

Psychological investigation of spinal cord injury patients

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Spinal cord injuries (SCI) often have psychological consequences, primarily anxiety and depression, which may interfere with rehabilitation possibilities, with adjustment to the impairment and therefore with the possibility of returning to previous familiar social life and work. To assess the degree of anxiety and depression in SCI patients, and to study the factors contributing to their genesis, 100 SCI in- and out-patients were administered questionnaires for self-rating anxiety and depression. A group of newly injured patients was followed up for a year after their discharge to study the evolution of the two psychological syndromes. These two psychological pathologies in SCI patients were respectively 13% (anxiety) and 16% (depression). Some characteristics were significantly associated with a higher risk of developing psychological distress: the presence of severe complications, the lack of autonomy, and low educational level. We did not observe any modification of the psychological picture over time. The lack of reduction in anxiety and depression over time could mean that the two pathologies are maintained by the obstacles SCI patients meet every day resulting from their neurological deficit. Our data justify the provision of psychological services for SCI patients in the rehabilitation centres; these services should still be available to the patients even after discharge.

Keywords: spinal cord injuries; anxiety; depression; psychological distress

Introduction

Spinal cord injuries (SCI) often have psychological consequences due to loss of functions, to alterations in the urinary tract and sexual functioning and to other symptoms such as pain, loss of social and work status and to a decrease in future expectations.^{1,2} The reported incidence of these pathologies varies from author to author: in the initial studies anxiety and most of all depression were considered almost inevitable consequences of SCI³, but today many authors report depression in only 20–45% of patients.^{4–6}

The relevance of the psychological consequences is demonstrated by the rate of suicide and divorce among SCI patients; both are greater than in the general population and are on the increase.⁷ Anxiety and depression may have a considerable impact on functioning. Severe depressive episodes can cause health problems such as loss of weight, social problems such as loss of job and financial problems. Depressive episodes can be even more negative for those with functional losses (for example SCI patients). Tate *et al*⁸ demonstrated that depressed SCI patients spend more hours in bed, less time out of the house and need more medical assistance and nursing than non-depressed SCI patients.

The aim of this study was to investigate the psychological impact of spinal cord injury. We assessed the prevalence rates of SCI patients' anxiety and depression and examined some social, demographic and patient characteristics in order to determine their impact on psychological adjustment.⁹ We also followed a group of newly injured patients after their discharge from our hospital to see if there were differences in anxiety and depression over time and if our data were consistent with the traditional models of adjustment to SCI.

Patients and methods

Patients

One hundred patients with spinal cord injury of traumatic and non traumatic aetiology were assessed (79 males, 21 females, mean age 36 years) (Tables 1 and 2). Most of the patients (83%) had lesions of the thoracic or lumbo-sacral spine (33 T1–T6 level, 35 T7–T12, 15 lumbo-sacral); 17 patients had a lesion of the cervical spine. With regard to the completeness of the lesion, 71 patients had an ASIA impairment scale A lesion¹⁰, 13 an ASIA B, 16 an ASIA D. At the time of assessment the distance from the lesion was between 3 months and 28 years (mean 4.6 years). None of our patients had a history of major psychiatric (major depression, schizophrenia) or cognitive disorders (head

Table 1 Patients characteristics (n = 100)

Gender (%):	Males 81%	Females 19%
Age (years):	Mean 36	Standard deviation 14.4
	Range 17–80	Distribution
	10–40 years 71%	41–80 years 29%
Distance from lesion (years)	Mean 6.4	Standard deviation 6.8
	Range 3 months -28 years	Distribution:
	<1.5 years 43%	1.5–5 years 32%
	>5 years 25%	
Level of lesion (%):	C 17%	D1-D6 33%
	D7-D12 35%	L-S 15%
Completeness of lesion (ASIA impairment scale):	A 71%	C 13%
	D 16%	
Aetiology of lesion (%):	Traumatic 81%	Non traumatic 19%
Complications (%):	Present 21%	Absent 79%
Barthel Index:	Mean 55.7	Standard Deviation 17.4
	Range 10–100	Distribution:
	<40 20%	>40 80%

injury, mental retardation, organic mental disorders) that could affect the validity of their test responses.

A group of 27 newly injured (<6 months) patients was followed up over time; the first evaluation was made as soon as the patients were mobile in a wheelchair.

Methods

All patients underwent:

- demographic and social inquiry;
- complete physical and neurological examination;
- the Spielberger State-Trait - Anxiety Inventory XI;
- the Depression Questionnaire (QD) of the Cognitive Behavioural Assessment.¹²

The STAI XI is a 20-item self-report measure of state anxiety; it has been widely used to study anxiety, also in SCI patients;¹ it has a test-retest reliability of 0.68

Table 2 Social and demographic characteristics

Marital status (%):	Single 58%	Married 30%
	Divorced 7%	Widowed 3%
Educational level (%):	Primary school 15%	Secondary school 37%
	High school 37%	University 11%
Employment (%):	Unemployment 25%	Employed 20%
	Retired 42%	Students 13%
Family support:	Patients alone 15%	Patients with family 85%

and 0.59 (7 and 30 days);¹² the internal consistency (alpha coefficient) is 0.92.¹² The QD questionnaire is a well validated self-report measure of depression consisting of 24 items adapted from the Beck Depression Inventory and the Zung Self-Rating Depression Scale;^{12,13} test-retest reliability is 0.88 and 0.72 (7 and 30 days) and the alpha coefficient 0.86.¹²

Statistical analysis

We first evaluated the overall prevalence of anxiety and depression in the patients' group; the data of each patient were compared to the norms of the two tests (presented by the authors of the tests,¹²) the mean scores of a normal population of uninjured subjects comparable for age and sex. As already done in other studies,¹ we choose as 'cut-off' score a score equivalent to one standard deviation above the mean of the norms. Patients were then defined anxious and depressed when their scores on the two scales were higher than the mean of uninjured subjects plus one standard deviation.

We then divided the SCI patients into groups on the basis of:

- age: 10–40 years vs 41–80 years;
- sex: males vs females;
- distance from the lesion: <1.5 years vs 1.5–5 years vs >5 years;
- the SCI level: C vs D1–6 vs D6–12 vs L-S;
- the completeness of the lesion: ASIA A vs C vs D;
- the presence or absence of severe complications such as pain, decubitus ulcers, paraosteoarthritis, and repeated, severe urinary tract infections;
- level of autonomy, evaluated by means of the Barthel Index:¹⁴ <40 vs >40;
- marital status: single vs married vs divorced vs widowed;

- educational level: primary school vs secondary school vs high school vs university;
- occupation: students vs employed vs unemployed vs retired;
- family support: patients with family vs those alone;
- aetiology of the lesion: traumatic vs non traumatic.

The groups were compared with the chi square test to evaluate if there were differences in prevalence of anxiety and depression.

The group of newly injured patients was assessed on three occasions during the first year after injury and the results were evaluated by means of chi square test. An alpha rate of 0.05 or less was used.

Results

With regard to the overall prevalence of the two psychological syndromes 13 patients were anxious and 16 depressed. Tables 3 and 4 show the results of the various groups of patients (prevalence of anxiety and depression). With regard to medical characteristics, patients with severe complications were significantly more anxious and more depressed than the others ($P < 0.005$) and so were patients with a low level of autonomy ($P < 0.05$). With regard to social characteristics, patients with a low educational level, unemployed patients and those who lived alone had greater psychological distress than the others. No statistically significant difference was seen with regard to the other

Table 3 Prevalence of anxiety and depression in the various groups: medical variables

Gender	Males n=81	Females n=19		p	
anxiety	11%	21%		n.s.	
depression	16%	16%		n.s.	
Age	10-40 years n=71	41-80 years n=29		p	
anxiety	10%	20%		n.s.	
depression	14%	20%		n.s.	
Distance from SCI	<1.5 years n=43	1.5-5 years n=32	>1.5 years n=25	p	
anxiety	14%	15%	8%	n.s.	
depression	18%	12.5%	16%	n.s.	
Level of lesion	C n17	D1-D6 n=33	D7-D12 n=35	L-S n=15	p
anxiety	6%	9%	17%	20%	n.s.
depression	17%	12%	14%	26%	n.s.
Completeness of SCI	ASIA A n=71	ASIA C n=13	ASIA D n=16		p
anxiety	11%	23%	12.5%		n.s.
depression	18%	7%	12.5%		n.s.
Aetiology of SCI	Traumatic n=81	Non traumatic n=19			p
anxiety	11%	21%			n.s.
depression	15%	21%			n.s.
Complications	Present n=21	Absent n=79			p
anxiety	38%	6%			<0.005
depression	38%	10%			<0.005
Barthel Index	<40 n=20	>40 n=80			p
anxiety	30%	8%			<0.05
depression	33%	11%			<0.05

Table 4 Prevalence of anxiety and depression in the various groups: social and demographic variables

Marital status*	single n=58	Married n=30	Divorced n=7	Widowed n=3	p
anxiety	7%	20%	28%	33%	n.s.
depression	12%	20%	42%	0%	n.s.
Educational level	Primary school n=15	Secondary school n=37	High school n=37	University n=11	p
anxiety	33%	11%	8%	9%	<0.05**
depression	40%	13%	13%	0%	<0.05***
Employment	Unemployed n=25	Employed n=20	Retired n=42	Students n=13	p
anxiety	12%	10%	19%	0	n.s.
depression	28%	15%	14%	0	<0.05****
Family support	Patients alone n=15	Patients with family n=85			p
anxiety	13%	13%			n.s.
depression	33%	13%			<0.05

*statistical analysis was performed only between single and married patients, because of small number of patients in other groups. **between primary and high school. ***between primary school and the other three groups. ****between unemployed and students

variables: age, sex, aetiology, level and completeness of the lesion, marital status.

Table 5 shows results of newly injured patients on the three assessments: no statistically significant differences were observed.

Discussion

Depending on the extent of their loss, SCI patients often present anxiety and depression.^{15–17} Apart from immobility and loss of sensation, SCI patients experience other unpleasant effects, such as pain and impaired urinary and sexual functioning;² these physical symptoms often result in vocational and social losses.

Knowledge about adjustment to SCI is still incomplete;¹⁸ previous opinions have suggested that psychological distress, in particular depression, is a universal reaction following SCI;³ on the contrary current literature reports the presence of depression in only 20–40% of patients.^{4,5}

A number of variables have been described in relation to anxiety and depression: age (older patients tend to be less well adjusted),¹⁹ education (low education is associated with worse adjustment),⁹ completeness and level of lesion,²⁰ gender (male patients are more anxious and female patients more depressed)^{8,21} and marital status.

Our results are comparable to those of other studies even though the prevalence rates of anxiety and depression are lower than those reported elsewhere. None of our patients presented severe psychiatric disorders (according to DSM III) as in Judd's study¹⁶ in which patients fulfilled the diagnostic criteria for major depression.

We studied a number of variables to see if they were associated with anxiety and depression in our patients. Only few of these resulted important for the pathogenesis of psychological distress. The first one is the presence of severe complications, probably because these complications interrupt life routines and restrict social roles. Another medical variable is the patients level of autonomy: a low level of autonomy on the wheelchair and in daily living activity is associated with higher levels of anxiety and depression, regardless of the level and the completeness of the lesion. Once again this could be due to reduction of social life resulting from lack of autonomy.

Another variable positively associated with both anxiety and depression is educational level: patients with low education are more anxious and more depressed; in our opinion this could be due to the difficulties that these patients encounter when looking for an occupation, resulting in further vocational and social losses. Also important are family support and the possibility of returning to work after discharge from the hospital.

Thus the psychological effects of SCI seem to depend mainly on the degree of autonomy and on the possibility to have a lifestyle as normal as possible, independently from all the other medical and social factors.

We believe that the more interesting data concerns the lack of significant changes in prevalence rates of anxiety and depression over time. As already observed by Craig,²² this lack is inconsistent with the usual models of adjustment, that is the stage models, which suggest that psychological distress should decrease over time as happens after mourning. A common example of the stages includes denial (in the first six months after the lesion), depression, anger and acceptance²³ and implies that the lesion itself is the primary factor influencing the adjustment.²⁴

On the contrary, our data seem to demonstrate that psychological distress in SCI patients is caused and maintained by the difficulties the patients meet every day; daily living with a handicap such as that resulting from a SCI means the need to cope with architectural barriers, economic costs, vocational limitations, alterations in familiar and social role. These obstacles replace the difficulties met during hospitalisation (lack of privacy, separation from parents and relatives, dependence on nursing staff) and maintain anxiety and depression over time.²⁵ In fact in our patients the variables associated with psychological distress were mostly those influencing the social and vocational life (presence of severe complications, level of autonomy, education, employment, family support), while the other medical variables appeared to be less important.

Psychological adjustment to SCI is a complex and extremely individual process, because of the interaction of organic variables (medical aspects), person variables (personality, capacity to manage stress) and environmental variables (family support and socio-economic status). Thus, saying that time will lower depression and anxiety may be merely a simplification.

Conclusions

Our results have important implications for the treatment of SCI patients: first, they show that psychological distress is not an inevitable consequence of SCI, but is limited to 20% of patients; second, although not inevitable, anxiety and depression are maintained over time and do not decrease as previous models have suggested. In our opinion these data justify the provision of a psychological service in every hospital where SCI patients are treated. These services

Table 5 Evolution of the two psychological syndromes over time (group of newly injured patients)

Prevalence rates	First evaluation	Second evaluation	Third evaluation
Anxiety	15%	18%	17%
Depression	17%	16%	19%

should be available to patients not only during hospitalisation, but also after their discharge.

References

- 1 Hancock KM, et al. Anxiety and depression over the first year of spinal cord injury: a longitudinal study. *Paraplegia* 1993; **31**: 349–357.
- 2 Engel GL. *Psychological development in health and disease*. Philadelphia: WB Saunders Company, 1962; pp 288–305.
- 3 Siller J. Psychological situation of the disabled with spinal cord injuries. *Rehab Lit* 1969; **30**: 290–296.
- 4 Fullerton DT, Harvey RF, Klein MH, Howell TH. Psychiatric disorders in patients with spinal cord injuries. *Arch Gen Psychiatry* 1981; **38**: 1361–1371.
- 5 Judd FK et al. Depression following spinal cord injury: A prospective in-patient study. *Br J Psychiatry* 1989; **154**: 668–671.
- 6 Fuhrer MJ et al. Depressive symptomatology in persons with spinal cord injury who reside in the community. *Arch Phys Med Rehabil* 1993; **74**: 255–260.
- 7 Geisler WO, Jousse AT, Wynne-Jones M, Breithaupt SD. Survival in traumatic spinal cord injury. *Paraplegia* 1983; **21**: 304–373.
- 8 Tate D, Forcheimer M, Maynard F, Dujkers M. Predicting depression and psychological distress in persons with spinal cord injury based on indicator of handicap. *Am J Phys Med Rehabil* 1994; **73**: 175–183.
- 9 Woodrich F, Patterson JB. Variables related to acceptance of disability in persons with spinal cord injuries. *J Rehabil* 1983; **49**: 26–30.
- 10 Di Tunno JF, Young W, Donovan WH, Creasey G. The international standards booklet for neurological and functional classification of spinal cord injury. *Paraplegia* 1994; **32**: 70–80.
- 11 Spielberger et al. Manual for the State-Trait Anxiety inventory. Palo Alto: Consulting Psychologist Press, 1983.
- 12 Sanavio E et al. CBA - 2.0 Scale Primarie. Manuale. Firenze: Organizzazioni Speciali, 1986.
- 13 Zotti AM, Bertolotti G, Meriggi A. L'assessment psicofisiologico ed il suo impiego nell'approccio riabilitativo. IV Congresso Nazionale di Biofeedback e Medicina Comportamentale (Atti), 1984.
- 14 Mahoney F, Barthel DW. Functional evaluation: the Barthel Index. *Mar State Med J Rehab* 1965; **2**: 61–65.
- 15 Judd FK, Burrows GD. Liaison psychiatry in a spinal injuries unit. *Paraplegia* 1986a; **24**: 6–19.
- 16 Judd FK, Burrows GD, Brown DJ. Depression following acute spinal cord injury. *Paraplegia* 1986b; **24**: 358–363.
- 17 Somasundaram O, Balakrishnan S, Ravindran OS, Shanmugasundaram TK. A psychological study of spinal cord injured patients involved in the Madras Paraplegia Project. *Paraplegia* 1992; **30**: 799–802.
- 18 Stensman R. Adjustment to traumatic spinal cord injury. A longitudinal study of self-reported quality of life. *Paraplegia* 1994; **32**: 416–422.
- 19 Kerr W, Thompson M. Acceptance of disability of sudden onset in paraplegia. *Int J Paraplegia* 1972; **10**: 94–102.
- 20 MacDonald MR, Nielson WR, Cameron MGP. Depression and activity patterns of spinal cord injured persons living in the community. *Arch Phys Med Rehabil* 1987; **68**: 339–343.
- 21 Rasdloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Meas* 1977; **1**: 385–401.
- 22 Craig AR, Hancock KM, Dickson HG. A longitudinal investigation into anxiety and depression in the first 2 years following a spinal cord injury. *Paraplegia* 1994; **32**: 675–679.
- 23 Homan G. Psychological aspects of treatment and rehabilitation of the spinal injured person. *Clin Orthop* 1975; **112**: 81–88.
- 24 Frank RG, Elliot TR, Corcoran JR, Wonferlich SA. Depression after spinal cord injury: is it necessary? *Clin Psychol Rev* 1987; **7**: 611–630.
- 25 Trieschmann RB. Spinal cord injuries: psychological, social and vocational rehabilitation, 2nd Edition, Arizona: Scottsdale, 1988.