Modeling Anesthetic Drugs' Pharmacodynamic Interaction on the Bispectral Index of the EEG: the Influence of Heart Rate

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Abstract

The effect of drugs' interaction on the brain signal bispectral index (BIS) is of great importance for an anesthesia control drug infusion system. In this study, the objective was to inspect the influence of patient's heart rate on the effect of the drugs on BIS. With this goal, the patient's heart rate was incorporated in an drug interaction model. The model was fitted per patient during anesthesia induction, and tested for prediction under surgery. The results showed that the model with time changing parameters incorporating patient's heart rate has a better performance than a non adjusted model. Three clusters of models were also identified using the fuzzy c- means algorithm. These clusters will help to distinguish between different patients' dynamics.