Intracranial electroencephalography

see also Epidural grid monitoring

Subdural grid monitoring.

Intracranial electroencephalography (iEEG), including electrocorticography (ECoG) or stereoelectroencephalography (sEEG) is the neuroelectrophysiologic signal obtained from implanted subdural electrodes or deep electrodes. iEEG has been widely applied in epilepsy surgery for pre-operative evaluation and functional cortex mapping. Implanted over both pathologic and functionally normal cortex, ECoG/sEEG not only help guide surgical intervention of intractable epilepsy [1].

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188 subjects undergoing iEEG monitoring across 10 institutions participated in 770 research stimulation sessions over 3.5 years. Seizures within 30 minutes of a stimulation session were included in our retrospective analysis. Goldstein et al. analyzed stimulation parameters, seizure incidence, and typical seizure patterns, to assess the likelihood that recorded seizures were stimulation-induced, rather than events that occurred by chance in epilepsy patients prone to seizing.

In total, 14 seizures were included in our analysis. All events were single seizures, and no adverse events occurred. The mean amplitude of seizure-associated stimulation did not differ significantly from the mean amplitude delivered in sessions without seizures.
 In order to determine the likelihood that seizures were stimulation-induced, they used three sets of analyses: Visual iEEG analysis, statistical frequency, and power analyses. We determined that three of the 14 seizures were likely stimulation-induced, five were possibly stimulation-induced, and six were unlikely stimulation-induced. Overall, we estimate a rate of stimulation-induced seizures between 0.39% and 1.82% of sessions.

The rarity of stimulation-associated seizures and the fact that none added morbidity or affected the clinical course of any patient are important findings for understanding the feasibility and safety of intracranial stimulation for research purposes [2].

All children undergoing intracranial electroencephalography subdural grid placement at the Children's Hospital of Philadelphia from 2002-2008 were asked to enroll.

Huang et al, utilized intraoperative pictures to determine the location of the electrodes and define the resection cavity. A total of 15 patients had surgical fields that allowed for complete identification of the electrodes over the area of resection. Eight of 15 patients were seizure free after a follow up of 1.7 to 8 yr. Only one seizure-free patient had complete resection of all seizure onset associated tissue. Seizure free patients had resection of 64.1% of the seizure onset electrode associated tissue, compared to 35.2% in the not seizure free patients (p=0.05). Resection of tissue associated with infrequent seizure onsets did not appear to be important for seizure freedom. Resecting ≥ 90% of the electrodes from the predominant seizure contacts predicted post-operative seizure freedom (p=0.007). The best predictor of seizure freedom was resecting ≥ 90% of tissue involved in majority of a patient's seizures. Resection of tissue under infrequent seizure onset electrodes was not

necessary for seizure freedom [3].

References

1)
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