

Relationship between Anxiety, Depression, and Personality Type and the Incidence of Reflex Sympathetic Dystrophy in Patients with Distal Radius Fracture

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Abstract

Background: There is inconsistent information about the role of psychological factors in the incidence of reflex sympathetic dystrophy (RSD) in patients with distal radius fractures. The present study was thus undertaken to evaluate the relationship between some of these factors and the occurrence of reflex sympathetic dystrophy in patients with distal radius fracture.

Methods: One hundred and twenty patients with distal radius fracture who met the criteria to enter the study and admitted to the orthopedic department of Imam Reza hospital in Mashhad were evaluated. Spielberger anxiety questionnaire, Beck depression questionnaire, and personality type questionnaires as well as the information about the patients' demography were recorded after the treatment. The patients were followed for two months based on clinical evidence of RSD and the results of specific examinations. In our study, Veldman's criteria were used to set the diagnosis of RSD. Finally, the psychological status of the patients with or without RSD was evaluated using Chi square and *t* tests.

Results: Of the 88 patients completed the study, 13 were affected by RSD. There was no significant relationship between depression and anxiety of the patients with occurrence of RSD ($P>0.05$). The presence of type A personality characters had a significant positive relationship ($P=0.000$) and the presence of type B personality had a significant negative relationship ($P=0.004$) with the incidence of RSD after 2 months.

Conclusion: Personal characteristics of patients with distal radius fracture play a role in the incidence of RSD.

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Keywords • Reflex sympathetic dystrophy • depression • anxiety • personality • radius fracture

Introduction

Reflex sympathetic dystrophy (RSD) includes signs and symptoms such as pain, swelling, susceptibility and instability of local vasomotor function, and serious disturbance in the function of hand or upper extremity. This

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disorder occurs following various conditions such as trauma or surgery with persistence of the disease symptoms despite healing the underlying disorder. Severity of RSD increases the length of the clinical course of the underlying disease.^{1,2}

The etiology of this disorder has not been fully understood.^{3,4} Certain theories presume the causative or acceleratory role of psychological and psychiatric factors in RSD.⁵⁻⁷ In some studies, psychological and personality disorders have been shown to be related to the incidence of RSD.⁸⁻¹⁰ The role of psychological support in the treatment of RSD indirectly indicates the rapport of psychological factors with RSD.^{5,11-14} Studies on the treatment of RSD have reported high percentage of healing after treatment with placebo.^{15,16} In one study, stressful social accidents have been found in 60 percent of patients with RSD.¹⁷ Other surveys have shown that individuals with psychological instability are more susceptible to post traumatic RSD.^{13,18,19}

The role of psychological factors in the incidence of RSD has been questioned in some studies. Some researchers have shown that psychological deviation is a function of chronic pain. And the disability is resulted from the disease. It is not from the personal characters of the patients. The researchers also showed that there was no psychological difference between the patients with RSD and the patients with chronic pain disorder. They concluded that the results of psychological surveys in patients with RSD were biased because of severe pain and disability in the patients.^{9,20-23} In a prospective study on the level of psychological distress in patients with Colles' fractures by Field and Gardner in 1997, those who developed RSD did not show increased distress before the onset of the condition.²⁴

With regard to the different and occasionally paradoxical views on the role of psychological factors and personality characters in the incidence of RSD, and the lack of studies on this topic in Iran, we tried to address this subject in a prospective study on patients with distal radius fracture.

Patients and Methods

One hundred and twenty patients of the total patients with distal radius fracture admitted to the orthopedic emergency department of Imam Reza Hospital, affiliated to Mashhad University of Medical Sciences, Iran in 2007 were selected. These patients had negative history of psychiatric diseases, chronic diseases, and serious stressful situation. Written informed consents were obtained from all the included patients.

All the patients were subjected to emergency orthopedic treatment in the form of closed reduction and casting, or pin and plaster according to the severity of the fracture. One day after treatment a questionnaire to collect the demographic information, Persian version of Spielberger anxiety questionnaire measuring state and trait anxiety, Persian version of Beck depression inventory (BDI),^{25,26} and personality questionnaire were filled by the patients. The later questionnaire evaluates types A and B personalities. Type A personality is described as follows: intense feeling of lack of time, animosity and aggression, multiple goals and attempt to reach goals without proper plans. Type B personality is characterized by showing signs contrary to what can be seen in type A.

The patients were followed up for two months and occurrence of RSD in them was evaluated using clinical signs and specific orthopedic examination. In our study, Veldman's criteria were used to set the diagnosis of RSD. Finally 88 patients completed the study; 13 patients had experienced RSD, and 75 patients did not experience it. Based on the occurrence of RSD the patients were divided to two groups and their information was subjected to statistical analysis.

Descriptive statistical indices were used for description of the data and *t* test and Chi square test were used to compare the variables of the two groups.

Results

Of the 88 patients completed the study, 53.5% were female. The mean age of the patients was 46.33 (± 18.25) years. Fifty percent of the patients were employed, 57.9% did not have high school diploma, and 89.7% were city residents. A 84.1% of patients had type A fracture. Demographic data of the patients is shown in table 1.

A day after admission the mean depression score of the patients based on BDI was 12.25 with a standard deviation of 7.30. State anxiety score was 24.22 with a standard deviation of 7.30. Trait anxiety score was 24.22 with a standard deviation of 7. In survey of personality type, the score of type A character was generally 19.14 with a standard deviation of 8.55, and the score of type B character was 14.59 with a standard deviation of 8.65.

Of the 88 patients with distal radius fracture 13 patients (14.75%) developed RSD. Comparison of the different demographic variables between the two groups showed no significant relationship (table 2). Likewise, comparison of the psychiatric symptoms studied in the two groups showed that only the personality type of

Table 1: Demographic data of the patients with distal radius fracture admitted to emergency room of Imam Reza hospital.

| Variables | | Number | Percent |
|-----------------|-----------------------------|--------|---------|
| Gender | Female | 47 | 53.5 |
| | Male | 41 | 46.5 |
| Occupation | House wife | 41 | 46.6 |
| | Business | 22 | 25 |
| | Governmental | 22 | 25 |
| | Unemployed | 3 | 3.4 |
| Education level | Illiterate | 16 | 18.2 |
| | Without high school diploma | 51 | 57.9 |
| | High school diploma | 21 | 23.9 |
| Residence | Rural | 9 | 10.3 |
| | Urban | 79 | 89.7 |
| Fracture type | Type A | 74 | 84.1 |
| | Other types | 14 | 15.9 |

the persons upon trauma had a significant relationship with the incidence of RSD (table 3). Individuals with a higher score of personality type A ($P=0.000$) and lower score of personality type B ($P=0.004$) were significantly more prone to RSD following radius fracture, while their depression and anxiety scores had no correlation with the incidence of RSD.

Discussion

Reflex sympathetic dystrophy occurs following fractures and operations on upper extremity as a complication. Its signs and symptoms include pain, swelling, sensitivity and vasomotor instability. It prolongs the symptoms of the main disease and disables the patients. Its incidence following distal radius fracture in our study was 14.75% after two months follow up.

In a study in Poland,¹⁸ the incidence of RSD after two months was 18%, while in another study the incidence was only 1% after distal

radius fracture.²⁷ In a recent study in the Netherlands, conducted on general population rather than orthopedic clinics' clients, the rate of RSD was reported to be 26.2 per 100000 populations.²⁸ As indicated, this disorder has had different incidences in various communities and different situations.

A number of factors including psychological factors have been considered effective in the incidence of this disorder. Some studies have shown the relationship between factors such as anxiety and depression in the incidence of RSD.^{5,6,11,29-31} However, in our study anxiety and depression rate in patients with distal radius fracture who developed RSD were not significantly different with those who did not experience this disorder. This discrepancy can be due to the differences between the type of our study design compared with the other studies. Most of the above mentioned studies have discussed psychological survey of the patients after developing RSD. Therefore, the present

Table 2: Relationship of demographic variables with the incidence of reflex sympathetic dystrophy (RSD) in patients with distal radius fracture admitted to emergency room of Imam Reza hospital

| Variables | | RSD | No RSD | chi-square | t | P |
|-----------------|------------------------|-------|--------|------------|-------|-------|
| Age (year) | | 48.54 | 44.13 | - | 0.796 | 0.431 |
| Gender | Female | 69% | 51.6% | 0.282 | - | >0.05 |
| | Male | 31% | 48.4% | | | |
| | Illiterate | 25% | 26.7% | | | |
| Education level | No high school diploma | 37.5% | 60% | 0.384 | - | >0.05 |
| | Diploma | 37.5% | 13.3% | | | |
| | House wife | 53.8% | 46.4% | | | |
| Job | Business | 30.8% | 25% | 0.656 | - | >0.05 |
| | Governmental | 15.4% | 28.6% | | | |
| | Urban | 100% | 84.6% | | | |
| Residence | Rural | 0% | 15.4% | 0.211 | - | >0.05 |
| | Type (A) | 77.8% | 87.5% | | | |
| Fracture | Type (B) | 22.2% | 12.5% | 0.488 | - | >0.05 |

Table 3: Relationship between psychological variables and the incidence of reflex sympathetic dystrophy (RSD) in patients with distal radius fracture admitted to emergency room of Imam Reza hospital

| Variables | Patients with RSD | Patients without RSD | t | P |
|--------------------|-------------------|----------------------|--------|-------|
| BDI* | 10.31 | 13.32 | -1.007 | 0.321 |
| State anxiety | 25.61 | 25.89 | -0.106 | 0.917 |
| Trait anxiety | 22.77 | 25.64 | -1.262 | 0.230 |
| Type A personality | 28.31 | 15.26 | 6.748 | 0.000 |
| Type B personality | 9.61 | 16.59 | -3.109 | 0.004 |

*BDI: Beck Depression Inventory

study cannot confirm whether psychological factors such as depression and anxiety cause RSD or are results of the chronic course of RSD. In our study, we have evaluated the psychological state of the patients prior to the development of RSD and, thus, we avoided the bias that could result from the effects of chronic nature of RSD and the pain resulting from it.

Some other studies reviewing psychological factors before RSD have not shown a significant relationship between such factors and the incidence of RSD. In a study in Poland on 62 patients with radius fracture who were evaluated early after the trauma using BDI and Yesavages Geriatric Depression Scale, it was shown that patients with RSD did not show significant difference in the extent of depression compared with the other group.¹⁸ In another study on 100 trauma patients using General Health questionnaire 30 (GHQ-30) to evaluate psychological function of patients early after the trauma, it was shown that psychological factors play no role in the incidence of RSD.²⁴

In our study, we found that personality type A had a significant relationship with the incidence of RSD ($P=0.000$). Personality type B had a negative rapport with RSD ($P=0.004$).

Other studies examining the relationship between personality factors and the incidence of RSD have also attributed this disease to certain personality characteristics. RSD had a positive correlation with personality traits such as excitation imbalance and low self-esteem, while it showed a negative relationship with traits such as extroversion, neurotism, and psychotism.¹⁸

A potential weakness of the present study was the limited number of the patients included in this study.

Taken together, despite limitations in our study it seems that personality characters prior to accidents play effective roles in the incidence of RSD, while the presence of anxiety and depression symptoms have no relationship with this disorder.

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Conflict of Interest: None declared

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