Surgical Therapies Commission

2022 Annual Report

MEMBERS

Dario J. Englot (USA), chair
Lara Jehi (USA)
Sam Wiebe (Canada)
Fernando Cendes (Brazil)
Riki Matsumoto (Japan)

The goal of the commission is to promote scientific inquiry, assessment of evidence, access, education, and safety in epilepsy surgery across the world. The commission is comprised of five core members and five task forces charged with advancing specific goals in the field of epilepsy surgery. In 2022, the five task forces have been pursuing several projects which are summarized below. In addition to several meetings of the individuals task forces, the commission had a one virtual mid-year meeting of all core members, and a half-day year end meeting of all taskforce members at AES 2022 to discuss progress in the task forces.

EPILEPSY SURGERY EDUCATION

TASK FORCE

Arthur Cukiert (Brazil), chair
Faisal Al-Otaibi (Saudi Arabia)
Rushna Ali (USA)
Eyiyemisi Damisah (USA)
Christian Dorfer (Austria)
Nico Enslin (South Africa)
Guy McKhann (USA)
Carrie Muh (USA)
Bertil Rydenhag (Sweden)
Tatiana von Hertwig (Brazil)
Xiongfei Wang (China)

Project 1 - Neurosurgical Video Library

This project aims to provide educational videos for core surgical procedures with contributions obtained from widespread social and geographic distribution. The videos received from authors are transcribed and legends are added. Additionally, self-evaluation questions are embedded in the videos. The initial three videos are live on the ILAE website, and production is ongoing with a goal of 40-50 videos.

Project 2 – Epilepsy Surgery Education Questionnaire

This project aims to document how epilepsy surgery is taught and learned worldwide trying to define the gaps and opportunities among the different geographical and development status regions. It also aimed to evaluate how epilepsy surgery is practiced, how much of individual surgeons' carriers are dedicated to it and how to increase engagement. The survey was distributed using SurveyMonkey. The project is ongoing with initial manuscript planning.

Project 3 – Epilepsy Surgery Competencies for Neurologists
It was noted that the quite extensive ILAE CV did not significant surgical competencies for neurologists. In its surgical competencies item, it does include competencies for preoperative and postoperative care. This proposal is meant to improve on that gap of knowledge. The project is currenting awaiting Educational Council review for inclusion in the ILAE CV.

Project 4 – Epilepsy Surgery Core CV
This project aims to develop a Core CV for neurosurgeons dedicated to epilepsy surgery. It would guide to structure and evaluate future fellowship and educational programs for surgeons. It would also serve a backbone for future ILAE educational initiatives such as courses for surgeons. The next goal is to generate an educational course proposal.

Project 5 – Local Educational Mentorship Program Feasibility
This project aims to explore the usefulness of local mentorship as opposed to traditional fellowships carried out in well-developed centers. Outside and local training have their value. On the other hand, there is a subset of centers that already have some capability in evaluating and treating patients surgically that might benefit from an intensive short duration visit from experts to boost their capability, maximizing their local resources. The project is currently awaiting budget consideration.

Project 6 – Neurosurgical Meetings' Representation
This project aims to evaluate how neurosurgical related issues are discussed worldwide in local, national, regional, and international meetings to ensure that the surgical treatment of epilepsy is adequately and conveniently represented in a way that more patients could benefit from this approach. Budget consideration is underway.

EPILEPSY SURGERY EVIDENCE AND OUTCOMES

TASK FORCE

John Rolston (USA), chair
Fabrice Bartolomei (France)
Sallie Baxendale (UK)
Sarah Bick (USA)
Kees Braun (Netherlands)
Robyn Busch (USA)
Nathalie Jette (USA)
Colin Josephson (Canada)
Mark Keezer (Canada)
Churl-Su Kwon (USA)
Sylvian Rheims (France)
Michael Sperling (USA)
Peter Widdess-Walsh (Ireland)

Project 1 - Standardized Outcomes Reporting
The goal of the project is to work towards improved outcomes reporting in epilepsy surgery. A systematic review of EQUATOR guidelines to assess the landscape of available reporting standards is being planned. Nex steps include a complete narrative review on existing EQUATOR guidelines to then use these results to prepare a Delphi study of reporting outcomes which will be proposed to ILAE publication council.

Project 2 – Outcomes Beyond Seizure Freedom
The goal is to better define and report outcomes beyond seizure freedom in epilepsy surgery. The initial proposal was vetted and approved by the ILAE publication council. IRB approval for multi-site study on surgical satisfaction is underway. Members are currently working on DUAs with interested sites, and next steps will include data collection prior to analyses.

Project 3 – Neuromodulation Outcome Scale
As epilepsy surgery seizure outcome scales were not designed with neuromodulation in mind, the goal is to create an outcome scale that better reflects clinical results after neuromodulation treatments. Proposal of scale generation via Delphi was vetted and approved by the ILAE Publication Council. An IRB being drafted for focus groups, a list of Delphi items is being compiled, and Welphi subscription is being pursued.

Project 4 – Expert Opinion on Neuromodulation
The goal of this project is to determine which neuromodulation option experts seem most fitting in specific clinical scenarios. The plan is for Delphi survey to assess expert opinion was vetted by the ILAE Publication Council. The next step will be to select Delphi members.

PEDIATRIC EPILEPSY SURGERY

TASK FORCE

Georgia Ramantani (Switzerland), chair
Youssef Comair (Lebanon)
Sarah Ferrand-Sorbets (France)
Martha Feucht (Austria)
Lakshminarayanan Kannan (India)
Andre Palmini (Brazil)
Taras Studeniak (Ukraine)
Manjari Tripathi (India)
Howard Weiner (USA)
Elaine Wirrell USA)
Mary Lou Smith (Canada)

Project 1 – Spectrum of International Practice in Pediatric Epilepsy Surgery
Description/Progress: We plan to update and expand the highly cited 2007 paper on this topic: Defining the spectrum of international practice in pediatric epilepsy surgery patients. Harvey et al; ILAE Pediatric Epilepsy Surgery Survey Taskforce. Epilepsia. 2008. We aim to conduct an international survey among epilepsy surgery programs to determine the frequency of epilepsy procedures and etiologies in a calendar year and will strive for representation across all ILAE regions.

We plan to collect the following data: epilepsy duration to surgery, need for intracranial exploration, resection extent, underlying etiology, age at surgery/specifics of particular age groups, need for reoperation, use of palliative surgery, rate of MRI-negative cases. This update is necessary due to the increasing volume of pediatric epilepsy surgery and the key changes in presurgical evaluation and surgical techniques in the last 20 years (high-resolution MRI, histopathology, genetics, SEEG, MEG, radiosurgery). Our work ultimately aims to facilitate the

identification of critical issues to be addressed in terms of healthcare and research. In addition to the questions posed by the 2004 survey, we will address the promptness of referral to presurgical evaluation, use of SEEG, frequency of various etiologies worldwide, use of minimally invasive surgical techniques, use of palliative procedures (callosotomy, MST), palliative resections, stimulation procedures (VNS, DBS, and RNS), the role of genetics in surgical decision-making, surgery in non-drug-resistant lesional epilepsy. Our proposal has received approval from the ILAE publication council. We are currently working on establishing a dedicated web-based electronic data entry form and selecting representative epilepsy centers.

Next Steps: We are planning to submit a funding application to support dedicated personnel for our project. Our next steps will involve contacting the epilepsy centers and collecting and analyzing the multicentric data.

Project 2 – Criteria for Referral and Evaluation of Children for Epilepsy Surgery
Description/Progress: We plan to update and expand the highly cited 2006 paper on this topic: Proposed criteria for referral and evaluation of children for epilepsy surgery: recommendations of the Subcommission for Pediatric Epilepsy Surgery. Cross JH, et al. Subcommission for Pediatric Epilepsy Surgery; Commissions of Neurosurgery and Pediatrics. Epilepsia. 2006. An update is urgently required since this seminal paper reflects a consensus reached almost 20 years ago, drawing from a considerably more limited spectrum of pediatric epilepsy surgery candidates and a considerably more limited body of evidence on pediatric epilepsy surgery than currently available. We will focus on addressing unique aspects in the pediatric population, such as developmental arrest or regression due to seizures, age-specific etiologies, age-specific presentations, and greater functional plasticity in early life. We will highlight changes in the last decades, including surgery in non- drug-resistant lesional epilepsy, palliative procedures (callosotomy, MST), palliative resections, and stimulation procedures, and provide a global perspective relevant to both high- and low-resource settings. We will avoid overlapping with the 2020 paper on “Establishing criteria for pediatric epilepsy surgery center levels of care" from the previous Pediatric Epilepsy Surgery Task Force and the 2021 paper on "Recommendations for the timing of epilepsy surgery evaluation” from the Surgical Therapies Commission. Our proposal has received approval from the ILAE publication council.

Next Steps: We plan to perform a scoping review of the available evidence, perform a Delphi process, and finally provide consensus criteria for the pediatric population. In the meantime, we have been informed that the EAN/EpiCare/EPNS are preparing epilepsy surgery guidelines for children and adults and will seek collaboration with the relevant task forces.

Project 3 – Non-Seizure Outcomes of Pediatric Epilepsy Surgery
Description/Progress: We acknowledge the need for more refined epilepsy surgery outcomes for the pediatric population undergoing epilepsy surgery than only seizure outcomes. Beyond seizure freedom, benefits in developmental, cognitive, behavioral, and quality of life domains are crucial for affected children and their families. However, surgical success is currently assessed mainly in terms of seizure freedom, and non-seizure outcomes, such as cognitive,

quality of life, behavioral, emotional, and vocational outcomes, are rarely reported. The specific outcomes measured, and the techniques used vary significantly in different regions, limiting their comparability and generalizability. Follow-up evaluation is rarely long-term, while relevant (developmental) changes often take more time. Gaining insight into these non-seizure outcomes of pediatric epilepsy surgery is essential for patient management, counseling, and prognostication. We plan to perform a systematic review for cognitive outcomes, since these have been more extensively documented, and a scoping review for other non-seizure outcomes, where only limited data is available. We aim to develop assessment scores/questionnaires for the standardized evaluation of non-seizure outcomes drawing from the existing knowledge and performing a rigorous Delphi process. Our ultimate goal is to provide recommendations on evaluating and reporting non-seizure outcomes. In the meantime, we have investigated possible synergies with other task forces.

- Mary Lou Smith, Neuropsychology Task Force, Diagnostic Methods Commission, has shared preliminary material on the Pediatric Epilepsy Severity Scale, comprising questionnaires for parents and youth (ages 10+ or 12+). This tool is intended to be used for monitoring the progression of epilepsy and for evaluating treatment outcomes. These forms are yet to be piloted, but they could give a starting point for a simple scale to measure non-seizure surgery outcomes.
- Robyn Busch, Epilepsy Surgery Evidence and Outcomes Task Force, Surgical Therapies Commission, has shared published material on the Epilepsy Surgery Satisfaction
- Questionnaire (ESSQ-19), a recently developed and validated measure of patient satisfaction with epilepsy surgery. This questionnaire has been developed for adults but could give a starting point to develop a similar tool for pediatric epilepsy surgery.

Next Steps: We will review the available evidence on non-seizure outcomes, starting from cognitive outcomes. We will assess the existing questionnaires as starting point to develop questionnaires for the standardized evaluation of non-seizure outcomes following epilepsy surgery.

Project 4 – Surgery in Non-Drug-Resistant Lesional Epilepsy

Description/Progress: Epilepsy surgery is a safe and effective treatment for selected children with focal lesional epilepsy but has traditionally been considered only after the criteria of pharmacoresistance have been met. However, there is a growing body of evidence supporting that 1) the vast majority of children with specific types of lesional epilepsy will eventually progress to pharmacoresistance, 2) the surgical treatment of these lesions is safe, especially in non-eloquent regions, 3) earlier surgical intervention may be associated with better seizure outcomes, and 4) withdrawal of antiseizure medications after successful surgery may lead to improvements in developmental trajectories and quality of life. Epilepsy surgery in non-drug-resistant lesional epilepsy is thus increasingly considered. The recent ILAE recommendations on the Timing of Referral to Evaluate for Epilepsy Surgery state that “referral for a surgical evaluation should be considered in patients who are seizure-free on 1–2 antiseizure medications, with a lesion in non-eloquent cortex”.

We plan to collect multicentric data on surgery in non-drug-resistant lesional epilepsy within the scope of Project#1 to define the scope of international practice and, most importantly, to evaluate the surgical outcomes of these patients. We ultimately aim to investigate whether epilepsy surgery, in carefully selected cases, may be considered prior to drug resistance and thus identify the optimal time point for surgical intervention.

Next Steps: see Project 1

EPILEPSY SURGERY NETWORKS

TASK FORCE

Kate Davis (USA), chair
Leo Boniha (USA)
Milan Brazdil (Czech Republic)
Ezequiel Gleichgerrcht (USA)
Xiaosong He (China)
Riki Matsumoto (Japan)
Carrie McDonald (USA)
Aileen McGonigal (Australia)
Victoria Morgan (USA)
Terence O'Brien (Australia)
Nishant Sinha (USA)
Chengyuan Wu (USA)

Photo: AES Annual Meeting 2022 - Meeting of Epilepsy Surgery Networks Task Force

Project 1- Brain Connectivity for Pre-Surgical Localization of Epileptogenic Tissue: Systematic Review and Meta-Analysis from ILAE Epilepsy Surgery Networks Taskforce

This project aims to analyze the current state of brain connectivity analysis methods in identifying the seizure onset zone for pre-surgical planning of patient with drug-resistant epilepsy. Our objective is to demonstrate the effectiveness of brain connectivity analysis and how it compares to current methods of seizure onset zone localization.

Progress we have made progress on developing a reproducible study design which is described below:

- Establishment of search strategy, inclusion, and exclusion criteria
- Planning items for data extraction
- Defining outcome measures
- Definition of ground truth: Seizure onset zone delineated through interdisciplinary epilepsy pre-surgery meeting by assessing information from structural MRI, iEEG, MEG,

sEEG, PET, or subtraction ictal PET co- registered with MRI and report on surgical outcome at least one year after surgery.

- Data Analysis: Meta analyses. We plan to compute pooled estimates and 95% confidence intervals (CIs) calculated using a random-effects model to incorporate heterogeneity between studies.
- Risk of bias assessment: We plan to apply Newcastle-Ottawa Quality Assessment Scale

Next steps: After another group meeting in January 2023, we aim to register the protocol on PROSPERO. The next steps after protocol registration are: a) screening the articles, b) assessing the eligibility of studies using pre-defined inclusion and exclusion criteria, c) data extraction, d) study assessment and critical appraisal, e) meta-analysis using xmeta R package, followed by f) write-up and dissemination. Phases (a, b, d) will be performed by at least three authors requiring consensus amongst at least two.

EPILEPSY SURGERY IN LOW RESOURCE SETTING

TASK FORCE

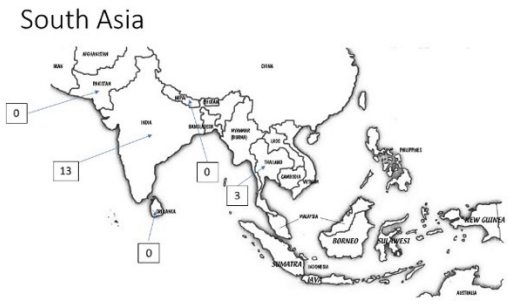
Jorge Burneo (Canada), chair
Maria Alonso-Vanegas (Mexico)
Juan Enrique Bender del Busto (Cuba)
Fernando Cendes (Brazil)
Sarat Chandra (India)
Arthur Cukiert (Brazil)
Katia Lin (Brazil)
Guoming Luan (China)
Malla Bhaskar Rao (India)
David Steven (Canada)
Sam Wiebe (Canada)
Jo Wilmshurst (South Africa)

Project 1: Survey of Epilepsy and Epilepsy Surgery Fellowship Programs in Low- and Middle-Income Countries

We have submitted a survey to all ILAE chapters in those regions. The response rate after 3 submission was low for most regions except Latin America. The findings revealed a small number of epilepsy fellowships.

In Latin America:

In South Asia:



In Africa: Only two in South Africa (one for adults and one for pediatrics.

Next Steps: We have expanded the task force and each new member has been assigned to contact each chapter in every region to obtain more detailed information.

RESEARCH AND PUBLISHED ARTICLES

- Touma L*, Dansereau B*, Chan AY, Jetté N, Kwon CS, Braun KPJ, Friedman D, Jehi L, Rolston JD, Vadera S, WongKisiel LC, Englot DJ*, Keezer MR*. Neurostimulation in people with drug-resistant epilepsy: Systematic review and meta-analysis from the ILAE Surgical Therapies Commission. *Epilepsia* 2022 Jun;63(6):1314-1329.
- Jehi L, Jette N, Kwon CS, Josephson CB, Burneo JG, Cendes F, Sperling MR, Baxendale S, Busch RM, Triki CC, Cross JH, Ekstein D, Englot DJ, Luan G, Palmini A, Rios L, Wang X, Roessler K, Rydenhag B, Ramantani G, Schuele S, Wilmshurst JM, Wilson S, Wiebe S. Timing of referral to evaluate for epilepsy surgery: Expert Consensus Recommendations from the Surgical Therapies Commission of the International League Against Epilepsy. *Epilepsia* 2022 Oct;63(10):2491- 2506.
- ILAE Neurosurgical Education Video Library: https://www.ilae.org/education/neurosurgical-education

Report submitted by Dario Englot