly observed in women less than 75 years, while hip fracture became commonly in women above 75 years. (16) Wrist fractures have risks factor for included lower bone mineral densities, where were no previous oestrogen using, histories of 2 or more falls in preceding year, and previous fractures post 50 years. Poor cognitive status increasing wrist fracture risks to women above 75 years. (17)

Mechanism of injury

Wrist fractures common outcome from falls sustained while walk and occurred when people are still healthy, actives, and independent. (17) The different characteristics of wrist fractures are generally agreed to be influenced by hand position at impact time, the type of surface with which it makes contact, and the velocity of the force. Added to this the quality and strength of the bone will influence the severity of the fracture. (18)

Clinical Evaluation

Eliciting the symptoms of a fracture of the distal radius is usually straightforward with a history of a fall on to outstretched hands or occasional higher-energy injury. Pains and swelling surround wrist were invariable features and with displacement the patient may also complain of a visible deformity. Specific questioning should include any paresthesia or numbness in the fingers to exclude any median or ulnar nerve injury. Pain evidences in limb should be sought to diagnose an ipsilateral injury. (18)

A thorough neurologic examination of the hand should be performed as acute carpal tunnel syndrome (CTS) may require prompt treatment. It is also important to remember that distal radius fractures may be complicated by acute compartment syndrome and the symptoms and signs of this condition should also be sought. (18)

Fernandez Type 1 Fracture: Bending fracture: The thin metaphyseal cortex fails owing to tensile stress, with the opposite cortex undergoing a certain degree of comminution (extraarticular Colles or Smith fractures) (19)

Instability Prediction

Many factors are associated with re-displacement following closed extraarticular distal radius fracture manipulations. Lafontaine and colleagues define 5 “instability parameters” and illustrated linear relationships among instability parameters and ultimate fracture collapse with closed treatments, (20) as follows:

1) Age

Above eighty years with displaced distal radius fracture were 3 time more to had instability than those less than thirty years. (20)

2) Initial fracture displacement

Higher initial displacement degree above 20 degree.(20)

3) Metaphyseal dorsal comminution

Metaphyseal defect evidenced by plain radiographs and computerized tomography increasing instability chances. (20)

4) Ulnar fracture. (20)

5) Articular radiocarpal fracture. (20)

6) Displacement following closed treatment (21)

Lafontaine et al reported that, cases with 3 to 5 parameters need surgical intervention throughout earlier stages. (20) Any patient with 3 or more of those criteria was excluded from our study.

Patients and Methods

We conducted a prospective study with minimum follow up of 3 months to assess functional outcome after casting of distal radius fractures.

A total of 60 geriatric patients with wrist fractures were followed up for 16 to 30 weeks with mean follow up period of 22 weeks. Agee maneuver of reduction was used followed by below elbow cast (Fig.3)

Cast was removed at 6 weeks, FU with Quick Dash score was used to estimate functionality at 3 months.

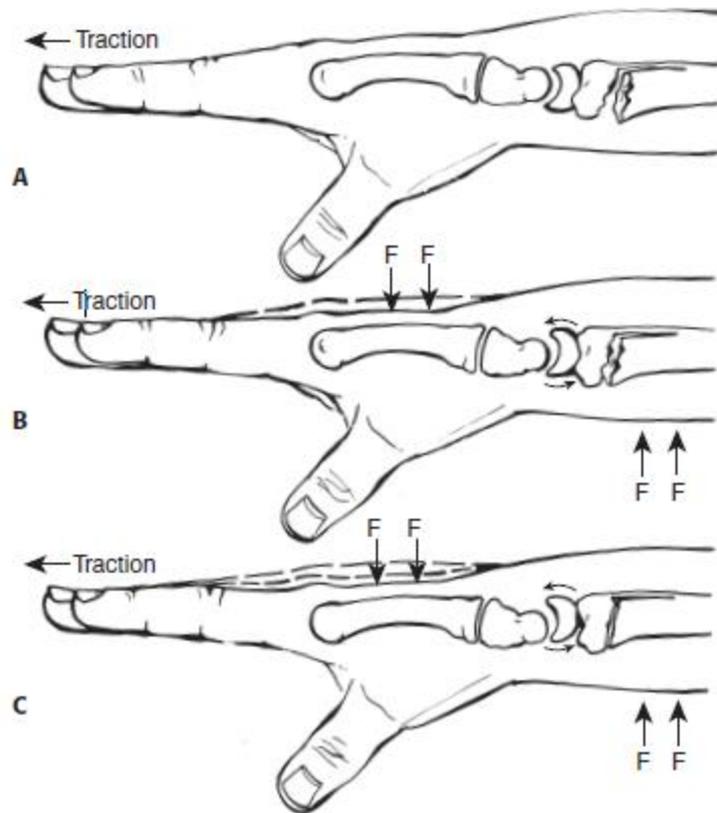


Fig.3 Agee method of reduction

RESULTS

Wrist fractures were considered as commonly arm fractures in old people. Where Incidence varies ranged 2.4 : 10 / 1000 / year (1, 2). Many wrist fractures risks had observed as low bone mineral densities, no previous oestrogen used, history of 2 or more falls yearly, and previous fracture post 50 years. Poor cognitive status increased wrist fracture risks for women above 75 years. (17)

- A) Average age: All patients were above 60 years with mean age 62.5
- B) Sex: 38 of the patients were females.
- C) QuickDASH score

The mean of the whole group is 15 (95% confidence interval 12.96-16.5). Mean and standard deviation is shown in table 1.

Table (1): Mean and standard deviation

	Range	Mean	Standard deviation
Conservative	6.6- 20.7	15	5.9

D) Incidence of Complications:

1) Major complications

No major complications that required reoperation were reported in the study. No tendon rupture/adhesion, nerve lesion.

2) Minor complications

All minor complications encountered in the study were treated medically and resolved.

Chronic regional pain complex occurred in 10 patients and was treated by physiotherapy (galvanic stimulation), vitamin C and D administration in addition to advising patient to use their hands in daily activities.

Carpal tunnel syndrome manifestations (numbness and parasethia) were mild and were treated by neurotonics (vitamin B complex).

CONCLUSION

We recommend conservative management for all those low demand patients with extra articular wrist fractures as we obtained good functional results for those low demand patients with conservative management. There is no need to expose them for all the known risks of surgical management

REFERENCES

- [1] Melton III LJ, Chrischilles EA, Cooper C, Lane AW, Riggs BL. Perspective. How many women have osteoporosis? *J Bone Miner Res.* 1992;7:1005–10.
- [2] Thompson PW, Taylor J, Dawson A. The annual incidence and seasonal variation of fractures of the distal radius in men and women over 25 years in Dorset, UK. *Injury.* 2004;35:462–6.
- [3] Edwards BJ, Song J, Dunlop DD, Fink HA, Cauley JA. Functional decline after incident wrist fractures—Study of Osteoporotic Fractures: prospective cohort study. *BMJ.* 2010;341:c3324.
- [4] Chung KC, Kotsis SV, Kim HM. Predictors of functional outcomes after surgical treatment of distal radius fractures. *J Hand Surg [Am].* 2007;32:76–83.
- [5] Soteriades ES, Evans JC, Larson MG, Chen MH, Chen L, Benjamin EJ, et al. Incidence and prognosis of syncope. *N Engl J Med.* 2002;347:878–85.
- [6] Vergara I, Vrotsou K, Orive M, Gonzalez N, Garcia S, Quintana JM. Factors related to functional prognosis in elderly patients after accidental hip fractures: a prospective cohort study. *BMC Geriatr.* 2014;14:124.
- [7] Van der Putten JJ, Hobart JC, Freeman JA, Thompson AJ. Measuring change in disability after inpatient rehabilitation: comparison of the responsiveness of the Barthel index and the Functional Independence Measure. *J Neurosurg Psychiatry.* 1999;66:480–4.
- [8] Baztan JJ, Hornillos M, Gonzalez-Montalvo JI. [Geriatric day hospital. Characteristics, performance, and effectiveness]. *Med Clin (Barc).* 1993;101:699–704.
- [9] Cooper C, Atkinson EJ, O’Fallon WM, Melton LJ 3rd. Incidence of clinically diagnosed vertebral fractures: a population-based study in Rochester, Minnesota, 1985–1989. *J Bone Miner Res.* 1992; 7:221–7. [PubMed: 1570766]
- [10] Greenspan SL, Perera S, Nace D, Zukowski KS, Ferchak MA, Lee CJ, et al. FRAX or fiction: determining optimal screening strategies for treatment of osteoporosis in residents in long-term care facilities. *J Am Geriatr Soc.* 2012; 60:684–90. [PubMed: 22316237]
- [11] Smith MG, Dunkow P, Lang DM. Treatment of osteoporosis: missed opportunities in the hospital fracture clinic. *Ann R Coll Surg of Engl.* 2004; 86:344–6. [PubMed: 15333170]
- [12] Kleerekoper M, Nelson DA. Which bone density measurement? *J Bone Miner Res.* 1997; 12:712–4. [PubMed: 9144336]
- [13] Ammann P, Rizzoli R. Bone strength and its determinants. *Osteoporos Int.* 2003; 14(Suppl 3):S13–8. [PubMed: 12730800]

- [14] Nordin, M.; Frankel, VH. Biomechanics of bone. In: Nordin, M.; Frankel, VH., editors. Basic Biomechanics of the musculoskeletal system. 4. North American: LWW; 2012. p. 472
- [15] Cummings SR, Black DM, Rubin SM. Lifetime risk of hip, Colles', or vertebral fracture and coronary heart disease among white postmenopausal women. Arch Intern Med 1989;145:2445-8.
- [16] Melton LJ 3rd, Therneau TM, Larson DR. Long term trends in hip fracture prevalence: the influence of hip fracture incidence and survival. OsteoporosInt 1998;8:68-74.
- [17] Kelsey JL, Browner WS, Seeley DG, Nevitt MC, Cummings SR. Risk factors for fractures of the distal forearm and proximal humerus. Am J Epidemiol 1992;135:477-89.
- [18] Brown CM, Heckman JD, McQueen MM. Rockwood and Green's fractures in adults .Eighth edition 2015. Osteoporosis.Ch19 p609-621.Fractures of the Distal Radius and Ulna.Ch32 p1057-1115.
- [19] Fernandez DL, Jupiter JB. Epidemiology, Mechanism, Classification.Fractures of the distal radius. 1st ed. New York, NY: Springer-Verlag; 1996:23–52.
- [20] Lafontaine M, Hardy D, Delince PH: Stability assessment of distal radius fractures.Injury 20(4):208–210, 1989.
- [21] Flinkkila T, Ristiniemi J, Hyvonen P, et al. Nonbridging external fixation in the treatment of unstable fractures of the distal forearm. Arch Orthop Trauma Surg. 2003;123:349–352.