

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Amino Acids and Related Supplements for Mild Traumatic Brain Injury: Clinical Effectiveness

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Questions or requests for information about this report can be directed to requests@cadth.ca

Research Questions

1. What is the clinical effectiveness of nutritional supplementation as a prophylactic treatment for mild traumatic brain injury?
2. What is the clinical effectiveness of nutritional supplementation as treatment for mild traumatic brain injury?

Key Findings

No evidence was identified regarding the clinical effectiveness of nutritional supplementation as a prophylactic treatment or a treatment for mild traumatic brain injury.

Methods

A limited literature search was conducted by an information specialist on key resources including Medline and Embase via OVID, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were mild traumatic brain injury and nutritional supplementation with creatine, tyrosine, n-acetyl-L-cysteine, and/or n-acetylcysteine amide compounds. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2015 and February 10, 2020. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Populations	Q1: People of all ages, at risk for mild traumatic brain injury Q2: People of all ages, with suspected or diagnosed mild traumatic brain injury
Interventions	The following nutritional supplements, either as single ingredients or in combination preparations: <ul style="list-style-type: none"> • Creatine • Tyrosine • N-acetyl-L-cysteine • N-acetylcysteine amide
Comparators	Q1,2: Placebo or usual diet
Outcomes	Q1,2: Clinical effectiveness (e.g., severity of signs and symptoms [e.g., nausea, headache, dizziness], duration of hospitalization, mental status [e.g., level of consciousness, memory], structural brain lesions, neurologic disability, performance measures) and harms (e.g., morbidity, mortality, adverse drug reactions, side effects)
Study Designs	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports and systematic reviews are presented first. These are followed by randomized controlled trials and non-randomized studies.

No health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies were identified regarding the clinical effectiveness of nutritional supplementation as a prophylactic treatment or a treatment for mild traumatic brain injury.

References of potential interest are provided in the appendix.

Overall Summary of Findings

No relevant literature was identified regarding the clinical effectiveness of nutritional supplementation as a prophylactic treatment or a treatment for mild traumatic brain injury. Therefore, no summary can be provided.

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

No literature identified.

Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

No literature identified.

Appendix — Further Information

Previous CADTH Reports

1. Acetylcholinesterase inhibitors for traumatic brain injury. (*CADTH Rapid response report*). Ottawa (ON): CADTH; 2007: <https://www.cadth.ca/acetylcholinesterase-inhibitors-traumatic-brain-injury>. Accessed 2020 Feb 13.

Systematic Reviews and Meta-analyses

Unclear Population - Mild Traumatic Brain Injury Not Specified

2. Bhatti J, Nascimento B, Akhtar U, et al. Systematic review of human and animal studies examining the efficacy and safety of n-acetylcysteine (NAC) and n-acetylcysteine amide (NACA) in traumatic brain injury: impact on neurofunctional outcome and biomarkers of oxidative stress and inflammation. *Front Neurol*. 2017;8:744.
[PubMed: PM29387038](#)
3. Gruenbaum SE, Zlotnik A, Gruenbaum BF, Hersey D, Bilotta F. Pharmacologic neuroprotection for functional outcomes after traumatic brain injury: a systematic review of the clinical literature. *CNS Drugs*. 2016;30(9):791-806.
[PubMed: PM27339615](#)
4. Shen Q, Hiebert JB, Hartwell J, Thimmesch AR, Pierce JD. Systematic review of traumatic brain injury and the impact of antioxidant therapy on clinical outcomes. *Worldviews Evid Based Nurs*. 2016;13(5):380-389.
[PubMed: PM27243770](#)

Alternative Intervention

5. Sharma B, Lawrence DW, Hutchison MG. Branched chain amino acids (BCAAs) and traumatic brain injury: a systematic review. *J Head Trauma Rehabil*. 2018;33(1):33-45.
[PubMed: PM28060208](#)

Review Articles

6. Ainsley Dean PJ, Arkan G, Opitz B, Sterr A. Potential for use of creatine supplementation following mild traumatic brain injury. *Concussion*. 2017;2(2):CNC34.
[PubMed: PM30202575](#)
7. Freire Royes LF, Cassol G. The effects of creatine supplementation and physical exercise on traumatic brain injury. *Mini Rev Med Chem*. 2016;16(1):29-39.
[PubMed: PM26202200](#)

Randomized Controlled Trials

Upcoming Clinical Trials

8. The University of Texas Medical Branch, Galveston. NCT01495871: amino acid supplementation in recovery from traumatic brain injury (TBIS). *ClinicalTrials.gov*. Bethesda (MD): U.S. National Library of Medicine; 2015:
<https://clinicaltrials.gov/ct2/show/NCT01495871?term=supplements&cond=Brain+Injuries&draw=3>. Accessed 2020 Feb 13.

Non-Randomized Studies

Upcoming Clinical Trials

9. Thomas Jefferson University. NCT03241732: PET-MRI and the effect of n-acetyl cysteine (NAC) and anti-inflammatory diet in traumatic brain injury. *ClinicalTrials.gov*. Bethesda (MD): U.S. National Library of Medicine; 2019: <https://clinicaltrials.gov/ct2/show/NCT03241732?term=supplements&cond=Brain+Injuries&draw=3&rank=11>. Accessed 2020 Feb 13.