

# Sevoflurane sedation using Anesthetic Conserving Device in postoperative abdominal surgery patients in the ICU – A comparison to an intravenous propofol-based regimen



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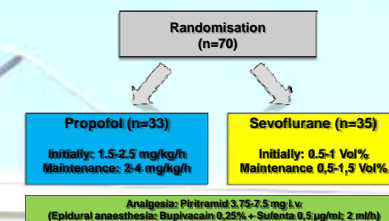
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## Introduction:

Since the approval of the Anaesthetic Conserving Device (ACD), the use of volatile anaesthetics in the intensive care unit (ICU) has become a more cost-effective and easy way of sedation than the use of vaporizer techniques (1). Inhalational sedation has been studied with isoflurane compared to midazolam in ICU patients (2,3), but sevoflurane has scarcely been evaluated to date (4,5). We studied the efficiency and practicability of a postoperative inhalational sedation with sevoflurane using the ACD compared to a propofol-based sedation in patients following major abdominal surgery.

## Methods:

After approval from the ethical and governmental committee, 70 patients following major abdominal, vascular or urological surgery were allocated to this prospective, randomized, single-blinded study, to either receive sevoflurane (n=35) via the ACD (endtidal sevoflurane concentration: 1–0.5 Vol%) or propofol (n=35) intravenously (2-4 mg/kg/h) for postoperative sedation up to 24 h. Primary endpoint was extubation time from termination of sedation. Further focus was set on sedation quality using Richmond Agitation Sedation Scale (RASS) and BIS values, recovery times and the consumption of anaesthetics.



## Results:

Both study groups were similar in terms of demographic and perioperative data. Time of sevoflurane and propofol sedation was similar (mean 10 h). Mean sevoflurane consumption was 3.7 ± 1.1 ml/h to obtain endtidal sevoflurane concentrations of 1.1 ± 0.4 Vol%. Mean administration of propofol was 2.5 ± 0.7 mg/kg/h during sedation. Sedation quality including RASS and BIS values were similar in both groups throughout the time of sedation (50-65), and during recovery from sedation to extubation. Mean extubation times were significantly shorter (p<0.001) with sevoflurane than with propofol (24.7 ± 31.8 min vs. 81.6 ± 45.8 min), as well as eye opening (11.1 ± 18.8 min vs. 32.5 ± 32.4 min) and following commands (10.9 ± 9.4 min vs. 40.6 ± 37.6 min). Ventilator time was significantly shorter (p<0.01) in the sevoflurane group (10.2 ± 4.5 h vs. 13 ± 5.7 h). Length of ICU and hospital were comparable between the groups.

	Sevoflurane (n=35)	Propofol (n=33)
Age (years)	66 ± 12	67 ± 10
Height (cm)	169 ± 9	172 ± 9
Weight (kg)	75 ± 12	80 ± 14
Gender (m/f)	21/14	23/10
ASA classification (I/II/III)	4/20/10	5/20/8
Operative discipline: Surgery	26	26
Urology	12	6
Gynaecology	3	2
Duration of surgery (min)	280 ± 119	262 ± 122
Duration of anaesthesia (min)	365 ± 125	351 ± 122
Intraoperative anaesthesia management:		
Fentanyl (mg)	5.0 ± 0.4	0.6 ± 0.3
Midazolam (mg)	4.0 ± 0.6	4.4 ± 0.6
Clonidine (mg)	1.3 ± 0.1	1.5 ± 0.1
Pancuronium (mg)	11.1 ± 3.9	12.8 ± 4.8
Sevoflurane (MAC)	1.1 ± 0.2	1.0 ± 0.3
Propofol (mg)	22	24

Table 1: Demographic and perioperative data

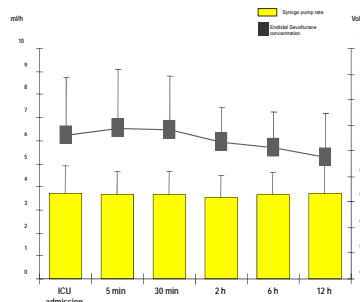


Figure 1: Sevoflurane consumption in ml/h (syringe pump rate) and endtidal concentration (Vol%)

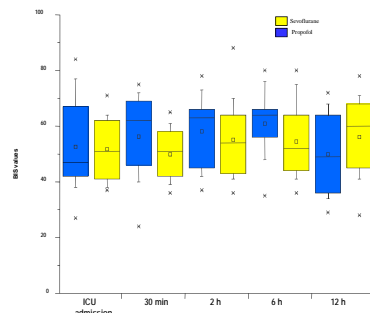


Table 1: BIS values during sedation

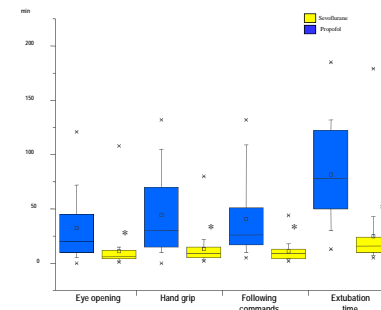


Table 2: Recovery parameters after termination of sedation

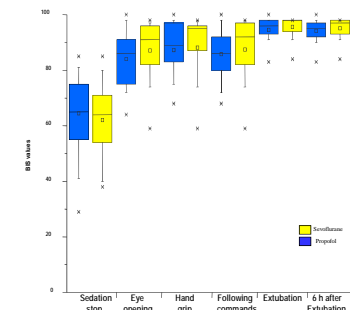


Table 3: BIS values during recovery from sedation

## Conclusions:

Postoperative sevoflurane sedation using the Anaesthetic Conserving Device appears to be a valid and safe alternative to the commonly used intravenous propofol-based regimen. Sevoflurane provided a comparable sedation quality to propofol at end-tidal concentrations of 1.1 Vol% (0.54 MAC). Patients showed a faster and more predictable return of recovery after sevoflurane, and shorter times of mechanical ventilation.

## References:

- (1) Enlund M. Acta Anaesth Scand 2002; 46:506-11.
- (2) Sackey PV. Crit Care Med 2004; 32:2241-6.
- (3) Belda JF. Anesth Analg 2008;106:1207-14.
- (4) Röhm KD. ICM 2008;