Epilepsy Surgery: A Pediatric Neurologist’s Perspective

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Where does it all start?
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Why do we ask SO MANY questions?
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- The answers to the questions inform us:
  - How did the epilepsy start?
  - Is it genetic or related to a lesion?
  - Is the epilepsy “medically intractable?”
  - Is there a medical or dietary option that would be more effective?
  - Where in the brain do the seizures come from?
  - How do the seizures impact this person’s lifestyle: their talents and goals?
How did the epilepsy start?

- Trauma
- Injury
- Infection
- A prolonged epilepsy
- Difficulties at birth
- No clear reason “idiopathic”
Is it genetic or related to a lesion?

- Childhood absence epilepsy
- Juvenile Absence epilepsy
- Benign Rolandic Epilepsy
- Juvenile Myoclonic Epilepsy
- Doose syndrome

- Dravet Syndrome
- Otahara Syndrome
- Angelman’s syndrome
- Cornelia De Lange syndrome
- Aicardi’s syndrome
Is the epilepsy “medically intractable?”

• Failure of 3 appropriate anti-epileptic medications
  – Failure
  – Three medications
  – Appropriate
Where in the brain do the seizures come from?

- Frontal
- Parietal
- Temporal
- Occipital
The Presurgical Evaluation

• Detailed history and physical by a pediatric epileptologist

• Routine EEG
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The Presurgical Evaluation

• Detailed history and physical by a pediatric epileptologist
• Routine EEG
• MRI
The Presurgical Evaluation

- Detailed history and physical by a pediatric epileptologist
- Routine EEG
- Head MRI
- Admission to the Pediatric EMU “PEMU” for identification of the seizure focus
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- PET: neuroanatomic localization of seizure focus
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- Neuropsychological/developmental evaluation
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- Neuropsychological/developmental evaluation
- Language localization
The Presurgical Evaluation

• The most important aspect, and the most unique to Vanderbilt
• The Epilepsy Surgery Case Conference
The Presurgical Evaluation

- Additional testing may be recommended:
  - Additional EMU monitoring
  - Interictal and ictal SPECT test
The Surgical Evaluation

• History and physical by a trained, pediatric neurosurgeon, specializing in epilepsy surgery

• Decision by conference:
  – 1 stage vs. 2 stage surgery
The Surgical Evaluation
The Surgical Evaluation

• Special circumstances:
  – Infantile spasms
  – Hemimegalencephaly
  – Rasmussen’s encephalopathy
In a large study of children undergoing surgery over a 10 year period:

- Overall: 78% good outcome (SF or >90% reduction), 60% SF (seizure-free)
- Lesional cases vs Non-lesional cases:
  - 80% good outcome, 65% SF
  - 74% good outcome, 51% SF (no statistical difference)
- Site of seizures:
  - Temporal 80% good, 70% SF,
  - Non-temporal 78% good outcome, 61% SF (no statistical difference)
- Most significant feature:
  - Completeness of the resection: 92% good outcome, 76% SF (p<0.0001)
    - Paolicchi et al, Neurology 2000; 54 (3): 642-647
Outcome: Development

• Factors that improve developmental outcome:
  – Younger age at the time of surgery
  – Short duration of epilepsy
  – Seizure freedom/outcome
  – Improved developmental, dependent on the study is estimated at 59-70%

What if my child doesn’t qualify?

- New medications
- Dietary therapy
- Vagus Nerve Stimulator Implantation
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