Comparison of the real-world effectiveness of vertical versus lateral functional hemispherotomy techniques for pediatric drug-resistant epilepsy: A post hoc analysis of the HOPS study


OBJECTIVE
This study was undertaken to determine whether the vertical parasagittal approach or the lateral peri-insular/peri-Sylvian approach to hemispheric surgery is the superior technique in achieving long-term seizure freedom.

METHODS
We conducted a post hoc subgroup analysis of the HOPS (Hemispheric Surgery Outcome Prediction Scale) study, an international, multicenter, retrospective cohort study that identified predictors of seizure freedom through logistic regression modeling. Only patients undergoing vertical parasagittal, lateral peri-insular/peri-Sylvian, or lateral trans-Sylvian hemispherotomy were included in this post hoc analysis. Differences in seizure freedom rates were assessed using a time-to-event method and calculated using the Kaplan-Meier survival method.

RESULTS
Data for 672 participants across 23 centers were collected on the specific hemispherotomy approach. Of these, 72 (10.7%) underwent vertical parasagittal hemispherotomy and 600 (89.3%) underwent lateral peri-insular/peri-Sylvian or trans-Sylvian hemispherotomy. Seizure freedom was obtained in
62.4% (95% confidence interval [CI] = 53.5%-70.2%) of the entire cohort at 10-year follow-up. Seizure freedom was 88.8% (95% CI = 78.9%-94.3%) at 1-year follow-up and persisted at 85.5% (95% CI = 74.7%-92.0%) across 5- and 10-year follow-up in the vertical subgroup. In contrast, seizure freedom decreased from 89.2% (95% CI = 86.3%-91.5%) at 1-year to 72.1% (95% CI = 66.9%-76.7%) at 5-year to 57.2% (95% CI = 46.6%-66.4%) at 10-year follow-up for the lateral subgroup. Log-rank test found that vertical hemispherotomy was associated with durable seizure-free progression compared to the lateral approach (p = .01). Patients undergoing the lateral hemispherotomy technique had a shorter time-to-seizure recurrence (hazard ratio = 2.56, 95% CI = 1.08-6.04, p = .03) and increased seizure recurrence odds (odds ratio = 3.67, 95% CI = 1.05-12.86, p = .04) compared to those undergoing the vertical hemispherotomy technique.

SIGNIFICANCE
This pilot study demonstrated more durable seizure freedom of the vertical technique compared to lateral hemispherotomy techniques. Further studies, such as prospective expertise-based observational studies or a randomized clinical trial, are required to determine whether a vertical approach to hemispheric surgery provides superior long-term seizure outcomes.

date of publishing: 12-09-2021
journal title: Epilepsia
ISSN electronic: 1528-1167