

## **Review of Distal Radius Fracture in The Emergency Department of Baghdad Technical Hospital**

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### **Abstract:**

#### **Background**

Wrist injuries are common, accounting for 2.5% of emergency department visits annually; distal radius fractures (DRFs) are among the most common types of fracture, have a bimodal distribution, with a peak in younger (aged 18-25 y) and older (>65 y) persons.

#### **Aim of study:**

To study the distal radius fracture characteristics and classification among a sample of Iraqi patients visited the emergency department in Baghdad Teaching Hospital.

#### **Patients and methods:**

A cross-sectional study was conducted at the surgical emergency department of Baghdad Teaching Hospital during the period from January 1st, 2013, to the 1st of 2013 to November 1, 2013. Forty patients (18 males and 22 females), their ages ranged between 8 -70 years, all with distal radius fracture, were selected regardless of their age or gender. Patients who had other types of fractures other than distal radius fractures, complicated traumatic injury, and were unconscious or refused to participate were excluded. Data were collected through full history and clinical examination of the patients by using a pre-constructed data collection sheet. Plane X-rays in all patients and laboratory investigations were performed accordingly. Management was performed under the supervision of the orthopedic residents,

The mean age of patients was 46.5 18.8 years, and the peak incidence (35%) was among patients aged 60. Right hand was the dominant injury side (92.5%), a housewife was 52.5% of the total patients, Diabetic was 57.5%,

FOSH, RTA, and sports injuries were the mechanisms of injuries in (72.5%,15%, and 12.5%), respectively. Regarding the AO classification, 23 A2 in 30%, 23A3 in 17.5%, 23 B1 class in 15%, and the least frequent was 23C3 in only one patient (2.5%). Females were significantly more likely to have class 23 A2 rather than males, 50 % vs. 5.6% respectively; in the contrary, males were more likely to have 23 A3 and 23 C2 class rather than females, P-0.009.

No statistically significant correlation had been found between the AO classification and age, history of chronic diseases, or mechanism of injury in all Comparisons P>0.05.

#### Conclusions:

Distal radius fracture incidence increased with the advancing age and the peak in elderly > 60 years. More common in females than males. Right-sided fractures are more frequent. According to the AO classification, males had more sever fractures than females.

**Keywords:** Distal, Radius, Fractures, AO, Mechanism, Emergency.

## Introduction

The wrist is the area from the distal radius and ulna to the carpometacarpal joints. It is a complex unit with articulations among the eight carpal bones and the distal radius and ulna. Wrist injuries are common, accounting for 2.5% of ED visits annually. Clinical diagnosis is often difficult, and even subtle injuries may lead to significant impairment if not properly diagnosed and treated. Management options vary from conservative to surgical. [1]

The distal radius is the only forearm bone that articulates directly with the carpal bones (scaphoid and lunate). The distal radius has three articular surfaces: radiocarpal distal radioulnar. And the triangular fibrocartilage complex. The radiocarpal surface is concave and tilted in two planes. It has an ulnar inclination, or tilt, of 15 to 25 degrees in the frontal plane and a volar tilt of 10 to 15 degrees in the sagittal plane. [2]

The ulna is separated from the carpal bones by a triangular fibrocartilage complex, the main stabilizer of the distal radioulnar joint at its distal end. The triangular fibrocartilage complex forms a smooth, continuous, directed extension of the distal radial surface, supporting the lunate and tricuspid or distal ulna [3]. The distal radius has a concave sigmoid notch in its ulnar aspect that articulates with the flexion of the ulnar head, allowing rotation of the wrist during pronation/supination of the forearm. The distal radioulnar joint is also supported by the dorsal and palmar radioulnar ligaments that fuse with the triangular fibrocartilage complex. [4]

Distal radius fractures often redisplayed after closed reduction, with 87% of reduced fractures resembling the original length. Risk factors include dorsal comminution, intraarticular extension, volar displacement, age, activity level, lifestyle, co-morbidities, and osteoporosis. This study aims to analyze these factors. [5]

Younger patients have stronger bones and require more energy to create a fracture. Motorcycle accidents, falls from a height, and similar situations are common causes for distal radius fracture (DRF). Trauma is the leading cause of death in the 15- to 24-year-old age group, and this is also reflected in the incidence of lesser traumas. [6]

Older patients have much weaker bones and can sustain a DRF from simply falling on an outstretched hand in a ground-level fall. An increasing awareness of osteoporosis has led to these injuries being termed fragility fractures, with the implication that a workup for osteoporosis should be a standard

part of treatment. As the population lives longer, the frequency of this type of fracture will increase [7,8,9,10]

### **Patient and method**

**Study design, setting, and time:** This was a prospective study conducted at the surgical emergency department at Baghdad Teaching Hospital during the period from January 1, 2013, to November 1, 2013 where. A total of 40 patients were enrolled in this study, all with distal radius fractures, who visited the surgical emergency unit at Baghdad Teaching Hospital during the study period seeking medical care. They were 18 males and 22 females; their ages ranged between 8-70 years. Inclusion criteria:

All patients with distal radius fractures, regardless of their age, gender, and surgical history, were considered eligible in this study.

### **Exclusion criteria:**

Patients with one or more of the following criteria were excluded from the study

- Patients who had other types of fractures other than distal radius fractures were excluded.
- Patients with complicated traumatic injuries who needed emergency surgical intervention.
- Unconscious patients
- Patients who refused to participate in the study

### **Data collection:**

Data were collected through full history and clinical examination of the patients by using a pre-constructed data collection form consisted of the

### **Following items:**

1. Patient name
2. Date of visit
3. Age and gender of the patient.
4. Occupation
5. Dominant hand.
6. General medical condition and history of chronic diseases.
7. Mechanism of injury and the side of fracture
8. AO classification of the distal radius fracture.

### **Investigations:**

### **Radiography:**

Plane X-ray to the affected side was performed to all patients

### **Laboratory investigations:**

A venous blood sample was drawn from the patient and sent for laboratory investigations accordingly.

### **Management:**

Was performed by the supervision of the orthopedic residents, and all the patients were managed with the back slab of the affected limb. Analgesic medication had been given, and the patient was discharged from the ED and informed to re-visit the orthopedic consultation department as soon as possible.

### **Ethical considerations:**

1. The study protocol was proved by the Scientific Council of the Arab Board of Emergency Medicine.
2. Verbal consents of patients were obtained.

### **Statistical analysis:**

Patients' data were entered and analyzed by using the Statistical Package for social sciences (SPSS) version 20, IBM, US, 2011. Descriptive statistics of the patients were presented as mean and standard for age and as frequencies and proportions (%) for other variables (age group, gender, medical condition, mechanism of injury, side of injury, .... etc.)

Statistical tests were performed accordingly, Chi square test was used to compare frequencies and to assess the significance of the correlation between the Ao Classification and other variables.

Analysis of variances (ANOVA) test was used to compare the age of patients according to the AO classification and to assess the significance difference in the age of patients in each class with the other groups to find the significance of the correlation between AO classification and the age.

A level of significance (P-value) of  $\leq 0.05$  is considered a significant difference or correlation.

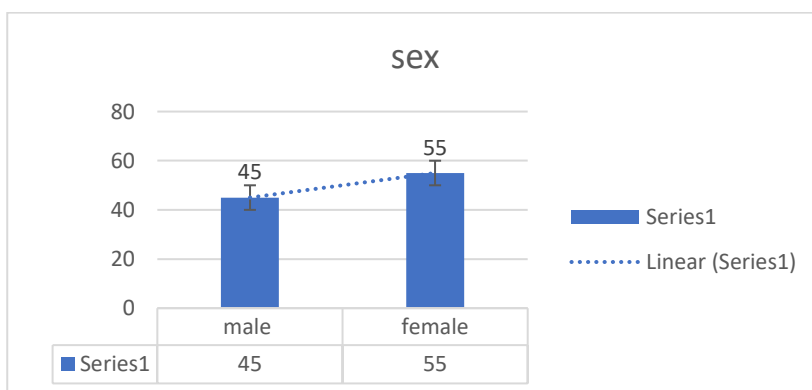
Finally, results were presented in tables with an explanatory paragraph for each table and figure.

## Results

**Table 1- Distribution of patients according to age**

Age	No	%
<20	4	10
20-29	3	7.5
30-39	3	7.5
40-49	7	17.5
50-59	9	22.5
>60	14	35

**Fig 1- Distribution of patients according to sex**



**Table 2- Demographic outcomes of study group**

Characteristics		No	%
Gender	Male	18	45
	Female	22	55
Dominant hand	Right	37	92.5
	Left	3	7.5
Occupation	Housewife	21	52.5
	Student	3	7.5
	Teacher	3	7.5
	Worker	2	5
	employee	2	5
	Driver	2	5
	Other	7	17.5

**Table 3- Distribution of chronic disease among patients**

chronic disease	No	%
Diabetes	23	57.5
Hypertension	13	32.5
Osteoporosis	6	15
Other	3	7.5

**Table 4- Mechanism of fracture**

v	n	%
FOSH	29	72.5
RTA	6	15
Sport injury	5	12.5

**Table 5- Distribution of side fracture**

	no	%
Right	23	57.5
Left	17	42.5

**Table 6- Distribution of AO classification**

AO classification	No	%
23 A2	12	30
23 A3	7	17.5
23 B1	5	12.5
23 B2	4	10
23 C1	2	5
23 C2	9	22.5
23 C3	1	2.5

**Table 7- Correlation between AO and Age**

AO class	N	Mean age
23 A2	12	53.6
23 A3	7	34.3
23 B1	5	49
23 B2	4	42.2
23 C1	2	46.50
23 C2	9	45.8
23 C3	1	57

### Discussion

Distal radial fractures are among the most common injuries reported in emergency departments. Moreover, these are among the most common fractures in the elderly, although they are not uncommon in the young adult population or children and adolescents, where they occur as a result of high- injuries. [11,12,13]

AO classification of the fracture is the most commonly found in literature due to its simplicity on one hand and precise division of fractures into types and subtypes on the other. The AO classification divides fractures into three main categories: extra-articular fractures, partly intra-articular fractures, and fully intra-articular fractures. Severity of injury. This classification is of practical benefit, considering that assigning a given Fracture to the right type has a bearing on the selection of treatment approach [14].

The current study, which was conducted in the surgical emergency unit in Baghdad Teaching Hospital Baghdad-Iraq, included 40 patients with distal radius fractures.

The mean age of the patients was 46.5 18.8 years with a wide range of ages: 8 70 years; moreover, the age group distribution revealed that the incidence of this type of fracture increased dramatically with advancing age, particularly after the age of 40 years where 17.5% at the age of 40-49 years, 22.5% at the age of 50-59 years and reached its peak incidence (35%) at the age of 60 years, this indicating a higher incidence of this type of fractures in the elderly, although it affected the younger age groups.

These findings agreed that reported in the literature concerned with the distal fractures of the radius where it had been reported among the most common fractures in the elderly, although they are not uncommon in the young adult population or children. [15,16]

In younger people, these fractures result from high-energy injuries, such as sports injuries, falls from a height, and direct mechanism injuries, such as a blow with a hard object. In the older population, over 60 years of age, the main cause is a low-energy injury, such as a fall from the standing height [17]. In a Chinese study in 2009 conducted on 431 patients with distal radius fractures, Koo K et al. reported these fractures occur at all ages, peaking at the 50 to 60 years age group.

A Swedish study in 2007, in which study Brogren E et al. found a direct association between the incidence of these fractures and the elderly age, particularly among women. In our study, more than half of the patients (55%) were females vs 45%

Males, this is consistent with the epidemiological characteristics of distal radius fracture reported in other studies and literature. Fractures of the distal radius occur more frequently in women than men. This relationship is most pronounced in the older population, where these fractures are more common than in younger people and. The findings of the present study were close to that reported in Brazil (2011); Guaraldo V. et al. studied a group of 14 patients with a mean age of 4114 years, and the females represented 57% of the studied group. The predominance of females and the higher incidence among females

Might be attributed to osteoporosis and increased risk of falling as the main predictors of fracture in the older female population. According to our findings about the mechanism of injury, FOSH represented the common fracture mechanism among the studied group.

Followed by RTA and sport injuries (72.5%, 15% and 12.5%), respectively. Regarding the side of fractures, the right limb fractures were more frequent fractures, represented 57.5% of the patients; other studies found left Limb fractures dominant; this might attributed to the demographic variations of our population and these countries. This disagreed with that reported in a randomized clinical trial by Maciel JS et al. that reported the left limb was fractured in 58% of patients from the evaluation group and in 69% of controls (overall, in 64% of all study participants). These findings also disagreed with that reported in the Swedish study, and this discrepancy might attributed to the environmental and demographic differences with these regions.

More According to the AO classification, the 23A2 class was the most frequent among the cases. Our finding was consistent with that of the Swedish study and another study from Korea in which Heo YM e (2013) reported similar results.

## Conclusion

1. Distal radius fractures are occurred at any age and more frequent in the elderly; the Incidence increased with the advancing age.
2. Females were more likely to have a higher incidence of this type of fracture.
3. Right-sided fractures are more frequent than the left side.
4. No significant association between the AO classification and age.
5. According to AO classification, males were more likely to have more sever fractures than females.

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