

Epilepsy Surgery in Tuberous Sclerosis Complex

Results from The Pediatric Epilepsy Research Consortium (PERC) Epilepsy Surgery Database

Eschbach K¹, Karia S², Depositario-Cabacar D³, Singh RK⁴, Ostendorf AP⁵, McNamara NA⁶, Romanowski E⁶, Sullivan J⁷, Nangia S⁸, Grinspan Z⁸, Bolton J⁹, Reddy SB¹⁰, Manuel C¹⁰, Shrey DW¹¹, Tatachar P¹², Marashly A¹³, Ciliberto MA¹⁴, Gedela S¹⁵, Koop J¹⁶, Coryell J¹⁷, Wolf S¹⁸, McGoldrick P¹⁸, Wong-Kisiel L¹⁹, Shandley S²⁰, Perry MS²⁰, Alexander AL¹

¹Children's Hospital Colorado, University of Colorado Anschutz Medical Campus. ²Norton Children's Hospital, University of Louisville School of Medicine, ³Children's National Hospital, George Washington University School of Medicine, ⁴Atrium Health/Levine Children's Hospital, ⁵Nationwide Children's Hospital, Ohio State University, ⁶Michigan Medicine, University of Michigan, ⁷University of California San Francisco Weill Institute for Neurosciences, ⁸Benioff Children's Hospital, ⁹Weill-Cornell Medicine, ¹⁰Boston Children's Hospital, ¹¹Vanderbilt University Medical Center, ¹²Monroe Carell Jr Children's Hospital of Ohio, ¹³Children's Hospital of Orange County, ¹⁴Ann and Robert H Lurie Children's Hospital, Chicago, ¹⁵University of Washington/Seattle Children's Hospital, ¹⁶University of Iowa Hospitals and Clinics, ¹⁷Emory University College of Medicine, Children's Healthcare of Atlanta, ¹⁸Children's Hospital of Wisconsin, ¹⁹Medical College of Wisconsin, ²⁰Doernbecher Children's Hospital, Oregon Health and Sciences University, ¹⁸Boston Children's Health Physicians, ¹⁹Mayo Clinic College of Medicine, ²⁰Justin Neuroscience Center, Cook Children's Medical Center

RATIONALE

- Tuberous Sclerosis Complex (TSC) is a leading cause of genetic structural epilepsy in childhood and is often drug-resistant.
- Variations in care are understudied, including pre-surgical evaluation, recommended surgical treatments, the use of palliative resections, and surgical outcomes.

METHODS

- Children 0-18 years of age with TSC were included from the PERC Epilepsy Surgery Database, a prospective cross sectional study enrolling patients undergoing epilepsy surgery evaluation at 20 US pediatric epilepsy centers.
- Predefined variables collected included demographics, epilepsy characteristics, presurgical treatment, epilepsy evaluation, goal of surgery (palliative vs definitive), and outcome of surgery.
- Data was obtained from database initiation in 1/2018 to present 5/2021.

Children in database:
1037



Children with TSC:
36

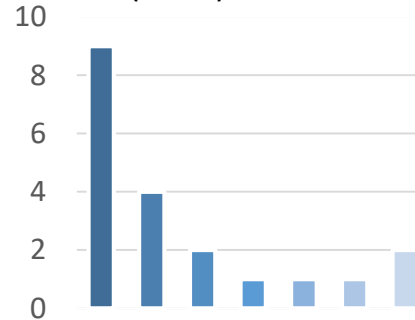
Patient and Epilepsy Characteristics

Age at seizure onset (median)	0.3 years (IQR 0.3-0.65)
Age at failure of second ASM (median)	1.5 years (IQR 0.9 – 4)
Age at referral for current phase I (median)	4.1 years (IQR 2.0 – 9.1)
# of failed ASM prior to phase I (median)	4 (IQR 2-5)
# with history of prior epilepsy surgery	9 children

ASM: antiseizure medication

Type of Surgery Performed (n=16)

- Lesionectomy
- Lobectomy
- Laser interstitial ablation
- Corpus callosotomy
- Cortisectomy
- Vagus nerve stimulation (VNS)
- > one of the above

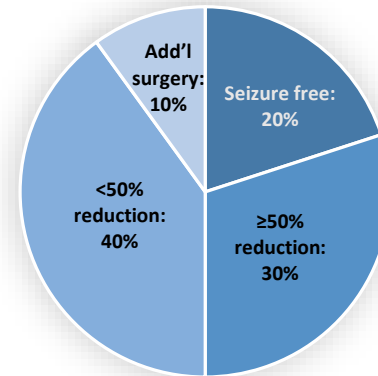


- No additional testing after phase I evaluation in 15 (42%)
- Additional testing (MEG, PET, and / or SPECT) completed in 21 (58%)
 - MEG (11), PET (11), SPECT (7); 2 modalities (4), 3 modalities (2)
- Surgery offered in 25 (69%)
 - 1-stage surgery in 11 (31%)
 - 2-stage surgery in 15 (42%) with stereo-EEG completed in 10
 - One child offered either a 1-stage or 2-stage surgery
 - Intent of surgery palliative in 10 (63% who underwent surgery)
- Reason surgery not offered: inadequate data (4), multifocal onset (3), risk of injury outweighed benefit (2), > one of these (3), not reported (4)

RESULTS

Median duration of follow-up is 7.5 months (IQR 1-10.4).

Ten children have at least 6 months of follow-up since epilepsy surgery (range 6-27 months).



CONCLUSIONS

- Children with TSC referred for consideration of epilepsy surgery have an early onset of epilepsy and early drug-resistance.
- The extent of pre-surgical evaluation and additional testing after phase I evaluation is variable.
- Surgery is often intended to be palliative and most often consists of focal resections.
- Ongoing follow-up of this cohort will provide insight into potential benefits of palliative epilepsy surgery in children with TSC.