

Spectral entropy and haemodynamic response to surgery during sevoflurane anaesthesia

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Introduction

Apart from somatic responses, surgery also evokes autonomic responses, including haemodynamic responses. Spectral entropy has been validated as a means to monitor the hypnotic state during sevoflurane anaesthesia.

Aim

To investigate the relationship between spectral entropy, heart rate, and blood pressure during sevoflurane anaesthesia.

Patients and methods

The sample consisted of 43 patients scheduled for elective abdominal surgery. Patients were premedicated with oral midazolam. Induction of anaesthesia was achieved with alfentanil 15 mg/kg, vecuronium 0.1 mg/kg, lignocaine 1.5 mg/kg, and propofol 2 mg/kg. End-tidal sevoflurane was increased in 1% increments up to 3% after which it was adjusted to maintain state entropy (SE) < 60. When surgery neared completion, the sevoflurane concentration was again decreased. Response (RE),

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SE and RE-SE difference (RE-SE), heart rate, and blood pressure were recorded before induction of anaesthesia and immediately after the target ET sevoflurane concentrations. The ratios of blood pressure and heart rate at the different times were calculated relative to the preoperative values. For the haemodynamic variables, ratios of < 0.85 or > 1.15 were regarded as clinically significant.

Results

There was a significant change in RE ($p < 0.0001$), SE ($p < 0.0001$) and RE-SE ($p = 0.0006$) at the different sevoflurane

concentrations. No RE-SE > 10 was recorded at sevoflurane more than 1%. No SE > 60 was recorded at a sevoflurane concentration of 3%. No correlation was found between entropy and haemodynamic ratios.

Conclusion

The main findings of this study was that an end-tidal sevoflurane concentration of $> 2\%$ rendered unconsciousness in all patients (SE less than 60, RE-SE less than 10). The depth of anaesthesia did not guarantee absence of haemodynamic response to noxious stimuli.