Epilepsy - Identifying Epileptical Sources in the Human Brain

Abnormal brain signals → Epileptical activity is rather focal → Where is the source of epilepsy for this specific patient?

Traditional treatment: RX

70% ~20%

Epileptic source localization using non invasive measurements

Electroencephalography (EEG)

Magnetoecephalography (MEG)

Source localization pipeline:

- 11 year old boy
- medically intractable epilepsy
- tumor anterior to motor area

Source localization result - surface EEG (red arrow) vs. implanted electrodes (source under orange electrodes)

Epileptic source localization result localized close to tumor tissue

Case Study

Source Localization Pipeline

- Image acquisition & processing
- Identification of structures
- Tissue segmentation
- Volume model (Meshing)
- Source Localization

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Epileptic activity is rather focal

Epileptic spikes marked

Source Localization result - surface EEG (red arrow) vs. implanted electrodes (source under orange electrodes)

Behavioral events

Surgical planning

Surgical planning used estimated source location for