Use of stereoelectroencephalography beyond epilepsy: a systematic review

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ABSTRACT

Stereoelectroencephalography (sEEG) is an increasingly popular surgical technique used clinically to study neural circuits involved in medication refractory epilepsy, and it is concurrently used to scientifically investigate behavioral neural circuitry. The purpose of this systematic review is to summarize prior and current clinical investigations using sEEG for indications other than epilepsy.

METHODS

Using PRISMA guidelines, the United States National Library of Medicine at the National Institutes of Health PubMed database was queried for investigational or therapeutic applications of sEEG in human subjects. Abstracts were analyzed for inclusion or exclusion independently by two authors.

RESULTS

The study search resulted in 752 publications, and after applying exclusion criteria eight studies were selected for in-depth review. Among these eight studies, 122 patients were included with indications ranging from schizophrenia to Parkinson’s disease. All studies included were single-institution, case series representing level IV scientific evidence.

CONCLUSIONS

• sEEG could be applied to novel target identification and investigative science in diseases and research pursuits outside of epilepsy.
• Localization of non-lateralizing non-structural epilepsies.
• Extraoperative retrospective analysis of brain physiology.
• Historical literature suggests that sEEG is fully – and safely – capable for accomplishing such purposes without deviation from standards of care.
• Current uses restricted to epilepsy surgery.
• Strict adherence to and evolution of ethical considerations necessary.