

Number of skin conductance fluctuations increased differently from BIS during tetanic stimuli. Increasing doses of remifentanil attenuated the skin conductance response.

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Background and goal

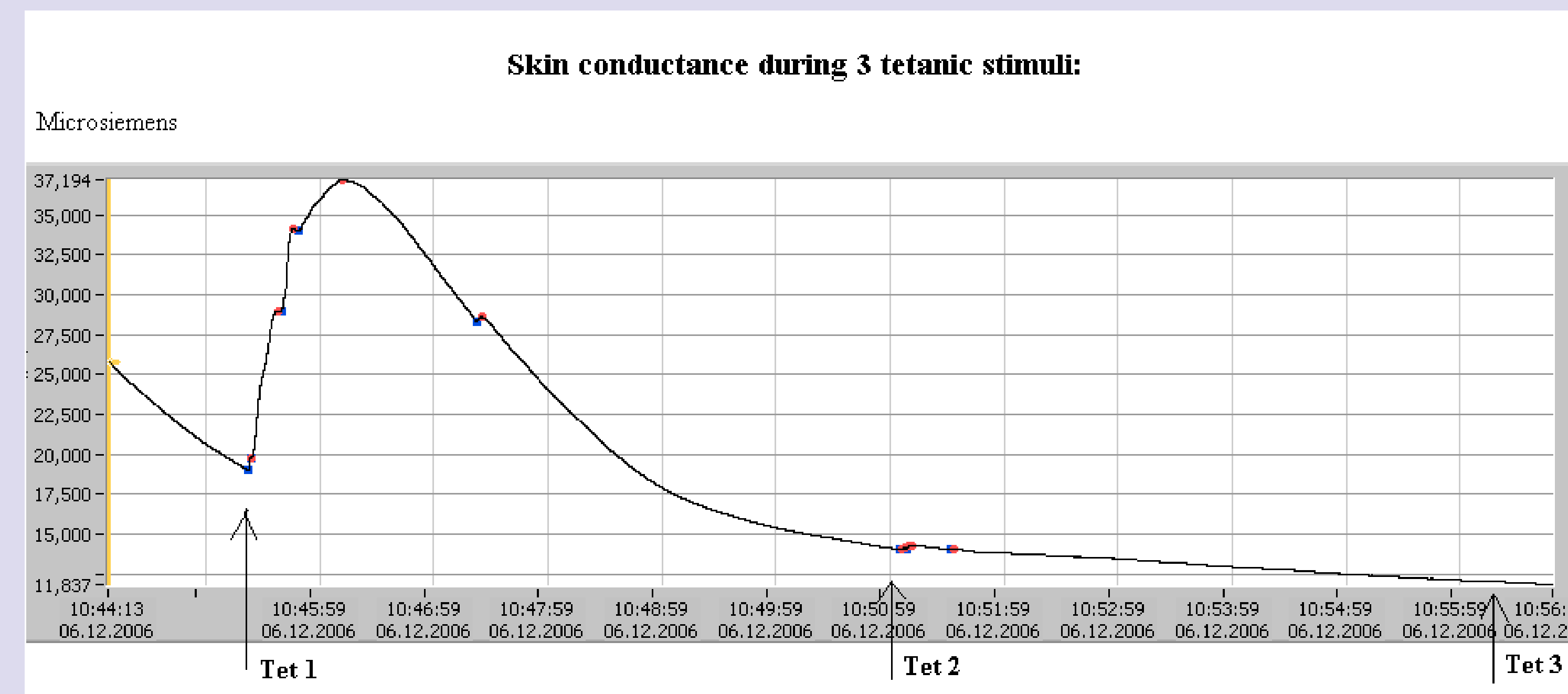
Number of skin conductance fluctuations per sec (NSCF) in the palmar surface correlates well with sympathetic nerve activity. NSCF has been proposed to measure pain responses. The BIS index measures disorders in the EEG signal and is associated with awakening. The purpose of the study was to examine if NSCF and BIS could detect the pain response from tetanic stimuli, and to further examine if the tetanic stimuli response was stronger in a situation without analgesic infusion compared to a situation with ongoing analgesic target control infusion (TCI).

Materials and methods

28 patients in ASA 1 or 2 were studied after induction of general anaesthesia with propofol (BIS between 40-50), but before intubation and start of laparoscopic surgery. The patients were given 3 series of tetanic stimulus of 50mA that lasted for 30 sec: Tetanic 1 (Tet 1) without ongoing remifentanil analgesic infusion, Tetanic 2 (Tet 2) after 4 min with TCI 4 ng/ml remifentanil and Tetanic 3 (Tet 3) after 4 min with TCI 10 ng/ml remifentanil.

The NSCF and BIS responses were registered continuously, starting 30 sec before stimuli and ending 30 sec after the stimuli started. The maximum values for NSCF and BIS during the tetanic pre stimuli periods were compared with the maximum values of the tetanic post stimuli periods. Moreover, NSCF and BIS responses during Tet 1 were compared with the responses during Tet 2 and Tet 3. The Wilcoxon non-parametric test was used.

Result and discussion



	pre-post Tet 1 NSCF	pre-post Tet 2 NSCF	pre-post Tet 3 NSCF	pre-post Tet 1 BIS	pre-post Tet 2 BIS	pre-post Tet 3 BIS
Mean(SD)	0.00(0.01)-0.07(0.07)	0.00(0.00)-0.02(0.04)	0.00(0.00)-0.01(0.06)	43(9)-44(13)	42(9)-44(12)	42(6)-44(7)
P value	0.000	0.027	0.180	0.272	0.393	0.227

	Response Tet 1-Tet 2: NSCF	Response Tet 1-Tet 3: NSCF	Response Tet 1-Tet 2: BIS	Response Tet 1-Tet 3: BIS
Mean (SD)	0.07(0.07)-0.02(0.04)	0.07(0.07)-0.01(0.06)	44(13)-44(12)	44(13)-44(7)
P value	0.000	0.001	0.873	0.882

The NSCF post stimulus level was higher than the pre stimulus level during Tet 1 and Tet 2, contrasting BIS, which did not change significantly. After 4 min with TCI 10 ng/ml remifentanil, no differences between post stimulus and pre stimulus levels during Tet 3 was observed for NSCF and BIS. The NSCF response during tetanic stimuli was reduced when the remifentanil doses was increased different from BIS.

Conclusion

In contrast to BIS, this study showed that NSCF is sensitive to tetanic noxious stimuli during sleep, and the measured response is attenuated when an ongoing analgesic infusion is given.

