Epilepsy arising from Low Grade Gliomas
Current Practice and Challenges

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MEG
ION M
HFOs
Epilepsy from Low Grade Gliomas in Children

• May arise from a LGG in any lobar distribution; and it is common.
• Temporal > Frontal > Parietal > Occipital
• Ganglioglioma > DNET > Astrocytoma > Oligo > Glioneuronal
• Seizure may be the first presentation
• Residual tumour leading to persistent seizures
• Post-excisional scar tissue leading to persistent seizures
• Medical management with anti-convulsants
Lobar Low Grade Gliomas Causing Epilepsy
Amenable to Surgical Resection

Advanced neuroimaging
Neuronavigation
Neuromonitoring
Ultrasound
Cortical mapping
Cavitron
Interstitial Laser
Intra-operative MRI
Nico Myriad
Paediatric Low Grade Glioma
Temporal Lobe tumor

• 14 year old female
• 3 month history of headache, and double vision
• First ever seizure
• Nystagmus
• Esotropia
• Papilledema
Low Grade Glioma - Temporal Lobe

- Gross Total Excision
- Esotropia and Diplopia resolved
- Papilledema Resolved
- No further seizures
- Pathology = Ganglioglioma
Advances in LGG Surgery
Neuroimaging Has Paved the Way

Resection with neuronavigation, neuromonitoring (train of 5’s) and advanced neuroimaging (DTI).
Utility of MEG and Neuronavigation to Treat Epilepsy Caused by Tumors

Neurosurgery Nov 2004
Advances in Neuromonitoring and Mapping
Removing LGGs in Eloquent Regions

- 4 year old male
- Intractable epilepsy
- Right leg sensory seizures
- Subtle lesion seen on MRI
Approach to Cingulate Gyrus LGG: Video

Seizure Free
4 months
Neurologically intact
At Times Invasive Monitoring for LGGs

Pathology
Low grade glioma

High frequency oscillations
Sometimes Palliative Procedures Can Help

• 10 year male
• Intractable epilepsy
• Large infiltrative lesion
• Extensive temporal lobectomy performed
• Oligodendroglioma, 1p/19q intact
• Significant residual tumour
• Seizures vastly improved
Sometimes Peritumoral Scar Excision

- 18 year male, right handed
- Intractable epilepsy
- fMRI shows left dominance for language
- Previous lesionectomy performed at age 10, LGG
- Residual FLAIR change surrounding tumour bed
- Family reluctant to consider further resection if deficit
- Tried multiple anti-convulsants + VNS
- Finally consented to OR
- Peritumoral scar excised + residual LGG
- Seizure free, no new deficit
What the Literature Tells Us

Dysembryoplastic neuroepithelial tumors in childhood
Long-term outcome and prognostic features
M.A. Nelson, FRACP; R. Sakuta, MD; N. Chuang, MD; H. Otao, MD; J.T. Rutka, MD, PhD;
O.C. Sneed III, MD; C.E. Hawkins, MD, PhD; and S.K. Weiss, MD

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The need to re-study your patients!

Bottom line: Post-resection ECoG can be helpful in predicting seizure outcome!

Epilepsy surgery related to pediatric brain tumors: Miami Children's Hospital experience

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What the Literature Tells Us

Surgery alone to remove low grade tumors is associated with excellent outcomes in TLE!

Gross total resection offers excellent seizure outcome results.
But there are late recurrences requiring re-operations!
Management of Epilepsy caused by LGG’s

Conclusions:

• Wherever possible, take the lesion out!
• Resection of LGGs is aided by neurosurgical adjuncts (DTI, MEG, IONM, awake craniotomy etc)
• Residual tumor and persistent epilepsy after surgery usually requires further surgery
• Occasionally, invasive monitoring is helpful
• Occasionally, peritumoral scar excision may be required
• Work closely with your paediatric epileptologists to determine best medical management throughout
Arigatou gozaimasu!