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Traumatic brain injury

Long term care of patients in general practice

Background

Traumatic brain injury is a significant cause of disability worldwide. Patients with a traumatic brain injury may have a range of physical, mental, cognitive and social problems involving care from a general practitioner.

Objective

This article provides a summary of the available evidence for managing the common mental health, somatic and cognitive/behavioural issues associated with traumatic brain injury.

Discussion

The long term sequelae of traumatic brain injury pose a number of challenges for patients, their families and GPs. Common somatic complaints include seizures, headache, dizziness and sleep disturbance. Common mental health problems include depression, psychosis and anxiety. Cognitive and behavioural or personality changes can be significant and persist for some time following injury. Quality of life is closely predicted by return to the workforce and long term functional status is often linked to the severity of the injury. There is limited evidence for effective treatments of these sequelae and a need for more research. However, there are a number of proven treatments and an emerging understanding of the long term sequelae of traumatic brain injury.

Keywords: brain injuries; rehabilitation



Traumatic brain injury (TBI) is a significant cause of disability worldwide. In Australia, there are approximately 107 hospital separations for TBI every year per 100 000 population.¹ Between 1990 and 2005 this overall figure has remained stable, however, the proportion of these patients aged less than 14 years has decreased while the proportion over 45 years of age has increased.¹ According to Bruns,² TBI can be defined as 'an alteration in brain function manifest as confusion, an altered level of consciousness, seizure, coma or focal sensory or motor neurologic deficit resulting from blunt or penetrating force to the head'. It should not be confused with the more general term 'head injury' which can include facial and other superficial lacerations without altered brain function.

Traumatic brain injury is more likely to occur in males, particularly from assault and motor vehicle crashes. In older people falls and motor vehicle accidents are the most common cause, with alcohol an important associated factor in all causes.³ A study has shown that TBI due to assault was 21 times more likely in Indigenous Australians compared with non-Indigenous Australians.⁴

Severity of TBI is measured according to the International Classification of Diseases (ICD) Injury Severity Score which uses ICD estimates of patient survival for each injury sustained and aggregates these into a single overall measure of the probability of survival in an individual patient.¹ The main focus of this article is on the long term care of people with severe and very severe TBI according to the ICD Injury Severity Score.

People with TBI face major ongoing problems. While TBI can cause long term physical disabilities, the complex cognitive, behavioural and personality sequelae are commonly the most disabling problems.¹ General practitioners play a significant role in providing ongoing support for TBI patients in the community and are a major source of information and counselling for patients, their families and carers.

This article has been adapted and updated from earlier guidelines⁵ and provides a summary of the evidence for the effectiveness of strategies to manage some of the common conditions facing TBI survivors.



Issues facing people with traumatic brain injury

Mental health issues

Depression

One major study estimated that major depression occurs in approximately 27% of TBI patients⁶ and another showed that TBI sufferers are 1.5 times more likely to have depression during their lifetime.⁷ Feelings of hopelessness, difficulty enjoying activities and feeling worthless are the most distinguishing symptoms of depression in TBI patients. Difficulty falling asleep, restlessness, weakness and poor concentration are also common but not as specific.

Commonly used depression scales, such as the Beck Depression Inventory scale may not be as valid in TBI patients. Sertraline has been studied in TBI patients with depression and is an effective and well tolerated treatment.⁸ Community based outreach rehabilitation is also effective in improving depression scores in the first 2 years postinjury.⁹ Counselling, music therapy and/or exercise may also be effective and, in many cases, preferred treatment options for TBI patients.^{10–13} There will be spontaneous recovery from depression without treatment in more than half of TBI patients.⁶

Anxiety

Anxiety is more likely to take the form of post-traumatic stress disorder (PTSD), obsessive compulsive disorder and generalised anxiety in TBI patients and may occur in up to 20% of patients.¹⁴ A Cochrane review concluded that there is some evidence for the effectiveness of cognitive behavioural therapy (CBT) for acute stress disorder following mild TBI and CBT combined with neurorehabilitation for generalised anxiety symptomatology in those with mild to moderate TBI.¹⁵ An extended period of unconsciousness may be protective against the development of PTSD. Telephone counselling may prevent PTSD in some cases.¹⁶

Schizophrenia

Schizophrenia is likely to be twice as common in patients with TBI than in the general community (adjusted OR=1.8; 95% CI: 1.0–3.3)¹⁷ and patients are more likely to present with paranoia and auditory hallucinations of gradual onset. There are no known TBI-specific treatment issues, therefore general schizophrenia management guidelines should be followed.¹⁸

Cognitive and behavioural issues

Cognitive impairment

Self reported memory problems, difficulty writing letters and dealing with paperwork are common in TBI patients and the prevalence 5 years postinjury increases with injury severity.¹⁹ Two-thirds of patients with severe TBI report memory problems, 44.4% have difficulty writing a letter, and 59.3% have trouble dealing with paperwork.¹⁹ Memory

aids and reminder devices can reduce the number of everyday memory failures and cognitive rehabilitation may have the additional benefit of reducing anxiety and improving self concept and interpersonal relationships.^{20–23}

The use of dopamine agonists for improvement of memory and executive functions has not been proven to be effective.²⁴ A randomised controlled trial showed that mindfulness meditation techniques did not improve cognition in TBI patients.²⁵ Cognitive deficits usually resolve in patients with mild TBI within 1–3 months of injury. Cognitive improvement may continue in patients with moderate to severe TBI for up to 2 years.²⁶

Personality and behaviour changes

Behavioural problems are common and may occur in more than half (61.6%) of TBI patients 12 months postinjury.²⁷ Patients are likely to have a depressive temperament and exhibit irritability, impatience and socialisation problems. Behavioural problems are more frequent in severe TBI. A review concluded that there is no definitive evidence for the effectiveness of drug therapy for behavioural problems in TBI patients.²⁸ There is weak evidence, mainly based on case studies, that psychostimulants may be effective in the treatment of apathy, inattention and slowness; high dose beta blockers for agitation and aggression; anticonvulsants and antidepressants, particularly selective serotonin reuptake inhibitors (SSRIs) in the treatment of agitation and aggression (especially in the presence of an affective disorder).²⁸ There is also limited evidence for the effectiveness of anger management programs in the treatment of TBI patients with anger problems.²⁹ Unfortunately, behavioural problems are often chronic with estimates that 63% of patients with severe TBI suffer from irritability and 40.7% with depressive temperament 5 years postinjury.¹⁹

Lifestyle issues and quality of life

Quality of life

Employment, particularly part time, is an important prognostic indicator for quality of life after TBI. In a study comparing quality of life indicators in individuals with TBI with others living in the community, those with mild TBI rated their quality of life as lower than people with severe TBI and individuals with TBI reported work, socialising, close friends and significant others as important unmet needs.³⁰ Caregiver perceptions of patient fitness to drive strongly influence driving levels but do not accurately predict driver safety; medical assessment is a more accurate method of determining road safety.³¹

Functional status

In most patients with TBI, cognitive difficulties are more prominent than impairments in functional status (ie. the ability to perform set tasks and activities of daily living). However, functional difficulties can occur. Importantly, they are more common in patients with severe TBI than in the mild to moderate groups. There is limited evidence for the effectiveness of individual placement and/or apprenticeship models of



supported employment for TBI patients.⁵ Functional status is dynamic but generally improves over the first 2 years following TBI. Predictors of final functional status are uncertain.³²

Issues for carers and families

Estimates of primary caregiver stress and family dysfunction vary considerably. They may be as low as 10% or as high as 68%, with primary carers (particularly female spouses) at greatest risk of poor psychological outcomes.⁵ Male relatives (most of whom are secondary or tertiary carers) are likely to express their distress as anger or fatigue rather than depression or anxiety. This should be considered in assessing caregiver and family stress. Caregiver stress is greater if the patient has a troubled psychosocial history and in those who have financial barriers to accessing services. Social support structures appear to play an important role in the prognosis for caregiver burden.³³

Substance use disorder

A longitudinal study showed that TBI patients generally had a higher alcohol consumption rate before injury than the general population and that younger patients and those with high pre-injury consumption levels were most at risk of postinjury alcohol abuse.³⁴ Importantly, 42% of patients with head injuries of varying severity were legally intoxicated (blood alcohol level >100 mg/dL) on presentation to hospital emergency departments.³⁵

There is conflicting evidence about the postinjury patterns of alcohol use, however, use may decline in the first year following TBI but increase gradually over subsequent years.⁵ The CAGE questionnaire for alcohol abuse has 86% specificity and 91% sensitivity following TBI.³⁶ There is limited evidence for the effectiveness of comprehensive case management or systematic motivational counselling in TBI patients with alcohol abuse.⁵

Common physical issues

Seizures

Post-traumatic epilepsy develops most commonly in the first 12 months postinjury and affects approximately 10% of TBI survivors.³⁷ One study found that epilepsy is more likely to occur in patients showing computerised tomography and/or focal electroencephalogram changes and which may have not been predicted by the Glasgow Coma Score postinjury.³⁸

Phenytoin in the postacute phase may reduce the chance of early post-traumatic seizures (RR=0.34; 95% CI: 0.21–0.54) but prophylactic phenytoin, carbamazepine and valproate have no effect on the prevention of late post-traumatic seizures.^{39,40} Studies have shown no conclusive evidence for the effectiveness of relaxation therapy, CBT, electroencephalogram, biofeedback, educational interventions or yoga as a treatment for epilepsy in general (not specific to TBI).^{41,42} Patients with post-traumatic epilepsy are more likely to have poor behavioural and functional outcomes.⁵

Table 1. Diagnosis of postconcussion syndrome

A diagnosis of postconcussion syndrome requires:

- A history of head trauma with loss of consciousness preceding symptom onset by maximum of 4 weeks and
- The presence of three or more of the following symptom categories:
 - headache, dizziness, malaise, fatigue, noise intolerance
 - irritability, depression, anxiety, emotional lability
 - subjective concentration, memory, or intellectual difficulties without neuropsychological evidence of marked impairment
 - insomnia
 - reduced alcohol tolerance
 - preoccupation with above symptoms and fear of brain damage with hypochondriacal concern and adoption of sick role

Source www.who.int/classifications/icd/en

Somatic complaints

Headaches (29–54%), dizziness (26–58%), pain (11–48%) and sleep disturbances (11–58%) are the most common somatic complaints attributable to TBI.¹⁹ Self reports of dizziness are particularly sensitive and specific in TBI patients and the Dizziness Handicap Inventory is a useful and reliable method for evaluating the efficacy of antivertigo/dizziness drugs (see *Resource*).⁵ There is no TBI-specific treatment for headache and sleep disturbances, however vestibular rehabilitation (including exercise therapy) is effective in the early stages of dizziness.⁴³ Betahistine 48 mg/day for 8 weeks significantly reduced dizziness in one study.⁴⁴ However, if present, somatic complaints typically persist for the long term in many patients.⁵

Postconcussion syndrome

Postconcussion syndrome (*Table 1*) occurs in approximately 15% of TBI survivors. However, its existence as an entity specifically associated with brain injury (as opposed to other trauma) is often debated. A report on 10 observational studies showed that this symptom cluster is no more prevalent in TBI than in other chronic disease states within the community.⁴⁵ Brief cognitive and educational interventions following injury may be beneficial but most symptoms of postconcussion syndrome will resolve within 3 months postinjury.⁴⁶

Summary of important points

- Traumatic brain injury is a significant cause of disability worldwide.
- Patients with a traumatic brain injury can have a range of physical, mental, cognitive and social problems that require care from their general practitioner.
- Common somatic complaints in patients with TBI include seizures, headache, dizziness and sleep disturbance. Common mental health problems include depression, psychosis and anxiety.



- Cognitive and behavioural or personality changes are common and can persist for some time following injury.
- Quality of life is closely predicted by return to the workforce and long term functional status is often linked to the severity of the injury.
- There is limited evidence for effective treatments. However, there are a number of proven treatments and an emerging understanding of the long term sequelae associated with TBI.

Resource

The Dizziness Handicap Inventory is available in Trevena L, Cameron I, Porwal M. Clinical practice guidelines for the care of people living with traumatic brain injury in the community. Motor Accident Authority, 2004. Available at www.psych.usyd.edu.au/cemped/docs/Clinical_Prac_Guidelines_TBI_Full_report.pdf.

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