

Effect of 2.5% sevoflurane, at Pa_{CO₂} 30 mmHg for epileptic focus resection, on hemodynamics and hepatic and renal functions

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To the editor: Epileptic cortical focus resection under monitoring by electrocorticography (ECoG) has been performed for patients with intractable epileptic seizures [1]. Several reports suggest a correlation between the concentration of

sevoflurane and spike activity on ECoG and electroencephalography (EEG) [2,3]. Hypocapnea, which may be applied during neurosurgical procedures, also affects EEG spike activity [4,5]. Therefore, a combination of a high concentration of sevoflurane and controlled hyperventilation has been favored over other agents, because its use allows the induction of the epileptic seizure wave from cortical foci [6,7].

We measured the effect of this anesthesia for epileptic cortical focus resection under ECoG on hemodynamics and hepatic and renal functions. Five consecutive patients (two male and three female) receiving epileptic cortical focus resections under ECoG underwent anesthesia with constant expiratory 2.5% sevoflurane with hyperventilation, at a partial pressure of arterial carbon dioxide (Pa_{CO₂}) of 30 mmHg. All patients were uneventfully extubated after the operation. The durations of anesthesia and the operation were 600 ± 216 (mean ±

Table 1. Changes in heart rate, systolic blood pressure, and body temperature

	Time				
	Pre	2h	4h	6h	8h
Heart rate (beat·min ⁻¹)	78.3 ± 15.3	118.3 ± 11.6 ^{2*}	111.7 ± 12.6 ^{2*}	111.7 ± 15.3 ^{2*}	110.0 ± 10.0 ^{2*,3*}
Systolic blood pressure (mmHg)	110.0 ± 13.2	111.7 ± 2.9	98.3 ± 2.9 ^{3*}	95.0 ± 5.0 ^{1*,3*}	100.0 ± 0.06
Body temperature (°C)	36.6 ± 0.4	36.6 ± 0.5	37.0 ± 0.6	37.4 ± 0.6 ^{1*,3*}	37.7 ± 0.2 ^{1*,3*,4*}

^{1*} *P* < 0.05; ^{2*} *P* < 0.001 compared with Pre; ^{3*} *P* < 0.05 compared with 2h; ^{4*} *P* < 0.05 compared with 4h

Values are means ± SD (*n* = 5, excluding 8h [*n* = 4]). The differences in heart rate, systolic blood pressure, and body temperature values among the five time points were compared by one-way repeated measures analysis of variance (RANOVA), following the PLSD test

Pre, pre-anesthesia induction; 2h, 2h after anesthesia induction; 4h, 4h after anesthesia induction; 6h, 6h after anesthesia induction; 8h, 8h after anesthesia induction

Table 2. Changes in biochemical data

	Time		
	Pre	Post early	Post late
TP (g·dl ⁻¹)	6.9 ± 0.8	5.7 ± 0.6 ^{2*}	6.9 ± 0.8 ^{4*}
GOT (IU·l ⁻¹)	17.6 ± 3.3	20.2 ± 1.3	25.2 ± 9.8
GPT (IU·l ⁻¹)	28.2 ± 14.5	22.2 ± 8.7	32.0 ± 10.8 ^{3*}
LDH (IU·l ⁻¹)	168.6 ± 24.9	190.4 ± 37.1	178.0 ± 6.8
CK (mg·dl ⁻¹)	120.3 ± 94.2	567.3 ± 273.9 ^{1*}	184.8 ± 239.7
BUN (mg·dl ⁻¹)	10.1 ± 2.2	8.8 ± 2.8	9.4 ± 3.4
Creatinine (mg·dl ⁻¹)	0.68 ± 0.20	0.71 ± 0.30	0.64 ± 0.14

^{1*} *P* < 0.05; ^{2*} *P* < 0.001 compared with Pre; ^{3*} *P* < 0.05; ^{4*} *P* < 0.001 compared with Post early

Values are means ± SD (*n* = 5). The differences in values among the three time points were compared by one-way repeated measures analysis of variance (RANOVA) following the PLSD test

Pre, preoperative day; Post early, the first through third postoperative days; Post late, the fourth through twelfth (8.8 ± 3.0) postoperative days; TP, total protein; GOT, glutamic oxaloacetic transaminase; GPT, glutamic pyruvic transaminase; LDH, lactate dehydrogenase; CK, creatinine kinase; BUN, blood urine nitrogen

SD) min and 469 ± 164 min, respectively. The total amount of sevoflurane was 450 ± 328 ml. The patients received 52 ± 16 mg of vecuronium. Tables 1 and 2 show hemodynamics and biochemical changes, respectively. The heart rate and body temperature increased significantly, whereas systolic blood pressure decreased gradually during anesthesia. Glutamic pyruvic transaminase (GPT) increased significantly in the late postoperative phase. However, the increase in GPT was not significantly different from the preoperative value. Glutamic oxaloacetic transaminase (GOT), lactate dehydrogenase (LDH), blood urine nitrogen (BUN), and creatinine did not change significantly during the perioperative phase.

In conclusion, anesthesia with constant expiratory 2.5% sevoflurane at P_{aCO_2} 30 mmHg for epileptic cortical focus resection induces significant increases in heart rate and body temperature and a decrease in systolic blood pressure, but does not alter hepatic and renal functions clinically.

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