

Pragmatic Evidence Based Review

Challenging behaviour in moderate to severe TBI

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Important Note:

- This report is not intended to replace clinical judgement, or be used as a clinical protocol.
- A robust systematic review of; evidence based guidelines, systematic reviews and high quality primary evidence relevant to the focus of this report was carried out. This does not however claim to be exhaustive.
- The document has been prepared by the staff of the research team, ACC. The content does not necessarily represent the official view of ACC or represent ACC policy.
- This report is based upon information supplied up to 12th May 2011

Purpose

The purpose of the current report is to summarise the research on challenging behaviour occurring in a person after a *moderate to severe*¹ traumatic brain injury (TBI). The following review will cover:

- Prevalence and risk factors for challenging behaviour in TBI patients,
- Impact of the behaviour on rehabilitation outcomes,
- Interventions/strategies for clients with concurrent TBI and behavioural problems.
- Potential extra costs associated with challenging behaviour and TBI rehabilitation.
- Recommendations for changes where appropriate, based on best practice identified in the available literature

¹ Based on the classifications of moderate to severe TBI used in the ACC TBI Guideline (2006)¹. From here on in the report, TBI will refer to this classification.

Key Findings

- Externalising behaviours are more common than internalising behaviours
- 25% of adults show aggression following moderate to severe TBI
- Children = 35-70% behavioural disorders
- Behaviour and personality problems are more distressing than cognitive/physical problems
- Social and work integration is significantly lower
- Best quality evidence for treatment is beta-blockers
- Comprehensive/holistic approaches appear to be the most effective behavioural treatments

Recommendations

- Extra support for carers/family members should be provided as part of a holistic rehabilitation for TBI patients
- Education for clients/carers/family members about possible personality changes and behavioural problems should be part of rehabilitation
- Providers should use pharmacological intervention only where absolutely necessary due to the additional confusion and irritability they may cause the client
- Treatment of behavioural problems should form a central part of rehabilitation and not be secondary to physical or cognitive rehabilitation

1 Background

1.1 Definitions

Challenging behaviour encompasses a variety of behaviour from serious problems such as physical aggression to more minor issues like poor hygiene. A recent systematic review looking at interventions for challenging behaviour have provided a list of the behaviour's covered in the studies they reviewed ²;

- unspecified aggression
- physical aggression
- verbal aggression
- anger management problems
- self-injury
- impulsiveness, disruption
- non-compliance
- sexually inappropriate talk or activity
- anxiety
- unsafe behaviour
- poor hygiene.

1.2 Personality Disorders

Personality changes and disorders are also part of the challenging behaviour category and are common in the TBI population. Although quality research on personality disorders (PD) following TBI is sparse, there is some suggestion that the

frequency of PD's in the TBI population both before and after injury, are greater than in the general population and are similar to rates in mental health facilities³⁻⁵. The most common post-injury PD's were borderline (34%) and paranoid (26%).

In a cross-sectional study with 100 TBI patients (severity not indicated), 24% met the criteria for a PD pre-injury, with antisocial personality disorder being the most common. This figure increased to 66% post-injury and included borderline PD and obsessive compulsive PD.

For those patients who are first diagnosed with a PD post-TBI, there are two main streams of thought for the mechanism by which the PD develops. The first is that the personality changes are caused by organic changes to regions in the brain. Neurochemical changes and specific damage to the prefrontal, orbitofrontal and anterior temporal regions are thought to be responsible for some of the personality changes that occur after TBI⁴. Other authors propose that the personality changes are caused by the person's inability to cope with environmental demands that were not a problem pre-injury.

1.3 Methodology

A comprehensive literature search focused on moderate to severe TBI search undertaken by an information specialist. The literature was critically appraised using SIGN grading for systematic reviews and Randomised Controlled Trials (RCTs), and the AGREE instrument for appraisal of guideline quality.

2 Review of the Literature

Externalising behaviours are more common than internalising ones following TBI². However internalising problems may be under-reported as they may not be recognised as easily or be judged as important as externalising problems.

2.1 Prevalence

For adults with moderate to severe brain injury, prevalence rates for aggression were found to be 25% across 3 time points for up to 60 months following their injury⁶. This was unrelated to pre-injury characteristics so can be classed as new behaviour. Additionally, aggression and agitation is a common occurrence immediately after injury. Brooke found that 11% of patients in medical or surgical wards showed signs of aggression or agitation⁷.

For children with severe TBI, new persisting behavioural disorders range from 35% to 70%. These problems have been found to be more of a problem in adult life than intellectual or physical problems².

2.3 Risk Factors

In a systematic review of violence following head injury, the risk of violence was found to be up to 3 times more than in the general population⁸. The authors identified several risk factors for violence, including co-morbid depression, prefrontal/frontal lobe lesions, and history of lower educational attainment.

As mentioned above, certain personality traits/disorders, such as antisocial personality disorder are more common in patients pre-injury. This indicates that an antisocial lifestyle that involves risk taking and impulsivity places an individual at an increased risk for having a TBI.

2.4 Impact on Outcomes for Rehabilitation

Challenging behaviour poses problems for both carers (both in acute care and residential/home care) and patients. It can significantly decrease the effectiveness of rehabilitation for the cognitive and functional deficits that may occur post-injury⁹.

Several authors note that the behavioural issues and personality changes are more distressing for the patient and their families than the cognitive or physical problems that occur after TBI⁴.

Additionally, there is some evidence that shows the persistence of PD's over time. Koponen and colleagues found that 23% of their participants suffered from a PD up to 30 years after their injury³.

Both social and work integration are found to be significantly lower in TBI patients with behaviour problems compared to controls¹⁰.

2.5 Treatment/Strategies

Treatment for challenging behaviour is dependant on the type of behaviour but includes pharmacological and behavioural interventions.

Pharmacological interventions

Pharmacological interventions are common in the immediate management of aggression and agitation, and are often used to sedate the patient. Medications used include; antipsychotics, benzodiazepines, antidepressants, beta-blockers and lithium. However, medications that sedate patients often cause confusion and increase the agitation and aggression levels of the patient¹¹.

A small Cochrane review of pharmacological interventions for aggression in people with acquired brain injury (ABI) found the best quality evidence for the effectiveness of beta-blockers (propranolol). However, this conclusion was based on only four studies, with only 1 of these having patients with TBI and the remaining having ABI.

Gains observed after drug treatment are often only short term with many patients returning to baseline levels of aggression several months later¹¹. Follow up over several months or more is essential for understanding the outcomes of pharmacological treatment.

Behavioural Interventions

Ylvisaker et al place the interventions in their review in three categories; primary use of contingency management procedures (CMP), associated with traditional applied

behaviour analysis (ABA), or a combination of these. The majority of participants in the review had severe TBI ².

Treatment gain, measured by a reduction in negative behaviour, was observed in the majority of studies (n = 65). Forty-two of the studies showed maintenance of the gain, 21 showed treatment transfer to non-treatment settings, and 45 of the studies showed some type of social validity (e.g. independent living success).

Successful interventions associated with ABA are;

- positive reinforcement
- negative reinforcement
- extinction
- punishment
- token economy programmes (positive behaviour exchanged for rewards).

Successful interventions associated with PBIS (positive behaviour interventions and supports) included;

- proactive development of positive communication alternatives to negative behaviour
- adjustment of tasks and expectations to ensure success
- provision of meaningful and well understood daily routines
- positive behavioural momentum before difficult tasks.

The authors of the above review state that behavioural intervention *in general* should be considered best practice at acute and post-acute recovery for TBI for those with behaviour problems.

Specific types of intervention (ABA or PBIS) should be considered as evidence-based treatment *options*. Because of the lack of quality evidence, stronger recommendations (i.e. practice standards or intervention guidelines) cannot be provided.

Functional behaviour assessments and ongoing monitoring of patients' response are critical in behavioural rehabilitation.

A more recent extension of the above review ⁹ compared ABA with cognitive behaviour therapy (CBT), and comprehensive-holistic approaches. Unfortunately the review included people with an ABI so is not specific to the TBI population, however it is still relevant.

The review outlines the differences between the approaches of ABA and CBT as these are closely related and CBT is often thought to come under the ABA umbrella. ABA focuses on environmental antecedents and consequences for behaviour while CBT focuses on the therapeutic relationship as the main component for treatment. Additionally, CBT highlights natural and logical rewards compared to the artificial rewards (e.g. token economy programmes) in ABA programmes.

Comprehensive-holistic approaches can be differentiated from the more traditional approaches of ABA and CBT by their focus on developing alternative or compensatory behaviours rather than restoring previous behaviours. The final goal of this approach is regaining a level of community involvement by teaching appropriate changes to maladaptive psychosocial patterns.

Due to the absence of good quality studies, the authors could only suggest that approaches based on ABA and CBT are “practice options”, and could not make stronger recommendations. There was class I and II evidence for significant treatment effects for comprehensive-holistic approaches, which allowed them to recommend the use of them for standard practice.

To summarise, they argue that the treatment of behavioural disorders following ABI should be a central part of rehabilitation, rather than secondary to cognitive and physical rehabilitation.

References

1. Accident Compensation Corporation. Traumatic brain injury: diagnosis, acute management and rehabilitation. Wellington: Accident Compensation Corporation, 2006.
2. Ylvisaker M, Turkstra L, Coehlo C, Yorkston K, Kennedy M, Sohlberg MM, et al. Behavioural interventions for children and adults with behaviour disorders after TBI: a systematic review of the evidence. *Brain Injury* 2007;21(8):769-805.
3. Koponen S, Taiminen T, Portin R, Himanen L, Isoniemi H, Heinonen H, et al. Axis I and II psychiatric disorders after traumatic brain injury: a 30-year follow-up study. *The American Journal Of Psychiatry* 2002;159(8):1315-21.
4. Hibbard MR, Bogdany J, Uysal S, Kepler K, Silver JM, Gordon WA, et al. Axis II psychopathology in individuals with traumatic brain injury. *Brain Injury: [BI]* 2000;14(1):45-61.
5. van Reekum R, Bolago I, Finlayson MA, Garner S, Links PS. Psychiatric disorders after traumatic brain injury. *Brain Injury: [BI]* 1996;10(5):319-27.
6. Baguley IJ, Cooper J, Felmingham K. Aggressive behavior following traumatic brain injury: how common is common? *The Journal of Head Trauma Rehabilitation* 2006;21(1):45-56.
7. Brooke MM, Patterson DR, Questad KA, Cardenas D, Farrel-Roberts L. The treatment of agitation during initial hospitalization after traumatic brain injury. *Archives of Physical Medicine and Rehabilitation* 1992;73(10):917-21.
8. Fazel S, Philipson J, Gardiner L, Merritt R, Grann M. Neurological disorders and violence: a systematic review and meta-analysis with a focus on epilepsy and traumatic brain injury. *Journal of Neurology* 2009;256(10):1591-602.
9. Cattelani R, Zettin M, Zoccolotti P. Rehabilitation treatments for adults with behavioral and psychosocial disorders following acquired brain injury: a systematic review. *Neuropsychol Rev* 2010;20(1):52-85.
10. Milders M, Fuchs S, Crawford JR. Neuropsychological impairments and changes in emotional and social behaviour following severe traumatic brain injury. *Journal Of Clinical And Experimental Neuropsychology* 2003;25(2):157-72.
11. Fleminger S, Greenwood RRJ, Oliver DL. Pharmacological management for agitation and aggression in people with acquired brain injury (Cochrane review). *Cochrane Database of Systematic Reviews* 2006;2006(4):CD003299.