

Antiepileptic Agents for Early Seizure Prophylaxis in Traumatic Brain Injury



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Background

- Posttraumatic seizures (PTS) are among the many complications associated with traumatic brain injury (TBI)¹
- Early PTS (within 7 days) is thought to be associated with secondary brain injury which may result in worse outcomes^{2,3}
- The incidence of early PTS is approximately 1-2%^{4,5,6}
- Evidence-based practice guidelines currently support the use of antiepileptic drugs (AED) to reduce the risk of early PTS when overall benefit outweighs the risk of treatment^{7,8,9}
- Phenytoin is the drug of choice, with one guideline supporting levetiracetam, for a total of seven days^{7,8,9}
- Current practice at Royal Columbian Hospital (RCH) is variable and clinician dependent

Purpose

- To characterize the incidence of PTS and the use of AED for early seizure prophylaxis in patients with TBI at RCH

Methods

- Design:** Retrospective chart review, tertiary care trauma centre
- Patients:** Random sample of convenience
 - Admitted to RCH April 1, 2015 – August 31, 2017
- Inclusion:**
 - >18 years of age
 - Diagnosis of TBI within 24h of admission
 - ≥1 risk factor for early PTS
- Exclusion:**
 - Death within 48h of injury
 - History of previous TBI or seizure disorder
 - Injury causing TBI >24h prior to admission
 - Transfer out of RCH within 7 days of admission
- Primary outcomes:**
 - Proportion that experienced early PTS
 - Proportion that received seizure prophylaxis
- Secondary outcomes:**
 - Incidences of early and late PTS
 - Selection and duration of prophylactic AED
 - Associated monitoring, adverse effects, and drug interactions

Table 1: Patient Characteristics

	n=81
Median age, years (range)	54 (19-94)
Male	77.8%
Median no. risk factors for early PTS, n (range)	2 (1-5)
Patients with GCS ≤10	29.6%
Patients requiring ICU admission	39.5%
Patients requiring neurosurgical intervention	12.3%
Patients with history of alcohol abuse	19.8%

Figure 1: Proportion of patients that experienced PTS

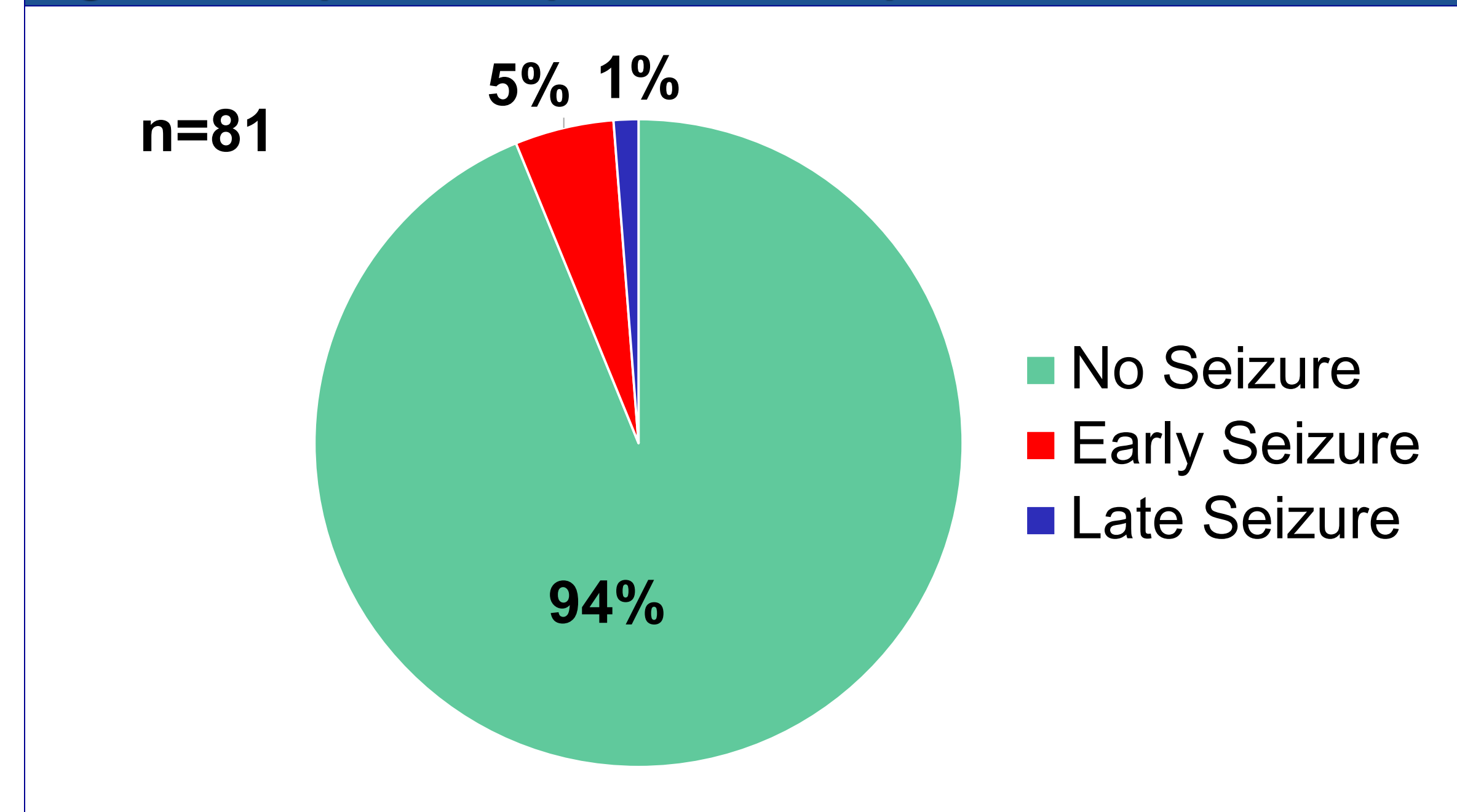
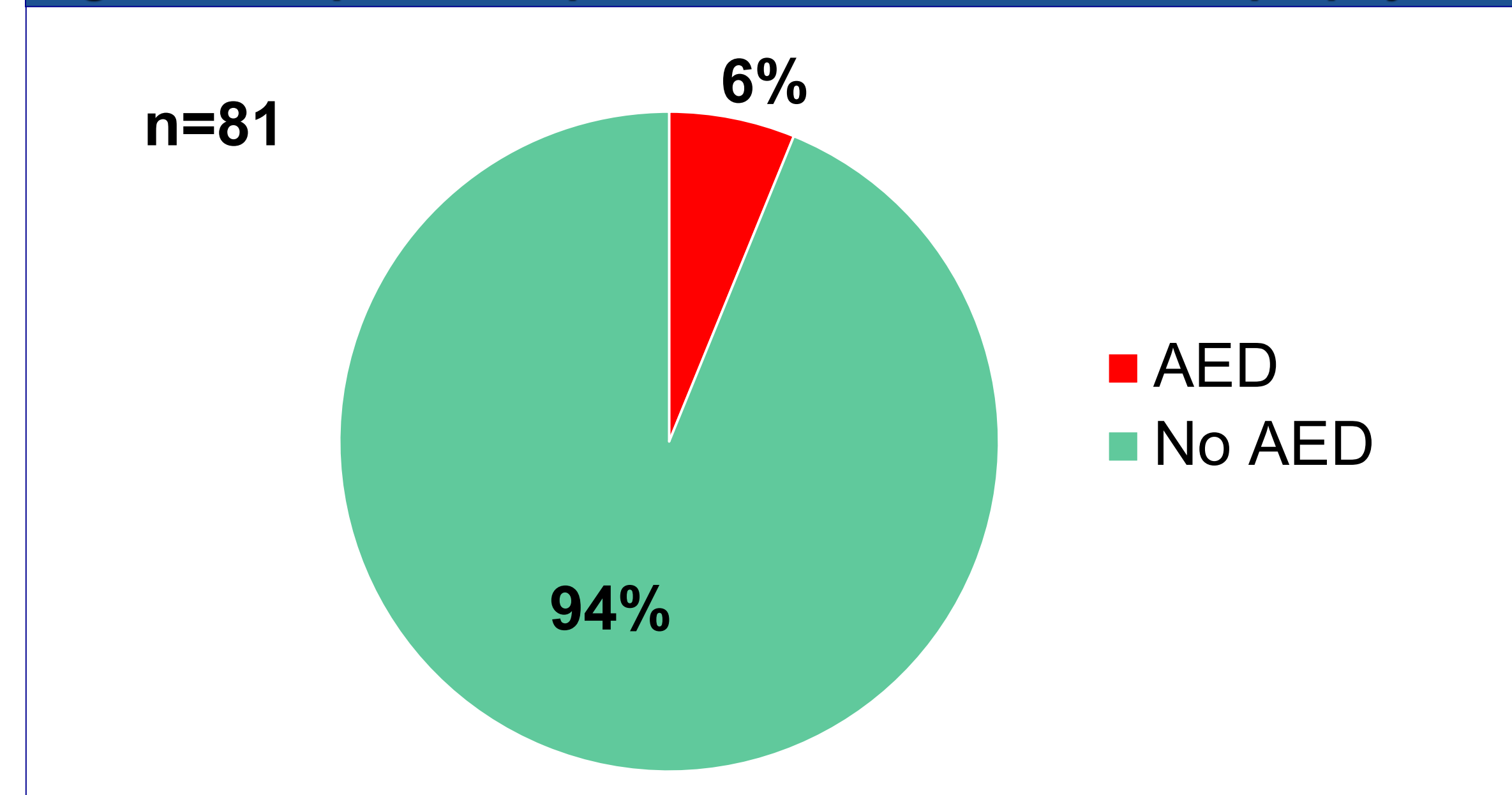


Figure 2: Proportion of patients that received seizure prophylaxis



Risk factors for early PTS

- Glasgow Coma Score (GCS) ≤10
- Penetrating head injury
- Posttraumatic amnesia ≥30 min
- Intracranial hemorrhage
- Immediate seizure post trauma
- Cortical contusion
- Depressed skull fracture

Table 2: Outcomes

Patients who received seizure prophylaxis	n=5
Patients who received phenytoin	80%
Median no. of levels drawn per patient	1
No. of corrected levels within therapeutic range	2
No. of subtherapeutic levels	0
Patients who received levetiracetam	20%
Median duration of AED therapy, days (range)	7 (2-14)
ADRs reported requiring discontinuation	0
Patients with potentially significant drug interactions	80%
All patients	n=81
Patients who received propofol	38%
Patients who received benzodiazepine(s)	48%

- Of those receiving prophylaxis, one patient (20%) experienced early PTS
- Of those not receiving prophylaxis, three patients (3.9%) experienced early PTS

Limitations

- Retrospective chart review
- Small sample size
- Low event rate
- Use of propofol and benzodiazepines early during admission may have reduced seizure events

Conclusions

- Overall observed incidence of early PTS at RCH was 4.9%
- 6.2% of patients with at least one risk factor for early PTS received seizure prophylaxis
 - 80% of these patients received phenytoin
 - 50% had a phenytoin level within therapeutic range
- No ADRs requiring discontinuation of AED were reported
- Further research is required to better identify TBI patients at high risk of early PTS that would most benefit from prophylaxis with AED

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