Stereotactic EEG (SEEG) Practices: A Survey of United States Level 4 Epilepsy Centers

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Objectives

1. Describe current practice among National Association of Epilepsy Centers (NAEC) Level IV institutions.
2. Compare practices across several demographic properties.
3. Identify preferences for SEEG utilization.

Methods

- An online survey was sent to directors of all Level IV epilepsy centers as defined by the NAEC (192 centers).
- A SurveyMonkey online survey was sent in August 2019.
- The survey consisted of 63 questions.
- Survey had assessing the following: institutional information, institutional criteria for SEEG utilization, planning and implantation of SEEG electrodes, analysis and technical recording parameters of SEEG, epilepsy monitoring unit care for SEEG patients, cortical stimulation in SEEG and treatment options and complications after SEEG.

Results

SEEG Utilization

- The majority of respondents (76%) felt that age of the patient did not impact their decision on phase implantation method (subdural vs. SEEG).

Technical Recording Parameters

- Most centers are currently implanting SEEG electrodes via a robot (75%).
- Most centers report an average of 11-15 SEEG electrodes per implantation case (53%).
- About half of centers utilize electrocorticography at the time of SEEG electrode implantation (53%), typically utilized to assure good EEG signal quality (76%).
- Reference electrodes vary among institutions with 21% utilizing scalp EEG electrodes, 24% placing additional intracranial electrodes as a reference and 43% utilizing selected contacts from one of the SEEG electrodes.
- Few centers consistently place concurrent scalp EEG electrodes (25%).

SEEG Interpretation

- Few institutions have SEEG monitoring performed by a group of dedicated SEEG faculty (17%).
- While most centers report a standard SEEG nomenclature at their institution (59%), there is variability among centers on the specifics of the nomenclature.
- Most centers utilize cortical stimulation for SEEG cases, both to identify eloquent cortex (84%) and to provide habitation strategies (73%).
- There was variable use of cortico-cortical evoked potentials (15%), high frequency oscillations (HFO) (57%), ictal baseline shifts (43%) and automated spike, seizure or HFO detectors (38%).

SEEG Perception

- Most respondents felt that the perceived benefits of SEEG are patient comfort (97%), ability to perform bilateral exploration (92%), testing multiple hypothesis (79%) and ability to perform resection or ablation (76%).

Disadvantages of the use of SEEG compared to SDE were significantly increased workload and challenging data interpretation issues.

CONCLUSIONS

- SEEG has been rapidly adopted in the USA and is now the principal invasive EEG modality in many centers.
- While substantial similarities exist in the overall practice of SEEG, this survey finds significant differences between centers in implant planning protocol, electrode nomenclature, technical aspects of SEEG, the use of advanced signal processing techniques and current cardiopulmonary monitoring.

REFERENCES