

About symptoms of patients with post traumatic brain injury psychiatric sequels

Roxana Mittler-Matica

PhD Student in Medicine, University of Oradea, Romania
Neurosurgery Resident, Neurochirurgische Klinik, Städtisches Klinikum
Braunschweig, Germany

Abstract: Introduction: Because of high incidence, even if not permanently, some post traumatic brain injury (TBI) psychiatric sequels, are analysed. *Material and methods:* The paper refers to 1185 patients who were admitted to Section I Psychiatry, Neurology and Psychiatry Hospital, Oradea, during 2013 year. It was analysed the symptoms of those who suffered a TBI in the past; patients called: patients in the analysis group. The linear correlation coefficient was computed, in purpose to determine the relationship between duration relapses and number of symptoms. *Results:* It is observed a strong correlation between the years number of relapse (of post-TBI psychiatric disease) and the number of psychiatric symptoms associated. For 80% of psychiatric relapses after a TBI with loss of conscious (about patients in the analysis group), the TBI were suffered in infancy; such an incident in infancy may have severe influence on mental health. The psychiatric disease (for which they were admitted in hospital) worsened general health status at a percentage of 83.58% patients in the analysis group. The average by hospitalization days was 11.58; with approximation it was 12 days. *Discussion:* The most common symptoms of post-TBI psychiatric disease, which affects physical functionalities of patients in the analysis group, were: insomnia, fatigue, headache (64.66% have accused insomnia; 41.18% have accused weakness and / or fatigue; 33.34% have accused headache). Average by age of the patients in the analysis group with reduced instincts was 45.08 years. Women patients preserve better the instincts excepting defense instinct which diminishes more often compared to men patients in the analysis group.

Key words: linear correlation coefficient, years number of relapse, loss of conscious.

Introduction

Establishing causality between TBI and psychiatric disorders, it is important in terms both clinically and scientifically, [5]

especially in purpose to treat them effectively. [2] For some patients, [1] the consequences of TBI are particularly serious.

Many cases of TBI are followed [4] by

permanent disabilities with socio-economic impact, ones of these involve psychiatric disorders. For example, reported incidence rate of 15.3 to 33% were followed by a post-TBI major depression or other psychiatric disease such as: [7] posttraumatic stress disorder, personality change, aggression, inconsequent or immature behavioural, hyperactivity, mania, psychosis.

The spectrum of neuro-psychiatric sequels includes various manifestations, both somatic and psychiatric manifestations. These psychiatric symptoms may be divided into two categories: [6] cognitive and behavioral presentations.

Materials and methods

The paper refers on the 1185 patients who were hospitalized in Section I Psychiatry, Neurology and Psychiatry Hospital, Oradea, during 2013. A number of 67 patients have declared an antecedent TBI, so they are suspected to suffer of post-TBI psychiatric sequels. These 67 patients are named: patients in the analysis group.

Linear correlation coefficient (Bravais-Pearson) [3] was calculated in purpose to identify interdependence of two phenomena, as well as intensity of the connections, according with next formula:

$$r = \pm \frac{\Sigma(x' \cdot y')}{\sqrt{\Sigma(x')^2} \cdot \sqrt{\Sigma(y')^2}} \quad (1)$$

The notations are: r is correlation coefficient, with x' deviations from the arithmetic average of x phenomenon values; with y' deviations from the arithmetic average of the y phenomenon values. About correlation coefficient value, it is advisable to interpret (according to the theory Guilford) as follows: [3] an absolute value between 1 and 0.9 denotes a very strong correlation; between 0.9 and 0.7 denotes a strong correlation; between 0.7 and 0.4 denotes a correlation of medium intensity; between 0.4 and 0.2 denotes a low intensity correlation; between 0.2 and 0 denotes a very weak intensity correlation that it can be considered as non-existent.

Results

General health status of patients in the analysis group, were damaged by the psychiatric disorders for 46 of them, so at a percentage of 83.58%. For other 21 patients (16.42%) in the analysis group, the state of general health was evaluated to be reliably.

On admission to hospital, besides psychiatric disorder, a number of 38 patients in the analysis group were suffering by other chronic diseases. Of them, 31 patients had more than another chronic condition, figure 1. As well as psychiatric disorder, a percentage of 46.26% of patients in the analysis group were suffering of two or more chronic disease.

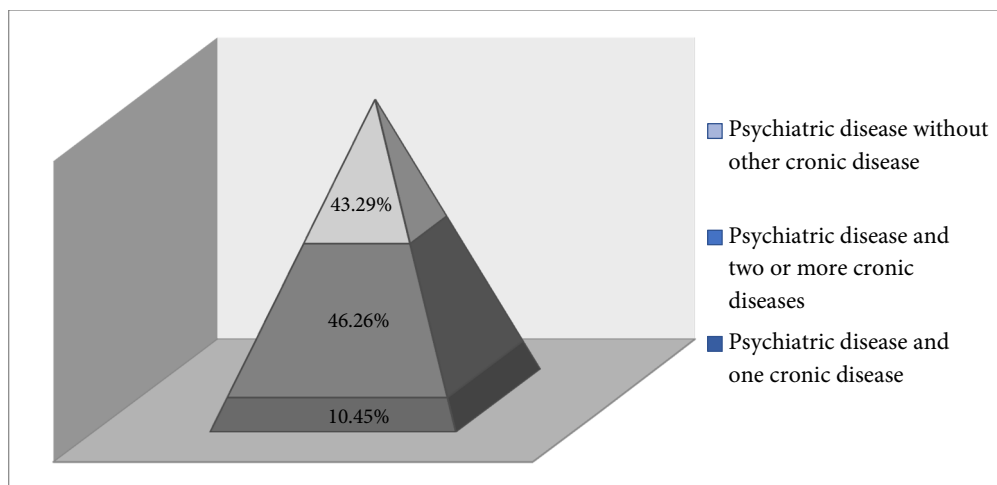


Figure1 - Chronic diseases (others than psychiatric) for patients in the analysis group

The symptoms described by patients in the analysis group are diverse. On the symptoms of patients in the analysis group were defined those vectors, comprising following:

a) Physical functionalities vector of symptoms which includes the following symptoms: vertigo, dizziness or balance disorders, tremors, tingles, retardation in movement, neck pain, back pain, limb pain or physical pain in general, chest pain, palpitations, sweating, lack of appetite, asthenia, fatigue, insomnia, etc.;

b) Cognitive functionalities vector of symptoms which determines the capability to work and to have a job and includes the following symptoms: low capability to memorize, aboulia (decrease of the will), voluntary activity reduction, spatial or/and temporal disorientation, etc.;

c) Emotional vector of symptoms which includes the following symptoms: fear, worries over everyday existence, psychomotor inhibition, psychomotor restlessness, psychomotor agitation, etc.;

d) Social vector of symptoms which determines the socio-affective functionalities and which includes the following symptoms: verbose, depressed mood, sad mood, aggressiveness, verbal aggression, mental degradation, etc.

For a percentage of 5.97% patients in the analysis group, some motor skills, corresponding physical functionalities vector, were affected by tremor of the extremities, sudden involuntary limb movements or false sensation of tingling, numbness, etc. (that occurs in some neurological disorders).

Headache was accused by a percentage of 33.34% patients in the analysis group.

Vertigo was accused by a percentage of 10.45% the patients in the analysis group; dizziness was accused by a percentage of 16.41%; vertigo and dizziness was accused by a percentage of 26.86% patients in the analysis group, figure 2.

Neck pains and / or lumbar pains were accused by a percentage of 7.46%; limb pains a percentage of 1.49%; generally physical pains

were accused a percentage of 2.98% patients in the analysis group.

Chest pains (in the thoracic region that is above the heart) were accused by a percentage of 4.47% patients in the analysis group (at one of these patients was reported duodenal ulcer, the other chest pains are not correlated with any other diseases than the psychiatric disease). Palpitations were accused by a patient of 61 years old, which among other diseases found (cervical spondylosis, thyroid dysfunction) was ESSV arrhythmia (over ventricular extra systole arrhythmia).

Fatigue was blamed by a percentage of 14.93%; fatigue and asthenia were blamed by a percentage of 23.88% of patients in the analysis group, figure 3. Sweating was accused by a percentage of 2.98% of patients in the analysis group.

Lack of appetite was accused by a percentage of 8.96%; lack of appetite and weight loss were accused a percentage of 4.47%. So, a percentage of 13.45% patients in the analysis group have accused lack of appetite (followed or not by weight loss). Feeling lump in the throat was accused by one female patient of 48 years old, who suffered a

TBI two year ago, with the diagnosis recurrent depressive disorder (RDD), severe depressive episode. Sound phobia was accused by a male patient of 48 years old, who suffered a TBI one year ago, diagnosed with RDD, severe depressive episode.

Frequently, insomnia was accused by patients in the analysis group; mixed insomnia accused a number of 31 patients (a percentage of 42.27%); wake insomnia was accused by a percentage of 14.93%; insomnia about the sleep start (dyssomnia) was accused by a percentage of 7.46%; figure 4.

About the instincts analysis, it was observed diminished instincts at a percentage of 17.91% patients in the analysis group.

For year 2013, hospitalization days of patients in the analysis group were 776. A percentage of 22.39% patients in the analysis group have declared a TCC with loss of conscious; a percentage of 33.33% those cases of TCC with loss of conscious represents psychiatric relapses; for example: a male patient of 49 years old, with diagnostic: recurrent depressive disorder, moderate depressive episode and psychiatric relapses along last 24 years.

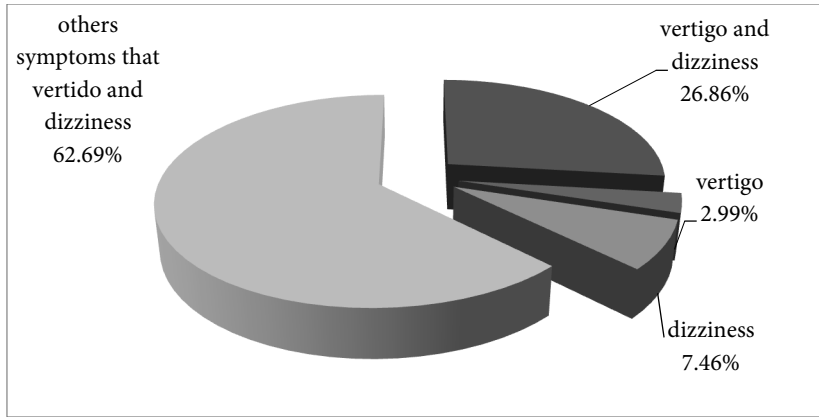


Figure 2 - Symptoms of vertigo and dizziness

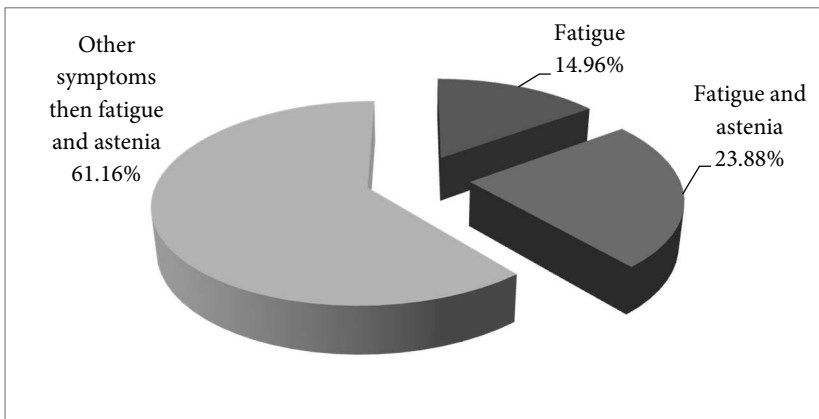


Figure 3 - Symptoms of fatigue and asthenia

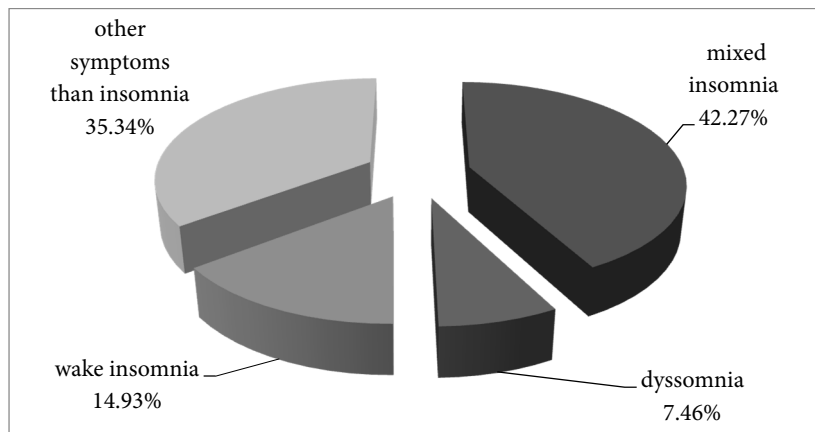


Figure 4 - On complaints of insomnia

Discussions

For a small percentage, 16.42% patients in the analysis group, the general health status was evaluated as good.

A percentage of 56.72% patients in the analysis group, besides psychiatric disease, they suffer from other chronic diseases, which complicate their treatment, sometimes. Those diseases were:

- hypertensive cardiomyopathy (4 patients), ischemic cardiomyopathy (2 patients), metabolic cardiomyopathy (2 patients), arrhythmia ESSV (1 patient), mitral (heart) in-sufficient (2 patients), arterial hyper pressure (10 patients);
- cervical spondylosis (6 patients), herniated disc (3 patients);
- chronic gastritis (2 patients), duodenal ulcer (2 patients), state postoperative colon cancer (1 patient);
- biliary dyskinesia (2 patients), gallstones (1 patient);
- liver disease (3 patients), toxic liver disease (2 patients), hepatic stenosis (2 patients);
- renal impairment (2 patients);
- alcohol abuse syndrome (2 patients), alcohol withdrawal syndrome (2 patients);
- anemia (1 patient), obesity (1 patient), diabetes (3 patients);
- sinusitis (3 patients), bronchitis chronic asthmatic (1 patient), chronic obstructive broncho pneumonia (1 patient);
- thyroid dysfunction (2 patients).

A percent of 20,89% patients in the analysis group have a diagnostic that involve a damaged functioning of the brain; those diagnostics were: organic disorder of personality and post-TCC behavior, cod F079, at a percentage of 2.98% patients in the analysis group (for example, a male patient of 51 year old, who suffered a severe TBI and brain contusion, 20 year ago), personality disorder of organic type, at 4.47%, (male patient of 42 years old, who suffered a severe TBI, one month ago), personality disorder of mixt type, at 2.98%, organic delusional disorder, cod F062 (at male patient of 55 years old, who suffered a severe TBI and cerebral hematoma, 11 month ago), cognitive disorder and brain atrophy (at a female patient of 69 year old, who suffered a TBI a week ago), organic mental disorder, cod F069, at 2.98% (for example, a male patient of 48 years old who suffered a TBI 3 year ago, with symptoms: psychomotor restlessness, low capability to memorize, low capability to process the information, MMSE test: 27 points, anxiety, low tolerance on frustration, social withdrawal tendencies).

The symptoms described by patients in the analysis group are different.

It was analyzed the correlation between years number of psychiatric relapses were noticed and number of symptoms (about hospitalization in 2013). Average by years, for which patients in the analysis group have registered psychiatric relapses, was 11 years (more accurate 10.82353). Average by number of symptoms was 6 (more accurate 6.05882).

The computation of linear correlation coefficient includes the determination of

deviation from the arithmetic average of two phenomena. It was performed according to table 1, (where it is written only values different from zero of achievement number, so it was detected at least one case).

The result of correlation coefficient value is: $r = -29 / (10,95445 * 34,32200) = -0,07713$; consequently, a strong correlation between those (but not a very strong correlation).

TABLE 1

Correlation between number of symptoms and time period (years) of psychiatric relapses

Years	1	2	6	8	9	13	14	19	23	24
Deviation (average=11)	10	9	5	3	2	-2	-3	-6	-12	-13
<i>The two events pairs values multiplied of achievements number</i>										
Symptoms/ Deviation										
3 / 3 (average=6)	3x10 <i>x1</i> =30						3x -3 <i>x1</i>	3x -6 <i>x1</i>		3x -13 <i>x1</i>
4 / 2		2x9 <i>x1=18</i>			2x2 <i>x1=4</i>					
5 / 1				1 x 3 <i>x1=3</i>		1 x(-2) <i>x1=-2</i>				
6 / 0			0 x 5 <i>x2=0</i>			0 x -2 <i>x1=0</i>				0x -12 <i>x1</i>
9 / -3	-3 x10 <i>x2</i>									
10 / -4	-4x10 <i>x1</i> =-40							-4 x -6 <i>x1</i>		
11 / -5									-5 x -12 <i>x1</i>	
total	30- - 60 - 40	18	0	3	4	-2 +0	-9	-18 +24	60	-39 + 0
Total general	-29									

It is noticed that a percentage of 88.24% patients (in the analysis group) with psychiatric relapse (who suffered a TBI before psychiatric disease) has accused insomnia as symptom and a percentage of 41.18% has

accused weakness and / or fatigue (for other 5.97% the psychiatric relapses was before the TBI). About those who have not accused weakness and / or fatigue, a percentage of 40% have accused lack of appetite or lack of

appetite with weight loss.

It is noticed that a percentage of 52.94% of patients (in the analysis group) with psychiatric relapses (who suffered a TBI before psychiatric disease) suffers from other chronic disease; among those diseases were: cervical spondylosis, arterial hypertension, arthrosis, chronic gastritis, diabetes, hepatic stenosis, renal impairment.

Regarding physical functionalities vector of symptoms, headache was accused, frequently. A percentage of 65.22% patients in the analysis group specified a constant location of pain. It was complaints about a frontal headache (sometimes with left frontal headache specification) or occipital headache, for most of them. Uncommon, it was accused left parietal headaches. Further descriptions of these pains were earpiece, mixed, persistent or diffuse. Of the patients who experienced headache, only one suffered from cervical spondylosis, his diagnosis was: cognitive disorder in observation, (MMSE: 17 points).

Headache and vertigo were accused by a percentage of 71.43% of patients with vertigo. Headache and dizziness and were accused by a percentage of 45.45% patients with dizziness. For example, a patient of 66 years old, with diagnostic: organic mental disorder, who underwent a TBI with 8 months before hospitalization in Section I Psychiatry; other symptoms were psychomotor restlessness, limitation of movements by involuntary contraction, fixing and evoking amnesia, ideas of guilt.

Fatigue and weakness represent symptoms that have been reported frequently, more accurate by a percentage of 38.81% patients in

the analysis group.

It can be observed that insomnia is the most common symptom; a percentage of 64.66% patients in the analysis group accused insomnia, that it means a rate of two out of three patients, fig.4.

Arithmetic average by age of the patients with reduced instincts was 45 years (45.08). Of these patients, 33.33% were women and 66.66% were men; it is noticed that the proportion of women / men is not the same as the patients in the analysis group, (a percentage of 41.79% were women and 58.21% were men); women preserved better all instincts (the difference is 8.46%). Instinct of defense was found to be decreased to 8.95% of patients in the analysis group. Average by age of patients with diminished instinct of defense was 58.5 years, while women represent a percentage of 83.33%, the difference is 41.54%; much more than the percentage of female patients in the analysis group. It is observed that women lose much easier the defense instinct than men. Exacerbated defense instinct was observed at a 68 year old male patient, with diagnostic: personality disorder mixed type; which suffered a TBI, 21 years ago. Food instinct was observed to be exacerbated at a female patient of 49 years suffering a severe TBI in childhood, or it was observed to be diminished at two male patients of 48 and 62 years old. Food instinct was observed to be abolished at a female patient of 61 years old, whose psychiatric disease started immediately after a TBI, 13 years ago. Instinct for alcohol

consumption it is noticed at a percentage of 4.47% patients in the analysis group, for example at a patient of 51 year old, his psychiatric disease started immediately after a severe TBI, due to a traffic accident (cerebral hematoma), 24 years ago, with psychiatric diagnostic: organic mental disorder. In conclusion, women preserve better the instincts, excepting defense instinct which diminishes more often comparing to men.

A percent of 20.89% patients in the analysis group have a psychiatric diagnostic that involve an anatomically damaged functioning of the brain; correlation between TBI and psychiatric disease was considered evident; for example: organic disorder of personality and post-TBI behavior, cod F079; organic delusional disorder, cod F062; organic mental disorder, cod F069.

It is recommended an increasing attention on risk of post-TBI psychiatric disorder, especially during convalescence after a TBI.

A good response to treatment with good result of each patient social integration, depend of each patient motivation; it is noticed the case of a 60 years old male patient with diagnostic: organic disorder of personality and post-TCC behavior, which suffered a severe TBI due an traffic accident, 14 years ago (the expert consult revealed: fluctuation of concentration and mobilization of attention, mental fatigue... and CT image reveals post-TBI brain sequels), but has a job.

Correspondence

Roxana Mittler-Matica

e-mail: roxana.mittler-matica@live.de

References

1. Anderson, V., & Spencer-Smith, M & Coleman, L., & Anderson, J. & Greenham, M. & Jacobs, R. & Lee, K. & Leventer, R., (2014), Predicting neurocognitive and behavioural outcome after early brain insult. *Dev. Med. Child. Neurol.*, Apr., 56(4):329-36;doi:10.1111/dmcn.12387
2. Bhalerao, S.U. & Geurtjens, C & Thomas G.R. & Kitamura, C.R. & Zhou, C. & Marlborough, M., (2013), Understanding the neuropsychiatric consequences associated with significant traumatic brain injury. *Brain. Inj.*, 27(7-8):767-74, doi: 10.3109/02699052.2013.793396
3. Dugaciu, N. & Moise, Gh. & Doroftei, S., (1997), *Elemente de biostatistică*. Arad, Editura Vasile Goldis, ISBN 973-98196-1-3
4. Greenberg, M.S., (2010), *Handbook of Neurosurgery*. New-York, Thieme Medical Publishers, ISBN 978-1-60406-326-4
5. Kinnungen, K.M. & Greenwood, R. & Powell, J.H. & Leech, R. & Hawkins, P.C. & Bonnelle, V. & Patel, M.C. & Counsell, S.J. & Sharp, D.L., (2011), White matter damage and cognitive impairment after traumatic brain injury. *Brain*, (a Journal of Neurology), vol.134, issue 2, doi: <http://dx.doi.org/10.1093/brain/awq347>
6. Riggio, S., & Wong, M., (2009), Neurobehavioral Sequelae of Traumatic Brain Injury. *Mt Sinai J of Med*, Apr; 76(2):163-172, doi:10.1002/msj.20097
7. Schwarzbald, M. & Diaz, Al. & Martins, E.T. & Rufina, A. & Amante, L.N. & Thais, M.E. & Quevedo, J. & Hohl, Al. & Linhares, M.N. & Wals, R., (2008), Psychiatric disorders and traumatic brain injury. *Neuropsychiatric Disease and Treatment*, Aug, v.4(4): 797-816
8. Whelan-Goodison, R. & Ponsford, J. & Schonberger, M., (2008), Association between Psychiatric States Following traumatic brain injury and outcome. *Journal Rehabil. Med.*, 40:850-85, doi:10.2340/16501977-0271