

# Trends and Associations in Open Surgery for Epilepsy

Jose F Dominguez MD<sup>1</sup>, Sima Vazquez MS<sup>2</sup>, Eris Spirollari BA<sup>2</sup>, Ankita Das BS<sup>2</sup>, Alexandria Naftchi BS<sup>2</sup>, Carrie R Muh MD<sup>3</sup>, Vishad Sukul MD<sup>1</sup>

<sup>1</sup> Department of Neurosurgery, Westchester Medical Center, Valhalla NY

<sup>2</sup> School of Medicine, New York Medical College, Valhalla NY

<sup>3</sup>Department of Neurosurgery, Maria Fareri Children's Hospital, Valhalla NY

**Background:** Surgical treatment for epilepsy include resection, callosotomy, deep brain stimulation, hemispherectomy, or laser interstitial thermal therapy. Here we explore trends and associations with open surgical techniques in epilepsy patients.

**Methods:** Patents were selected from 2016-2019 Kids' Inpatient Database using the ICD10 code G40. Open surgery (OS) was defined using the ICD10 codes 00B70ZZ, 00500ZZ, 00570ZZ, 00B60ZZ. Data defining demographics, clinical characteristics, and outcomes were extracted. Pearson's chi-squared test was used to describe associations between variables. Univariate regression was used to analyze predictors of OS.

**Results:** 264,979 patients had epilepsy. The median age was 9 (IQR 3-16). The most frequent age groups were 5-10 (25.1%) and >15 (25.1%) years old. 19.9% were 11-15, 16.3% 2-4, and 13.6% <2 years old.

20,159 (0.8%) of patients underwent OS. OS was predicted by focal/partial epilepsy (4.823 (4.394-5.295)  $p < 0.001$ ). Patients with non-intractable, non-status epilepticus epilepsy were not likely to undergo OS (0.069 (0.47-0.103)  $p < 0.001$ ).

OS was associated with cerebrospinal fluid leak (7.409 (5.175-10.609)  $p < 0.001$ ), infarction (3.552 (2.507-5.034)  $p < 0.001$ ), aphasia (4.504 (3.438-5.900)  $p < 0.001$ ), and postprocedural delirium (2.657 (1.419-4.978)  $p < 0.05$ ). Patients undergoing OS were less likely to experience sepsis (0.12 (0.06-0.24)  $p < 0.001$ ), acute kidney injury (0.215 (0.125-0.371)  $p < 0.001$ ), and mechanical ventilation (0.424 (0.349-0.516)  $p < 0.001$ ).

A length of stay greater than 10 days was more likely in patients undergoing OS (2.482 (2.242-2.749)  $p < 0.001$ ). There were no differences inpatient death or discharge.

**Conclusions:** OS was more likely in patients with focal/partial epilepsy and less likely in patients with non-intractable, non-status epilepticus epilepsy. OS was positively associated with cerebrospinal fluid leak, aphasia, and delirium but negatively associated with infection, kidney injury, and mechanical ventilation. Length of stay was increased in patients undergoing OS.