Abstract.

ABTRACT TITLE: MONITORING HYPNOTIC EFFECT WITH qCON DURING GENERAL ANAESTHESIA.

Presenting Author: Ms. Patricia Pineda, Dept ESAII, Centre for Biomedical Engineering Research, UPC BarcelonaTech, Spain

Co-Authors:
Dr. Erik Weber Jensen, Dept ESAII, Centre for Biomedical Engineering Research, UPC BarcelonaTech, Spain
Prof José Fernando Valencia, Universidad de San Buenaventura, Electronic Engineering Dpt., Cali(Colombia)
Mr. Mathieu Jospin, Dept ESAII, Centre for Biomedical Engineering Research, UPC BarcelonaTech, Spain

Introduction/Background: In recent year anesthetic monitoring has been in progress by improving mathematical methods applied to the different monitors. One of the fields that are currently being studied is monitoring anesthetic depth. These monitors help the anesthesiologist to tailor the anesthetics to the patient requirements. The electroencephalogram (EEG) is a direct measure of brain activity and from the EEG signal recorded a measure of hypnotic effect can be developed.
In the present study, the qCON (Quantium Medical, Spain) monitor was used, which defines the qCON index of hypnotic effect. The qCON index is based on the combination of different frequency bands, which are fed into an Adaptive Neuro Fuzzy Inference System (ANFIS) which generates the output on a 0-99 scale.
The objective of the present work was to analyze EEG recorded from patients undergoing surgery under general anaesthesia to find a specific indicator of hypnotic effects.

Methods: After Ethics Committee approval, data was recorded from 60 patients scheduled for general anaesthesia with propofol and remifentanil, using TCI. Response to noxious stimulation was recorded. The patients were classified as movers or non-movers and the mean value for the qCON were calculated over the 1 min period after the stimulus. The qCON was compared with the BIS, and the linear correlation coefficient was calculated. A Students t-test (paired) was used to test for significance, at $p < 0.05$.

Results: The R^2 between qCON and Bis was 0.85. The qCON were able to detect the response to noxious stimuli for LMA, tracheal intubation, laryngoscopy and suture ($p<0.05$) but not to incision. During the general anaesthesia (Ce propofol$>$2μg/ml Ce remi $>$ 2ng/ml) the mean value for qCON was 45(8).

Conclusion: During general anaesthesia with propofol and remifentanil, in this study, the qCON was able to detect loss of consciousness and movement as a response to noxious stimulation. During general anaesthesia qCON decreased to values in the 40-60 range.
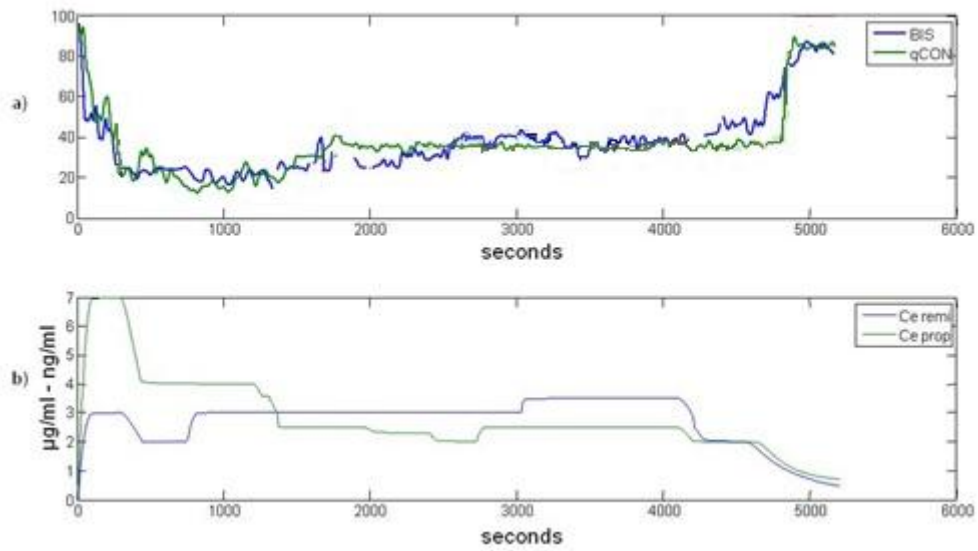
Figure 1: Panel (a) shows the tracing of the EEG derived parameters; qCON (green line) and Bis (blue line). Panel (b) shows the time course of predicted effect-site concentration of propofol and remifentanil for this particular patient.