Introducing Bedside Continuous Electroencephalography Monitoring in a Non-Neuro Intensive Care Unit

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Overview

Technology in critical care is constantly changing and evolving. The use of bedside continuous electroencephalography (cEEG) is one example of evolving technology that can have a considerable impact on critical care patients. Bedside cEEG monitoring can be used to provide information on the status of the brain in real-time, allowing critical care nurses to assess their patients’ level of consciousness, and to monitor the effects of therapy, such as sedatives. Bedside cEEG monitoring can also be used by the interdisciplinary team to detect and manage seizures, and to provide additional data for prognostication when planning goals of care for patients with brain injuries (e.g. post-cardiac arrest, anoxic brain injuries, etc.).

Although cEEG is traditionally implemented in intensive care units that specialize in neurology, this technology was implemented in our twenty-bed medical – surgical intensive care unit in order to provide our clinicians with the tool to improve patient care. We utilized a four-channel bedside GE EEG module with a sub-hairline montage to accomplish this in partnership with GE Healthcare and clinical experts from across Canada. The purpose of this presentation is to describe the process undertaken to implement this technology including planning, implementation, as well as lessons learned for the future.

Clinical Background

Similar to other physiological vital signs (blood pressure, heart rate and rhythm, oximetry, temperature, etc…), EEG is a tool for monitoring what is occurring in the brain. Monitoring electrical activity in the brain can assist with:

- Detection and management of seizures
- Assessment in level of consciousness
- Monitoring the effects of therapy (e.g. sedatives)
- Help provide prognosis planning (e.g. post-cardiac arrest / anoxic brain injury patients)

Implementation

Our ICU team, with support from GE HealthCare, facilitated bringing cEEG experts from London Health Sciences Center, to our center to provide education and hands-on training with our staff. Point of care ICU nurses with an interest in technology and interested in being a primary user where invited to a half day training event, along with three physician champions. An overview of the benefit of cEEG would bring to our critical care population, intended uses, and challenges were all discussed. The session concluded with hands on application and practice on staff volunteers.

Challenges

Personnel Challenges:

- RN training, understanding, and interpretation of EEG waveforms
- Availability of EEG experts (technologists and physicians) to aid in trouble shooting and interpretation

Environmental Challenges:

- EEG is very sensitive to electrical interference
- ICU has many sources of electrical interference / artifact

Successes to Date

To date we have successfully utilized cEEG in our ICU to monitor patients:

- With continuous seizure activity
- To titration medications in patients otherwise unable to communicate effect
- For anoxic brain injured patients as another source of information aide families in planning direction of care

References


