Seizures After Epilepsy Surgery

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Spells are “Not Seizures”
(Non-epileptic Paroxysmal events)

Spells are “Seizures”, however, due to “acute problem” after surgery
Acute symptomatic seizures
Failure of epilepsy surgery

Non-epileptic Events After Surgery
May Mimic Epileptic Seizures

Child is usually in intensive care or floor recovering from surgery
Risk factor
Hyper vigilant parent or care giver
Hyper-focus on bedside monitors, alarms, numbers, tubes and lines etc. (then the child)

Non-epileptic Events May Occur Remotely After Surgery

Risk factors
Usually a developmentally delayed child
Young child or infant
Hyper vigilant parent or school teacher/psychologist
May have some unexplained or unrecorded spells before surgery

Non-epileptic Events May Occur ‘Remotely’ After Surgery

“Staring and non-responsive despite my calling his name repeatedly”
“Teachers report blank stare and suspect absence or complex partial seizures”
“Shaking or trembling” - limb(s) or whole body
“Falling” – fainting, tripping, imbalance

Non-epileptic Events Are Usually Benign

History and exam are usually sufficient for diagnosis
Cautious observation is warranted
If spells continue or worsen:
Video EEG is usually done to confirm the diagnosis
Other explanations (medical) are considered as necessary
Treatment
Reassurance
Long term: Attention Deficit Disorder evaluation or lower anti-epileptic drugs if toxicity suspected
Seizures After Surgery

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  * (Non-epileptic Paroxysmal events)

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  * Acute symptomatic seizures

* Failure of epilepsy surgery

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Seizures After Surgery May be Due to Upset Brain or Infection

* Upset Brain
  * Irritation from surgery, blood, fever, chemicals released from body’s defense mechanisms
  * Anesthetic agents, new drugs
  * Drop in antiepileptic levels (withdrawal seizures)
  * Pressure changes in side the skull
  * Biochemical abnormalities:
    * Blood Glucose, Sodium, Potassium, Oxygen levels

* Infection
  * Blood, spinal fluid

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Acute symptomatic seizures are Treated By Correcting The Cause

* Blood tests and brain CT or MRI may be done to find the cause
* Correction of abnormal biochemistry
* Aggressive treatment of infection
* Steroids for Chemical irritation of the brain
* Adjustments in antiepileptic medications

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The Real Issue:

When do acute postoperative seizures (APOS) suggest failure of epilepsy surgery?

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Postoperative seizures after extratemporal resections and hemispherectomy in pediatric epilepsy

J. Nazi, MD, MS; M. A. Gupta, MD; R. Manji, MD; D. Leckband, MD; R. PSykowich, MD; W. Winneker, MD; W. Wallace, MD

Abstract: Objective: To evaluate seizure and student behavior post extratemporal resections and hemispherectomy. The authors compared 344 children admitted for extratemporal resections and hemispherectomy with 421 age-matched control patients. The authors compared the incidence of seizures and postoperative behavioral changes in these two groups. Results: Thirty-two percent of the patients in the extratemporal resections and hemispherectomy group had seizures, compared to 15% in the control group. Postoperative behavioral changes were seen in 22% of the extratemporal resections and hemispherectomy group, compared to 8% in the control group. Conclusions: Postoperative seizures and behavioral changes, not medical or surgical complications, influence long-term seizure outcome. The seizures and behavioral changes can be rectified with aggressive treatment.

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Seizures Soon After Surgery: Higher Risk Of Surgical Failure

* 25% of children have seizures during recovery following epilepsy surgery
  * APOS reduce chances of good one year seizure outcome by 8 folds (42% vs 85%, OR = 0.12)

* APOS: number, type, or the presence of medical or surgical complications do not influence long term seizure outcome

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Mani J et al., Neurology 2006
Symptomatic Seizures May Occur ‘Remotely’ After Surgery

- After epilepsy surgery, no ongoing habitual seizures occur
- However, seizures are precipitated by
  - Fever, infection, fasting, physical or emotional stress
  - Usually brief clusters for 24-72 hours
- This is still considered to be a “Good surgical outcome” (ILAE, 2001)
- Treatment:
  - Anticipatory or abortive: Benzodiazepenes
  - Some children may stay on one antiepileptic drug

Seizures After Surgery

- Spells are “Not Seizures”
  - (Non-epileptic Paroxysmal events)
- Spells are “Seizures” from
  - “Acute” problem soon or some time after surgery
- Failure of epilepsy surgery

Failure of Epilepsy Surgery

- 30-50% patients after surgery may not achieve the goal of “complete seizure freedom”
  - Surgical success is high in patients with benign tumor, stroke, small dysplastic lesion
  - Surgical success is low in patients with extensive or hemispheric dysplasia, epilepsy after trauma or infection

Surgery May Fail Due to Incomplete Resection or Disconnection

- In research series, “Incomplete resection of the seizure zone or lesion” is the most important independent predictor
- Complete resection may not occur
  - Location and surgical access to the lesion
  - Proximity to eloquent (motor, speech) region
  - Incomplete disconnection in hemispherectomy operations
  - Incorrect or under-estimation of epileptogenic zone – especially when ‘Normal brain MRI’

Seizures May Come from Other Usual or Unusual Suspects

- Other side (?healthy hemisphere)
- Another distant region of the brain
  - Children with multiple lesions such as Tuberous Sclerosis Complex
- Surgery was anticipated to be palliative
  - Resection of the epileptogenic region with most disabling and frequent seizures
- Another type of epilepsy
  - Generalized epilepsy syndrome

Management of Seizures After Surgical Failure: Real Solutions

- Aggressive medical management
- Investigating surgical failure may require “re-evaluation” with review of entire records, video EEG, brain MRI and other testing as necessary
- Reevaluation after surgical failure could be complicated and may require special expertise
Management of Seizures After Surgical Failure: Real Solutions

- Consideration to another surgery
  - Benefits risks assessment
  - Management conference presentation
- Success after 2nd surgery
  - ~ 50% patients who undergo 2nd surgery achieve seizure freedom or >75% improvement in series with lesion surgeries and hemispherectomy
  - Success is likely lower in patients with 'normal MRI' before the 1st surgery

THANKS