The relationship between duration of postoperative oxygen administration and postoperative nausea and vomit in patients undergoing laparoscopic gynecological surgery

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Background ① : Oxygen and PONV

After 10 yrs disputes, intraop high O₂ concentration would not be effective for PONV. We, however, sometime saw the cases postop O₂ reduced nausea, or nausea ceased just after O₂ resupplied. Focused on postop O₂ administration and PONV, only one study exists, and the subjects are with particular condition*. We investigated whether the duration of postop O₂ administration affects PONV after gynecological laparoscopic surgery.

Background ②: Intraoperative antiemetics in Japan

Usual intraop antiemetics are droperidol, metoclopramide and sometimes H₂ antagonists. Dexamethasone(DEX) is off-label but very inexpensive. 5HT₃ antagonists and aprepitant is off-label, expensive and very uncommon in operative room in Japan.

Subject & Method:

This study is, **an open pseudo-randomized clinical trial**.
Subjects: Patients for gynecological laparoscopic surgery, allocated by ID number: ended in odd for 1H group and even for 5H group. 1H group postoperatively received 2L/min O₂ with nasal cannula (FiO₂≐0.28) for 1 hour and 5H group received for 5 hours. O₂ was resupplied when SpO₂ dropped and ward nurse judged as it is necessary after O₂ ceased.

Intraoperative anesthetic protocol: Basically we used TIVA with propofol and remifentanyl and/or fentanyl. Volatile anesthetics were not used, but permitted within 30mins. Intraop O₂ was 40-60% with N₂. IV DEX was used for antiemetic and fentanyl IVPCA was used; 20μg/h+20μg/bolus/10min. Types and doses of other antiemetics, muscle relaxants and reversals, and adjuvant analgesics were discretionary to attending anesthetists.

Data were collected by anesthetic postop round.

Statistical analysis (EZR): student's t-test was used for continuous variables and χ² test for proportional variables. P<0.05 was considered significant. **Analyses were done with an intention-to-treat (ITT) approach.**

Postoperative O ₂ administration protocol		
Group	1H group	5H group
O ₂	1 hour	5 hours

Flow diagram

All participants were followed up & analyzed (Including protocol deviation participants)

Demographic data and potential confounding factors

	1H (n=687)	5H (n=651)	
Age (yrs)	41.6 (±9.8)	42.3 (±9.9)	P=0.195
BMI	21.8 (±3.5)	21.6 (±3.5)	P=0.348
Smoke	7.2%	7.3%	P=1.0
Motion sickness	40.5%	39.3%	P=0.741
History of PONV +	7.3%	7.8%	P=0.756
PONV -	16.3%	16.1%	P=0.941
Apfel score			
2	4.1%	2.4%	
3	52.7%	56.6%	
4	43.2%	41.0%	

Result

	1H (n=687)	5H (n=651)	
Duration of Anesthesia	149 (±67)	149 (±71)	P=0.93
Fentanyl (mcg/kg/h)	2.2 (±1.2)	2.3 (±1.2)	P=0.12
Remifentanyl (ng/kg/h)	15.3 (±5.1)	15.2 (±4.9)	P=0.67
Volatile anesthetics(≤30min)	13.8%	11.1%	P=0.14
Number of Antiemetics	2.1(±0.6)	2.1(±0.6)	P=0.44
Dexamethasone	98.5%	98.0%	P=0.53
Droperidol	91.1%	91.1%	P=1.0
Metoclopramide	14.4%	15.2%	P=0.28
Domperidone	2.2%	1.5%	P=0.25
Hydroxydine	2.6%	2.0%	P=0.47
Diphenhydramine	1.0%	0.2%	P=0.44

Discussion

- No significant difference in PONV incidence between 1h and 5h group, even both in early (1-5h) and late (5-48h) phase.
- Protocol deviation occurred more commonly in 1H group mainly due to O₂ resupply.
- Limitation was,

1. Postop O₂ for both groups was about 28%: only 7% rise from air.
2. Only 4 hours difference between two groups in postop O₂ administration.
3. With TIVA & IV DEX, PONV incidence was intrinsically suppressed and there might be no more margin for postoperative O₂ supply.

- Although we used “per protocol” approach in the first abstract which had significant difference in vomit incidence, we adopted ITT approach in this presentation to acquire more precise analyses.

Conclusion

Longer Postop O₂ administration did not reduce PONV for patients undergoing laparoscopic gynecological surgery under GA with TIVA.
Further investigation will be required.

Reference: *Ghods AA et al. Effect of postoperative supplemental oxygen on nausea and vomiting after cesarean birth. J Perianesth Nurs. 2005 Jun;20(3):200-5