

Pragmatic Evidence Based Review

Substance Abuse in moderate to severe TBI

Reviewer	Emma Scheib
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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 substance abuse occurring in a person after a *moderate or severe*¹ traumatic brain injury (TBI). The following review will cover;

- The prevalence and risk factors for substance abuse in TBI patients
- Impact of the abuse on rehabilitation outcomes,
- Interventions/strategies for clients with concurrent TBI and substance abuse
- Potential extra costs associated with substance abuse 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)NZGG (2006). Traumatic Brain Injury: Diagnosis, Acute Management and Rehabilitation. Evidence based best practice guideline (ACC). ACC. New Zealand, NZGG.

Key Findings

- Between 36-51% of people presenting with a TBI are intoxicated at the time of the injury
- Pre-injury history of *alcohol abuse* in TBI patients is between 18-51% / Post-injury alcohol abuse = 7-25%
- Pre-injury history of *other drug abuse* in TBI patients is between 10-44% / Post-injury other drug abuse = 20%
- Risk Factors include; history of abuse, being younger/male, employed
- Limited outcome research suggests patients with TBI who have concurrent alcohol problems have lower visuospatial ability, verbal memory, attention span, delayed memory recall, and lower employment and independent living status
- Some preliminary evidence suggests that Screening & Brief Intervention may reduce both use of alcohol and costs related to substance abuse
- The costs associated with treating a TBI patient with a substance abuse problem do not appear to be significantly greater than those without a comorbid substance problem
- Individually tailored case management within community settings improves patients life satisfaction

Recommendations

- All patients with reported TBI should be screened for substance abuse, both the history of abuse and time of injury abuse
- ACC clients who screen positive for substance abuse should be referred to specialist alcohol and drug services
- Vocational support services and alcohol and drug services need to collaborate to ensure that the client is returning to work at an appropriate pace, which does not place undue stress on them and increase their likelihood of substance abuse post-injury
- Clinical guidelines are needed to inform best practice in the area of withdrawal from substances for TBI patients

1 Background

1.1 Definitions

Substance is defined, for the purposes of this report, as alcohol or any illicit drug (e.g. cannabis, amphetamines), and does not include tobacco. The majority of research focuses on alcohol abuse, and the few that include other substances do not usually specify the type of drug used by participants.

Substance abuse is defined in the DSM-IV-TR (American Psychiatric Association 2000) as a maladaptive pattern of substance abuse leading to clinically significant impairment or distress involving one or more of the following;

- Failure to fulfil major role obligations at work, school or home
- Recurrent substance abuse that occurs in physically hazardous situations (e.g. driving a car)
- Recurrent substance-related legal problems (e.g. being arrested)
- Persistent or recurrent social or interpersonal problems caused by or exacerbated by the substance abuse

Substance dependence is defined in the DSM-IV-TR (American Psychiatric Association 2000) as a maladaptive pattern of substance abuse leading to clinically significant impairment or distress as manifested by three or more of the following (in the same 12 month period);

- Tolerance (need for increased amounts to achieve intoxication)
- Withdrawal (including the use of substances to relieve or avoid withdrawal symptoms)
- Substance taken in larger amounts and for longer periods of time than intended
- Desire to cut down, unsuccessful attempts to control substance abuse
- Increase in activity necessary to obtain the substance
- Important social, occupational, or recreational activities are given up or reduced
- Continuation of use despite knowledge of problems

This report specifies where possible, between *abuse* and *dependence*, and the majority of the literature deals with substance abuse. However there are some authors who do not make this differentiation clear.

1.2 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

2.1 Prevalence

Prevalence rates for the misuse of substances and TBI are often reported for three separate time points; a history of abuse, abuse occurring directly prior to injury, or abuse following the injury.

History of *alcohol* abuse prevalence ranges from 18 to 51%. History of *other drug* use ranges from 10-44%. Studies reporting some of the lower prevalence rates may be prone to under-reporting due to memory problems, self report by family members who are not aware of problems, or fear of being reported to the police for illegal activity (Parry-Jones, Vaughan et al. 2006).

Research suggests that between 37 and 51% of people presenting with a TBI are intoxicated at the time of injury (Corrigan 1995; Cash and Philactides 2006; Parry-Jones, Vaughan et al. 2006).

Post injury alcohol abuse prevalence ranges from 7-26% (measurements taken 2-47 months post-injury). Post injury drug abuse is harder to determine, but one study estimates 20% of 'other drug abuse'. Post injury alcohol abuse may depend on the severity of the injury. Some studies report a reduction in alcohol abuse for severely injured people in comparison to their pre-injury drinking (Parry-Jones, Vaughan et al. 2006) but this generally increases during the first two years post-injury (Corrigan, Bogner et al. 2010).

2.2 Risk Factors

Those that abuse alcohol prior to their injury are 11 times more likely than TBI patients without pre-injury abuse to abuse alcohol after their injury (Parry-Jones, Vaughan et al. 2006).

Young patients have the highest proportion of alcohol abuse before and after the injury (Horner, Ferguson et al. 2005; Ponsford, Whelan-Goodinson et al. 2007).

Males had significantly higher levels of alcohol abuse both pre-injury and post-injury (Horner, Ferguson et al. 2005; Ponsford, Whelan-Goodinson et al. 2007).

A large population based study found that depression diagnosed after injury was associated with an increase in heavy drinking (Horner, Ferguson et al. 2005).

Participants who were in employment, on average 16 months after their injury, were more likely to be drinking at hazardous levels at this time point than those not in employment. While this could be indicative of the interaction of the stress of returning to work after a serious injury there are many positive outcomes of returning to work that may outweigh the risk of increased alcohol consumption. Further research in this area, particularly with a risk analysis focus would be beneficial (Parry-Jones, Vaughan et al. 2006; Ponsford, Whelan-Goodinson et al. 2007)

2.3 Screening

A recent international review on screening and brief intervention (SBI) for substance abuse in TBI patients suggests that screening be done in either trauma centers or emergency departments (ED) on admission for TBI (Corrigan, Bogner et al. 2010). Other research has highlighted the importance of screening for other mental health conditions concurrently with the screening for substance abuse, given the prevalence of them occurring together post-TBI (Walker, Cole et al. 2007).

SBI has the opportunity to greatly reduce the use of alcohol in patients who are admitted to an ED with an injury that is alcohol related (D'Onofrio 2004). Cost benefit studies have also shown that SBI has the ability to reduce the costs related to the misuse of alcohol. Gentilello and colleagues found that costs savings of brief intervention were up to \$3.81USD for each dollar spent. These were only for direct medical costs and did not include costs related to factors such as reduced productivity at work (Gentilello, Ebel et al. 2005).

Issues related to administering SBI are patient's ability to provide informed consent and carry out conversation, which may be compromised following TBI. The systematic review by Corrigan et al. found that patients with more severe TBI were routinely excluded from SBI. This is a significant barrier to providing comprehensive rehabilitation to TBI patients with more severe injuries. The authors suggest that a multi-method approach be taken to conducting SBI, by providing alternatives to verbal communication (Corrigan, Bogner et al. 2010).

2.4 Impact on outcomes for rehabilitation

The impact of substance abuse for TBI rehabilitation falls into three categories; medical and neurological outcomes, neuropsychological outcomes, and functional outcomes.

There are no consistent findings with regards to alcohol abuse and medical or neurological outcomes. Some studies show positive blood alcohol level (BAL) at time of admission is associated with higher scores on the Glasgow Coma Scale (GCS), while others show no difference between BAL and scores on the GCS (Parry-Jones, Vaughan et al. 2006).

In regards to neuropsychological outcomes there is evidence to suggest that patients with positive BAL levels on admission score lower on measures of visuospatial ability, verbal memory and IQ. They also likely to have lower attention span and delayed memory recall. The strength of this evidence is limited by small sample sizes and not accounting for history of substance abuse (Parry-Jones, Vaughan et al. 2006).

Employment status and return to work rates are among the functional outcomes associated with substance abuse and TBI. Specifically, low employment status and lack of return to productive activity 1 year post injury are associated with pre-injury substance abuse.

In addition, independent living status, measured on average, 10 years post injury, is lower for those who have a history of alcohol abuse.

2.5 Interventions/Strategies

Interventions for substance abuse post-injury vary between the brief interventions mentioned above, and more intensive case management that follows a patient through their rehabilitation.

A study looking at a community based case management approach found that family satisfaction decreased over time for the control group compared to the group receiving case management whose levels remained similar. Additionally, life satisfaction increased over a 9 month period for the group receiving case management. No differences were found between groups for physical well-being or community integration (Heinemann, Corrigan et al. 2004). Caution must be taken when generalizing these findings, as they are limited by a weak study design.

Research in this area is very limited and more high quality studies are needed to inform the strategies for treatment of co morbid substance abuse and TBI.

2.6 Impact on Costs Associated with TBI

There is very little information available on the extra economic costs that are involved in treating a patient with co morbid substance abuse and TBI. A recent study (Dobrez, Heinemann et al. 2010) conducted a secondary file analyses investigating the impact of mental disorders on costs for inpatient rehabilitation facilities (IRF). Payment for over 1 million patients was compared for those with and without major depression, substance use, or anxiety disorders (analyses controlled for patient characteristics such as age and gender). They found that for those patients with substance abuse, costs for their rehabilitation did not differ significantly from those without substance abuse problems.

2.7 Management of withdrawal from drugs

There do not appear to be specific guidelines about the management of withdrawal from drugs in TBI patients in acute settings in the literature. Advice on this topic was sought from an expert (J. Ponsford, personal communication, 13 July 2011) in TBI rehabilitation. It was noted that patients with severe head injury, who are placed in a medically induced coma, will physically withdraw from any substance during that time, therefore reducing any side effects from withdrawal. For patients who fall into the more moderate end of the scale, it is assumed that general guidelines about management of withdrawal are used and specialist drug and alcohol advisors are brought in when necessary. There is a need for clinical guidelines to inform on best practice in management of withdrawal from drugs for TBI patients who present with concurrent drug/alcohol addiction.

2.8 Currently in place in New Zealand

The New Zealand Guidelines Group has a guideline for recognising, assessing and treating alcohol and cannabis abuse in primary care but there is nothing specifically targeted towards people presenting with a TBI. It is unclear whether these guidelines are used for TBI patients regardless of this and further investigation into screening and any type of brief intervention is needed.

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