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Hemodynamic Features Of Preloading And Coloading Fluids In Patients Under Spinal Anesthesia At Emanuel Hospital Banjarnegara

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Abstract

Background: *Spinal anesthesia techniques can cause acute vasodilation due to sympathetic nerve blockade, resulting in decreased hemodynamics in spinal anesthesia patients. Central blood volume can be increased to prevent hemodynamic decline by administering fluid preloading and coloading. The aim of this study was to determine the hemodynamic status of preloading and coloading fluids in spinal anesthesia patients at Emanuel Banjarnegara Hospital.*

Method: *The research design used is descriptive with a cross-sectional approach. This research was conducted in May 2023. Samples were taken using a purposive sampling technique as many as 37 respondents who met the inclusion criteria. The instruments used in this study were observation sheets and bedsite monitors. Data processing techniques in this study using univariate analysis.*

Results: *The results showed that the majority of patients in this study experienced normal preloading hemodynamics, blood pressure with 23 (62.2%) respondents, normal pulse for 32 (86.5%) respondents, normal MAP for 31 (83.8%) respondents, normal temperature. 37 (100%) respondents, normal RR 37 (100%) respondents, normal SpO2 37 (100%) respondents. Hemodynamic coloading blood pressure was normal with 25 (67.6%) respondents, normal pulse with 30 (81.1%) respondents, normal MAP with 27 (73%) respondents, normal temperature with 37 (100%) respondents, normal RR with 37 (100%) respondents, normal SpO2 37(100%) respondents.*

Conclusion: *Giving preloading and coloading fluids can maintain hemodynamic status in spinal anesthesia patients at Emanuel Banjarnegara Hospital.*

Keywords: *Coloading, Hemodynamics, Preloading, Spinal anesthesia.*

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INTRODUCTION

Intraoperative hemodynamic disorders are considered the leading cause of morbidity and mortality during surgery. One cause of hemodynamic disorders is a high dose of bupivacaine and a ≥ T5 sensory block level (Siddiqui et al., 2016). The physiological effects caused by intra-spinal anesthesia patients if they continue to experience hemodynamic decline are injuries to the kidneys, heart, and brain.

The use of drugs for induction of anesthesia is a factor that can affect hemodynamic stability. This is because most anesthetic substances work by suppressing sympathetic activity so that heart contractions decrease due to peripheral vasodilation and hypotension, then the body's hemodynamic balance is also disturbed due to the body's hemeosis, which is compensation that occurs in an abnormal state.

According to (Ngabalin et al., 2017) research early complications caused by high blocks of spinal anesthesia are 40.9% hypotension, 13.6% bradycardia, 25.8% shortness of breath, 36.4% nausea vomiting, and 28.8% hypothermy. There have been 28 cases of cardiac arrest from 42,521 patients due to severe hypotension in spinal anesthesia (Purnawan & Sukarja, 2018).

Preloading and coloading fluids can increase central blood volume to prevent hemodynamic decline. Preloading is the administration of fluids before spinal anesthesia, while coloading is the administration of fluids during spinal anesthesia. Fluids are given intravenously because intravenously has the fastest effect compared to other means.

METHODS

This study used a descriptive method. This study design used descriptive observational with a cross sectional approach. The study was conducted in May

2023. Sampling using purposive sampling techniques as many as 37 respondents who entered the inclusion criteria. The instruments used in this study were observation sheets and bedsite monitors. Data processing techniques in this study used univariate analysis.

RESULT AND DISCUSSIONS

Hemodynamic picture in spinal patients 5 minutes after preloading fluid in spinal anesthesia patients at Emanuel Hospital Banjarnegara.

Table 1. Hemodynamic picture 5 minutes after fluid preloading

Hemodynamic	***f***	**%**
Blood pressure		
Hypotension	1	2.7
Normal	23	62.2
Pre Hypertension	13	35.1
Pulse		
Bradycardia	2	5.4
Normal	32	86.5
Tachycardia	3	8.1
Mean arterial pressure		
Hypotension	1	2.7
Normal	31	83.8
High	5	13.5
Temperature		
Normal	37	100
Respiratory rate		
Normal	37	100
SpO2		
Normal	37	100
Total	**37**	**100**

Source : Primary data, 2023

In this study, the results showed that the hemodynamic picture 5 minutes after administering fluid preloading in patients with spinal anesthesia was the most common, namely with the normal blood pressure category of 23 (62.2%) respondents, who experienced a normal pulse rate of 32 (86.5%) respondents,31 (83.8%) respondents had normal MAP status, 37 (100%) respondents had normal temperature and respiratory rate (RR) status and 37 (100%) respondents had normal SpO2 status.

Hemodynamic picture in spinal patients 5 minutes after coloading fluid in spinal anesthesia patients at Emanuel Hospital Banjarnegara.

Table 2. Hemodynamic picture 5 minutes after fluid coloading

Hemodynamic	***F***	**%**
Blood pressure		
Hypotension	8	21.6
Normal	25	67.6
Pre Hypertension	4	10.8
Pulse		
Bradycardia	5	13.5
Normal	30	81.1
Tachycardia	2	5.4
Mean arterial pressure		
Hypotension	8	21.6
Normal	27	73.0
High	2	5.4
Temperature		
Normal	37	100
Respiratory rate		
Normal	37	100
SpO2		
Normal	37	100
Total	**37**	**100**

Source : Primary data, 2023

The results of the study provide information that the hemodynamic picture 5 minutes after administration of fluid coloading is mostly 25 (67.6%) respondents who experience normal blood pressure, 30 (81.1%) respondents who experience normal MAP status 27 (73.0%) respondents had normal temperature and respiratory rate (RR) 37 (100%) respondents and 37 (100%) had normal SpO2 status.

DISCUSSION

Hemodynamic picture in spinal patients 5 minutes after administering fluid preloading in spinal anesthesia patients in the hospital Emanuel Banjarnegara

Description of blood pressure Pressure given preloading

The results of this study showed that blood pressure 5 minutes after administering fluid preloading in patients with spinal anesthesia who experienced normal blood pressure status was 23 (62.2%) respondents. The results of this study

are in accordance with the research of (Ansyori & Rihiantoro, 2016) at A. Yani Metro Hospital which showed that blood pressure preloading did not experience hypotension as many as 26 (86.7%) respondents.

Giving these fluids rationally is to increase circulating blood volume in order to compensate for decreased peripheral resistanc. This theory is reinforced by research put forward by (Ansyori & Rihiantoro, 2016) where the administration of fluid preloading has a high level of effectiveness for hemodynamic stability.

Description of pulse given preloading

The results of this study indicate that the pulse 5 minutes after administration of fluid preloading in patients with spinal anesthesia most of the respondents experienced normal pulse status as many as 32 (86.5%) respondents. The results of this study are in line with research conducted by Arlin (2021) at Anutapura Hospital in Palu, showing that 35 (77.8%) respondents had normal blood pressure.

The results of this study are in line with research conducted by (Darah & Spinal, 2023)whose research results stated that the pulse frequency of patients with spinal anesthesia. In general, stimuli that increase heart rate also increase blood pressure, while those that decrease heart rate also decrease blood pressure.

Description of Mean arterial pressure given preloading

The results of the study showed that the MAP image 5 minutes after administration of fluid preloading in patients with spinal anesthesia as many as 31 (83.8%) respondents who experienced normal MAP status. The results of this research are in line with research conducted by Triana et al. (2022) at Pasar Rebo Hospital, East Jakarta, showed that MAP was normal for 97 (88.2%) respondents.

The results of MAP measurements in this study were in the normal category because the respondent's blood pressure did not experience hypotension when the measurements were taken. MAP measurements are obtained from the results of blood pressure measurements. MAP measurement can describe systolic blood pressure and diastolic blood pressure.

Description of temperature Pressure given preloading

The results of the study showed that the temperature 5 minutes after administering fluid preloading in patients with spinal anesthesia who had a normal temperature was 37 (100%). This research is in accordance with research conducted by Putu (2022) at Sanjiawi Hospital, Gianyar, showing that the temperature was normal for 82 (82%) respondents.

Patients who have a normal body temperature in the initial minutes are because the patient has not been exposed to the cold temperature of the operating room, so there is no heat loss mechanism through convection. Changes in the patient's body temperature must be continuously monitored throughout the operation, except for short operations. Body changes in spinal anesthesia patients occur due to the effects of anesthetic drugs, exposure to room temperature, fluid intake, amount of bleeding and duration of surgery.

Description of respiratory rate (RR) given preloading

The results of this study indicate that the RR image 5 minutes after administration of fluid preloading in patients with spinal anesthesia who experienced normal RR status was 37 respondents (100%). The results of this study are in line with research conducted by Trengginas (2014) which showed that a comparison of changes in respiratory rate did not show a significant difference

between the bupivacaine and bupivacaine-fentanyl groups in all measurement variables did not significantly affect changes in respiratory rate.

The effect after administration of spinal anesthesia is that the majority of breathing has decreased, but from the values obtained, the patient's RR is categorized as normal, which means that they do not experience any respiratory disorders. as revealed by Tobias & Marc., (2011), where the decrease in RR value is caused by a reaction between the fentanyl receptors and the respiratory nerves in the medulla and pons which reduces the frequency regulation performance of breathing.

Description of oxygen saturation preloading administration

The results of this study indicate that the description of oxygen saturation 5 minutes after administration of preloading fluids in patients with spinal anesthesia who experienced normal oxygen saturation was 37 respondents (100%). The results of this study are in line with research conducted by Fadlilah (2020) at the Mangusada Hospital in Bandung, which showed that 81 (67.5%) respondents had normal oxygen saturation.

The oxygen saturation experienced by patients after administering spinal anesthesia on average decreases within normal limits. There is a decrease in the total oxygen saturation value due to the low oxygen partial pressure, where most of the hemoglobin is deoxygenated, namely the process of distributing oxygenated blood from the arteries to the body's tissues is lacking.

Hemodynamic picture in spinal patients 5 minutes after administering fluid co- loading in spinal anesthesia patients in the hospital Emanuel Banjarnegara

Description of blood pressure given coloading

The results of this study showed that the description of blood pressure 5 minutes after administration of fluid coloading in patients with spinal anesthesia as many as 25 respondents (67.6%) respondents who experienced normal blood pressure status. These results are in line with research conducted by Arlin (2021) at the Anutapura Hospital in Palu, which showed that 31 (68.9%) respondents had normal blood pressure.

The results of this study are in line with a study conducted by (fikran et al., 2016) with the title Comparison of the effects of giving crystalloid fluids before spinal anesthesia (preload) and immediately after spinal anesthesia (coload) on the incidence of maternal hypotension in cesarean section which shows that giving ringerfundin fluid in coload has a better effect on preventing a decrease in blood pressure compared to preload in cesarean section.

Description of the pulse given coloading

The results showed that the picture of the pulse 5 minutes after administration of fluid coloading in patients with spinal anesthesia as many as 30 (81.1%) respondents who experienced a normal pulse status. Arlin (2021) at Anutapura Hospital, Palu, showed that 39 (86.7%) respondents had a normal pulse.

Pulse frequency can be affected by blood pressure and anxiety levels. According to Ganong (2012) in general, stimuli that increase the pulse also increase blood pressure while those that decrease the pulse also reduce blood pressure.

Description of Mean Arterial Pressure given coloading

The results showed that the MAP image 5 minutes after administration of fluid coloading in patients with spinal anesthesia as many as 27 (73.0%) respondents who experienced normal MAP status. The results of this study are in line with research conducted by (Bakar, 2022) at RSAD TK. II Udayana shows that the normal MAP is 55 (79.7%) of respondents. Changes in MAP can be affected by blood pressure, if there is a decrease in blood pressure resulting in hypotension, it will result in a decrease in the respondent's MAP.

This change in MAP is also in line with a study conducted by Robert H. Sirait, Bellatania Yuda (2017) which showed the results of a study of the Mean Arterial Pressure (MAP) of cesarean section patients at UKI General Hospital in primiparas, many of whom increased and many of the multiparas decreased their MAP.

Description of temperature given coloading

The results of this study showed that the temperature 5 minutes after administering fluid coloading in patients with spinal anesthesia who experienced normal temperature status was 37 (100%) respondents. The results of this research are in line with research conducted by Tri et al (2022) at RSUD dr. Abdul Aziza Singkawang West Kalimantan indicated that the temperature was normal for 50 (93.7%) respondents.

Factors that can influence changes in body temperature thermoregulation in the operating room include operating room temperature, size of the surgical wound, fluids, age, anesthesia, and duration of surgery, so it is necessary to know perioperative temperature management. Body temperature disturbances due to spinal anesthesia are influenced by anesthetic drugs which affect the thermoregulatory elements which consist of efferent input elements, besides that they can also eliminate the adaptation process and disrupt the physiological mechanisms of the skin in thermoregulatory function, namely shifting the threshold for the response process of vasoconstriction, shivering, vasodilation and sweating.

Description of respiratory rate (RR) given coloading

The results of this study showed that RR images 5 minutes after administering fluid coloading in patients with spinal anesthesia who experienced normal RR status were 37 (100%) respondents. The results of this research are in line with research conducted by Putri Ayu (2022) at RSU Kertha Usada Singaraja which showed that the RR was normal for 95 (96.9%) respondents.

When carrying out spinal anesthesia, sufficient oxygen in the blood is absolutely taken into account so that factors that affect oxygen saturation really need to be taken into account. Anesthesia procedures, especially inhalation general anesthesia, have a significant risk of experiencing desaturation.

Description of oxygen saturation given coloading

The results of this study showed that the picture of oxygen saturation 5 minutes after administering fluid coloading in patients with spinal anesthesia who experienced normal SpO2 status was 37 (100%) respondents. The results of this research are in line with research conducted by Putri Ayu (2022) at RSU Kertha Usada Singaraja which showed that oxygen saturation was normal for 98 (100%) respondents.

Spinal anesthesia patients do not experience a decrease in oxygen saturation because there is no height of the spinal block. When carrying out spinal anesthesia, sufficient oxygen in the blood is absolutely taken into account so that factors that

affect oxygen saturation really need to be taken into account. Anesthesia procedures, especially inhalation general anesthesia, have a significant risk of experiencing desaturation.

CONCLUSIONS

Based on the results of data analysis, it can be concluded that the hemodynamic picture of fluid preloading in patients with spinal anesthesia at Emanuel Banjarnegara Hospital shows that the blood pressure results after preloading were 23 respondents who experienced normal blood pressure status, the pulse status of 32 respondents who experienced pulse rate status. normal, as many as 31 respondents experienced normal MAP status, as many as 37 respondents experienced normal temperature and RR status and as many as 37 respondents experienced normal SpO2.

Based on the results of data analysis, it can be concluded that the hemodynamic picture of administering fluid coloading to patients with spinal anesthesia at Emanuel Banjarnegara Hospital shows the results of 25 respondents experiencing normal blood pressure status, 30 respondents experiencing normal pulse status, 27 respondents experiencing normal blood pressure status. experienced normal MAP status, as many as 37 experienced normal temperature and RR status, as many as 37 respondents experienced normal SpO2 status.

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