VANDERBILT UNIVERSITY
MEDICAL CENTER
DIVISION OF ACUTE CARE SURGERY

Practice Management Guidelines for Seizure Prophylaxis

Rationale

Anticonvulsants are recommended by the Brain Trauma Foundation for the prevention of early post- traumatic seizures (PTS) within 7 days of injury. The recommendation stems from a randomized, placebo-controlled trial conducted in 1990 that demonstrated a significant reduction in early PTS with phenytoin. However, given phenytoin's adverse effects, possible interference with cognitive recovery, and significant drug and enteral nutrition interactions, smaller randomized studies, as well as retrospective and prospective observational studies have assessed the efficacy of levetiracetam for prevention of early PTS. Findings have indicated that levetiracetam offers similar efficacy to phenytoin in the reduction of early PTS. The 2024 Neurocritical Care Society Guidelines for seizure prophylaxis in moderate-severe traumatic brain injury (TBI), do not make a recommendation for or against antiseizure medication (ASM) use for seizure prophylaxis. In addition, they do not make a recommendation for a specific ASM. Given the varying definitions of TBI severity in the studies included in the guideline update, moderate-severe TBI was defined as injury with acute-radiographic abnormalities regardless of GCS.

Indications

Patients with structural intracranial injury on CT/MR imaging should receive levetiracetam for early PTS prophylaxis.

- Therapy should not continue beyond 7 days past date of injury unless documented seizure activity or continuing home medications for a known seizure disorder.

Exception

If seizure prophylaxis is started despite meeting the listed exceptions, please document on the inpatient problem list and/or daily progress notes.

Seizure prophylaxis may be omitted in patients who meet ALL the following criteria:

- **Mild TBI (GCS ≥ 13) AND without need for Q1hr neuro checks**

Prophylaxis dosing

- Levetiracetam 1000mg IV/PO load -> 500mg IV/PO BID x 7 days
    - **Please ensure stop date has been added to the levetiracetam order**
- Renal adjustment
    - Hemodialysis:500mg daily + supplemental 500 mg dose after each HD session
    - Peritoneal dialysis: 500 mg daily
    - CRRT: 500 mg BID
- Levetiracetam can be converted to the oral route at the same dose as the IV route. The oral solution should only be used for patients with a j-tube.

Follow-up

- If seizure activity is documented at any point in the continuum of care, a Neurology consult should be placed to ensure long-term management.

References

1. Bratton SL, Chestnut RM, Ghajar J, et al. Antiseizure prophylaxis. *Journal of Neurotrauma*. 2007;24(supp 1): S-83.
2. Temkin NR, Dikmen S, Wilensky A, et al. A randomized, double-blind study of phenytoin for the prevention of post-traumatic seizures. *N Engl J Med*. 1990; 323:497.
3. Szaflarski J, Sangha K, Lindsell C, Shutter L. Prospective, randomized, single-blinded comparative trial of intravenous levetiracetam versus phenytoin for seizureprophylaxis. *Neurocrit Care*. 2010;12:165.
4. Inaba K, Menaker J, Branco B, et al. A prospective multicenter comparison of levetiracetam versus phenytoin for early post-traumatic seizure prophylaxis. *J Trauma Acute Care Surg*. 2013;74:766.
5. Bhullar I, Johnson D, Paul J, Kerwin A, Tepas J, Frykberg E. More harm than good: antiseizure prophylaxis after traumatic brain injury does not decrease seizure rates but may inhibit functional recovery. *J Trauma Acute Care Surg.* 2014;76:54.
6. Frontera JA, Gilmore EJ, Johnson EL, Olson D, Rayi A, Tesoro E, Ullman J, Yuan Y, Zafar SF, Rowe S. Guidelines for Seizure Prophylaxis in Adults Hospitalized with Moderate-Severe Traumatic Brain Injury: A Clinical Practice Guideline for Health Care Professionals from the Neurocritical Care Society. Neurocrit Care. 2024 Jun;40(3):819-844. doi: 10.1007/s12028-023-01907-x. Epub 2024 Feb 5. PMID: 38316735.

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