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LETTERS TO THE EDITOR

Transformed ECG Signals: Another Potential Use

Response to Stewart. Transformed ECG signals highlight similarities between obstructive sleep apnea and obstructive apnea due to seizure-induced laryngospasm. *J Clin Sleep Med*. 2019;15(12):1859.

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We appreciate the letter to the editor written by Dr. Mark Stewart[1] to comment on our recent publication[2] concerning the use of a transformed electrocardiogram (ECG) signal (using high pass filtering) to detect respiratory effort during apnea. His letter points out another potential use of a transformed ECG signal. A study published in 2017 by Stewart et al[3] in a rat model recorded a high pass filtered ECG signal during tracheal occlusion. Variations in the transformed signal ("electromyography based artifact") were associated with each inspiratory effort. In addition, the amplitude of the variations increased with increasing effort. Ictal or post ictal laryngospasm is believed to be a possible cause of sudden death in epilepsy.[4–6] Variations in the ECG signal (especially after high pass filtering) during apnea events associated with a seizure have been demonstrated and have been proposed as a "biomarker" of airway (laryngeal) obstruction.[4–6] During monitoring of patients with epilepsy only electroencephalogram, ECG, and oxygen saturation data may be available for analysis after a seizure related desaturation event. Transformation of the ECG signal could potentially demonstrate evidence of airway obstruction associated with the event. Even if respiratory effort is monitored, a transformed ECG signal may still be useful as deflections in the effort belt signal during a desaturation event may be too small for definitive demonstration of airway obstruction. We thank Dr. Stewart for pointing out a potentially important use of a transformed ECG signal in a clinical setting other than obstructive sleep apnea.

CITATION

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