The effect of nicardipine on surgical pleth index during thyroidectomy under desflurane anaesthesia: a prospective randomized controlled trial

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Fig. 1. Trend of surgical pleth index (left) and heart rate (right) in patients receiving nicardipine or remifentanyl during anaesthesia and surgery.

- Materials and methods
- Prospective, randomized controlled, single center study
 - Subjects: 40 patients; 20-65 years, ASA physical status I ~ II undergoing thyroidectomy
 - Group assignment: nicardipine (Group N), remifentanyl (Group R) according to infusion drug
 - Premedication: midazolam 2 mg, iv
 - Induction: propofol 2 mg/kg, fentanyl 1 µg/kg and rocuronium 0.6 mg/kg
 - Maintenance: desflurane + nitrous oxide 50% in oxygen
 - Infusion (after intubation): nicardipine or remifentanyl
 - Target: Mean blood pressure (MBP) within ± 20% from the preoperative value
 - Dosing: **nicardipine** - 100 µg bolus followed by 0.5 µg/kg/min; **remifentanyl** - 50 µg bolus followed by 0.05 µg/kg/min → titration at every 2.5 min interval

Assessment	
OR	✓ SPI
	✓ BIS
	✓ Et Des
	✓ MBP
	✓ Heart rate
PACU	✓ Extubation time
	✓ Recovery time (time to reach a modified Aldrete score of 10)
	✓ Adverse events

- Results and discussion
- There was no significant difference between the groups in patients' characteristics (Table 1).
 - The trend of **SPI value** was **comparable** between the groups during surgery (P=0.76), although the trend of heart rate was significantly different between the groups (P=0.03; HR was generally higher in group N than in group R) (Figure 1: **primary outcome**).
 - The trends of intraoperative BIS, end-tidal desflurane concentration (Et Des) and MBP were comparable between the groups.
 - Extubation time, recovery time and incidence of nausea/vomiting at PACU were comparable between the groups (Table 2).

Table 1. Demographic and clinical data

Values are mean ± SD, median (range) or number of patients.	Group N (n = 19)	Group R (n = 21)
Age (yr)	46 (26-60)	46 (34-68)
Sex (M/F)	3/16	4/17
Body mass index (kg/m²)	24.5 ± 2.6	23.6 ± 2.5
Anaesthesia time (min)	97.4 ± 26.0	101.9 ± 20.4
Surgical time (min)	69.6 ± 23.8	70.5 ± 18.2
Intraoperative fluid (ml/kg)	4.1 ± 2.5	3.7 ± 1.5
Baseline SPI value	45.2 ± 19.1	49.4 ± 18.9
Baseline mean arterial pressure (mmHg)	92.7 ± 10.6	93.3 ± 7.8
Baseline heart rate (beats per min)	71.0 ± 13.6	75.4 ± 16.4

Table 2. Recovery profiles and perioperative medicine

Values are mean ± SD or number of patients.	Group N (n = 19)	Group R (n = 21)	P value
Extubation time (sec)	419.8 ± 105.0	416.5 ± 161.6	0.94
Recovery time (min)	23.7 ± 9.0	26.2 ± 10.7	0.43
Infused rate of nicardipine (µg/kg/min)	0.57 ± 0.09		
Infused rate of remifentanyl (µg/kg/min)		0.05 ± 0.01	
Nausea or vomiting at PACU (n)	4/19	3/21	0.57

- Conclusions
- The administration of nicardipine may confound the interpretation of SPI as a surrogate measure of the nociception-antinociception balance during general anaesthesia.
 - SPI does not seem to reflect the level of surgical stress and may not help guide the use of opioids (analgesics) in the clinical settings with the administration of nicardipine during general anaesthesia.