GENIUS JOURNAL
general nursing science journal
e-ISSN: 2723-7729
Vol. 03 No. 01 PP. 93-98 E-ISSN 2723-7729 Prefix DOI: 10.56359/gj

The Correlation of Intraoperative Blood Pressure with Post Operative Nausea and Vomiting Incidence

Ni Wayan Eni Sukmawati[1], Ni Made Dewi Wahyunadi[1], Ni Putu J. Sastamidhyani[1]
[1]*Diploma IV of Nursing Anesthesiology, Faculty of Health, Institute of Technology and Health Bali, Denpasar, Indonesia*

Correspondence author: Ni Made Dewi Wahyunadi
Email: ni.made.dewi.wahyunadi@gmail.com
Address : Jl. Tukad Balian No. 180, Renon, Denpasar, Bali, Telp. 089512121461
Submitted: 7 June 2022, Revised: 30 June 2022, Accepted: 6 July 2022, Published: 15 July 2022
DOI: doi.org/10.56359/gj.v3i1.75

ABSTRACT

Objective: To determine the correlation of intraoperative blood pressure with Post Operative Nausea and Vomiting (PONV) Incidence on post general anesthesia patients at Tk. II Udayana Hospital Denpasar.
Methods: This study employed analytical correlational with cross sectional design. There were 60 respondents as the samples. The data were collected by using observation sheet during intraoperative and PONV questionnaire. Data were analyzed using the Spearman's Rho test.
Result: The result showed that the dominant of intraoperative blood pressure of the patient was normotensive (68,3%), the dominant of PONV incident was no PONV (90%). There was significant correlation of intraoperative blood pressure and PONV incidence (p-value <0.001) with coefficient correlation -0.507.
Conclusion: There is a correlation of intraoperative blood pressure and PONV incidence on post general anesthesia patients at Tk. II Udayana Hospital Denpasar with strong correlation.

Keywords: anesthesia, blood pressure, intraoperative

Introduction

Post Operative Nausea and Vomiting (PONV) is a complication of general anesthesia that often co-occurs with pain. PONV causes discomfort to the patient, which can be an obstacle to early recovery (Nakatani et al., 2021). PONV was defined as postoperative nausea and vomiting that occurred within 24 hours of surgery. The vomiting center can be activated directly by irritation or indirectly following input from four main areas: the gastrointestinal tract, cerebral cortex and thalamus, vestibular region, and chemoreceptor trigger zone (CTZ) (Teshome, Fenta, & Hailu, 2020). The incidence of PONV can cause patient discomfort compared to postoperative

pain. PONV can cause various complications, such as sweating, abdominal pain, weakness, disturbing patient comfort, reopening the surgical wound, bleeding, and delaying wound healing. PONV increase the risk of gastric fluids aspiration into the lungs, and also disturbances of fluid and electrolyte (Sudjito et al., 2018). A further impact of PONV if not handled properly is prolong treatment time, increase treatment costs and can increase the stressors (Supatmi & Agustiningsih, 2019).

The incidence of vomiting occurred approximately 30%, the incidence of nausea is about 50% and the incidence of PONV can reach 80%. In the United States more than 100,000 (30%) patients experienced PONV. According to a study conducted in Ethiopia, the prevalence of PONV is quite high at 36.2% with factors related to a history of motion sickness, previous history of PONV, duration of anesthesia, major surgery and gynecological surgery (Teshome et al., 2020). In Indonesia, the incidence of PONV has not been clearly recorded. According to Sholihah et al. research (2015), the incidence of PONV in Ulin Hospital Banjarmasin in May-July 2014 was 26 patients (27.08%) out of 96 patients. Meanwhile, the incidence of nausea in the first 2 hours after surgery in the PACU (Post Anesthesia Care Unit) reached 20% and vomiting 5% (Sholihah et al., 2015).

The occurrence of PONV can be caused by various risk factors for PONV including age, gender, smoking status, motion sickness or previous PONV, ASA (American Society of Anasthesiologists) values, history of migraine, diet and, postoperative anxiety. Anesthesia risk factors are related to the use of postoperative opioids, anesthetic drugs, and the type of anesthetic action, while surgical risk factors include the length of surgery, and postoperative pain and changes in hypotensive blood pressure (Ardiansah, 2020). Hypotension is a well-known factor that triggers nausea and vomiting regardless of anaesthesia. The exact mechanism that causes PONV by hypotension is unclear, but reduced blood flow to the brainstem and effects on the CTZ can cause dizziness and disturbances in the vestibular system, leading to nausea or vomiting (Nakatani et al., 2021).

Objective

This study aims to determine whether there is a correlation between intraoperative blood pressure with the incidence of postoperative nausea and vomiting (PONV) on post general anesthesia (GA) patients at Tingkat II Udayana Hospital.

Method

This study employed analytical correlational with cross sectional design. The 60 respondents who under general anesthesia sevoflurane of the study were obtained by using consecutive sampling technic. The research instruments used were observation sheets and PONV questionnaire. Data collection was carried out on March-April 2022 at Tingkat II Udayana Hospital Denpasar. Univariate analysis used to identify intraoperative blood pressure and the incidence of PONV. The Spearman's Rho test used to analyze the correlation between intraoperative blood pressure with the incidence of PONV.

Results

Characteristics of Respondents

Characteristics of respondents in this study include age, gender, level of education, Surgery Duration and ASA.

Table 1. Characteristics of Respondents

Characteristics	Frequency (f)	Percentage (%)
Age Category		
12 – 16 years old	2	3.3
17 – 25 years old	15	25.0
26 – 35 years old	10	16.7
36 – 45 years old	10	16.7
46 – 55 years old	15	25.0
56 – 65 years old	8	13.3
Sex		
Female	36	60.0
Male	24	40.0
Level of education		
Elementary school	6	10.0
Junior High School	11	18.3
Senior High School	13	21.7
College	30	50.0
Surgery Duration		
<1 hour	22	36.7
12 hours	33	55.0
>2 hours	5	8.3
ASA		
1	27	45.0
2	29	48.3
3	4	6.7

Based on the age category of 60 respondents, the most dominant age who underwent surgery with general anesthesia at Tk. II Udayana Hospital Denpasar were 17-25 years old (25%) and 46-55 years old (25%). While the least were 12-16 years old (3.3%). Based on gender, female (60%) respondents are more dominant than male (40%). When viewed from the level of education, the most dominant respondents were graduated from college (50%), followed by respondents were graduated from senior high school (21.7%), then junior high school (18.3%) and the least were graduated from elementary school (6%). the duration of surgery for most respondents is approximately 12 hours (55%) and the most dominant respondents were patients with ASA 2 (6.7%) (table 1)

Intraoperative Blood Pressure in General Anesthesia Patients

Table 2. Intraoperative Blood Pressure

Category	Frequency (f)	Percentage (%)
Intraoperative		
Hypotension	10	16.7
Normotensi	41	68.3
Hypertension	9	15.0

Based on the table above, the dominant intraoperative blood pressure was normotensive (68.3%), 10 people (16.7%) had hypotension, and only 9 people (15.0%) had hypertension blood pressure.

Post Operative Nausea and Vomiting (PONV) Incident based on Respondents Characteristics

Table 3. Frequency of PONV

Category	Frequency (f)	Percentage (%)
PONV (Score)		
1	6	10.0
2	0	0.0
3	0	0.0
No PONV	54	90.0

Based on the table above, from 60 respondents, 10% respondent experienced PONV category 1 and 90% do not feel PONV.

Relationship between Intraoperative Blood Pressure with PONV Incidence

Table 4. The results of the Spearman rho correlation of intraoperative blood pressure variables with the incidence of postoperative nausea and vomiting

	***Post Operative Nausea and Vomiting*(PONV)**	
Intraoperative Blood Pressure	r	- 0.507
	p	<0.001
	n	60

The results of the correlation between intraoperative blood pressure and the incidence of PONV, showed that p value <0.001, which is means that there is a significant relationship between Intraoperative Blood Pressure and Post Operative Nausea and Vomiting (PONV) on Post General Anesthesia (GA) Patients at Tk. II Udayana Hospital Denpasar. The coefficient correlation value 0.507, which is means that the relationship between intraoperative blood pressure and the incidence of PONV were strong.

Discussion

Based on the results of The Spearman Rho test, showed that there was a significant relationship between intraoperative blood pressure and the incidence of PONV. This results are consistent with previous study conducted by Karlina (2020) which also found that there was significant relationship between mean arterial pressure and the incidence of postoperative nausea and vomiting on postoperative patients. It was explained from her research that patient who experience PONV was hypotension (Karlina, 2020).

In accordance with Nakatani et al. (2021) study described that hypotension is one of the factors that trigger PONV regardless of anesthesia, the mechanism that causes PONV by hypotension is not clear, but the reduction of blood flow to the brain stem and its influence on the chemoreceptor trigger zone (CTZ) can cause dizziness and disturbances in the vestibular system, leading to nausea or vomiting. Although the mechanism of nausea and vomiting has not been fully elucidated, PONV is thought to be induced by stimulation of the vomiting center from the vestibular organs(Nakatani et al., 2021).

The pathophysiology of vomiting is complex and involves several organs. The bilateral vomiting center is located in the medulla oblongata, close to the tractus solitarius at the level of the dorsal motor nucleus of the vagus. Afferent fibers from the gastrointestinal tract (mainly serotoninergic), pharynx, mediastinum, visual center, vestibular portion of the 8th cranial nerve

(mainly histaminergic) and from the "trigger zone" can stimulate the vomiting center. Increased intestinal serotonin release (stimulates 5HT3 receptors), then stimulates the vomiting center via vagal afferents. This mechanism may explain the effectiveness of 5HT3 receptor antagonists for therapy in the early period, but not effectiveness in the late period. Vomiting after administration of morphine or apomorphine is mediated by the chemoreceptor trigger zone in the 4th ventricle (Zhong et al., 2021).

In younger patients, afferent neurons are more sensitive to these stimuli and signals from these stimuli are relayed to the vomiting center in the brainstem where nausea and vomiting occur. So that patients with young age have a lower threshold for nausea and vomiting and the risk of PONV will be higher than those of older patients. It is also possible that younger patients may have high autonomic tone and respond worse to anesthetic and analgesic agents including opioids (Karnina & Salmah, 2022).

Furthermore, if based on the duration of surgery, that the duration of anesthesia more than 60 minutes is a predictor of PONV events. This is because longer surgery can increase the duration of exposure to potentially emetogenic anesthetic agents, thereby increasing the percentage of patients experiencing PONV(Al-Ghanem et al., 2019). Otherwise according to Aldecoa (2015) study showed that female patients were considered a high risk factor for postoperative nausea and vomiting with the incidence of nausea three to four times higher than men (Aldecoa et al., 2015). In addition, Hendro's (2018) study reported that the incidence of PONV was 2.8% on exposure to anesthetics for 30 minutes and increased to 13–17% at 90–150 minutes of operation duration. This means that the longer the operation, the higher the percentage of PONV. Apart from these factors, the anesthetic drug sevoflurane is also one of the causes of PONV (Karnina & Salmah, 2022).

Conclusion

The results of this study indicate that there is a significant relationship between intraoperative blood pressure with the incidence of postoperative nausea and vomiting (PONV) on post general anesthesia (GA) patients at Tingkat II Udayana Hospital Denpasar.

Ethical consideration

Research Ethics Commission of the Bali Institute of Technology and Health (ITEKES) No : 04.0061/KEPITEKES-BALI/II/2022

References

1. Al-Ghanem, S., Ahmad, M., Qudaisat, I., Samarah, W., Al-Zaben, K., Halaweh, S. A., … Zoubi, M. (2019). Predictors of nausea and vomiting risk factors and its relation to anesthesia in a teaching hospital. *Research Article Trends Med*, *19*(1), 1–5. https://doi.org/10.15761/TiM.1000171
2. Aldecoa, C., Sentürk, M., Stoicea, N., Gan, T. J., Joseph, N., Uribe, A., … Bergese, S. D. (2015). Alternative Therapies for the Prevention of Postoperative Nausea and Vomiting. *Front. Med*, *2*, 87. https://doi.org/10.3389/fmed.2015.00087
3. Ardiansah, A. I. (2020). Hubungan Dosis Dan Durasi Oksigen Dengan Postoperative Nausea And Vomiting (PONV) Pada Pasien Post Anastesi Umum | Journal of Applied Nursing (Jurnal Keperawatan Terapan). *Jurnal Keperawatan Terapan*, *6*(2), 121–127.
4. Karlina, N. (2020). Hubungan Mean Arterial Pressure Dengan Kejadian Mual Muntah Pasca

Operasi Pada Pasien Post Anestesi Spinal Di Rumah Sakit Bhayangkara The Correlation Of Mean Arterial Pressure With Post Operative Nausea Vomiting in Post Spinal Anesthesia In Bhayangkara Ho. *JURNAL KESEHATAN MAHARDIKA*, *7*(1), 1–3.

5. Karnina, R., & Salmah, M. (2022). Hubungan Usia, Jenis Kelamin, Lama Operasi dan Status ASA dengan Kejadian PONV pada Pasien Pasca Operasi Laparatomi Bedah Digestif. *Health and Medical Journal*, *4*(1), 16–22. https://doi.org/10.33854/HEME.V4I1.867
6. Nakatani, H., Naito, Y., Ida, M., Sato, M., Okamoto, N., Nishiwada, T., & Kawaguchi, M. (2021). Association between intraoperative hypotension and postoperative nausea and vomiting: a retrospective analysis of 247 thyroidectomy cases. *Brazilian Journal of Anesthesiology (English Edition)*. https://doi.org/10.1016/J.BJANE.2021.02.029
7. Sholihah, A., & Sikumbang, Kenanga Marwan Husairi, A. (2015). Gambaran Angka Kejadian Post Operative Nausea And Vomiting (PONV) DI RSUD Ulin Banjarmasin Mei-Juli 2014. *Berkala Kedokteran*, *11*(1), 119–129. https://doi.org/10.20527/JBK.V11I1.192
8. Supatmi, & Agustiningsih. (2019). Aromaterapi Pepermint Menurunkan Kejadian Mual dan Muntah pada Pasien Post Operasi. *Jurnal Kesehatan Karya Husada*, *2*(2), 1–18.
9. Teshome, D., Fenta, E., & Hailu, S. (2020). Preoperative prevention and postoperative management of nausea and vomiting in resource limited setting: A systematic review and guideline. *International Journal of Surgery Open*, *27*, 10–17. https://doi.org/10.1016/J.IJSO.2020.10.002
10. Zhong, W., Shahbaz, O., Teskey, G., Beever, A., Kachour, N., Venketaraman, V., & Darmani, N. A. (2021). Molecular Sciences Mechanisms of Nausea and Vomiting: Current Knowledge and Recent Advances in Intracellular Emetic Signaling Systems. https://doi.org/10.3390/ijms22115797