TITLE: Continuous Electroencephalography versus Intermittent Electroencephalography in Patients with Neurological Disorders or Brain Trauma: Comparative Clinical Effectiveness and Cost-Effectiveness

DATE: 24 March 2015

RESEARCH QUESTIONS

1. What is the comparative clinical effectiveness of continuous electroencephalography versus intermittent electroencephalography in patients with neurological disorders and brain trauma?

2. What is the comparative cost-effectiveness of continuous electroencephalography and intermittent electroencephalography in patients with neurological disorders and brain trauma?

KEY FINDINGS

Three non-randomized studies were identified regarding the comparative clinical effectiveness of continuous electroencephalography (EEG) versus intermittent EEG in patients with neurological disorders and brain trauma.

METHODS

A limited literature search was conducted on key resources including Ovid Medline, PubMed, The Cochrane Library (2015, Issue 3), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI (Health Devices Gold), Canadian and major international health technology agencies, as well as a focused Internet search. No methodological filters were applied to limit retrieval by publication type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2010 and March 12, 2015. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.
SELECTION CRITERIA

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

<table>
<thead>
<tr>
<th>Table 1: Selection Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
</tr>
<tr>
<td><strong>Comparator</strong></td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Study Designs</strong></td>
</tr>
</tbody>
</table>

EEG = electroencephalography

RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, and economic evaluations.

Three non-randomized studies were identified regarding the comparative clinical effectiveness of continuous EEG versus intermittent EEG in patients with neurological disorders and brain trauma. No relevant health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, or economic evaluations were identified.

Additional references of potential interest are provided in the appendix.

OVERALL SUMMARY OF FINDINGS

Three non-randomized studies were identified regarding the comparative clinical effectiveness of continuous EEG versus intermittent EEG in patients with neurological disorders and brain trauma.

The first study evaluated the detection of brain abnormalities on 16 to 24 hours of continuous video-EEG compared with 30 minute EEG session for patients with suspected seizures or an altered mental status. More epileptiform abnormalities were detected within the first 30 minutes of a continuous video-EEG than on the 30 minute EEG session. Also, new epileptiform findings developed in some patients over the subsequent 16 to 24 hours of continuous video-EEG, which changed treatment decisions in a small proportion of cases. The majority of patients with a history of seizures showed epileptiform abnormalities on continuous video-EEG. The authors concluded that while continuous EEG may lead to the identification of more epileptiform abnormalities, if this method is unavailable, the majority of these abnormalities can still be detected by a 30 minute EEG session.
Another study\textsuperscript{2} evaluated the background activity and epileptiform abnormalities on continuous EEG versus on two 20-minute EEG readings derived from the continuous recording in comatose adults who received therapeutic hypothermia treatment for a cardiac arrest. This study showed that there was high agreement and complete agreement between the two types of EEG readings during therapeutic hypothermia and normothermia, respectively. The authors concluded that continuous and intermittent EEG had comparable abilities to identify epileptiform activity in comatose cardiac arrest patients.

A third study\textsuperscript{3} compared the diagnostic accuracy of amplitude-integrated EEG with that of standard EEG for the identification of neonatal seizures. Amplitude-integrated EEG had high sensitivity (80\%) and low specificity (50\%) for seizure detection, and there was a significantly higher rate of seizure overdiagnosis in infants with amplitude-integrated EEG than with standard EEG. Both types of EEG had similar sensitivities to detect seizures when the indication for EEG was accounted for in the analysis. The authors recommended that neonatal seizures detected by amplitude-integrated EEG should be confirmed by standard EEG before initiating treatment.
REFERENCES SUMMARIZED

Health Technology Assessments
No literature identified.

Systematic Reviews and Meta-analyses
No literature identified.

Randomized Controlled Trials
No literature identified.

Non-Randomized Studies


Economic Evaluations
No literature identified.

PREPARED BY:
Canadian Agency for Drugs and Technologies in Health
Tel: 1-866-898-8439
www.cadth.ca
APPENDIX – FURTHER INFORMATION:

Randomized Controlled Trials – Unclear Comparator


Non-Randomized Studies

Alternate Comparator


No Comparator


Guidelines and Recommendations


Review Articles


