

Comparison Of The qCON And Sedline Depth of Anesthesia Monitors To Predict The Hypnotic Effect During Desflurane General Anesthesia

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Objective: The present study aims to compare the performance of two depth of anesthesia monitors, the SEDLINE (Masimo Inc., Irvine CA, USA) [1] and the qCON (Quantum Medical, Barcelona Spain) [2], during general anesthesia with desflurane. Specifically the ability of the processed-EEG index value from each monitor to differentiate between states of clinical consciousness and unconsciousness was assessed by the prediction probability (Pk) [3].

Methods: With IRB approval, 12 patients undergoing elective surgery signed informed consent and were included in the study. The Patient State Index (PSI) and the qCON index were recorded every second during the complete procedure.

In order to assess the performance of both monitors, the prediction probability (Pk) for the qCON and PSI was obtained by averaging one thousand Pk values calculated using one data point per patient in each iteration to ensure statistical independency. The interval considered for the Pk calculation was from 2 minutes before induction until just prior to emergence. The two sets of Pks were tested for Gaussianity (Lilliefors test) to decide the best method to compare average Pk values (t-student for Gaussian samples and Wilcoxon rank test in non-gaussianity scenarios).

Results: Patients enrolled were adults from both genders. The mean (SD) Pk values for the qCON and the PSI were 0.969 (0.029) and 0.814 (0.058) respectively. The sets of computed Pk values did not follow a Gaussian distribution, hence the Wilcoxon rank test was used to show statistical significance. The pk of the qCON was significantly higher than that of the PSI.

Conclusions: The qCON had a significantly higher Pk than the PSI when comparing the awake and the anaesthetized state. The reason for the higher Pk value for the qCON is likely to be due to artifactual increases in the PSI caused by the use of the diathermy or EMG activity as shown in the figure. The PSI appears to be more greatly influenced by high frequency activity than does the qCON.

1. John ER, Prichep LS, Kox W, Valdés-Sosa P, Bosch-Bayard J, Aubert E, Tom M, di Michele F, Gugino LD. Invariant reversible QEEG effects of anesthetics. *Conscious Cogn.* 2001;10:165-83.
2. Jensen EW, Valencia JF, López A, Anglada T, Ramos Y, Serra R, Jospin M, Pineda P, Gambus P Monitoring hypnotic effect and nociception with two EEG derived indices, qCON and qNOX, during general anaesthesia. *Acta Anaesthesiol Scand.* 2014;58:933-41
3. Smith WD, Dutton RC, Smith NT. A measure of association for assessing prediction accuracy that is a generalization of non-parametric ROC area. *Stat Med* 1996; 15: 1199-215.

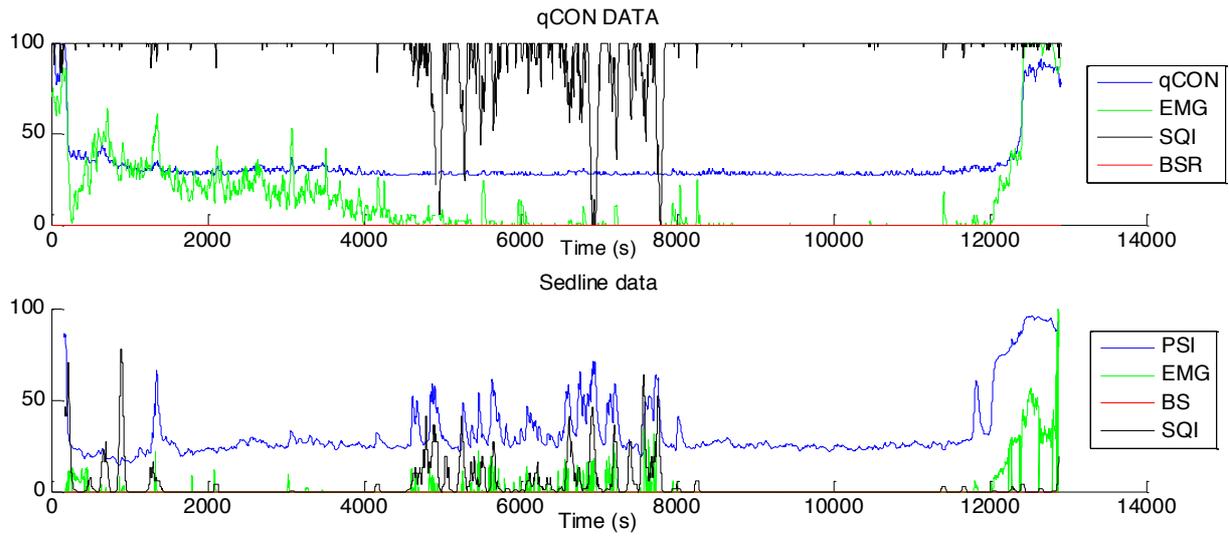


Figure: Examples of qCON and PSI trends