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Short report

Anxiety and depression after mild head injury: a case control study

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SUMMARY Thirty-five patients and corresponding matched controls were investigated between 5 and 17 months from mild head trauma using the Self Rating Depression Scale and the State-Trait Anxiety Inventory. The findings indicate that compared with an appropriate control group mild head injured patients are at risk of developing depression, whereas their liability to anxiety is not increased. Our results strongly suggest that all head injured patients should be screened for depression.

The postconcussion syndrome frequently occurs after mild head injury (MHI). The term postconcussion syndrome is reserved for patients who have persisting subjective symptoms resulting from cerebral concussion. We know that head injuries that initially seem mild can occasionally cause severe complications. Also a blow that fails to produce any loss of consciousness can cause a pronounced temporary impairment of recent memory, known as posttraumatic amnesia, without any other neurological signs. The patient with posttraumatic nervous instability is often intolerant of noise and crowds. Inability to concentrate, a feeling of nervousness, fatigue, apprehension complete the clinical picture. In contrast to this multiplicity of subjective symptoms, memory and other intellectual functions show little or no impairment on detailed neuropsychological testing,[1] except for a slowing of both simple and choice reaction times 1 month after injury.[2] The resemblance of postconcussion symptoms to those of anxiety and depression is at once apparent. The syndrome may persist for months or years, but usually the symptoms lessen as time passes.

Data from the literature show that within 3 months of injury 51–84% complain of posttraumatic symptoms.[3 4] After 6 months the figure is 49%,[5] after one year 15–33%[6 7] and after 3 years 15%.[7]

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Disagreement still prevails with regard to the aetiology and pathogenesis of the postconcussion syndrome. Some investigators believe that it is essentially due to traumatic brain lesion,[4 6 8–10] while others suggest that neurosis, anxiety, or outright malingering could be the explanation for persisting subjective symptoms in postconcussion syndrome patients.[11–13]

The question of whether patients suffering from MHI are at risk of developing affective disorders has not yet been fully explored. Depression and anxiety are the most common symptoms in these patients. The purpose of the present study was, therefore, to assess the incidence of affective symptoms among MHI patients and to determine if the anxieties that result have any unique features and to consider the possible relationship between anxiety and depression.

Materials and methods

Forty-eight MHI patients, referred to the University Hospital of Modena from July 1985 to May 1986, were studied prospectively for neuropsychiatric complications of MHI. Criteria for admission to our study were: loss of consciousness for less than 20 min, an initial score on the Glasgow Coma Scale of 13 to 15, hospitalisation for less than 3 days, negative neurological examination upon admission and discharge, and no medical complications. Patients younger than 15 or older than 65 years were excluded from the study, as were patients with a known pre-traumatic history of affective disorders.

Each patient had previously undergone, with his matched control subject, a neuropsychological assessment evaluating attention capabilities.[2] Controls were chosen one by one by each patient from his/her spouse, relatives, friends and

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Table *Mean values of test scores of patients and controls*

	Head injured	*Controls*	*t*	*dF*	*nominal p*	*corrected p*
Depression	36·25 SD 8·4	31·17 SD 5·54	−3·5628	68	0·001	0·003
Anxiety-state	40·37 SD 10·4	37·23 SD 7·83	−1·8344	68	0·067	0·202
Anxiety-trait	39·88 SD 9·59	36·63 SD 6·02	−1·9937	68	0·047	0·142

schoolmates (case-control pairing). In this manner not only age and educational characteristics were closely matched but possibly also social habits and environmental factors. The mean age of patients was 28, SD 14 years, their educational level was of 9, SD 3 years. The mean age of controls was 28, SD 14 years, they had attended school for 9 SD 3 years.

Between 5 and 17 months following trauma (on average after 9 months) each couple was asked to answer a questionnaire assessing, among other complaints, anxiety and depression. The Italian translation of the Self Rating Depression Scale (SRDS)[14-16] was used to quantify depressive symptoms since it produced better validity coefficients than MMPI and Beck depression scales.[17] The questionnaire consists of 10 positive and 10 negative items scored from 1 to 4. The Italian version of the State-Trait Anxiety Inventory (STAI)[18 19] was used to assess anxiety. It consists of two subtests relating to state anxiety, that is, anxiety present when the patient is being tested, and trait anxiety, that is, anxiety usually present as a personality trait. The subject is presented with two series of 20 items scored from 1 to 4. The higher the global score (maximum 80), the worse the anxiety for both state and trait. The average score of the head injured patients group and their matched controls in the depression, state and trait-anxiety tests were compared using Student's *t* test corrected according to Bonferoni.

Results

Thirty-seven out of 48 patients (77%) responded immediately, a surprisingly high proportion for a mailed questionnaire. However, to avoid a bias toward particularly querulous patients, only data from those 35 patients whose corresponding control had also responded were considered. Scores in each test approximated normal distribution. The mean values of test scores are reported in the table.

Discussion

The validity of questionnaires for epidemiological surveys, particularly in the field of neuropsychiatry, is still debated since subjects with no complaints are less motivated to respond. Moreover, data obtained from questionnaires reflect many factors beyond those investigated. These methodological questions have been taken into account in our study. The high response rate of 77% permits one to generalise about the results. The case control approach allows many factors to be taken into account which may weigh on test scores and on the risk of head concussions, such as educational characteristics, social habits and environmental factors.[1]

Patients and controls differ with respect to two variables: the head injury and the hospitalisation. The latter also could account for an increased incidence of psychiatric symptoms. However, it should be noted that the period in hospital never exceeded 3 days and dated back at least 5 months. Moreover, if anything, hospitalisation would reasonably increase the risk of anxiety rather than that of depression.

According to our results anxiety seemed to play no part at all, either in state or trait analyses. There was no a priori evidence against trait anxiety levels since head injured patients could have particular personality traits defined by the accident prone personality. However, none of our patients had suffered from previous trauma.

We did not find any evidence of an anxiety state either. One possible explanation is that the STAI questionnaire is not sensitive enough to differentiate between the two aspects of anxiety. However, in our study depression is clearly more evident in the head injured group than in matched controls. Moreover, depression seems also a more frequently reported symptom. In 103 MHI patients interviewed one year after trauma we found depression in 39% and anxiety in 26%.[20] In conclusion, our study indicates that patients who have sustained mild head injuries are at a substantially higher risk of developing depression, when compared with an appropriate control group. Irrespective of the explanation, these findings strongly suggest that all head injured patients should be screened for depression, otherwise this is likely to go undetected and untreated.

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