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Reduction of Propofol Influence on the qNOX Pain/nociception Index

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Introduction

An important issue with the current pain/nociception monitors is the influence of the effect of hypnotic drugs on the index, e.g. propofol which has very limited analgesic effect should therefore only cause little change in an index of nociception. The objective of this study was to evaluate the influence of propofol effect on a new version of the EEG derived pain and nociception index, termed qNOX 2.0 (Quantium Medical, Barcelona, Spain).

Methods

This study was based on the re-analysis of data previously published1, including 35 adult female patients, who were scheduled to undergo ambulatory gynecological surgery. Initially, an effect-site concentration of propofol of 1.5 µg/ml was targeted in the group without remifentanil, and 1 µg/ml was targeted in the group with 4 ng/ml remifentanil; this was increased every 4 min by 0.5 µg/m until loss of consciousness.

The qNOX 2.0 was developed from EEG matched with clinical signs from sedated or anesthetized patients. Seven frequency ratios were defined and fed into an Adaptive Neuro Fuzzy Inference System (ANFIS) Model, where the output was the qNOX.

We defined Model A where the ANFIS training reference for qNOX was a linear function of time decreasing from 100 to 50 during 20 min after start of propofol induction in the group where both propofol and remifentanil was administered, while decreasing from 100 to 80 in the group where only propofol was administered.

An alternative model (Model B) for qNOX was defined where the training reference for the propofol group was set to a decrease from 100 to 90 in 20 min, while the propofol plus remifentanil group reference remained as in Model A .

The prediction probability, Pk, was calculated to compare the two models.

Results

Figures 1 and 2 show the plots of the time course of each individual qNOX derived using Model A, the black thicker line represents the average of all subjects. The averaged Pk(standard error) for qNOX versus the reference scale was 0.85(0.01) for Model A, while for Model B, the Pk was to 0.7(0.05).

Discussion

Propofol influence on a nociception index can be reduced. However when using EEG frequency bands for designing a nociception index , a hypnotic such as propofol will cause an average change of 20 on a 0 -100 scale, the performance of the index drops in a model (Model B) forcing low propofol influence and getting a qNOX index more resistant.

References

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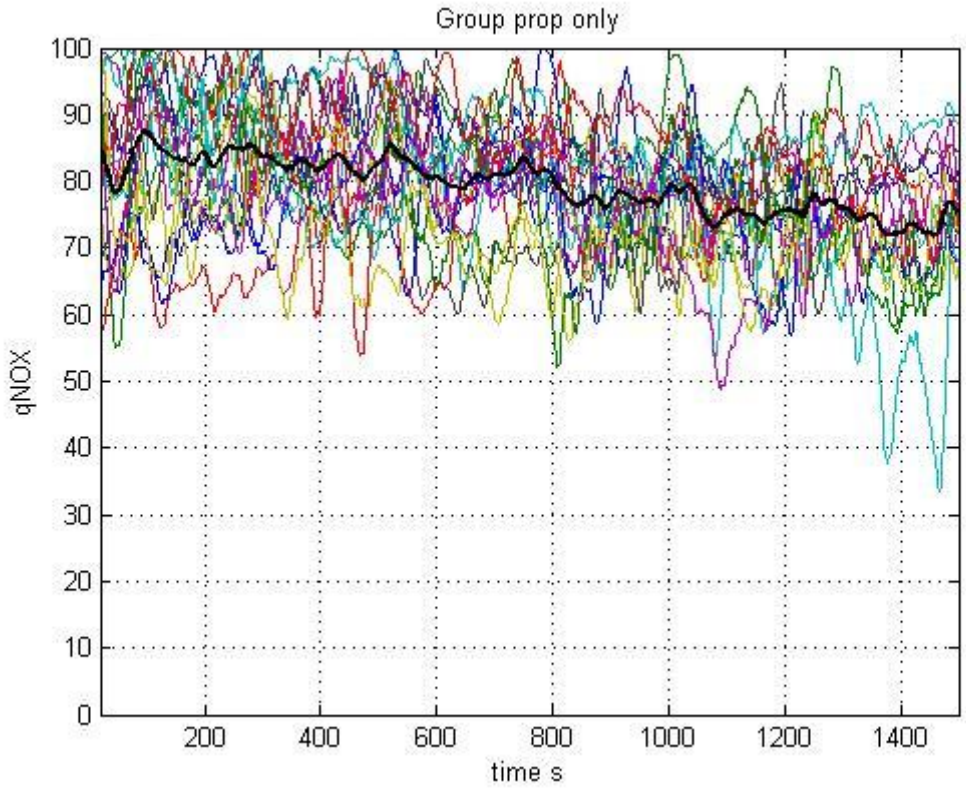

Figure 1

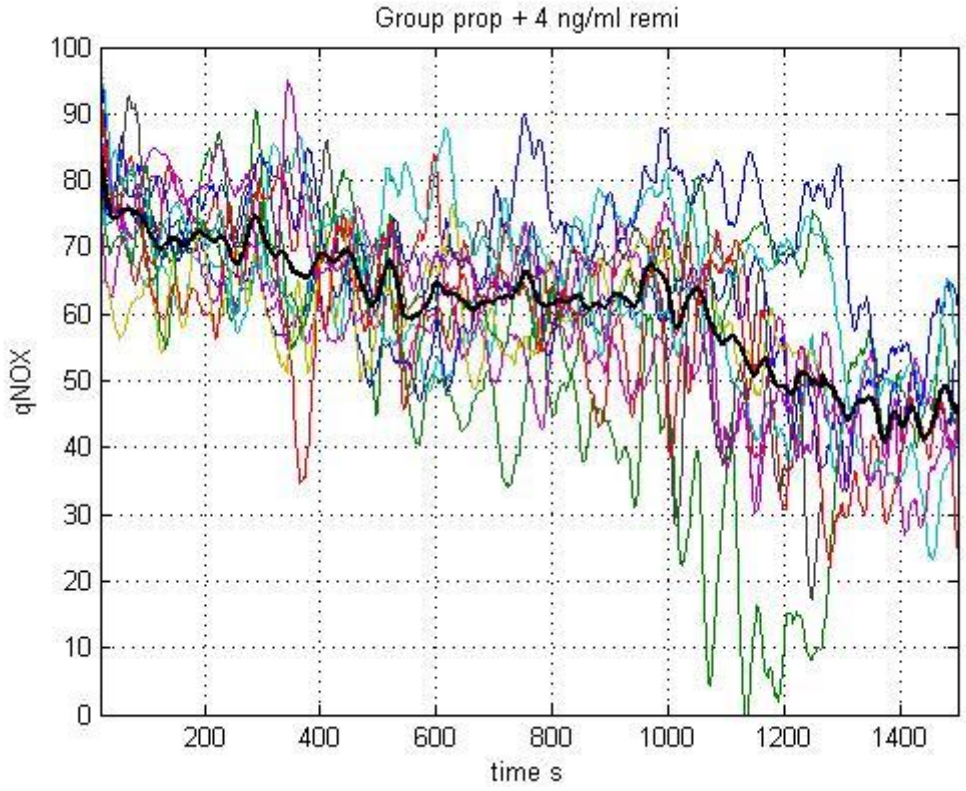

Figure 2