1. SPECIFIC AIM

Novel dynamic SPECT technology using a 72-detector SPECT scanner system (NeuroLogica, Corp) demonstrated time-lapsed alterations in blood flow during hippocampal propagation of stimulation current delivered through a NeuroPace® cortical stimulator depth lead. This dataset was compared with spatial imaging capturing the entirety of the activated circuit acquired with high-resolution static SPECT using the same scanner.

2. METHODS

A. Subjects

Three subjects (TS, SSp, SSm) with intractable independent temporal lobe epileptic sources were enrolled in the RUMC IRB-approved investigator-initiated study.

B. Technique

1. Testing was performed at 4.3 mo (TS), 27 mo (SSp) and 23 mo (SSm), respectively, following implantation of at least one hippocampal depth lead and skull-based stimulator. Prior to testing, 75 scalp electrodes were applied according to the 10-20 international system. The scalp positions were digitized using a Polhemus® digitizer. The subjects were seizure-free for a duration of 24 hr prior to testing.

2. Stimulation current was delivered through two adjacent contacts of a 4-contact depth lead implanted longitudinally in the parahippocampal grey-white matter junction. Two adjacent left posterior depth electrode contacts (3-4) were stimulated in each subject using a bipolar configuration. An intravenous injection of 0.9% saline was administered in each subject using a bipolar configuration. An intravenous injection of 0.9% saline was administered in each subject using a bipolar configuration.

3. Approximately 24 hours later, a baseline SPECT was obtained (when no stimulation was delivered, and no ictal activity recorded).

4. Time-lapsed SPECT dynamic scanning session was initiated 60 sec after beginning the scan session. Hyper- (bright) and hypo-perfused (dark) regions demonstrate the activated neural circuit. Radiologically oriented.

5. Dynamic SPECT complements static SPECT neuroimaging using a novel high-resolution SPECT scanner system. This technology and workflow offer a unique approach for validating depth lead implantation and delivery of stimulation therapy through the maximal extent of an epileptic circuit.

3. CONCLUSIONS

Dynamic SPECT complements static SPECT neuroimaging using a novel high-resolution SPECT scanner system. This technology and workflow offer a unique approach for validating depth lead implantation and delivery of stimulation therapy through the maximal extent of an epileptic circuit.

4. REFERENCES


5. ACKNOWLEDGEMENTS

NeuroLogica Corp (Danvers, MA) Institutional (RUMC)