Psychiatric Morbidity in Patients With Chronic Whiplash-Associated Disorder

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Abstract and Introduction

Abstract

Study Design: Prospective cohort with age- and gender-matched controls.
Objectives: To compare psychiatric morbidity between two groups: patients having chronic symptoms after a whiplash injury and patients who recovered completely.
Summary of Background Data: Psychiatric morbidity may influence the outcome of somatic diseases, and it has been suggested that psychological factors are often involved in the development of chronic symptoms after whiplash injuries, but there is no study assessing psychiatric morbidity in whiplash-associated disorder (WAD) using the Structured Clinical Interview for DSM-IV.
Methods: We studied a consecutive sample of 278 patients with a whiplash injury. Eighty-five had persisting neck pain after 1 year, and 38 of these participated in this study. For each patient with chronic neck pain at the 1 year follow-up, a gender- and age-matched recovered patient was selected from the study cohort of 278 cases. Psychiatric morbidity was determined using the Structured Clinical Interview for DSM-IV (SCID). The interview was conducted at 1 year after the accident (360 days, SD 2 days).
Results: The chronic WAD group had a significantly ($P < 0.05$) greater number of diagnoses 22 (58%) according to Axis I (acquired psychiatric disorders) than 11 (29%) the patients who were free of symptoms. This was also the case for Axis I diagnoses that were reported to have occurred before the accident (13 [34%]*vs*. 3 [8%]; $P < 0.01$). The most common diagnosis was depression; indeed, the number of patients with a history of depression at the time of the accident was significantly higher in the group who developed chronic pain compared to the group who recovered (11 [29%]*vs*. 3 [8%]; $P < 0.05$).
Conclusions: A history of psychiatric disease was more common in patients with chronic symptoms (chronic WAD). The dominating, retrospectively reported psychiatric diagnosis both before and after the accident was depression. Psychiatric morbidity may be a patient-related risk factor for chronic symptoms after a whiplash injury. The development of chronic symptoms after awhiplash injury seems to be associated with psychiatric vulnerability.

Introduction

Forces acting on the neck at a motor vehicle accident (MVA) can result in soft tissue injuries with different clinical manifestations (whiplash-associated disorder; WAD).[1] WAD accounts for a large proportion of the impairment and disability from MVAs. Disabling pain is the dominating symptom among chronic WAD patients, but cognitive symptoms may also be present. The importance of psychological factors is debated; they have been reported to be a consequence of the chronic pain in WAD rather than a causative factor.[2] In the general population, more than 25% of individuals develop one or more mental or behavioral disorders during the entire life.[3-5] Psychiatric morbidity is known to influence the outcome of somatic diseases.[6] There is, to our knowledge, no study focusing on psychiatric morbidity in WAD using the Structured Clinical Interview for DSM-IV (SCID). The SCID-I is a semistuctured interview for making the major DSM-IV Axis I diagnoses (acquired psychiatric conditions). The SCID-II is a semistructured interview for making DSM-IV Axis II (Personality Disorder) diagnoses.[7-11] The aim of this study was to compare psychiatric morbidity between two groups: patients having chronic symptoms after a whiplash injury and patients who recovered completely. The SCID interview was chosen in the current study because it measures all psychiatric diagnoses, including the preaccident history. Given the association between different psychiatric conditions and age and gender, a case control study design was chosen in this study.

Materials and Methods

We studied all cases of neck sprain after a MVA presenting to the emergency department at Huddinge University Hospital during the period September 1996 to October 1997. Inclusion criteria were as follows: age 18 to 65 years, car accident within the previous week, and fluency in the Swedish language. Cases with fractures or dislocations of the cervical spine, head trauma, or preexisting neurologic disorders were not included. In all patients, symptoms at 1 year after the accident were recorded. The individuals with persisting neck pain at 1 year were asked to participate in the SCID interview. There were a total of 85 patients with chronic pain in the neck region; 43 (51%) agreed to participate. For each case with a chronic neck pain at the 1-year follow up, an age- (± 10 years) and gender-matched recovered control case was chosen from the same study cohort of 278 prospective cases (Figure 1). Matching was done using a chronological case list; each chronic WAD case was matched with the first recovered case from this list where matching (age and gender) occurred; the willingness to participate was similar in the nonsymtomatic group as in the group with continued pain. In 5 cases, it was not possible to find an age- and gender-matched control that agreed to participate; these 5 cases were not included. The study sample therefore consisted of 76 cases: 40 men and 36 women. Each subject received 999 SEK (≈ 113 U.S. dollars) to help cover expenses such as absence from work and travel to the hospital. The local Ethics Committee approved the study. The mean interval between the accident and the SCID examination was 360 days (± SD, 2 days). The demographic data for the study sample are shown in Table 1. The SCID interview was done by a psychiatrist (M.S.) who was not informed about details regarding the accident and the resulting symptoms (*i.e.*, group membership). The evaluation assessed both Axis I and Axis II disorders. The Non-Patient Edition of Axis I was used, which includes affective disorders, screening for psychotic symptoms, substance abuse disorders, anxiety disorders, somatoform disorders, eating disorders, and maladaptive stress disorders. At the 1 year follow-up after the injury, all patients completed the Hospital Anxiety and Depression scale questionnaire (HAD).[12] These data were used for analysis of the nonparticipants *versus* participants. The Swedish version of the HAD has been evaluated for convergent and discriminant validity and tested for reliability and construct validity.[13,14] It consists of 14 items, each with four response categories in the range of 0 to 3. Seven questions concern depression. The HAD does not include items concerning somatic signs of depression and is preferred when studying depression in somatic samples.

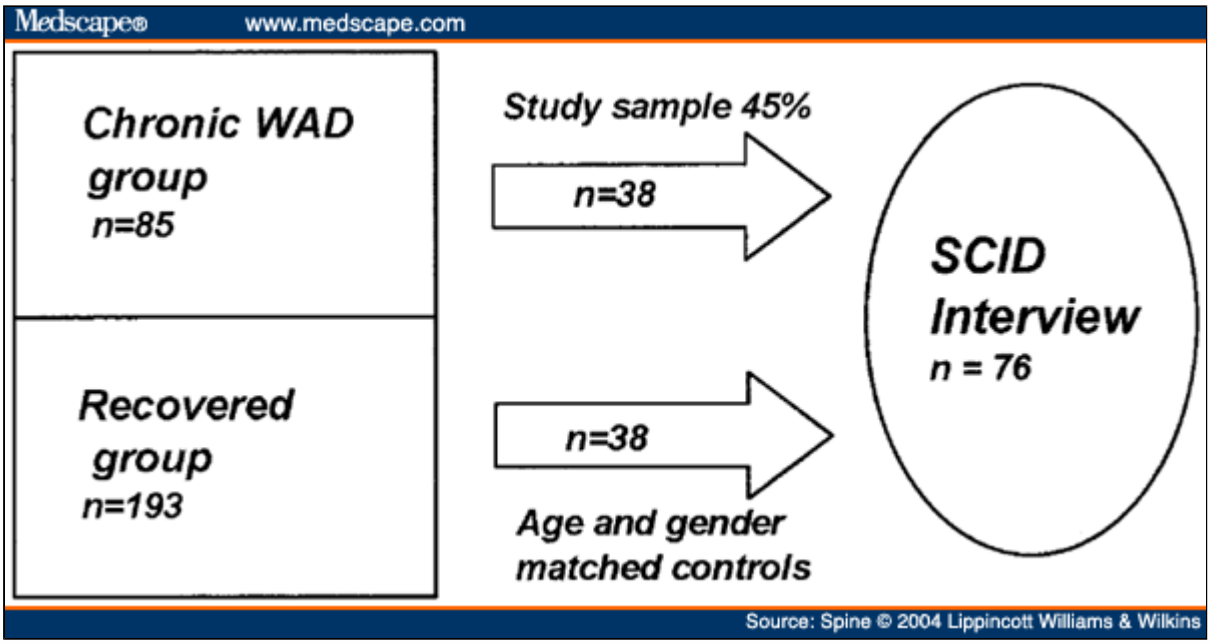

Figure 1. General study design.

Statistical Analysis

Numbers of diagnoses according to Axis I and Axis II DSM-IV were compared between the groups using Fisher's exact test. In all analyses, $P < 0.05$ was considered to be statistically significant. In the nonparticipant analysis, the two HAD items anxiety and depression were categorized into groups (no anxiety/depression <7 and anxiety/depression >/= 7 on the HAD scale).

Results

Seventy-six patients (40 men and 36 women) were included (Table 1). There was no difference between the participants in this study and the nonparticipants regarding age, gender, education, civil status, or HAD data (anxiety and depression) (Table 2). According to the Quebec WAD classification,[11] the distribution among the 76 cases was as follows: 5 Grade I (7%), 59 Grade II (77%), and 12 Grade III (16%). Thirty-three patients (43%) in the total study population of 76 had one or more Axis I diagnoses. Depression was the dominating diagnosis, with a total of 66% (22 of 33) of all Axis I diagnoses (Table 3). In group comparisons, the numbers of diagnoses according to Axis I was significantly higher in the symptomatic group (58%*vs.* 29%) (Table 3); this was true also for those Axis I diagnoses that retrospectively were reported to have occurred before the accident (34%*vs.* 8%) (Table 4). The most frequent diagnosis was depression in both groups. Lifetime prevalence of a depressive syndrome (major depression, mild depression, or dysthymia) was significantly higher in the

chronic WAD group than in the control group: 16 (42%) and 6 (16%), respectively (Table 3). The distribution according to DSM-IV among the 16 cases of depression in the symptomatic group was as follows: 14 major depression and 2 minor depression including 1 case of postpartum depression. When comparing the prevalence of depression before the injury between the two groups, there was a significantly higher number in the symptomatic group (11 *vs.* 3 cases) (Table 4). The 1-year prevalence of depression (*i.e.*, the year after the whiplash injury) was 7 in the symptomatic group and 4 in the asymptomatic group (not significant). In addition, 3 patients in the symptomatic group reported depressive symptoms before the accident not sufficient to warrant a diagnosis of depression, compared with 1 patient in the control group. Anxiety disorders (specific phobia, social phobia, panic attack disorder, posttraumatic stress disorder) were diagnosed in 4 patients in the symptomatic group compared to 6 patients in the control group. Only 1 case of posttraumatic stress disorder was found. This patient had a chronic WAD syndrome and was also diagnosed with a history of major depression and specific phobia as well as a phobic personality disorder. Another 2 patients in the symptomatic group reported posttraumatic anxiety but on a subsyndromal level. No other anxiety disorder in any patient had developed after the whiplash injury. Substance abuse and/or dependence was diagnosed in 3 patients in the symptomatic group, and all 3 were in full remission. In the control group, 4 patients were diagnosed with a substance-related disorder, of which 3 were in full remission.

Two patients were found to have had an eating disorder (1 case of anorexia nervosa and 1 case of bulimia nervosa) in the symptomatic group compared with 1 patient in the control group (bulimia nervosa). All 3 patients had recovered from their disorders. One patient in the symptomatic group had had a history of short, transient psychosis. No case of bipolar disorder or schizophrenia was found. Personality disorders (Axis II in DSM IV) were diagnosed in 4 patients in the chronic WAD group compared with 2 patients in the control group. In the symptomatic group, there were 3 cases of antisocial and 1 case of phobic personality disorder. In the control group, there was 1 case of antisocial personality disorder and 1 case of mixed personality disorder with cluster B traits.[10]

Discussion

In our study, 58% of the symptomatic patients had a lifetime history of a DSM IV Axis I disorder compared with 29% of the asymptomatic patients. Even if we disregard those subjects in the symptomatic group who developed a first episode of depression after the trauma, nearly one third of the patients reported a history of depression. The lifetime prevalence of psychiatric morbidity of a general Dutch population was estimated to be 41.2% in the NEMESIS study where a full, structured clinical interview was used; the prevalence of mood disorders was reported to be 19%.[15] These data are comparable to the findings in our small group of Swedish patients; a more detailed comparison is not justified. The point prevalence (last month) of depression was 3% in the recovered group, which is comparable to a general Swedish population (PART-study, unpublished data, quoted in "Behovsanalys avseende depression och ångest" R. Engström *et al* 2000, a report from Health and Medical Services Committee, Stockholm). The lifetime prevalence of anxiety disorders in the total study sample was 15%; it was 19.3% in the general population of the NEMESIS study.[15] We found only one posttraumatic stress disorder, whereas Mayou *et al*.[16] found 5% in their study using semistructured interviews at 3 months and 1 year after a whiplash injury. In their study, however, no information regarding the outcome or severity of the accident was available, which makes a comparison difficult. In our study, only a few patients had experienced an MVA serious enough to meet the A criterion for posttraumatic stress disorder (*e.g.*, life-threatening). Finally, the lifetime prevalence of substance abuse disorders in this study was 9% (18.7% in the NEMESIS study).[15] No new cases of anxiety disorder or substance abuse/dependence appeared after the accident.

Psychiatric morbidity is known to influence the outcome of somatic diseases.[11] It has been suggested that psychological factors associated with WAD are entirely explained by the fact that chronic pain has developed.[16,17] Radanov *et al*[18] studied a prospective cohort of 21 patients with chronic WAD who were pair-matched with regard to age, gender, and education to a completely recovered group. They suggested a somatic basis for the noted changes in psychological functioning and concluded that psychiatric problems are rather a consequence than a cause of somatic symptoms after a whiplash injury. Their results may not be fully comparable with those of the current study because of the differences in the study populations; they studied a cohort referred from primary health care as compared with the hospital-based cohort of consecutive cases in our study. Our material therefore included patients who were all treated in the same setting, whereas Radanov *et al*[18] advertised for nonconsecutive patients. They used questionnaires as a measure of psychological factors, whereas we measured psychiatric morbidity using the SCID. By doing the SCID interview at the end of the observation period, a case-control study design was possible and the postinjury period could be included. Similar protocols to study past psychiatric morbidity have been used by others.[19,20] The rigid structure of the SCID interview is likely to eliminate influence of an ongoing depressive state on the results; however, such a possibility cannot be ruled out completely. It is also possible that patients might have a tendency to underreport previous psychiatric morbidity, believing that this could make the association between the symptoms and the accident look weaker. Such a mechanism, however, would only strengthen the conclusions of this work.

We found that depression was especially common in the group with persisting neck pain. Our results also suggested that depression was not merely a consequence of chronic pain. The higher prevalence of preinjury Axis I morbidity and depression in the group with persisting neck pain suggested that indeed psychiatric morbidity and in particular a history of depression might directly or indirectly have an impact on the prognosis after a whiplash injury. In the total study sample, a depressive syndrome before the traumatic incident was reported in 14 patients (18%) and 11 (79%) of those developed chronic neck pain. We cannot say whether this overrepresentation of psychiatric symptoms in the group with chronic neck pain is related to the mental condition itself or if it is indirect. For example, it has been shown that patients with psychiatric disorders smoke more than others[21] and social factors such as isolation and unemployment could also contribute. Given the high rate of patients not willing to participate (55%)(Figure 1), a selection bias might be suspected, but a *post hoc* test

using the HAD data collected at 1 year after the accident showed no significant difference in the occurrence of clinical depression or anxiety between the participants and the nonparticipants (Table 2).

Conclusion

There was a significantly higher lifetime and preaccident prevalence of psychiatric diagnoses in the group of patients who developed chronic neck pain after a whiplash injury than among those who recovered. The most frequent psychiatric diagnosis was depression. Previous psychiatric morbidity seems to be a patient-related risk factor for the development of chronic pain after a whiplash injury. The development of chronic symptoms after a whiplash injury seems to be associated with psychiatric vulnerability.

Tables

Table 1. Demographic Data for the Groups

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	Asymptomatic n (%)	Symptomatic n (%)
N	38	38
Age		
Mean (SD) years	36 (12)	35 (11)
Sex		
Men	20 (53)	20 (53)
Women	18 (47)	18 (47)
Civil status		
Unmarried/living alone	12 (31)	11 (32)
Married/living together	26 (69)	23 (68)
Education		
High school/college	24 (77)	22 (65)
University level	11 (23)	12 (35)

Table 2. Nonparticipant Analysis

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	Participants n (%)	Nonparticipants n (%)
Number	38	47
Age		
Mean years (SD)	35 (11)	40 (10)
Gender		
Men	20 (53)	17 (36)
Women	18 (47)	30 (64)
Marital status*		
Single/living alone	11 (32)	18 (38)
Married/living together	23 (68)	29 (62)
Education*		
High school/college	22 (65)	34 (72)
University level	12 (35)	13 (28)
Depression (HAD)	18 (46)	20 (42)
Anxiety (HAD)	32 (84)	39 (83)

* Data missing for 4 cases in the participants group.

Table 3. Results from the SCID Interview at the 1-Year Follow Up After Whiplash Injury in 38 Recovered and 38 Patients With Chronic Neck Pain

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	Recovered n (%)	Chronic neck n (%)	*P* value*	Total n (%)
Total morbidity	11 (29)	22 (58)	0.010	33 (43)
Depression	6 (16)	16 (42)	0.011	22 (29)
Anxiety	6 (16)	4 (11)	0.242 (N.S)	10 (13)
Substance abuse/dependence	4 (11)	3 (8)	0.285 (N.S)	7 (9)

* Fisher's exact test.

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Table 4. Results from the SCID Interview at the 1-Year Follow-Up After Whiplash Injury in 38 Recovered and 38 Patients With Chronic Neck Pain: Preaccident Morbidity

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	Recovered n (%)	Chronic neck pain n (%)	*P* value*	Total n (%)
Total morbidity AXIS-I before	3 (8)	13 (34)	0.005	16 (21)
Depression (DSM-IV) before	3 (8)	11 (29)	0.018	14 (18)

* Fisher's exact test

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References

1. Spitzer W, Skovron M, Salmi L, et al. Scientific monograph of the Quebec Task Force on Whiplash-Associated Disorders. *Spine*. 1995;20(suppl):1-73.
2. Radanov B, Sturzenegger M, Di Stefano G. Long-term outcome after whiplash injury: a 2-year follow-up considering features of injury mechanism and somatic, radiological, and psychosocial findings. *Medicine (Baltimore)*. 1995;74:281-297.
3. Almeida-Filho N, Mari J de J, Coutinho E, et al. Brazilian multicentric study of psychiatric morbidity: methodological features and prevalence estimates. *Br J Psychiatry*. 1997;171:524-529.
4. Regier DA, Boyd JH, Burke JD, et al. One-month prevalence of mental disorders in the United States: based on five Epidemiologic Catchment Area sites. *Arch Gen Psychiatry*. 1988;45:977-986.
5. Wells JE, Bushnell JA, Hornblow AR, et al. Christchurch Psychiatric Epidemiology Study: I. Methodology and lifetime prevalence for specific psychiatric disorders. *Aust NZ J Psychiatry*. 1989;23:315-326.
6. Roy R. Many faces of depression in patients with chronic pain. *Int J Psychiatry Med*. 1982;12:109-119.
7. American Psychiatric Association. *Diagnostic, Statistical Manual of Mental Disorders*, 4th ed. Washington, DC: American Psychiatric Association, 1994.
8. First MB, Spitzer RL, Gibbon M, et al. *Structured Clinical Interview for DSM-IV Axis I Disorders, Research Version, Non-patient Edition*. New York: Biometrics Research, New York State Psychiatric Institute, 1997.
9. First MB, Spitzer RL, Gibbon M, et al. *Structured Clinical Interview for DSM-IV Axis I Disorders, Research Version, Patient Edition With Psychotic Screen*. New York: Biometrics Research, New York State Psychiatric Institute, 1997.
10. First MB, Spitzer RL, Gibbon M, et al. *Structured Clinical Interview for DSM-IV Personality Disorders*. Washington, DC: American Psychiatric Press, 1997.
11. Skre I, Onstad S, Torgersen S, et al. High interrater reliability for the Structured Clinical Interview for DSM-III-R Axis I. *Acta Psychiatr Scand*. 1991; 84:167-173.
12. Zigmond AS, Snaith RP. The Hospital Anxiety and Depression scale. *Acta Psychiatr Scand*. 1983;67:361-370.
13. Lisspers J, Nygren A, Söderman E. Hospital anxiety and depression scale (HAD): psychometric data for a Swedish sample. *Acta Psychiatr Scand*. 1997;96:281-286.
14. Sullivan M, Karlsson J, Sjöström L. Swedish obese subjects (SOS): an intervention study of obesity. Baseline evaluation of health and psychosocial functioning in the first 1743 subjects examined. *Int J Obes*. 1993;17:503-512.

15. Bijl RV, Ravelli A, van Zessen G. Prevalence of psychiatric disorder in the general population: results of the Netherlands Mental Health Survey an Incidence Study (NEMESIS). *Soc Psychiatry Psychiatr Epidemiol*. 1998;33: 587-595.
16. Mayou R, Bryant B, Duthie R. Psychiatric consequences of road traffic accidents. *Br Med J*. 1993;307:647-651.
17. Merskey H. Psychological consequences of whiplash: state of the art review. *Spine*. 1993;7:471-480.
18. Radanov B, Begre S, Sturzenegger M, et al. Course of psychological variables in whiplash injury: a 2-year follow-up with age, gender and education pair-matched patients. *Pain*. 1996;64:429-434.
19. Iketani T, Kiriike N, Stein, MB, et al. Personality disorder comorbidity in panic disorder patients with or without current major depression. *Depress Anxiety*. 2002;15:176-182.
20. Wenzel T, Schnider P, Wimmer A, et al. Psychiatric comorbidity in patients with spasmodic torticollis. *J Psychosom Res*. 1998;44:687-690.
21. Glassman AH. Cigarette smoking: implications for psychiatric illness. *Am J Psychiatry*. 1993;150:546-553.

Sidebar: Key Points

- A group of patients who developed chronic pain after a whiplash injury had a significantly higher lifetime prevalence of psychiatric diagnoses than a matched group of patients who recovered.
- Depression was the most common diagnosis in all groups and was significantly more common in the group with persisting neck pain than in the recovered group.
- The group with chronic neck pain had suffered from depression prior to the accident significantly more often than the recovered group.

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