

Intraoperative respiratory and circulatory changes and recovery process with infusion fentanyl and propofol sedation

YOKO OKUMURA, YUMI IWAIZUMI, YOSHINO ORIMOTO, JUN HARADA

Department of Anesthesiology, School of Dentistry, Aichi Gakuin University

Background

Sedative and opioid are concerned about dose- dependent respiratory and circulatory depression with infusion or multidose bolus administration for a long time. Therefore, we infuse fentanyl at 1 µg/kg/h and propofol to maintain moderate sedation at OAA/S Score 2-3 for minor but relatively long and invasive oral surgeries. However, details regarding the intra- and postoperative process using this sedation method are unknown.

Objectives

To evaluate the usefulness of this method in stability of respiratory and circulatory dynamics, intraoperative pain control, postanesthetic recovery, and occurrence of side effects retrospectively.

Methods

- ASA 1- 2 of 115 inpatients from Jun, 2009 to Dec, 2012 of Aichi Gakuin University Dental Hospital who had administrated fentanyl 1µg/kg/h continuously after 1µg/kg as a bolus infusion and maintained sedation level at OAA/S Score 2-3 with propofol during a minor oral surgery were investigated.
- 72 patients were included in this study, excluding of the patients who had uncontrolled respiratory and circulatory dynamics in spite of internal treatment preoperatively, were over 65 years, had an short time operation under 40 min, had needed deep sedation, had no administration of flurbiprofen axetil intraoperatively.

Research Items

- effect site concentration of fentanyl and propofol
 - fentanyl: the value was calculated using simulation software of AnestAssist™ version 1.8 from recorded doses of a medical record
 - propofol: extracted the value from a medical record
- respiratory and circulatory changes
- frequency of body movement, complaint of pain, and rescue dose of local anesthetic
- orientation, respiration, circulation, skin condition, activity, water intake and urinary output, O₂ saturation, nausea and vomiting, pain, and surgical bleeding which acquired from "Post Anesthesia Discharge Scoring System"¹⁾

Statistical Analysis

Effect site concentration of fentanyl and propofol, respiratory and circulatory data are analyzed with one-factor ANOVA and Tukey- Kramer method. P value <0.05 was considered statistically significant.

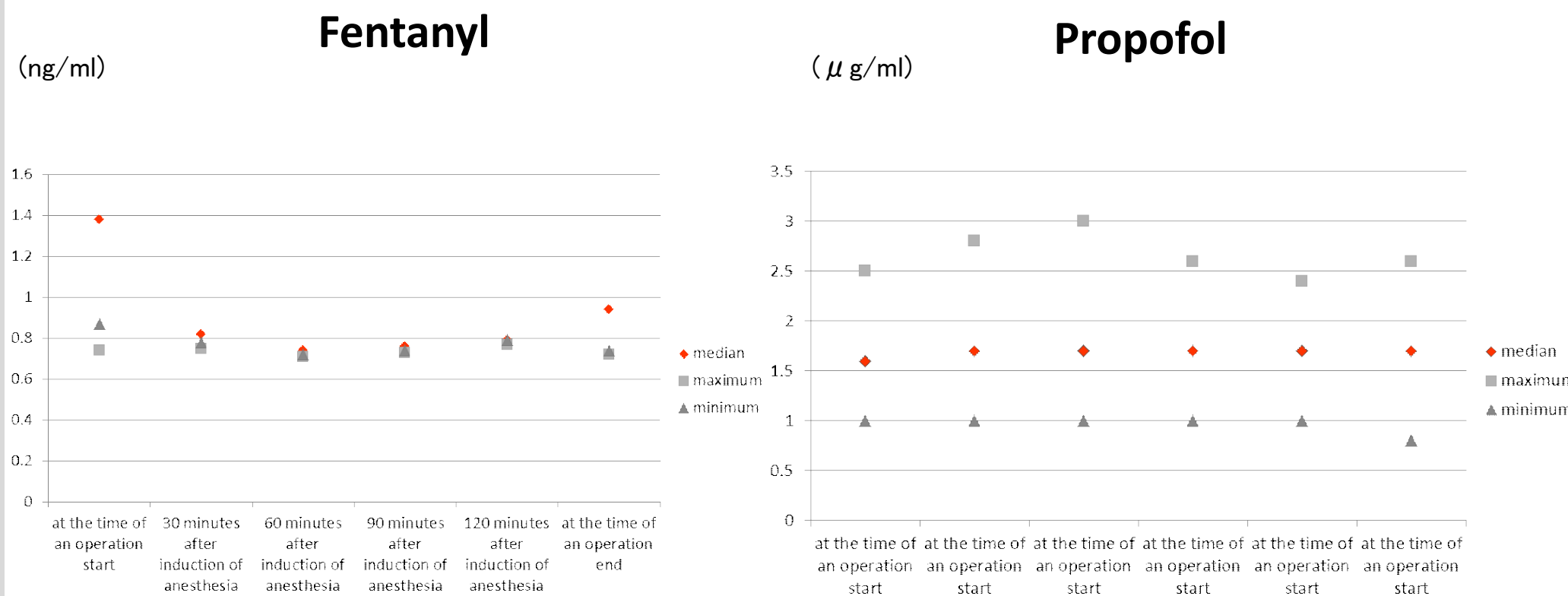
1) Yamada M, et al:Aichi Gakuin J.Dent. Sci. 37(3): 551-560,1999

Results

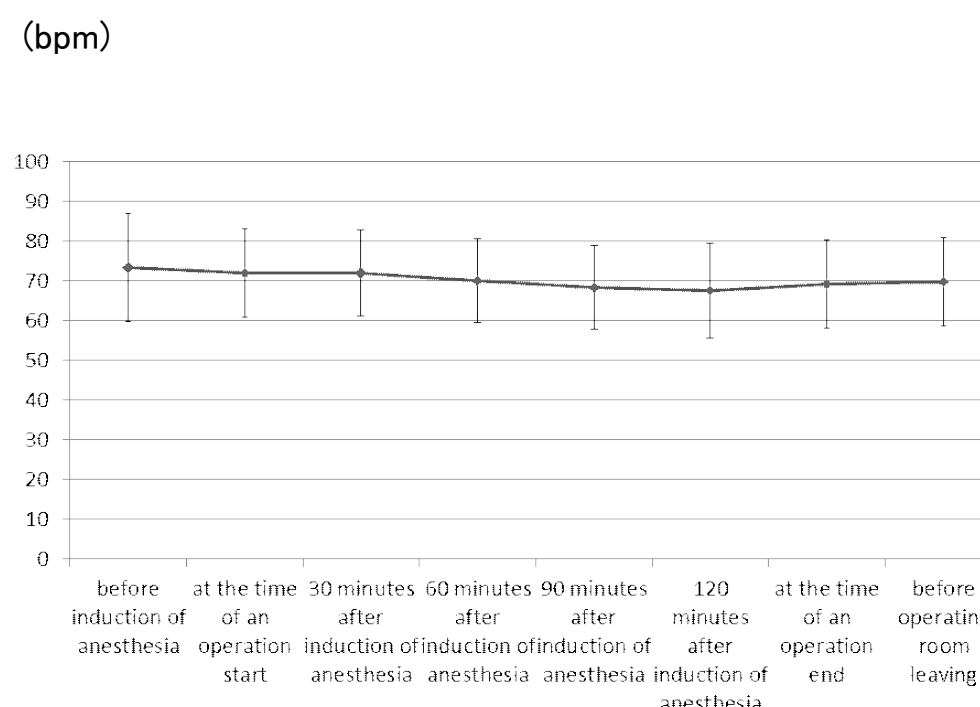
Patient characteristics and anesthesia demographics

	(mean±S.D.) (maximum; minimum)		
age (years)	42.9±14.4 (64;19)	basal disease : number of cases	cardiovascular disease : 9
weight (kg)	61.4±12.5 (95.4;43.6)		Psychiatric disease : 4
height (cm)	162.1±8.7 (181.0;146.5)		respiratory disease:3
gender (male : female)	32 : 40	Endocrine disease:1	none : 55
operation time (min)	76.7±33.3 (176;40)	operative method : number of cases	extraction of impacted wisdom teeth: 21
anesthesia time (min)	101.6±36.9 (220;50)		dental implant surgery: 16
			normal teeth extraction and cyst enucleation: 9
			autologous transplantation as a pretreatment of a dental implant surgery: 6
			autologous transplantation and dental implant surgery: 3
			others: 17

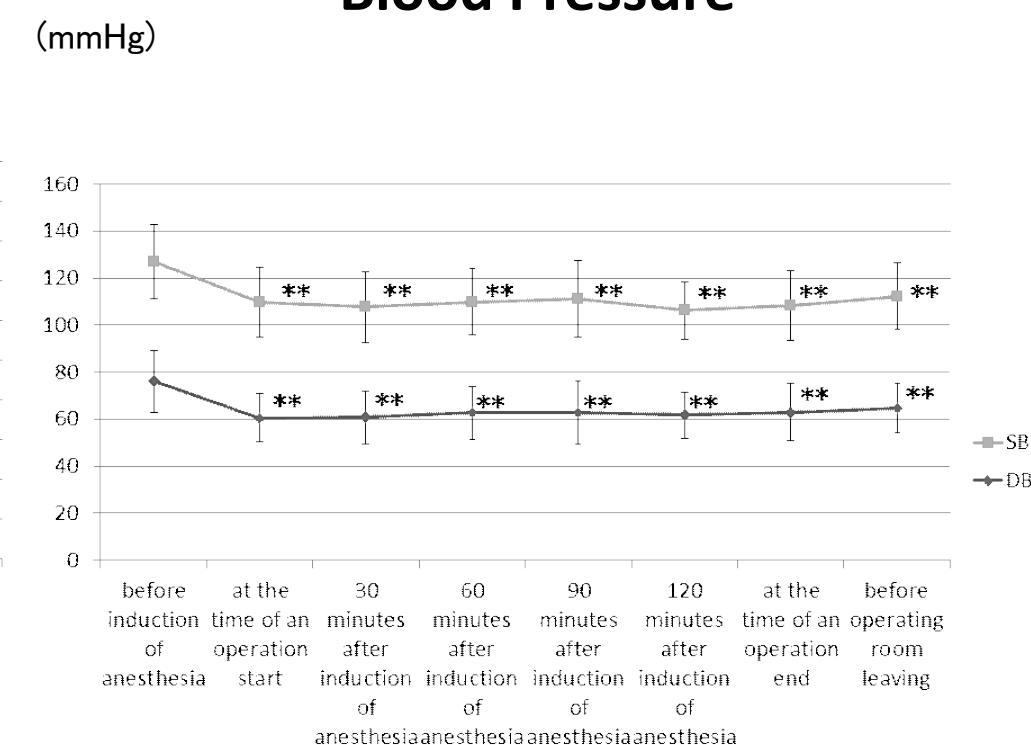
Effect site concentration



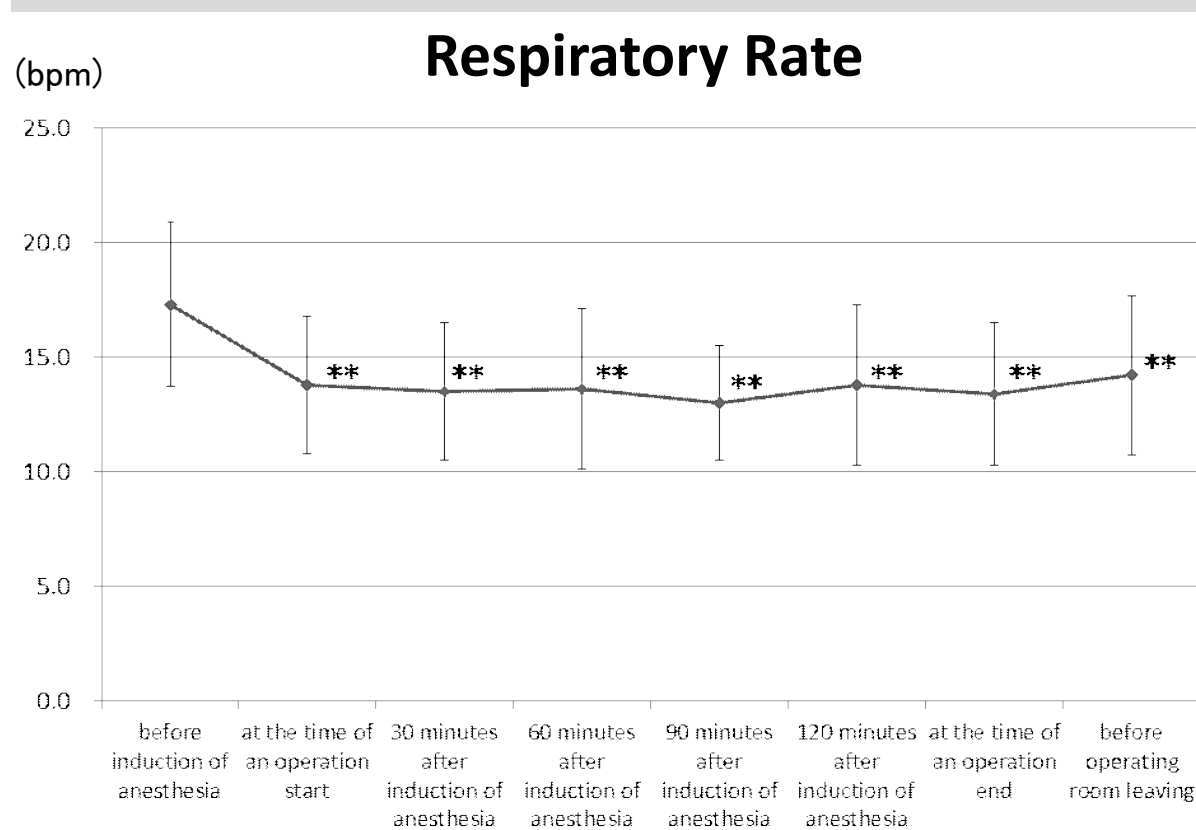
Heart rate



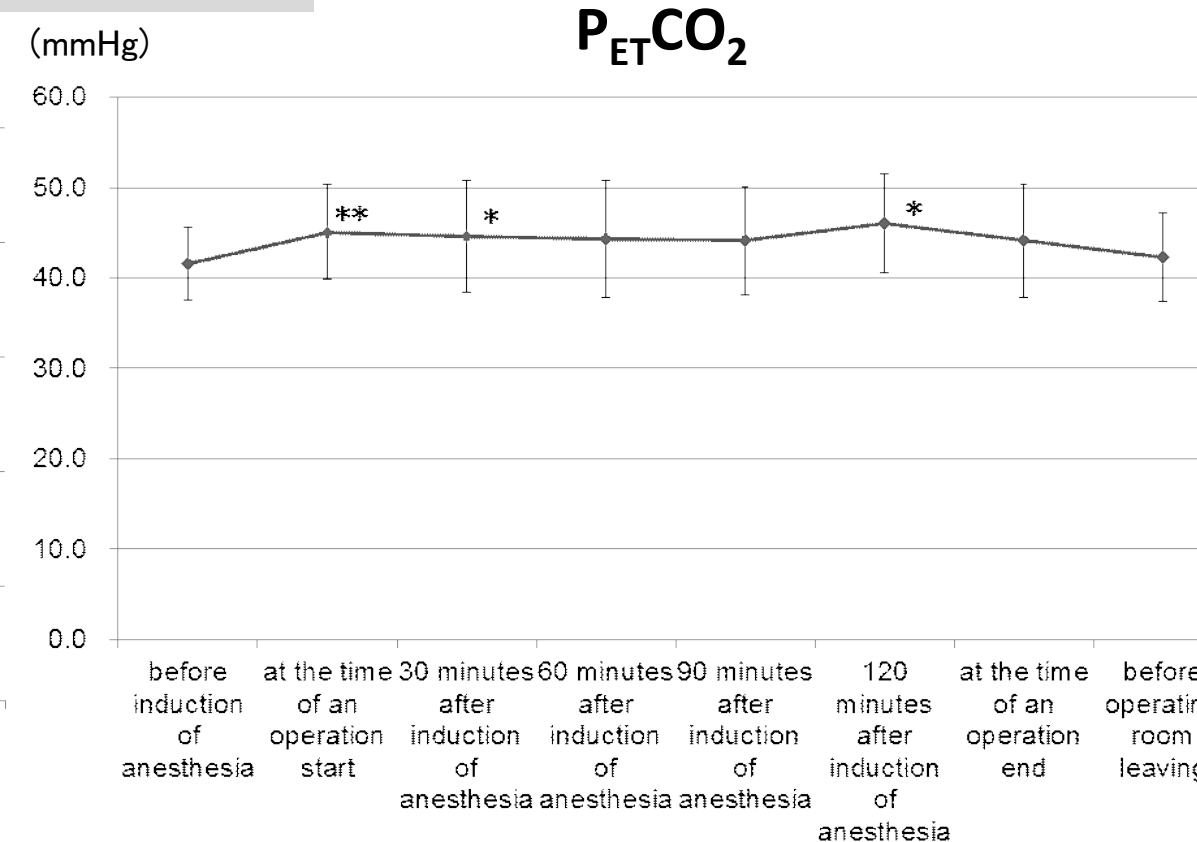
Blood Pressure



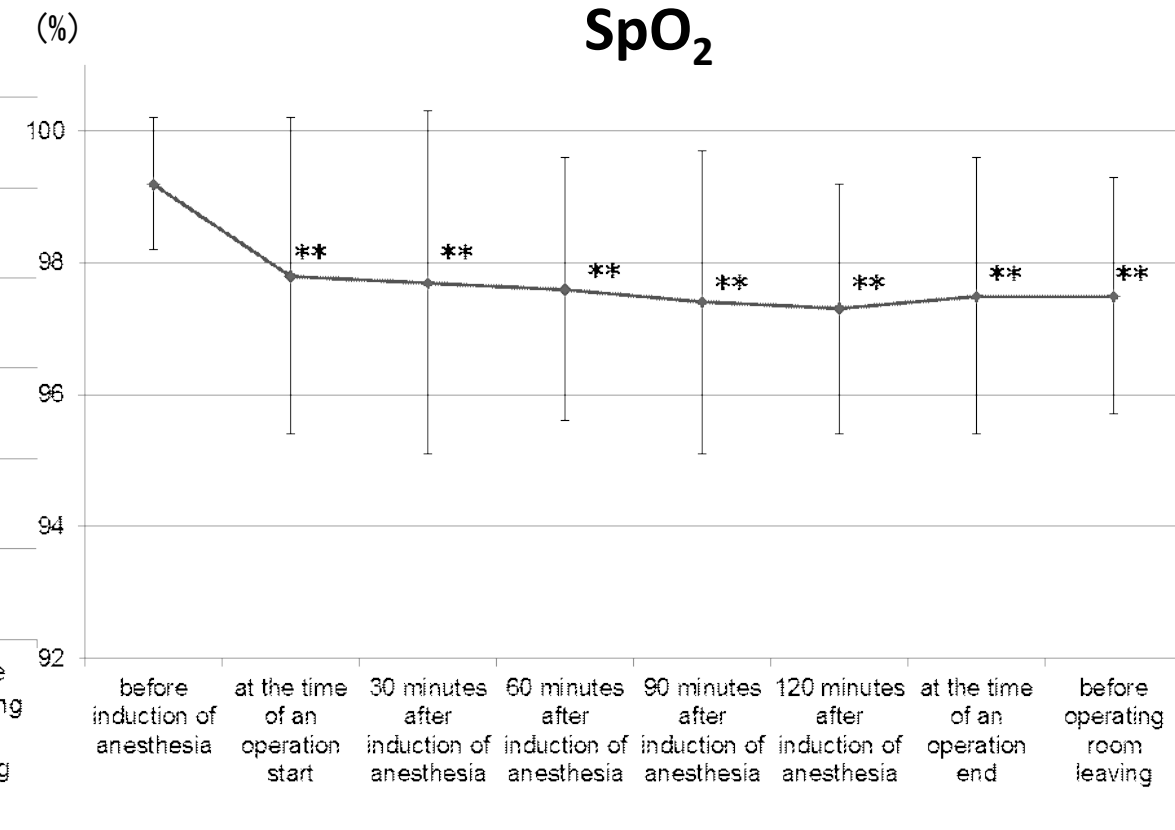
Respiratory Rate



P_{ET}-CO₂



SpO₂



*p<0.05 **p<0.01 compared with before induction of anesthesia

Frequency of body movement, complaint of pain, rescue dose of the local anesthetic

median (maximum ; minimum)

Body movement	0 (6 ; 0)
complaint of pain	0 (4 ; 0)
rescue dose of the local anesthetic	0 (7 ; 0)

Frequency of administration of antiemetics until the next morning

median (maximum ; minimum)	number of cases (%)
0 (1 ; 0)	1 (1.4)

Administrated analgesics until the next morning

	number of times of administration	number of cases (%)
number of times of administration	1 (3 ; 0)	72 (100)
Loxoprofen Sodium 120mg	1	17 (23.4)
	2	14 (19.4)
	3	1 (1.4)
Loxoprofen Sodium 60mg	1	5 (6.9)
Diclofenac Sodium 50mg	1	1 (1.4)
	2	1 (1.4)
Acetaminophen 400mg	1	1 (1.4)
Loxoprofen Sodium 120mg, Diclofenac Sodium 50mg	1 in each	1 (1.4)
none	0	31 (43.1)

Recovery time based on PADSS

	median (maximum ; minimum)
1. Orientation	15 (15 ; 15)
2. Respiration	15 (15 ; 15)
3. Circulation (blood pressure and heart rate)	15 (15 ; 15)
4. Skin	15 (105 ; 15)
5. Activity	30 (120 ; 15)
6. O ₂ Saturation (room air)	15 (15 ; 15)
7. Nausea and vomiting	15 (45 ; 15)
8. Pain (Visual Analogue Scale)	15 (105 ; 15)
9. Intake and output	37.5 (120 ; 15)
10. Surgical bleeding	15 (105 ; 15)

Conclusions

For relatively long and invasive minor oral surgery, the sedation method with fentanyl which infused 1 µg/kg/h continuously after 1 µg/kg bolus and propofol to maintain a sedation level within OAA/S score 2-3 constantly is safe and useful for stabilizing in respiratory and circulatory dynamics by minimizing surgical invasion continuously, enabling normal hospitalization life within 120 minutes after returning to the ward.