



Editorial

A short study of abbreviated EEG



The use of an abbreviated number of electrodes and channels for EEG recordings, principally in intensive care unit patients, has been explored by a number of investigators (Bridgers and Ebersole, 1988; Kolls and Husain, 2007; Young et al, 2009; Karakis et al, 2010; Tanner et al., 2014; Herta et al., 2017; Jordan, 2017). The incentive has been, presumably, the ease of application (especially for placement below the hairline/subhairline montages) and the perceived ease of interpretation by nonneurologists, e.g., nurses, residents or intensivists, by preventing “information overload”. The sensitivity for the use of reduced montages for seizure detection has been explored mainly using electroencephalographers (EEGers) and has been shown to be inferior to standard recordings for a mix of seizure types (Kolls and Husain, 2007; Young et al, 2009; Tanner et al, 2014). However, there has not until now been an examination of a reduced montage for generalized events with persons of different levels of EEG training or exposure.

Gururangan and colleagues (Gururangan et al., 2018) in this issue of the Journal present a study involving a reduced montage (bipolar anterior-posterior through the frontal, temporal and occipital regions) compared with a simultaneous standard full montage recording (bipolar anterior-posterior montage with the full 10–20 system). The performances of 20 experienced neurologists with extensive EEG experience, 20 residents with some EEG exposure and 43 medical students without EEG experience (but only a brief training session for each group) were compared for the sensitivity and specificity for detecting seizures (7 generalized, 1 focal), and rhythmic and periodic patterns (RPPs). The EEGs classifications were previously agreed upon by 3 experienced EEGers and served as the “gold standard”. As expected, the neurologists performed better than the residents who outshone the students for sensitivity for detecting seizures or RPPs, but within each group there was no significant difference in performances comparing reduced and full montages. However, the specificity was significantly greater for the reduced montage compared to the full montage for each group.

It is not surprising that the performance within each group was equivalent for the reduced and full montages, considering the heavy weighting for generalized phenomena, which should show equally well with both montages. It is unexpected that the specificity should be greater for the reduced montage, since the material of the reduced montage was already contained in the full montage. It is likely to be the result of the study design: 15 s epochs were presented with each sample; it may be easier psychologically to interpret and mentally extrapolate the evolutionary changes from an abbreviated sample from an already reduced montage.

Although the paper gives some justification for the use of an abbreviated montage for detecting generalized events, it has some limitations: numbers of seizures were small; the study does not allow for conclusions regarding focal/regional phenomena; there was no opportunity to examine the use of a referential montage, which is often superior for demonstrating generalized phenomena (Young and Mantia, 2017); the seizure samples may well have been too short for adequate assessments. Also, it would be worth exploring whether other abbreviated montages are better than temporal montage utilized in this study, as might well be the case (Kolls and Husain, 2007).

Limitations aside, the authors are to be congratulated in conducting an original, carefully controlled study, testing groups of individuals with different levels of experience, showing that even naïve subjects can show a credible performance and demonstrating the usefulness of a limited EEG montage in detecting various generalized phenomena that may well not be apparent clinically.

Conflict of interest

I declare no conflict of interest and no funding, personal or technical assistance.

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Received 27 March 2018

Accepted 30 March 2018

Available online 16 April 2018