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Differences in Halothane and Isofluran Anesthesia on Hemodynamic Status

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A B S T R A C T

Halothane and Isoflurane are two frequent inhalation agents used as maintenance anesthesia during surgery. After experiencing anesthesia, many patients experience decreased hemodynamic status as pressure blood, respiration, and pulse. Because that study this expected could determine proper anesthesia for use. Evaluates differences in hemodynamic status post-anesthesia consequence use of halothane and isoflurane. This is a study with quasi pre-post design experiment with a control group design. The sample study is all patients undergoing Installation Surgery at Sele Be Solu Hospital, Sorong City, which uses the general anesthesia technique with inhalation of halothane or isoflurane for as many as 21 people. Instrument study use sheet observation to measure pressure, blood, respiration, and pulse During surgery. The Wilcoxon test obtained a score of 0.157 on the pressure blood respondent after getting anesthesia halothane and respondents after getting anesthesia isoflurane, i.e., 0.007. Mann Whitney test shows changes in blood pressure, pulse, and respiration in anesthetized respondents who used halothane and isoflurane score significance of 0.784, 0.576, and 0.307. There is a difference in blood pressure at first and end anesthesia use of isoflurane. No, there is a difference in frequency pulse, initial pulse, and respiration anesthesia, and end anesthesia uses isoflurane. No there is a difference in pressure blood, pulse, and respiration at the beginning and end anesthesia uses halothane. There is no difference in blood pressure, pulse, and respiration after general anesthesia uses isoflurane and halothane.

INTRODUCTION

A drug is something substance that affects the chemistry and changes the function of biologics. Drugs could be synthesized in the body (e.g., hormone) or as substances incoming chemistry from beyond the so-called xenobiotics. Every substance chemistry is a characteristic poison (toxic), and its occurrence of poisoning is determined by the dose and method gift (Benjamin et al., 2022).

Data from the World Health Organization (WHO) report that the number of incident surgeries in the world ranged from 5% to 34%. in the period (Dobson, 2020; Haugen et al., 2015). January until December 2022, numbers incident surgery at Sele Be Solu Hospital, from whole total patient take care stay recorded as many as 270 patients. Almost all action surgery is conducted under the influence of anesthesia, among others conducted with anesthesia in general.

Agent anesthesia general could use through injection, inhalation, or through combined injection and inhalation. general Anesthesia frequent inhalation used in the world is halothane, Isoflurane, sevoflurane, desflurane, diethyl ether, and nitrous oxide. Anesthesia is generally given in a manner injection covers barbiturates (thiopental, methohexital, and pentobarbital), cyclohexane (ketamine, tiletamine), etomidate, and propofol (Miller et al., 2022; Sorrenti et al., 2021).

One shape of frequent anesthesia used is anesthesia inhalation. Anesthesia inhalation is medicine in the form of gas or fluid easy evaporates, given through a breathing patient. Anesthesia inhalation has superiority in its high potency and concentration that can be controlled through the machine, allowing titration dose to produce the desired response (Brown et al., 2018; Scheiermann et al., 2018) .

Anesthesia generally needs attention in Thing hemodynamic because, influential in a manner, mobile; Anesthesia generally reverses changes in the physiological status body, which is marked by loss of consciousness (sedation). Perception pain (analgesia), loss of memory (amnesia), and relaxation (Staheli & Rondeau, 2022).

Anesthesia has this narrow index, producing toxic effects on several organs, eg, the heart. How it works drug anesthesia inhalation to speed heart with change in a manner live speed depolarization of the sinoauricularis node (SA node), or with swipe balance activity system nerve autonomous. Several examples of anesthesia inhalation are halothane and Isoflurane (Becker & Reed, 2012; Becker & Rosenberg, 2008).

Halothane is a potent anesthetic with a weak analgesic effect. Halothane, in a manner that lives, hinders muscle heart and muscle vessels blood as well as lower the activity of nerve sympathetic. Decline pressure blood happens because of two things, namely (1) depression living with myocardial and (2) inhibition of its reflex baroreceptors to hypotension. Besides, halothane also causes bradycardia because of increased vagal activity. Halothane causes vasodilation of blood vessels in the muscle's skeleton and brain, so Genre blood to the brain and muscles increases (Miller et al., 2022).

Isoflurane, including halogenation ether causes depression and minimum heart. Cardiac output maintained with enhancement frequency pulse heart through maintenance Partial from baroreflex carotid. Using Isoflurane is more stable and more fast recovery compared with halothane (Aronson, 2016; Eis & Kramer, 2022; Hudson et al., 2019).

Inhalation with Isoflurane in many Things has more pharmacology good than halothane. Isoflurane has minimal effect side. For a reason, this security isoflurane is more often used, though eat costs higher (Hawley et al., 2022; Villeneuve & Casanova, 2003).

Most surgeries performed in Installation Surgery Sele Be Solu General Hospital, Sorong City, are conducted with an anesthesia general. Halothane and Isoflurane are two frequent inhalation agents used as maintenance anesthesia general During surgery. After experiencing anesthesia, many patients experience decreased hemodynamic status as pressure, blood, breath, and pulse. In general, the number of patients undergoing surgery who use anesthesia will be as many as 143 in 2022, with an average of 12 people per month.

Attention major in anesthesia is the security and safety of the patient; one factor is stability hemodynamic. During action induction, anesthesia goes on. Hemodynamic parameters include blood systole pressure, diastolic blood pressure, artery average, heart rate, and saturation oxygen (Hansen et al., 2022).

According to (Hafen & Sharma, 2022) blood average arteries and a 20% decrease in saturation oxygen arteries in 30 seconds. Meanwhile, on giving induction inhalation, halothane declines blood pressure on average arteries and saturation oxygen arteries up to 2 times more than Isoflurane. That is, giving anesthesia inhalation, Isoflurane safer for changing hemodynamic than halothane (Morimoto et al., 2022; Shoroghi et al., 2011).

According to research, (Franzén et al., 2022) stated that at the administration of 1 vol % up to a dose maximum of 7 vol %, Isoflurane gives change better hemodynamic stable than gift dose maximum of 5 vol % halothane. Of course, you can influence the results obtained in the study, different concentrations, and types of second anesthesia. Based on this will conduct a study on the ratio influence of anesthesia with halothane and Isoflurane on hemodynamic status. Inhalation with Isoflurane in many Things has more pharmacology good than halothane. Isoflurane has minimal effect side. Halothane and Isoflurane are two frequent inhalation agents used as maintenance anesthesia during surgery. After experiencing anesthesia, many patients experience decreased hemodynamic status as pressure, blood, breath, and pulse. For a reason, this security isoflurane is more often used, though eat costs higher. The purpose of the study is to evaluate the difference in hemodynamic status post-anesthesia consequence use of halothane and Isoflurane.

METHOD

The draft study is pre-experimental with approach quasi-experiment pre and post-test with control group design. The sample in the study is patients' surgery aged 16-55 years without systemic disease, deep vital signs, normal limits, results in the inspection of blood routine, and description of blood edge in normal limits. Patients with a disease malignancy who carried out surgery <1 hour or >3 hours and experienced bleeding >20 % and received patient transfusion blood before or when surgery was not entered in a study. As many as 21 respondents in the study recruited using technique accidental sampling. Study this done in room surgery house sick sele be solu city Sorong, on the June- July 2022. Instruments used in the study are a Bedside monitor, Calculator, Stopwatch, and Observation sheet. The observation sheet contains the hemodynamic status patient During surgery. The observation sheet this filled out every 15 minutes. Study this assisted by doctor anesthesia. The Subject Fasted 6 hours before surgery and installed infusion since fasting. They were given premedication with oral diazepam 5 mg in the room 2 hours before surgery. After arriving at the room, the surgery evaluated the first vital signs. Induction anesthesia intravenously with a total of 5 mg/kg BW (solution made new) was injected for more than 30 seconds until awareness and

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reflex hair eye loss and then given drug paralyzing muscle traction 0.5 mg/kg BW and fentanyl 1.5 μ g/kg BW. Ventilation using O₂ and N₂O concentration of 50%:50%, continued then gift inhalation agent halothane or isoflurane concentration 1-1.5 MAC (start counted minute 0). Intubation endotracheal was conducted after the 3rd minute. In the 15th minute, complete the evaluation second vital signs second. Then surgery started, and after 60 minutes of evaluation third vital signs after surgery finished conducted extubation. Room recovery after aware complete (with criteria Aldrete Score) was evaluated fourth vital signs Distribution data analysis frequency respondent containing Age, Type gender, Education, Occupation, Type anesthetics and drugs Anesthesia used. For test differences, use the Wilcoxon and Mann-Whitney tests.

RESULT

Characteristics of respondents will be explained in the study. This covers age, type of gender, education, occupation, gender anesthesia, type of drug anesthesia, and post-vital signs anesthesia. The distribution frequency characteristics respondent study served in Table 1 follows.

Table 1 Distribution frequency characteristics respondents (n=21)

No	Characteristics	n	%
1	Age (years)		
	16-25 years	8	38.1
	26-35 years	4	19
	36-45 years	4	19
	46-55 years	3	14.3
	56-65 years	1	4.8
	>65 years	1	4.8
2	Gender		
	Man	13	61.9
	Woman	8	38.1
3	Education		
	Junior high school	3	14.3
	Senior high school	12	57.1
	University	6	28.6.
4	Profession		
	Not work	9	42.9
	Civil Servant	4	19
	Private	8	38.1
5	Type anesthesia		
	General anesthesia	21	100
6	Drug Anesthesia		
	Halothane	5	23.8
	Isoflurane	16	76.2

Table 1 shows that the respondents in this study were dominated by males aged 16-25 years, with high school education and not working. All respondents who received general Anaesthesia received isoflurane. Analysis bivariate in a study for now hemodynamic status (pressure, blood, pulse, and respiration) post-anesthesia halothane hemodynamic status (pressure, blood, pulse, and respiration) post-anesthesia halothane and isoflurane.

1. Hemodynamic status (pressure blood, pulse, and respiration) beginning and end anesthesia halothane and isoflurane.

Pressure blood

Table 2 Influence pressure blood beginning anesthesia and end anesthesia halothane and isoflurane

No	Type anesthesia	n	Variable	Means	P*
1	Halothane	5	Pressure blood	1.50 0.00	0.157
2	Isoflurane	16	Pressure blood	4.50 0.00	0.007

Table 2 shows that based on the Wilcoxon test, a score of 0.157 significant from level 95% significance ($p < 0.05$) was obtained for pressure blood respondents who got anesthesia halothane. The opposite result was found under pressure blood respondents who got anesthesia isoflurane, i.e., 0.007 more small than level 95% significance ($p < 0.05$).

Table 3 Influence pulse beginning anesthesia and end anesthesia halothane and isoflurane.

No	Type anesthesia	n	Variable	Means	P
1	Halothan	5	Pulse	0.00 0.00	1,000
2	Isoflurane	16	Pulse	1.00 0.00	0.317

Table 3 shows that based on the Wilcoxon test, obtained score significance of 1.000 and 0.317 bigger from level 95% significance ($p < 0.05$) on pulse respondents who got anesthesia halothane and isoflurane.

Respiration

Table 4 Influence respiration beginning anesthesia and end anesthesia halothane and isoflurane.

No	Type anesthesia	n	variable	mean	P
1	Halothan	5	Respiration	0.00 0.00	1,000
2	Isoflurane	16	Respiration	0.00 2.00	0.083

Table 4 shows that based on the Wilcoxon test, obtained score significance of 1,000 and 0,083 were more considerable than level 95% significance ($p < 0.05$) on respiration respondents who got anesthesia halothane and isoflurane. Influence of hemodynamic status (pressure blood, pulse, and respiration) anesthesia halothane and isoflurane.

Table 5 Effect of hemodynamic status (pressure blood, pulse, and respiration) anesthesia halothane and isoflurane.

No	Type anesthesia	n	variable	P
1	Halothan	5	Pressure blood	0.784
	Isoflurane	16		
2	Halothan	5	Pulse	0.576
	Isoflurane	16		
3	Halothan	5	Respiration	0.307
	Isoflurane	16		

Table 5 shows that based on the Mann-Witney test no, there is a difference in change pressure blood, pulse, and respiration in anesthetized respondents who used indicated halothane and isoflurane with through with number significance of 0.784, 0.576, and 0.307 more significant from level significance $p < 0.05$.

DISCUSSION

Research results thus show a difference in pressure blood at first anesthesia and end anesthesia use of Isoflurane. However, no, there is a difference in pulse frequency and breathing. Studies also find no difference in blood pressure, pulse, and respiration at the beginning and end of anesthesia use of Halothane. Research results find no difference in blood pressure, pulse, and respiration after general anesthesia use of Isoflurane and Halothane.

Almost all action surgery was conducted under anesthesia, among them general anesthesia. Consequences influential in a manner cellular, general anesthetic need get attention. Anesthesia general circumstances reversible changes in the physiological status body, which is marked by loss of consciousness (sedation). According to the research on pain (analgesia), loss of memory (amnesia), and relaxation, this patient undergoing general anesthesia generally used Halothane and Isoflurane.

Isoflurane and Halothane are the agents of frequent inhalation used as maintenance anesthesia during surgery besides enflurane. Inhalation with Isoflurane in many Things has affected pharmacology more than Halothane. However, the study finds different things: pressure blood experience decreased at 60 minutes after getting anesthesia isoflurane but not on pulse and breathing. Isoflurane enters the lungs to the blood, influencing the center Settings respiration and heart in the pons and medulla oblongata. It will cause blood to be accommodated inside the heart; however, the heart slows down and affects the pulse's speed. So the pressure heart will increase to fulfil the need network will blood (de Souza Valente, 2022; Klincová et al., 2022).

Research results in this different from (Watanabe et al., 2022) show that Isoflurane has more influence on the enhancement pulse. Besides that, the use of Isoflurane causes tachycardia or enhanced frequency pulse heart, increases pressure in blood arteries, and needs oxygen to increase.

Anesthesia use of Halothane did not show a change in significant vital signs in a study compared with Isoflurane. Several theories support the results study this that is except for Halothane, everyone drug of anesthesia has lower resistance to vascular systemic cause decline pressure blood and produce reflex tachycardia.

During anesthesia with Halothane, resistance vascular systemic no change, and through the stimulation vagus nerve, bradycardia and rhythm node generally happen. Not a drug for anesthesia inhalation, Halothane causes sensitization heart to affect arrhythmogenic from catecholamines and ventricles ectopic

saw (Moen et al., 2022). Catecholamine levels in high circulation could cause tachycardia ventricular or fibrillation ventricles, especially in the circumstances of hypercarbia, which can occur in a breathing patient spontaneously with Halothane.

In many Things rated, Isoflurane is an inhalation agent that has effect more side low; however, in a study, this did not show a significant difference. Anesthesia inhalation with Halothane causes a decline of bulk heart and then causes a decline of an artery caused by the slightest change in prisoner vascular systemic (Amsterdam et al., 2015)

Halothane, in a manner, gradually pushes respiration. There is tachypnea with volumes of sleep reduced and alveolar ventilation. Halothane no creates irritation on the channel breathing and no enhancement secretion of saliva or bronchial, which usually happens. Reflex pharynx and larynx very fast, and not aware (Fröhlich, 2022; Ullal et al., 2022)

This causes bronchodilation, Hypoxia, acidosis, or apnea may develop During deep anesthesia. Halothane reduces blood pressure and often lower pulse. The bigger concentration medicine, the clearer change this happened. Atropine could reverse bradycardia. Halothane also causes widening vessels, skin, and muscles framework (Cirino et al., 2023; Shimizu et al., 2022).

Halothane is an anesthesia inhalation, Induction and recovery are fast, and deep anesthesia could with fast changes. Halothane does not cause the release of catecholamine from shop adrenergic.

Halothane also causes widening vessels' skin and muscles framework. Arrhythmia heart possibly happens During anesthesia Halothane. This includes nodal rhythm, AV dissociation, extrasystole ventricles, and tick heart. Halothane synthesizes system conduction myocardial for action epinephrine and norepinephrine, and their combinations could cause arrhythmia heart severe (Shoroghi et al., 2011).

Halothane increases pressure fluid cerebrospinal. Halothane produces moderate relaxation muscle. Relax muscle is used as an additive to maintain light anesthesia. Halothane adds action relaxant, nondepolarizing, and ganglionic blocking agent. Study this own limitation that is not determining respondents evenly, and Time is too short to study this, so the total respondent still needs to fulfil the standard study experiment.

CONCLUSION

Based on the results study this is what we conclude that not there is the influence of anesthesia halothane to pressure blood, pulse, and respiration; however, there is an influence of isoflurane under pressure blood, and no there is difference in pulse and not their difference change in pressure blood, pulse, and respiration in anesthetized respondents use halothane and isoflurane. We suggest that Need conduct a study continuation of surgeries with longer time against anesthesia with halothane and isoflurane to know if the decline in vital signs occurs due to drug anesthesia or other underlying factors such as preparation surgery.

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