

# Brain Injury CPG Medication Recommendations

Northeast Rehabilitation Hospital has adopted these Brain Injury Clinical Practice Guidelines to guide the clinical care that is provided by our Rehab Team.

## **VA/DoD: Management of Concussion—Mild Traumatic Brain Injury (mTBI)**

Refer to VA/DoD Appendix B for specific dosing recommendations for treatment of symptoms related to mTBI.

### **SIGN 130: Brain Injury Rehabilitation in Adults**

#### **Assessment and Treatment of Mild Brain Injury**

Antidepressants may be considered for symptom relief after mTBI

#### **Physical Rehabilitation and Management—Brain Injury (TBI and ABI)**

Spasticity: Botulinum neurotoxin therapy may be considered to reduce tone and deformity in patients with focal spasticity

Spasticity: Oral baclofen or tizanidine may be considered for treatment of spasticity

#### **Rehab of Behavioral and Emotional Disorders**

Propranolol or pindolol may be considered as a first line treatment option for moderate levels of agitation/aggression

#### **Management of the Patient in the Minimally Conscious or Vegetative State**

Amantadine may be considered as a means of facilitating recovery of consciousness in patients following severe brain injury

### **ONF: CPG for the Rehabilitation of Adults with Moderate to Severe TBI**

#### **Medication for Arousal and Attention**

Methylphenidate (initiated at a dose of approximately 0.10mg/kg and increased gradually to a target of 0.25–0.30 mg/kg bid) is recommended in to enhance attentional function and speed of information processing

Dextroamphetamine should be considered to enhance attentional function when methylphenidate is not tolerated

Consider amantadine to improve attention in individuals who are out of post-traumatic amnesia and who have not responded to other medications

Amantadine may be considered to enhance arousal and consciousness and accelerate the pace of functional recovery in individuals in vegetative or minimally responsive state

#### **Medication for Memory**

Rivastigmine may be considered for individuals with moderate-to-severe memory impairment in the sub-acute to chronic phase of recovery

Donepezil (5–10 mg/day) is recommended to enhance aspects of memory

#### **Management of Spasticity**

Botulinum neurotoxin therapy (BoNT) may be considered to reduce tone and deformity in individuals with focal spasticity

Botulinum neurotoxin therapy (BoNT) for individuals should be used in an interdisciplinary setting with physiotherapist/occupational therapist and orthotist inputs where appropriate

Oral baclofen, tizanidine or dantrolene sodium may be considered for treatment of spasticity

A trial of intrathecal baclofen for the treatment of severe spasticity in individuals may be considered. The trial should be carefully monitored for possible complications, including pump malfunction.

# Brain Injury CPG Scorecard

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## **ONF: CPG for the Rehabilitation of Adults with Moderate to Severe TBI**

### **Management of Fatigue and Sleep**

Consider use of melatonin 2–5 mg for insomnia

Consider use of trazodone 25–100 mg for insomnia

Benzodiazepines (lorazepam) and other non-benzodiazepine hypnotic (zopiclone) medications should be considered as last resort for the treatment of sleep disorders in individuals, and it should be prescribed for no longer than 7 days

Consider short-term treatment with methylphenidate to reduce excess daytime sleepiness in individuals

### **Management of Pain and Headaches**

Pregabalin may be considered for reducing central neuropathic pain caused by injuries to the brain or spinal column

### **Medication for Depression**

Selective serotonin reuptake inhibitors (SSRIs) are recommended as a first-line treatment for depression following traumatic brain injury (TBI). A limited body of evidence supports the efficacy of sertraline (starting at 25 mg; aiming for 50–200 mg/day) and citalopram (starting at 10 mg; aiming for 20–40 mg/day)

Stimulants such as methylphenidate may be considered for depression after traumatic brain injury over the shorter term; they may also be used to augment a partial response to selective serotonin reuptake inhibitors (SSRIs), especially in the setting of cognitive impairments, apathy, and/or fatigue

Consider use of tricyclic antidepressants (TCAs) (desipramine) as a third-line option for depression following traumatic brain injury, although possible reduced efficacy and a higher risk of side effects (e.g., seizures) may limit their use

### **Medication for Anxiety**

Selective serotonin reuptake inhibitors (SSRIs) may be considered for anxiety treatment of individuals

The use of benzodiazepines as first-line therapy for anxiety in individuals is **NOT** recommended due to potential effects on arousal, cognition, and motor coordination. The potential for abuse/dependency associated with these agents is also of concern, given the elevated rates of pre-injury substance use disorders observed among individuals with TBI. Nonetheless, short-term use of these agents may be helpful during periods of crisis or acute distress

### **Medication for Psychoses**

The use of second generation neuroleptics is recommended for the treatment of psychosis as they are associated with fewer extrapyramidal symptoms (EPS) than first generation neuroleptics and exert their effects at sites other than the D2 receptor

### **Medication for Bipolar Disorder/Mania**

The use of commonly used medications such as lithium, anticonvulsants and neuroleptics in the management of symptoms resembling bipolar disorder (i.e., mania and depressed mood) should be considered, although insufficient evidence supports or refutes their use in individuals with traumatic brain injury. Lithium requires careful monitoring, as side effects may limit its use in this population

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## **ONF: CPG for the Rehabilitation of Adults with Moderate to Severe TBI**

### **Medication for Agitation/Aggression**

For severe acute life threatening agitation and aggression that threatens staff or patient safety, the use of neuroleptic medications or intramuscular benzodiazepine can be considered

For severe agitation and aggression that threatens staff or patient safety, consider the use of oral neuroleptic medications (while taking into consideration the onset of action). Second generation neuroleptic medications like quetiapine, ziprasidone, olanzapine and risperidone are preferred as older agents may have more side effects though methotrimeprazine have been used with limited side effects

Either propranolol or pindolol is recommended for the treatment of aggression after traumatic brain injury, particularly for individuals in post-traumatic amnesia (PTA). Studies have reported the efficacy of both propranolol (maximum dose 420–520 mg/day) and pindolol (maximum dose 40–100 mg/day) in the treatment of aggression in this population, if there are no medical contraindications

The use of valproate (750–2250 mg/day and/or carbamazepine (200–1200 mg/day) to reach therapeutic range should be considered as an option for the treatment of aggression in individuals, particularly those who have a concomitant seizure disorder

The use of amantadine 100 mg bid or methylphenidate can be considered for individuals when impaired arousal and attention is suspected as a factor in agitation

The use of sertraline may be considered as an option for the treatment of individuals with moderate agitation and irritability. The use of other selective serotonin reuptake inhibitors (SSRIs) may be considered as an alternative if sertraline is not tolerated

Tricyclic antidepressants may be considered as a third-line option for the treatment of aggression, particularly for those who have an associated sleep-wake disorder. When used, nortriptyline or desipramine are preferable based upon their tolerability

The use of first generation neuroleptics and benzodiazepines to treat agitation or aggression in individuals with traumatic brain injury should be minimized, as these medications may slow recovery after brain injury and may have a negative effect on cognition

### **Management of Incontinence**

Anticholinergic medication should only be prescribed after demonstration of overactive bladder.

### **Seizures**

Anticonvulsants, particularly phenytoin and levetiracetam, are indicated to reduce the incidence of post-traumatic seizures in the first 7 days post-injury

Routine use of anticonvulsants to prevent late post-traumatic seizures after 7 days post-injury is **NOT** recommended

Consideration should be given to choosing medications with the most favorable side effect profiles

### **Deep Vein Thrombosis**

Low-molecular-weight heparin (LMWH) is preferred over unfractionated heparin (UFH) for venous thromboprophylaxis

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## **ONF: CPG for the Rehabilitation of Adults with Moderate to Severe TBI**

### **Principles of Medication Management**

\*Pharmacological treatment should be based on individual factors, symptom severity and comorbidity

\*Specific target symptoms/behaviors should be clearly defined and monitored during treatment

\*The serial use of validated rating scales appropriate for TBI and other methods of objective assessment are recommended

\*Minimize potential adverse effects on arousal, cognition, motivation and motor coordination following traumatic brain injury

Use of medications that target more than one brain-injury-related symptom/syndrome is recommended, if possible (e.g., one agent targeting both mood and insomnia, or headache and insomnia)

Inform individuals and surrogate decision makers when use of medication is “off label”

The introduction of medications for individuals be started at the lowest effective dose and be titrated slowly upwards, based upon tolerability, clinical response and situational urgency

Drug trials should allow adequate duration and dosing

Therapeutic goals should be clearly established and serve as indicators for the efficacy. If those goals are not met, ending the use of medication must be considered

Serum drug levels in the person should be monitored as necessary to prevent toxicity

Clinicians should avoid making more than one medication change at a time for a person with traumatic brain injury

Collaboration with family and/or significant others, if possible and accepted by the patient, may be useful to monitor the efficacy and side effects of treatment.

Pharmacological treatment of neurobehavioral/mental health or other symptoms should be used with caution and with the knowledge that studies suggest that many medications, including neuroleptics, anxiolytics, and anticonvulsants are associated with slowed recovery after brain injury

If the decision is made to prescribe medication to enhance arousal/awareness in a person with traumatic brain injury, a therapeutic trial (A-B-A design), should be employed, using a single agent at a time, with emphasis on formal monitoring to observe the impact of the medication

A person with traumatic brain injury with significant challenging behaviors may require a combination of non-pharmacological and pharmacological approaches for optimal treatment

If possible, a sequenced approach should be used to avoid confounding data and to determine effective components

\*Physicians are directed to consult their funder’s formulary for each medication under consideration to determine access to medication and eligibility for funding

### **Please refer to the full CPG for details of each recommendation:**

VA/DoD: Management of concussion-mild TBI (2016); <https://www.healthquality.va.gov/guidelines/Rehab/mtbi/>

SIGN: Brain injury rehabilitation in adults (2013); <http://www.sign.ac.uk/assets/sign130.pdf>

Ontario Neurotrauma Foundation (ONF): CPG for the rehab of adults with moderate to severe TBI (2016)  
<https://braininjuryguidelines.org/>