Cerebral state index may reflect electrical brain activity during propofol or isoflurane anaesthesia in rabbits

H. Yin, W. M. Chen, P. Zhao

Context
This study aimed to evaluate the use of a cerebral state index (CSI) as an anaesthetic depth monitor and to study the correlation between CSI, haemodynamic changes and sedation level during general anaesthesia of rabbits.

Main conclusion
The CSI values obtained from a cerebral state monitor (CSM) could reflect electrical brain activity and sedation level during propofol or isoflurane general anaesthesia in rabbits.

Approach
Eighteen New Zealand white rabbits, undergoing surgical catheterisation of the bilateral carotid and internal jugular vein, were used in this study. In group I (propofol), anaesthesia was maintained with an intravenous (iv) infusion of propofol at a rate of 0.7 mg/kg/min and interval iv fentanyl. In group II (isoflurane), the end-tidal concentration was adjusted to 1.0 minimum alveolar concentration (2.05 per cent), at a fresh gas flow rate of 3 l/min in 100 per cent oxygen for maintenance. The CSI values were collected from a CSM using three electrodes placed according to the manufacturer's instructions on the shaved and defatted heads of the rabbits. During the procedure, the left femoral artery was cannulated for blood gas analysis. An anaesthetist, blinded to the EEG signals, assessed the animals for behavioural responses to stimuli and for the sedation score.

Results
The CSI values showed the same variation pattern during propofol or isoflurane anaesthesia in all rabbits. The CSI values gradually decreased with increasing propofol and isoflurane concentrations. At the stimulus of intubation or skin incision, the CSI values increased compared to the value at the prestimulus time point. After stopping anaesthesia, the CSI values gradually increased to the conscious level. Statistical analysis showed positive correlation between CSI values and sedation score values in both groups (P<0.05). There was a lack of correlation between CSI and haemodynamic variables, including blood pressure and heart rate.

Interpretation and significance of findings
The changes in CSI values during anaesthesia correlated with the sedation score values. This may be a useful tool, after some appropriate changes, reflecting anaesthetic depth or stimulus during general anaesthesia in small animals.

The CSM can be used for monitoring electrical brain activity during general anaesthesia in rabbits but not for haemodynamic variables.
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