

Neuropsychiatric sequelae in a case of traumatic brain injury

Nityashree Koduri¹, Jyoti Shetty¹, Manjiri C Datar¹

¹Department of Psychiatry, Bharati Vidyapeeth (DTU) Medical College and Hospital, Katraj, Pune

Corresponding Author

Manjiri C Datar

E-mail ID: manjiri231@gmail.com

Submission : 26.10.2021

Acceptance : 25.11.2021

Publication : 22.12.2021



https://www.doi.org/10.56136/BVMJ/2021_00044

Introduction

Traumatic brain injuries in young adults are common after accidents and are a cause of concern. In India, 1.5 to 2 million persons are injured, and 1 million die every year due to traumatic brain injury⁽¹⁾. Road traffic accidents occurred predominantly in the age group of 15 - 40 years, among men and during evenings and nights (66%). Pedestrians (26%), two-wheeler riders (31%) and pillions (12%), and bicyclists (8%) were represented in higher numbers. The major behavioral factors were not wearing helmets, driving under the influence of alcohol, overspeeding and overtaking, and crossing in the middle of the road⁽²⁾.

Neuropsychiatric manifestations post head injury can be amnesia, cognitive impairment, personality change, psychosis, affective disorders⁽³⁾. The interventions involve comprehensive management and rehabilitation by multidisciplinary professionals. TBI rehabilitation is best managed by a specialized interdisciplinary team of health professionals. TBI rehabilitation often consists of two phases inpatient and community management⁽⁴⁾.

We present a case of a young male presenting to our hospital with a head injury.

Case

17year old male, a resident of Pune, completed 12th standard, with no comorbidities, had a road traffic accident with a head injury after a fall from his bike. The parents reported that he was admitted to a local hospital where he was unconscious for initial 4 hours after the head injury. After gaining consciousness, he was unable to recognize the family members for two days. He could not remember the events about the accident and

incidents thereafter. Subsequently, he started to be irritable, restless, and fearful after seven days of the accident when he was referred to our hospital. Family members reported that the patient was very uncooperative towards the nursing staff and doctors; he was also suspicious. The patient's relatives denied any history of psychiatric illness or substance use in the past.

His mental status examination revealed him to be distracted and was uncooperative during the interview. His psychomotor activity was raised, and he displayed disinhibited and childlike behavior. Rapport: Established with difficulty. The speech was Spontaneous, relevant, increased rate, childlike tone, and increased volume, coherent and comprehensible. Affect: Irritable, inappropriate, and restricted. Thinking revealed no depressive or psychotic features. Overfamiliarity and an increased sense of wellbeing were present. No perceptual disturbances were noted. His cognitive examination on Addenbrooke's cognitive assessment indicated orientation to date and new learning ability was impaired. The patient was able to carry out calculations. But he was very distractible to do three objects recall and digit span test.

The patient's Multi-Slice Computed Tomography of the Brain was done, which showed focal parenchymal edema in the left frontal region, likely non-hemorrhagic contusion. Small pneumocephalus in the left temporal region with minimal extra-axial bleed in the left parietal-temporal region. Minimally displaced fracture of the left parietal bone, extending inferiorly to involve the squamous and mastoid parts of the left temporal

bone with blood density collection in the left mastoid air cells and middle ear cavity.

The scores on the cognitive assessment batteries were-

Table 1: Scores on the cognitive assessment batteries

| Sr. No. | Test | Score |
|---------|---------------------------|-------|
| 1 | Similarities | 3 |
| 2 | Lexical fluency | 2 |
| 3 | Motor Series “Luria” test | 2 |
| 4 | Conflicting Instructions | 2 |
| 5 | Go-No-Go | 3 |
| 6 | Prehension Behaviour | 3 |
| Total | | 15/18 |

Table 2: Total ACE III Score

| TOTAL ACE III SCORE | 67/100 |
|---------------------|--------|
| ATTENTION | 14/18 |
| MEMORY | 4/26 |
| FLUENCY | 10/14 |
| LANGUAGE | 25/26 |
| VISUOSPATIAL | 14/16 |

The patient was diagnosed to have frontal lobe syndrome with anterograde amnesia following head injury. Neurosurgeons initiated conservative management with parenteral steroids (dexamethasone), later shifted to oral and anti-epileptic- Levetiracetam 1g/day was started.

The patient was started on Olanzapine 5 mg at night, an atypical antipsychotic which also has mood-stabilizing effects. Behavioral symptoms gradually subsided, and significant improvement was noted in his regressed as well as disinhibited behavior.

On follow-up after a month, relatives reported improvement in behavior with decreased irritability and remembering past events except around the accident. On MSE- his sense of wellbeing was increased, and there was raised self-esteem. His cognitive deficits of impaired recall and impaired new learning abilities were persistent after a month of the injury. His score on Addenbrooke cognitive examination III was: Attention: 18/18, Memory:14/26, Visuospatial:16/16, Language:26/26, Fluency:14/14; total: 88/100. In view of the above scores, a cognitive enhancer Donepezil

was added. On neuropsychiatric evaluation, no findings pertaining to parietal lobe injury changes were obtained.

Further plan of management includes psychosocial techniques for rehabilitation of the patient back into the community. Memory and vocational rehabilitation will also be introduced subsequently.

Discussion

In the present case, we discuss the importance of prompt management from a psychiatric aspect, in a case of traumatic brain injury. A prospective study of 939 head injury patients revealed that the prevalence of any psychiatric illness in the first year was 49% following moderate to severe head injury and 34% following mild head injury. Whereas moderate to severe head injury is associated with a higher initial risk, mild head injury may be associated with persistent psychiatric illness⁽⁵⁾.

Focal lesion research has replicably identified four categories of frontal lobe functions, each related to a defined anatomical region: energization – dorsomedial; executive (left – planning, task setting; right – monitoring); emotional/behavioral regulation – ventromedial/orbital; and integrative/metacognitive functions – frontopolar. The clinical presentation after TBI is clearly heterogeneous, and it is uncommon to have a single syndrome after TBI. Nevertheless, individual studies have demonstrated the value of focusing on the different behavioral domains to reveal the totality of potential sequelae after TBI⁽⁶⁾. Disinhibition, poorly modulated emotional reactions, disturbances in decision making and goal-directed behavior, social inappropriateness, hypersexuality, lack of empathy, and insight have all been linked to the occurrence of ventromedial frontal lesions⁽⁴⁾. In the present case, the patient exhibited, disinhibition, socially inappropriate and childlike behavior, lack of empathy, and poor insight.

Psychotropic medications including antipsychotics and mood stabilizers may be needed for the treatment of behavioral syndromes post head injury.

The long-term consequences of TBI are a matter of substantial concern for affected individuals and their families, and for society owing to the substantial

economic burden; moreover, the costs are greater in the elderly and, therefore, set to increase in an aging population⁽⁷⁾.

Multiple negative effects on lifelong health have been associated with TBI (panel). There is growing evidence that many people in the chronic phase live with under-recognized and poorly managed sequelae of injury^(8,9).

The management requires a combined pharmacological and psychosocial approach. Comprehensive rehabilitation programs include recreational programs, occupational therapy, vocational training workshops to facilitate the reacquisition of social and basic daily living skills. These therapies also provide opportunities for staff and evaluate and remediate patients' deficits in planning and problem-solving⁽¹⁰⁾.

In the case discussed above, as the patient was referred to a psychiatrist immediately, timely treatment was obtained, and thus neuro-psychiatric sequelae were managed promptly. Post the hospital stay, patient and relatives were given psychoeducation regarding behavioral management and vocational training. The patient was asked to formulate a routine for his day, including a social skill activity, i.e., farming or taking care of the animals in this case. Subsequently, on follow-ups patient was counseled regarding the nurturing his hobbies and indulging into recreational activities. The patient's family members were further psychoeducation regarding the need for regular follow-ups, continuing his education.

There is an added benefit – creating an awareness of how the presence of dysfunction related to frontal system pathology may impact virtually all treatment efforts. For example, teaching compensatory strategies for memory disorders by use of a paging system, and making this a self-sustaining routine, can be affected by executive dysfunction⁽¹¹⁾.

In conclusion, the neuropsychiatric sequelae after head injury require a multidisciplinary and combined biopsychosocial approach in the management. In this case, the prompt response to the psychotropic medications, immediate response, and a comprehensive approach benefitted the patient in transitioning from inpatient facility to his home very smoothly.

Declaration of patient consent

We have obtained all appropriate patient consent forms from the caregiver (father) as the patient is incapable of giving consent. The caregiver understands that the patient's name and initials will not be published, and due efforts will be made to conceal his identity, but anonymity cannot be guaranteed.

Source of support: Nil

Conflict of interest: Nil

Copyright © 2021 The Author. This is an open access article, it is free for all to read, download, copy, distribute, adapt and permitted to reuse under Creative Commons Attribution-NonCommercial-ShareAlike: CC BY-NC-SABY 4.0 license.

References:

1. Sadock BJ, Sadock VA, Ruiz P. Comprehensive textbook of psychiatry 10th edition.
2. Gururaj G, Kolluri S.V.R, Chandramouli B.A, Subbakrishna D.K and Kraus JF. Traumatic Brain Injury, National Institute of Mental Health & Neurosciences, Publication no. 61, Bangalore - 560029, India. 2005
3. David A, Fleminger S, Kopelman M, Mellers J, Lovestone S. Lishman's organic psychiatry: a textbook of neuropsychiatry.
4. Khan F, Baguley IJ, Cameron ID. 4: Rehabilitation after traumatic brain injury. Medical journal of Australia. 2003 Mar;178(6):290-5.
5. Fann, J.R., Burington, B., Leonetti, A, Jaffe, K., Katon, WJ., Thompson, RS. Psychiatric Illness Following Traumatic Brain Injury in an Adult Health Maintenance Organization Population. Arch Gen Psychiatry 2004; 61:53-61.
6. Stuss DT. Traumatic brain injury: relation to executive dysfunction and the frontal lobes. Current opinion in neurology. 2011 Dec 1;24(6):584-9.
7. Gooch CL, Pracht E, Borenstein AR. The burden of neurological disease in the United States: a summary report and call to action. Ann Neurol

- 2017;81:479–84.
8. Kolakowsky-Hayner SA, Hammond FM, Wright J, et al. Ageing and traumatic brain injury: age, decline in function and level of assistance over the first 10 years post-injury. *Brain Inj* 2012; 26: 1328–37.
 9. Schulz-Heik RJ, Poole JH, Dahdah MN, et al. Service needs and barriers to care five or more years after moderate to severe TBI among veterans. *Brain Inj* 2017; published online June 6. DOI:10.1080/02699052.2017.1307449.
 10. Levin H, Kraus MF. The frontal lobes and traumatic brain injury. *The Journal of neuropsychiatry and clinical neurosciences*. 1994.
 11. Fish J, Manly T, Emslie H, et al. Compensatory strategies for acquired disorders of memory and planning: differential effects of a paging system for patients with brain injury of traumatic versus cerebrovascular aetiology. *J Neurol Neurosurg Psychiatry* 2008; 79:930–935.