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Clinical profile of patients with unstable distal radius fracture

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Abstract
There are increasing reports of distal radius fractures suggesting that they are frequently articular injuries resulting in disruption of both radio carpal and radio ulnar joints and profoundly affecting the wrist of greater population. Preliminary information about age, sex, dominant hand, mechanism of injury, date of reporting to hospital, cause of delay and treatment received so far was noted and screening for associated injury after receiving of patient in emergency and vital parameters were checked. Out of 32 patients of Conservative group, 17(53.00%) were males and 15(47.000%) were females, while a total of 18 patients of operative (VLCP) group, 13 (72.00%) were males and 5(28.00%) were females. In Conservative group, majority was observed that in Operative group of patient i.e.16 (89.00%) and 22(68.76%) were lying in the age group < 50 years respectively.

Keywords: Distal radius fractures, RTA, VLCP

Introduction
Fracture of the distal radius continues to be one of the most common skeletal injuries treated by Orthopedic or trauma surgeons. For many patients such as labourers, musicians, carpenters, surgeons and a dentist, loss of hand function means loss of a career. In fact these injuries account for approximately 1/6 of all fractures seen and treated in emergency rooms, (Hollingsworth 1976, Jupiter and Lipton 1993. Wakefield 2000).
There appears to be a bimodal distribution of distal radial fractures consisting of a younger group who sustains relatively high-energy trauma to the upper extremity and an elderly group who sustains both high-energy injuries and insufficiency fractures. As life expectancy increases, the incidence of distal radial fractures can be expected to increase as well. Distal radial fracture is also frequently associated with low bone mineral density [1, 2].
There are common misconceptions regarding these fractures like.

- Despite deformity, all do well.
- Darrach Procedure can always be done.
- The advantages of open reduction and internal fixation include direct visualization and manipulation of the fracture fragments.
- Arthritis is not a problem since it is not a weight bearing joint.
- There is no place or surgical interventions as the fragment are too

There are increasing reports of distal radius fractures suggesting that they are frequently articular injuries resulting in disruption of both radio carpal and radio ulnar joints and profoundly affecting the wrist of greater population (Melone 1984).
Colle's initially stated that the wrist would eventually gain perfect freedom in all of its motions and be completely exempt from pain after this fracture. It is now being appreciated that all over half of these fractures may involve either the distal radioulnar or the radio carpal joints and the conventional reduction by traction or manipulation may not restore distal articular anatomy. Furthermore, many of these fractures, although initially reducible by manipulation, may be inherently unstable and may collapse with simple cast immobilization [3]. Distal radius fractures are caused by severe high-energy trauma, resulting in intra-articular involvement and comminution.

These fractures often are unstable, are difficult to reduce anatomically, and are associated with a high prevalence of complications. Restoration of normal alignment and articular congruity after a displaced fracture can be difficult but it is essential f6r a good functional result [4].

Unstable fractures of the distal radius remain challenging problems for orthopedic surgeons. Increasing evidence of unsatisfactory results with significant malunion has lead to a proliferation of methods to maintain radial length and inclination following reduction.

Methodology

Preliminary information about age, sex, dominant hand, mechanism of injury, date of reporting to hospital, cause of delay and treatment received so far was noted and screening for associated injury afterreceiving of patient in emergency and vital parameters were checked. Thorough examination of patient was done to rule out any associated chest, abdomen, head injury and assessment of neurovascular function. Good qualities of X-ray both AP and LAT view were taken&important points to consider are: 1. Fracture displacement, 2.1ntra articular or partial articular involvement, 3. Associated ulna fracture or
disruption of the distal radioulnar joint, 4. An overall assessment of bone quality and comminution.

And radiographs are evaluated for 1. Radial length, 2. Radial inclination, 3. Volar tilt & 4. Intra-articular step or gap.

After establishment of an intravenous line, fluid replacement was done according to patient's vital parameters and below elbow slab was applied. A tetanus prophylaxis (in case of open injury) and intravenous antibiotic and analgesic were given. Once patient was settled from acute injury then we decide to go for definitive fracture management.

This study involved total 50 patients, 18 cases were operated 32 were managed conservatively. Treatment to be received was decided by the patients themselves after thorough counseling about pros & cons of each modality, according to their financial status, activity level and associated comorbidities.

Inclusion criteria

- Skeletal maturity
- Unstable # lower end radius

Exclusion criteria

- Pre- existing wrist arthosis or disability
- Active infection
- Mental incompetence and unfitness for surgery

Results

Out of 32 patients of Conservative group, 17(53.00%) were males and 15(47.000%) were females, while a total of 18 patients of operative (VLCP) group, 13 (72.00%) were males and 5(28.00%) were females. It

& in Conservative group, majority was observed that in Operative group of patient i.e.16 (89.00%) and 22(68.76%) were lying in the age group < 50 years respectively. The mean age of Operative group & Conservative group was 36.27 + 13.13 years and 44.81 + 15.93 years respectively.

The road traffic accident was the leading cause of mode of injury in 16 (89.89%) patients of Operative group & 17 (53.12%) patients of Conservative group. This indicates the increase incidence of unstable Distal Radius fracture due to increase high velocity trauma. It was also observed that the slip was the second major cause of injury in 12 (37.50%) patients of Conservative group. Other causative factors were fall from height, assault etc.

In operative group 72% cases were right sided while conservative group 62.5% cases were left sided.

The above table shows that in the operative and conservative group, majority of patients, i.e. 38 (76%) got injury on their dominant side. This indicates that dominant hand was used first to touch the ground during motorcycle slip or fall on ground.

Table 1: Distribution of Case According To Age and Sex

Age Group (in yrs)	OP Group			CRS group		
	Male	Female	Total	Male	Female	Total
≤	7 (38.89)	2 (11.11)	9 (50.00)	6 (18.75)	1 (3.12)	7 (21.88)
31-50	6 (33.33)	1 (5.56)	7 (38.89)	8 (25.00)	7 (21.88)	15 (46.88)
51+	0 (0.00)	2 (11.11)	2 (11.11)	3 (9.37)	7 (21.88)	10 (46.88)
Total	13 (72.22)	5 (27.78)	18 (100.0)	17 (53.12)	15 (46.88)	32 (100.0)

Table 2: Distribution of Case According To Mode of Injury

MOI	OP Group		CRS Group	
	No.	%	No.	%
RTA	16	88.89	17	53.12
Slip	0	0.00	12	37.50
Others	2	11.11	3	9.38
Total	18	100.0	32	100.0

Table 3: Distribution of Case According To Side and To Dominancy

Particulars	SIDE			DOMINANCY		
	Right	Left	Total	N	ND	Total
OP	13 (72.22)	5 (27.78)	18 (100.0)	11 (61.11)	7 (38.89)	18 (100.0)
CRS	12 (37.50)	20 (62.50)	32 (100.00)	27 (84.37)	5 (15.63)	32 (100.0)
Total	25 (50.00)	25 (50.00)	50 (100.0)	38 (76.00)	12 (24.00)	50 (100.0)

Table 4: Distribution of Case According To Fernandez Classification

Fernandez Type	OP Group		CRS Group	
	No.	%	No.	%
1st	0	0.00	18	5.25
2nd	4	22.22	9	28.12
3rd	10	55.56	4	12.50
4th	3	16.67	1	3.12
5th	1	5356	0	0.00
Total	18	100.0	32	100.0

Discussion

In the past 100 years, most distal radius fractures have been treated conservatively. However, results of several studies have demonstrated that satisfactory outcome of such conservative treatment is not consistent and a lot of controversies whether anatomical reduction of distal radial fractures is essential but there is no controversy that maintaining satisfactory reduction is often difficult by simple plaster cast.

Fracture Beacom and Kurtzke (1953) analyzed the results of 2000 Colic's - and they observed that the poor functional results were directly related to the degree of radiological deformity secondary to loss of position at the fracture site in the plaster cast. Frykman (1967) also observed the same in his study. There is no controversy that maintaining satisfactory reduction in Colle's fracture treated by simple method is often difficult. Bacom and Kurtzke (1953) and Frykman (1967) both reported that lasting disability is greater in patients with severe residual deformity.

Today, a number of different surgical strategies such as external fixations, percutaneous pinning or open reduction and internal fixation are available. Fixed angle blades as well as locking screws and pegs enhance overall plate stability and support the articular surface of the distal radius [5].

Although some studies have shown good results for various methods, the choice of the best option still remains controversial as prospective randomised studies have not shown results which are convincingly better for any one of the procedures

In our present series, an attempt has been made to treat both extraarticular as well as intraarticular type unstable fracture of distal end radius by conservative (32 cases) and operative (vps, 18 cases) modalities. The results have been evaluated 32 cases & 18 cases at 3 month and 27 cases & 11 cases at 6 month in conservative and operative respectively because 5 cases in conservative group and 7 cases in volar plate group duration completed follow up of only 3 month [6].

Out of 32patients of Conservative group, 17(53.00%) were males and 15 (47.00%) were females, while a total of 18 patients of operative (VCP) group, 13 (72.00%) were males and 5(28.00%) were females. We observed these injuries to be occurring more commonly in males in their early middle age of 40s. The mean age of Operative group & Conservative group was 36.27± 13.13 years and 44.81 ± 15.93 years respectively. Melone observed the same thing in 1984.

The road traffic accident was the leading cause of mode of injury in 16 (89.89%) patients of Operative group & 17 (53.12%) patients of Conservative group. Road traffic accidents are high velocity injury. Such injuries accounted for 60% of the cases. This is similar to one reported by Knirk and Jupiter (1986) and Harish Kapoor (2000), Schuind (1989).

Fernandez type I (Cones) fracture displacements were the most coon type as also Reported by Vaughan (1985), Hutchinson (1995). Comminution was found more commonly in the volar cortex, followed by dorsal cortex. It was usually severe with multiple fragments (DePalma AF 1952, Cooney 1979) [7, 8]

In our study operative group 11 (61%) out of 18 cases had fracture styloid process of ulna, 2 male cases had fracture tibial plateu, 2 male & 2 female cases had fracture shaft of humerus, 2 male cases had fracture leg bone & 2 cases (one male & one female) fracture shaft of femur. Most of the cases were of ipsilateral side. One male case had radial nerve palsy associated with fracture shaft of humerus & one male case median nerve palsy due to tight cast. In conservative group there was no other bone injury except fracture styloid ulna. Several associated or secondary injuries may indicate operative intervention for distal radius fractures.

In our study we used Fernandez classification (1993) which developed a more simplified approach for classification that moved away from focusing on the fracture fragments and instead recognized that fracture patterns reflect specific mechanisms of injury. This system is designed to be practical, determine stability, include associated injuries, and provide general treatment recommendation. In Operative group patients, maximum i.e. 17 (95.56%) had Fernandez type-11, III & IV which indicate more comminution & intra-articular extension & fracture had avulsion, compression & shearing type mechanism while 27 (86%) patients of Conservative group had Fernandez oftype I & 11. which are bending & avulsion mechanism & indicate low energy trauma.

Colles Fractures (Fernandez type I) is reduced by one of three methods described by Robert Jones (1915), Bohlers (1923), Chamley (1972). The plaster should never extend beyond the metacarpophalangeal joint dorsally or the distal palmer crease. Most frequently a below elbow plaster cast or splint is used (Bohler 1923, Frykman 1967, Charnley 1972).

Smith Fractures (Fernandez typel): In all type of Smith fracture reduction can be usually effected by a manipulation like that used for Colles fractures, but all movements reversed. Pressure is applied volarly and the reduction is completed by twisting the hand into supination to lock the fragments (Mills 1957, Thomas 1957).

Bartons fracture dislocation (Fernandez typell): Fracture is reduced by one of the three methods described by Bohler (1935), Molls (1957), or King (1975). Anterior marginal fractures are immobilized in long arm cast with the forearm in

full supination and wrists in slight volar flexion. In posterior marginal fractures the reverse is true; a long arm cast is applied with the forearm in neutral or slight pronation with wrists in full dorsiflexion. Guide lines for acceptable close reduction have been formulated (Graham, Nana AD *et al*.) [9]

The ideal position of immobilization has been debated. Some form of three-point fixation is needed, with a dorsal splint holding the wrist in slight flexion (10 to 20 degrees) and u 1 nar deviation (15 degrees).

However, neither the position of immobilization extension above the elbow appear to influence the anatomic outcome. Maintenance of fracture alignment depends mostly on the inherent characteristics of a given fracture (e.g. initial displacement, comminution, bone quality). The piaster should never extend beyond the Metacarpo phalangeal joint dorsally or the distal crease in palm volarly. Most frequently a below elbow plaster cast or splint is used (Bohler 1923, Frykman 1967, Charnley 1972). Traditional Cotton - Loder position of extreme palmar flexion and ulnar deviation is abandoned now days because of increased incidence of increased carpal tunnel pressure.

Neutral with moderate ulnar deviation according to Bohler is often used. Sarmiento (1965) advocated supination of forearm with the help of above elbow plaster cast, as the deforming forces of brachia radialis is reduced in this position. Wahlstorm (1982) in a study concluded that pronator quadratus is the deforming force that causes loss of reduction. So immobilization in pronation was advised. But there is no difference in outcome in either of the position (Stewart *et al*.)

Conclusion

The road traffic accident was the leading cause of mode of injury in patients of both Operative group & patients of Conservative group. This indicates the increase incidence of unstable Distal Radius fracture due to increase high velocity trauma. It was also observed that the slip was the second major cause of injury in patients of Conservative group

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