Patterns of Prophylactic Antiepileptic Use After Oncologic Neurosurgery

Brett E. Youngerman, MD,1 Evan F. Joiner, BA,1 Xianling Wang, MS,2 Jingyan Yang, MS,2 Mary R. Welch, MD,3,4 Guy M. McKhann II, MD,1,4 Jason D. Wright, MD,4,5 Dawn L. Hershman, MD, MS,4,6 Alfred I. Neugut, MD, PhD,2,4,6 Jeffrey N. Bruce, MD1,4

Introduction

• Evidence supporting routine postoperative antiepileptic drug (AED) prophylaxis following oncologic neurosurgery is limited, and actual practice patterns of AED prophylaxis are largely unknown beyond survey data.

• The objective of this study was to describe patterns and predictors of postoperative seizure prophylaxis using pharmacy claims data.
Disclosures

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Methods

• In this retrospective multicenter cohort study, the MarketScan Database (Truven Health Analytics) was searched for adult patients who underwent resection or biopsy of intracranial neoplasm between 2009 and 2013, and who had no history of seizures or AED use prior to surgery.

• Single and multivariate analysis was performed to evaluate relationships among demographic and clinical covariates, pharmacy claims for AED use beginning within 2 weeks of discharge, and epilepsy related events.

• An epilepsy related event (ERE) was defined as an ambulance ride, emergency room visit, or hospitalization for seizure.
Results

- 5,895 patients who underwent craniotomy for brain tumor resection or biopsy were identified.
- 1,785 patients had 1 or more potential AED indications for AED (preoperative outpatient epilepsy diagnosis, preoperative ERE, preoperative AED use, preoperative admission epilepsy diagnosis, or postoperative epilepsy diagnosis or ERE prior to AED use).
- 4,110 patients were candidates for AED prophylaxis (no history of AED use or seizures).
- Among prophylaxis candidates, 1,671 (40.7%) received postoperative AEDs.
Results

- Duration of AED prophylaxis peaked at 5 weeks.

- Incidence of new EREs was fairly evenly distributed.

- Levetiracetam was most commonly used AED.

<table>
<thead>
<tr>
<th>AED</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levetiracetam</td>
<td>1312</td>
<td>(71.9)</td>
</tr>
<tr>
<td>Phenytoin</td>
<td>343</td>
<td>(18.9)</td>
</tr>
<tr>
<td>Other</td>
<td>13</td>
<td>(1.5%)</td>
</tr>
</tbody>
</table>
Results

• In multivariable analysis, tumor location, tumor pathology, and geographical region of surgery were significantly associated with AED prophylaxis.

  • Compared to patients with supratentorial intraparenchymal resections, those with supratentorial meningiomas were more likely to receive prophylaxis (OR 1.366, 95% CI 1.024-1.821); patients who had biopsy (OR 0.455, CI 0.326-0.668), infratentorial resection (OR 0.068, CI 0.052-0.089), or transsphenoidal procedure (OR 0.0030, CI 0.001-0.010) were less likely to receive prophylaxis.

  • Primary malignant brain tumors (reference) were more likely to receive prophylaxis than secondary malignancies (OR 0.717, CI 0.581-0.884) or benign tumors (OR 0.632, CI 0.481-0.830).

  • Patients in the Northeast (reference) were more likely to receive prophylaxis than patients in the West (OR 0.680, 95% CI 0.527-0.878), North Central region (OR 0.741, CI 0.591-0.926), or South (OR 0.794, CI 0.645-0.978).
Results

• In multivariable analysis, AED prophylaxis was significantly associated with new EREs at 2-months.
  • Compared to patients who received no prophylaxis (reference), those who received prophylaxis were more likely to have a new ERE by 2-months (OR 2.358, CI 1.235-4.503, p=0.0094).

• In multivariable analysis, AED prophylaxis and tumor location were significantly associated with new EREs at 6-months.
  • Compared to patients who received no prophylaxis (reference), those who received prophylaxis were more likely to have new EREs by 6-months (OR 1.614, CI 1.021-2.552, p=0.0405).
  • Compared to patients who underwent supratentorial intraparenchymal resection (reference), patients who underwent supratentorial meningioma resection (OR 0.218, CI 0.070-0.676, p=0.0084) and biopsy (OR 0.128, 0.038-0.427, p=0.0008) were less likely to have new EREs at 6-months.
Discussion

• Postoperative AED prophylaxis is driven in part by tumor location and pathology.

• However, practice patterns are inconsistent and vary by geographic region.

• The fact that patients who received AED prophylaxis were more likely to have a new ERE may be indicative of provider allocation of AED prophylaxis to patients at highest risk of seizure.
Summary Points

• Roughly 40% of AED prophylaxis candidates receive prophylaxis for resection or biopsy of brain tumors.

• While driven in part by tumor location and pathology, AED prophylaxis practice patterns are inconsistent.

• Given the lack of clear consensus on proper indications for AED prophylaxis, well-powered trials may be needed to guide clinical practice and future guidelines.