

Surges of Electroencephalogram Activity at The Time Of Death: A Case Series.

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Abstract

Abstract Level of consciousness at the end of life in critically ill patients is poorly characterized. We report a case series of seven patients who were neurologically intact before the decision to withdraw care due to extensive systemic critical illness.

As part of our end-of-life care protocol, bispectral index (BIS) monitor (Aspect Medical Systems, Newton, MA) or SEDline (Hospira, Lake Forest, IL) monitoring devices are placed on each patient to ensure adequate comfort. Both monitoring systems use an integer-based system (BIS or PSI, respectively) to reflect the level of consciousness/effect of anesthesia.

In each case, loss of blood pressure, as monitored by indwelling arterial line, was followed by a decline in BIS/PSI activity followed by a transient spike in BIS/PSI activity that approached levels normally associated with consciousness. This spike in electroencephalogram (EEG) activity had short duration and the activity then declined to a level of activity associated with burst suppression. In one case of a patient who had a SEDLine device, we were able to capture and analyze the raw EEG signal, and confirm that the EEG waveform was not artifact, and in fact a high frequency waveform was present during the spike activity.

We speculate that this level of BIS/SEDline activity is related to the cellular loss of membrane polarization due to hypoxemia. We further speculate that since this increase in electrical activity occurred when there was no discernable blood pressure, patients who suffer "near death" experiences may be recalling the aggregate memory of the synaptic activity associated with this terminal but potentially reversible hypoxemia.