Effect Of Different Remifentanil Effect Side Concentrations On The BIS, Qcon, ANI And Qnox At Constant NSRI

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Introduction: Anesthetic depth is considered to be the probability of hypnosis, immobility and hemodynamic stability, induced by hypnotics and opioids.
NSRI is an index of anesthetic depth, calculated from effect site concentrations of hypnotics and opioids and their interaction. Hypnotic/opioid combinations that attain identical NSRI's (points on the same isobole), attain the same probability of a certain anesthetic depth. Hypnotics can be titrated based on an EEG derived index (BIS, qCON), and opioids can be titrated with an anti-nociception index (ANI, qNOX). We examined whether these indices correlated with different remifentanil effect site concentrations (CeREMI) and with different end-tidal desflurane concentrations ($F_A$des) while keeping the NSRI constant.

Methods: We measured BIS (Covidien), qCON/qNOX (Quantium Medical) and ANI (MDoloris) in 13 patients undergoing prostatectomy. NSRI, CeREMI and $F_A$des were calculated by the SmartPilotView (Draeger).
CeREMI in each patient was increased from 1 to 3 to 5 ng/mL while $F_A$des was adjusted to keep NSRI at 5.
Once NSRI and $F_A$des had stabilized at the target CeREMI, BIS, qCON, ANI and qNOX values were collected every 5 sec for 20 min.
Effect of different CeREMI on each index (ANOVA on ranks) and the prediction probability (Pk) for ANI and qNOX for CeREMI and the Pk for BIS and qCON for $F_A$des were calculated.

Results: $F_A$des to maintain NSRI at 5 was 6.6±0.4, 4.1±0.2, and 3.0±0.1 % in the CeREMI1, CeREMI3, and CeREMI5 groups, respectively.

	Pk of index versus CeREMI	**Pk of index versus $F_A$des**
ANI	0.36 (0.08)	
qNOX	0.74 (0.07)	
BIS		0.26 (0.07)
qCON		0.69 (0.07)

Fig. 1. The prediction probability Pk, presented as mean (standard error).

Conclusion: ANI did not reflect opioid effect, qNOX performed better in this regard. In our study, BIS and qCON had poor prediction probability for the hypnotic component of anesthesia ($F_A$des).

Future research could focus on the Pk of BIS/qCON versus calculated drug interaction. Calculated indices that account for interaction like NSRI, might be a better probability prediction for clinical endpoints of anesthetic depth.[1]

References: (1) Hannivoort LN, Proost JH et al. ESAPC1-3. EJA Vol.30, June 2013, Supplement 51