

Reflex Sympathetic Osteodystrophy / Complex Regional Pain Syndrome: A Neglected Complication of Distal Radius Fracture

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ABSTRACT

Objective To assess the occurrence of reflex sympathetic osteodystrophy following different treatment modalities for distal radius fracture.

Study design Cross sectional study.

Place & Duration of study Department of Orthopaedic Surgery, Dow University of Health Sciences / Civil Hospital Karachi, from April 2013 to August 2017.

Methodology Patients treated for distal radius fractures were enrolled from outpatient department. They were assessed for reflex sympathetic osteodystrophy on the basis of history, clinical examination and radiograph at 4 weeks, 6 weeks and 10 weeks after treatment. Only those patients who had acute complex regional pain syndrome (CRPS), were included.

Results Eighty-four patients with distal radius fractures were treated either conservatively or with orthofix and plating. Twenty patients treated conservatively, four with orthofix and K-wire and two with plating, developed reflex sympathetic osteodystrophy (RSO), however frequency of reflex sympathetic osteodystrophy with respect to treatment method used was statistically insignificant ($p>0.05$).

Conclusions Reflex sympathetic osteodystrophy was one of the common complications of distal radius fracture found in this study. Different treatment modalities used for this condition did not affect the outcome.

Key words Distal radius, Reflex sympathetic, Osteodystrophy, Complications-fracture.

INTRODUCTION:

“Reflex sympathetic osteodystrophy” is an unclear condition also called as major algodystrophy, casualgia, or Leriche or post traumatic syndrome.¹³ “International association for the study of pain” with agreement in 1994 labelled it as complex regional pain syndrome. RSO usually presents as tenderness and pain in the extremity. However, the severity of

injury is not proportionate to the pain.^{4,5} Patient might develop swelling and stiffness due to sympathetic stimulation.⁶ The actual cause of RSO is unknown but usually occurs after minor injury to soft tissue, nerve or bone.⁷ The occurrence of RSO is reported as 10.5%-37%.⁸

RSO is difficult to diagnose, resolve and treat.⁹ The detection of RSO is clinical. Radiograph may demonstrate inconsistent osteoporosis.¹⁰ Bone scan can diagnose this condition. Findings are made by diffuse expanded take up in the delayed images which has a specificity as 98% and sensitivity as 96%, thus a wide variation in values of sensitivity and specificity has been observed.¹¹ MRI in initial complex regional pain syndrome (CRPS) stages may show interstitial edema, muscle edema and hyper permeability, yet again it is not viewed as a

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A comprehensive multidisciplinary technique is required for the management of this condition including physical, neurology or occupational therapy, pain management, physical medicine and psychological support. Conservatively RSO can be dealt with warmth, pain relieving analgesia, antidepressant, anti-inflammatory, and anticonvulsant drugs.¹² Interventional choices involve specific peripheral sympathetic blocks, neural blocks, dorsal column stimulators, electro acupuncture injection, and sympathectomies (surgical or chemical).¹³ This examination was conducted to record our experience of management of this condition.

METHODOLOGY:

This was a cross sectional study conducted in the Department of Orthopaedic Surgery, Dow University of Health Sciences / Civil Hospital Karachi, from April 2013 to August 2017, to assess the occurrence of reflex sympathetic osteodystrophy after the distal radius fracture. Patients treated for distal radius fractures were included in the study. Treatment methods used were either conservative or surgical.

Patients were assessed for reflex sympathetic osteodystrophy on the basis of history, clinical examination and radiographs. Patients were followed in outpatient department at 4 weeks, 6 weeks and 10 weeks. All the patients were treated with desensitization by keeping hand first in tolerable hot water and then cold water, analgesics and physiotherapy.

SPSS version 23 was used to analyze the data. Frequency and percentage were calculated for qualitative variables and mean and standard deviation for quantitative variables. Chi-square test was used to find out the statistical significance. P-value =0.05 was taken as statistically significant.

RESULTS:

Total of 84 patients were included in the study. Mean age of patients was 52.89±7.53 year. Of the total, 57 (68%) patients were females and 27 (32%) males.

Two (2.3%) patients had severe depression and 5 (5.9%) were diabetic. Fifty-five (65.4%) patients had distal radius fractures and were treated conservatively, 16 (19.1%) patients were treated with orthofix and K-wire and 13 (15.5%) patients with plates (table I).

Of the total twenty patients treated conservatively, four treated with orthofix and K-wire and two patients treated with plate developed reflex sympathetic osteodystrophy, however frequency of reflex sympathetic osteodystrophy with respect to treatment method used were statistically insignificant. (p>0.05). This is given in table II.

Variable	n (%)
Age in Years (Mean±SD)	52.89±7.53
Gender	
Male	27 (32.1%)
Female	57 (67.9%)
Severe Depression	
Yes	2 (2.3%)
No	82 (97.6%)
Diabetic	
Yes	5 (5.9%)
No	79 (94%)

DISCUSSION:

The reflex sympathetic osteodystrophy is a challenging problem. It needs to be diagnosed earlier so as to achieve the best functional results. Many treatment methods are described in literature. Treatment may be on conservative lines initially. Many interventions are also reported. Watson treated reflex sympathetic osteodystrophy with active stress loading, which consists of active traction and compression exercises that provide stressful stimuli to the extremity without joint motion. The advantages of this approach are its effectiveness, simplicity,

Treatment Method	Reflex Sympathetic Osteodystrophy		P-value
	Yes (n=26)	No (n=58)	
Plaster (n=55)	20 (76.9%)	35 (60.3%)	0.288
Orthofix & K-wire (n=16)	4 (15.4%)	12 (20.7%)	
Plate (n=13)	2 (7.7%)	11 (19%)	

safety, and non invasiveness.¹⁴

In a study by Zollinger PE et al, total of 427 patients were enrolled, among them 60% of the patients were treated with external fixation, 29% with K-wire and 10% with internal plate fixation and 379 patients were treated with a plaster. They concluded in their study that occurrence of RSO was low in patients treated with external fixation.¹⁵

In another prospective study, 62 patients were operated for displaced distal radius fractures by closed reduction and percutaneous fixation with K-wires. All these patients were examined psychologically on the day after the operation. Nine patients (18%) were diagnosed as having CRPS Type1.¹⁶ Study conducted by Dijkstra included 88 patients who developed CRPS Type I after fracture of distal radius.¹⁷

Another retrospective study was conducted at Netherland. Electronic patient record data from 600,000 patients were evaluated. The overall estimated incidence rate of CRPS was noted as 26.2 per 100,000 person per year (95% CI: 23.0–29.7). They observed that females were affected three times as more as compared to males (ratio: 3.4), upper extremity was also affected more than lower extremity and 44% of them had fracture.¹⁸

Arora R included 114 patients and followed them for a minimum of 12 months who were treated with 2.4 mm locking compression plate for distal radius fracture and found complex regional pain syndrome in 5 patients.¹⁹

In our study 84 patients were enrolled out of which 54 patients had distal fractures and were treated conservatively, 16 patients with orthofix and K-wire and 13 patients with plates. The incidence of RSO was observed higher in patients who were treated with plaster, followed by orthofix and k-wire fixation and plate fixation.

Masden in his study noticed abnormal involuntary motions of limb after injury in patients. These irregular muscle jerks and fits of the influenced limb may last for long period of time. In their findings sympathetic block didn't relieve the unusual movements in three of the patients. Two of the patients spontaneously acquired partial recovery, yet the other two of the patients required surgical management for the relief. (20) The CRPS acute stages ought to be treated with bisphosphonates, anti-inflammatory agents (steroids), or on the other hand topical utilization of dimethyl sulfoxide. Whereas in CRPS chronic stages, numerous side effects are identified with purported

central neuroplasticity. These involve sensory loss, hyperalgesia, motor symptoms, autonomic symptoms, body perception disturbance, and learned incorrect behavior like nonuse.²¹ In patients with wrist fracture timely administration of Vitamin C (ascorbic corrosive) has been suggested for prophylaxis against complex regional pain disorder.^{22,23}

CONCLUSIONS:

Reflex sympathetic osteodystrophy (RSO) was one of the common problems that should be suspected and not neglected in stiff hands after the management of distal radius fracture. RSO should be treated aggressively to get the better function of wrist and hand, round the way it is really disabling.

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Author's Contributions:

Badaruddin Sahito: Design of work.
Dileep Kumar: Interpretation of data.
Syed Mohammad Tariq: Final approval.
Sunel: Data interpretation.
Nauman Hussain: Drafting.
Syed Mujtaba Shah: Drafting.

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