

COGNITIVE AND BEHAVIOURAL OUTCOMES AFTER TRAUMATIC BRAIN INJURY IN CHILDREN

Traumatic brain injury remains a leading cause of mortality and morbidity in children and adolescents.

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Although traumatic brain injury (TBI) remains a leading cause of mortality and morbidity in children and adolescents,¹ improvements in medical management and treatment have led to a significant increase in survival rates.² However, survivors of paediatric TBI (pTBI) face a range of adverse cognitive, academic, behavioural and interpersonal outcomes. These sequelae have long-term effects and can lead to poor quality of life³ and a significant economic and social burden for families and communities.²

Paediatric TBI results in a broad array of cognitive deficits.

Cognitive outcomes

Paediatric TBI results in a broad array of cognitive deficits, including impairment of attention and memory, executive functions, processing speed, general intellectual functioning, and visuoperceptual and motor skills.¹ Research demonstrates a dose-response relationship between injury severity and cognitive outcomes.^{1,4}

Academic outcomes

TBI and its sequelae have adverse effects on academic functioning.⁵ Cognitive functions commonly affected after pTBI are also those necessary for learning and knowledge acquisition. As there are positive associations with returning to a mainstream school after TBI,⁶ families of the injured child may be eager to have him/her do so at the earliest opportunity. Children may therefore return to school without having been adequately assessed. Furthermore, there may be residual 'invisible' problems (i.e. memory or attentional impairments that are not as obvious as physical or behavioural impairments and that teachers may therefore not be aware of immediately) that have an impact on the child's ability to function in the classroom, especially in large classes.⁶ Furthermore, teachers are sometimes not aware that learners have sustained a TBI, which has an impact on the degree of support provided.

Behavioural outcomes

The behavioural sequelae of pTBI include hyperactivity, impulsivity, social disinhibition, aggression, poor temper control, mood swings and psychiatric disorders.^{6,8} Researchers and clinicians need to pay particular attention to outcomes in this domain firstly, because half of the children who survive TBI experience behavioural impairment,⁸ and secondly, impairment in this domain may be more persistent than in others.^{8,9} Both the family environment and injury severity are important in predicting behavioural outcome.⁷

Behavioural sequelae as a direct and an indirect effect of pTBI

Prefrontal areas of the brain are vulnerable to the impact and effects of closed head injury.^{4,10} Damage to this brain region may result in executive dysfunction, which might, in turn, be associated with problematic behaviours (e.g. impulsivity or inattentiveness). This is an example of behavioural impairment as a *direct* result of TBI, and of how cognitive effects can bring about behavioural effects.

Behavioural impairment can also occur as an *indirect* result of a brain injury.¹⁰ After physical recovery, caregivers may not be aware of the 'invisible' deficits as described above, and may therefore have unrealistic expectations of the child.¹¹ Difficulties in paying attention or in task completion may therefore be interpreted as behavioural problems.¹¹ An additional indirect effect may occur if children struggle to adjust to the change in their abilities from before to after injury, and consequently react to this change by either acting out or withdrawing.¹¹

Effects on the family

The effects of TBI impact not only on the child who sustained the injury, but also on his/her family. Recent research reports indicate severe levels of distress for parents or caregivers of children who have sustained a TBI, regardless of the severity of the injury.¹² In many cases, marital breakdown results from the stress associated with caring for a child with TBI.¹³

Factors determining outcome

There are numerous risk factors for adverse outcomes after pTBI (Fig. 1). This interplay of a number of injury-related and real-world factors in determining outcome^{7,11,12,14} makes it clear why a particular child's outcome after TBI is unique¹⁰ and challenging to predict.

Supplementary management strategies

Early identification

As social deprivation is key in determining outcome, it is suggested that children with TBI who come from disadvantaged backgrounds be identified as early as possible so that the moderating effects of these variables can be limited.¹⁵

Communicating with parents

Parents should be educated about the range of factors that can influence outcome, so that they have a better understanding and realistic expectations of their child's scope of recovery.¹² This task is undoubtedly challenging, owing to each child's unique characteristics and the family environment.



Fig. 1. Factors reported to predict outcome after pTBI.

Neuropsychological/psychiatric assessments

These evaluations can provide an overall sense of the child's impairment and a profile of his/her strengths and weaknesses. Information

may be communicated to parents and teachers to assist with management of the child.¹⁰ Input from clinical psychologists and psychiatrists with regard to typical emotional and behavioural difficulties after TBI is also recommended.⁶

Transition back to school

Communicating with educators about a child's injury and subsequent needs may allow greater support for the child and the parents after the injury.¹² It is recommended that there be continued monitoring of children who have sustained a TBI when they return to school in order to keep track of potential long-term deficits.⁹

References available at www.cmej.org.za

IN A NUTSHELL

- Traumatic brain injury (TBI) remains a leading cause of mortality and morbidity in children and adolescents.
- Improvements in medical management and treatment have led to a significant increase in survival rates.
- Paediatric TBI results in wide a range of adverse cognitive, academic, behavioural and interpersonal outcomes.
- There is a dose-response relationship between injury severity and cognitive outcomes.
- There are numerous risk factors for adverse outcomes after paediatric TBI.
- There are long-term effects that can lead to poor quality of life and a significant economic and social burden for families and communities.

SINGLE SUTURE

HIV in donor kidney

Organ transplant centres in the USA have been warned to test live donors for HIV a week before operating. This follows a case in which a kidney from a donor spread HIV to the recipient.

Although the donor tested negative 11 weeks before the transplant operation in 2009, they had unknowingly picked up the virus through unprotected sex in the time between the test and the transplant. The infection was discovered when the recipient developed AIDS a year later.

Both individuals are alive and receiving treatment, but the case highlights a danger with living donation, which has soared in recent years and now accounts for almost half of all donated organs.

Colin Shepard at the New York City Health Department, and lead author of the case report, says that the US Centers for Disease Control in Atlanta, Georgia, is now recommending donors have a nucleic acid test, which is sensitive enough to identify HIV within a week before a transplant.

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