DENVER HEALTH TRAUMA
LEVEL ONE ADULT & LEVEL TWO PEDIATRIC
ERNEST E. MOORE SHOCK TRAUMA CENTER

Denver Health Brain Injury Clinical Care Guideline

PURPOSE

Optimize the inpatient care of individuals with moderate to severe traumatic brain injury.

SCOPE

Patient population: Individuals with traumatic brain injury aged 15 or older; Glasgow Coma scale 3-12 in first 24 hours (without systemic sedation and after resuscitation) and/or post traumatic amnesia >24 hours.

A. Physicians and Advanced Practice Providers
B. Nurses
C. Physical Therapists
D. Occupational Therapists
E. Speech Language Pathologists
F. Health Care Partners / Certified Nurse Assistants
G. Pharmacists

DEFINITIONS

Traumatic Brain Injury: a non-degenerative, non-congenital insult to the brain from an external mechanical force, with an associated diminished or altered state of consciousness, leading to transient or persistent impairment of cognitive, physical, and/or psychosocial functions. (Note- does not necessarily result in standard imaging abnormalities).

Post traumatic amnesia: is the period of time following a traumatic brain injury where the patient is unable to reliably encode new memories and is not fully oriented. Validated measurements include the Galveston Orientation Assessment Tool and Orientation Log (GOAT and O-log)

Disorders of Consciousness: conditions of reduced arousal, awareness and responsiveness, to include coma, vegetative state and minimally conscious state

GUIDELINE

A. Diagnostic Assessments
    1. Consider MRI of the brain for patients with disorders of consciousness after stabilization.
    2. EEG for suspicion of clinical/subclinical seizures

B. Consultations (within 72 hours)
    1. Physical Medicine and Rehabilitation physician-include in discussions of long term prognosis.
    2. Physical and Occupational therapy
    3. Speech therapy

4. Social Work

C. Treatment Considerations (Note: patients under 40kg will require pediatric dosing)

D. Seizure Prophylaxis
1. 7 days levetiracetam 1g BID (or phenytoin) for seizure prophylaxis. May consider longer course if seizure activity is observed after 24 hours post injury.
2. Valproic Acid is an option for patients showing seizure activity after first 24 hours and requiring a longer course of antiepileptic.

E. Arousal, Attention and Cognitive Recovery
1. Initiate treatment with Amantadine 100 mg every morning and noon once hemodynamically stable, ICP stable and able to tolerate enteral medication.
2. Options for second line agents for promotion of arousal and attention include methylphenidate, bromocriptine, carbidopa/levodopa and modafinil.

F. Nutrition/ Dysphagia
1. Consider PEG placement for patients expected not to be meeting their nutritional needs orally for 4-6 weeks.

G. Paroxysmal Sympathetic Hyperactivity/Dysautonomia/ "Storming"
1. See "Approach to Paroxysmal Sympathetic Hyperactivity" in Medical Management of the Severe Tramatic Brain Injury Patient (Appendix)
2. Evaluate for infection, withdrawal, sepsis and other potential causes. Maintain a low stimulation environment.
3. Medications options include:
    a. Severe cases: treatment with dexmedetomidine or esmolol IV infusion
    b. Moderate cases: morphine or Labetalol IV.
    c. Stabilizing/Taking enteral medications-Propranolol 20 to 80 mg TID, Gabapentin 100 mg TID titrate to effect/tolerance up to 900 mg TID, Clonidine 0.1mg BID titrate to effect/tolerance up to 0.2 mg TID, Dantrolene 25 mg TID and titrate to 100 mg TID, monitoring LFTs, low dose narcotics.

H. Disorders of Consciousness
1. Avoid statements regarding certainty of poor long term prognosis during the first 4 weeks following injury.
2. Consider regular validated assessment with Coma Recover Scale Revised
3. Long term functional prognosis should be sensitively discussed by attending/senior staff level providers with expertise on the topic and the ability to knowledgably describe a range of possible outcomes. Timing should be determined by patient/family readiness.

I. Post Traumatic Delirium (Agitation) Management
1. Education Staff and family hat restlessness/inattention is a common phase of TBI recovery.
2. Environmental measures
    a. DC tubes and lines as able
    b. High and low stimulation schedule for daytime hours
    c. Limit visitors and noise in room
    d. Consider enclosure bed for restless patients who are medically stable

J. Medications
1. Avoid management of post traumatic delirium with typical antipsychotics such as haloperidol.
2. Propranolol 10 TID: titrate as tolerated to effect
3. Depakote 500 TID: baseline LFTs and check level at 3 days. Monitor LFTs weekly.
4. Avoid the use of atypical antipsychotics except in situations of demonstrated psychotic symptoms and/or directed aggression. Low dose olanzapine PRN is first line agent.

K. Sleep Wake
1. Environment: natural light during day
2. Medications: Consider scheduled trazodone and melatonin to assist with sleep cycles

L. Post Traumatic Amnesia
1. Assess using Orientation Log (O-Log) and/or Galveston Orientation and Amnesia Test (GOAT) (see Appendix)
2. Adults remaining in PTA should be considered "at risk" and lacking capacity to leave against medical advice.

M. Post Traumatic Headache
1. Ensure neurologic stability, rule out intracranial complications
2. Avoid narcotic management of headache
3. Avoid round the clock dosing with abortive agents such as narcotics, Fioricet, NSAIDs and acetaminophen, which can result in rebound HA phenomena.
4. HA treatment algorithm: see Colorado Division of Workers Compensation TBI Guidelines (Appendix)

EXTERNAL REFERENCES

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Lucca et al. Outcome prediction in disorders of consciousness: the role of coma recovery scale revised. BMC Neurology 2019;19:68

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Novack, T. (2000). The Orientation Log. The Center for Outcome Measurement in Brain Injury. http://www.tbims.org/combi/olog

Practice Guideline Recommendations: Disorders of Consciousness- American Academy of Neurology and American Congress of Rehabilitation Medicine 2018

DHHA RELATED DOCUMENTS

A. *Initial Management of Acute Severe TBI Clinical Care Guideline*

ATTACHMENTS

Attachment A – Headache Treatment Algorithm, version date (01/30/2019)

Attachment B – The Galveston Orientation and Amnesia Test (GOAT), version date (05/08/2020)

Attachment C – Approach to Paroxysmal Sympathetic Hyperactivity, version date (05/08/2020)

This Clinical Care Guideline is intended to assist care providers in the provision of patient care. This document serves as a guide, and is not a substitute for independent medical decision-making.