

Descriptive Analysis of Blood Pressure Changes Before and After Spinal Anesthesia in Patients with Respiratory System Comorbidities at Khidmad Sehat Afiat Regional General Hospital in 2023

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ABSTRACT

Surgery using the Sectio caesarea (C-section) method is frequently performed on pregnant women, especially in Indonesia. Therefore, the Obstetric Anesthesia Guidelines recommend the use of spinal/epidural anesthesia techniques over general anesthesia for most C-section cases. However, this anesthesia procedure can induce changes in hemodynamic parameters, such as a decrease in blood pressure. To determine blood pressure changes before and after spinal anesthesia in patients undergoing C-section at RSUD Depok. This study is a qualitative descriptive case study using case analysis and cross-case analysis methods. Data collection was conducted using observation sheets as research instruments. Participants in this study consisted of two patients undergoing the C-section procedure. Findings from the study indicate that before the administration of spinal anesthesia, systolic blood pressure, diastolic blood pressure, and MAP were within the normal range. However, after spinal anesthesia administration, there was a decrease in systolic blood pressure, diastolic blood pressure, and MAP between the fifth and tenth minutes. This is associated with the onset time of the spinal anesthesia drug, which typically occurs within five to ten minutes after administration, and the typical effect of reducing blood pressure of the drug, especially in patients undergoing C-section at RSUD Depok. A decrease in blood pressure occurs after the administration of bupivacaine-type spinal anesthesia drug, with a dose of 0.5% bunascan 20 mg.

Keywords: *Sectio Caesarea, Spinal Anesthesia, Systolic Blood Pressure, Diastolic Blood Pressure, Mean Arterial Pressure (MAP)*

1. INTRODUCTION

With increasingly advanced technology, developments in the health sector have also progressed. Apart from the normal delivery process, there are also other situations that require medical intervention, such as a cesarean section (CS) operation, which is performed when complications occur during pregnancy. CS is now a common surgical procedure performed on pregnant women, especially in Indonesia. Data from the 2013 Riskesdas shows that as many as 19.9% of births were via CS. Requests from pregnant women are also one of the main factors influencing the decision to perform a CS.

According to the standards set by the World Health Organization (WHO), the rate of caesarean section (CS) delivery in a country should be between 5-10% per 1,000 births. In government hospitals, the percentage is around 11%, while in private hospitals it can reach more than 30%. In Indonesia, especially in government hospitals, around 20-25% of the total number of deliveries are carried out through CS, while in private hospitals the figure is higher, ranging from 30-80%. In Java and Bali, deliveries through CS reach around 9-13% of the total deliveries.

Obstetric Anesthesia Guidelines recommend the use of spinal or epidural anesthesia techniques rather than general anesthesia for most CS cases. The main reason behind this recommendation is to reduce the risk of failed endotracheal intubation and possible aspiration that can occur with general anesthesia. This regional anesthesia technique is considered an appropriate

method for use in pregnant women because of its practicality, rapid onset, and allowing the mother to remain awake during the birth process. However, one of the complications that often occurs with anesthesia.

Research question: How is the variability of blood pressure before and after spinal anesthesia in patients undergoing CS procedures at Depok Regional Hospital?

2. METHODS

This study is a qualitative descriptive case study using case analysis and cross-case analysis methods. Data collection was carried out using observation sheets as a research tool. Participants in this study consisted of two patients who underwent a sectio caesarea procedure.

3. RESULT AND DISCUSSION

The results showed that before spinal anesthesia was given, the MAP value of CS patients remained stable in. This is because before the operation began, the hemodynamic values of CS patients were re-checked in their room, so that when they were transferred to the operating room, their MAP values remained within normal limits. While in the operating room, both participants were given ondansetron 4 mg (IV) as an anti-nausea and vomiting drug. After 5 minutes, changes occurred in the MAP value, but remained within the normal range. The first participant had a decreased MAP value, while in the second participant, the MAP value changed. The results showed that giving ondansetron before spinal anesthesia in cesarean section patients can reduce vasodilation and the incidence of decreased blood pressure when spinal anesthesia is given.

The first individual, at 15:50 WIB, was given spinal anesthesia using Bupivacaine 0.5% 20 mg. The patient was positioned on his left side, and the spinal anesthetic drug was injected into the lumbar 3-4 without barbotage. No adjuvant drugs such as fentanyl or morphine were given. Five to ten minutes after the drug was given, the patient's blood pressure decreased to 92/48 mmHg at 16:00 WIB. Therefore, the patient was given ephedrine 10 mg (IV) to increase blood pressure. Five minutes later, at 16:05 WIB, blood pressure began to increase to 96/50 mmHg. Furthermore, the patient received two ampoules of oxytocin (20 IU) through a three-way infusion to stimulate uterine contractions. Blood pressure began to stabilize after 20 minutes, namely at 16:25 WIB, with blood pressure reaching 112/68 mmHg. During the operation, the patient was given analgesic drip with two ampoules of tramadol (100 mg) + two ampoules of ketorolac (60 mg) in a 500 ml RL infusion (20 drops per minute) using a blood set. Two ampoules of oxytocin drip 20 IU were also prepared and installed directly with a three-way during the operation. The operation was completed at 16.45 WIB with blood pressure reaching 120/80 mmHg.

Meanwhile, the second individual, at 15:10 WIB, was given spinal anesthesia using Bupivacaine 0.5% 20 mg. The patient was positioned on his left side, and spinal anesthesia was injected into the lumbar 3-4 without barbotage. No adjuvant drugs such as fentanyl or morphine were given. Five to ten minutes after the drug was given, the patient's blood pressure decreased to 94/40 mmHg at 15:20 WIB. Therefore, the patient was given ephedrine 10 mg (IV) to increase blood pressure. Five minutes later, at 15:25 WIB, blood pressure increased to 98/45 mmHg. Then, the patient received two ampoules of oxytocin (20 IU) through a three-way infusion to stimulate uterine contractions. Blood pressure began to stabilize after 10 minutes, namely at 15:35 WIB, with blood pressure reaching 122/69 mmHg. The patient was also given analgesic drip with two ampoules of tramadol (100 mg) + two ampoules of ketorolac (60 mg) in a 500 ml RL infusion (20 drops per minute) using a blood set. Two ampoules of 20 IU oxytocin drip were also prepared and installed directly with a three-way during the operation. The operation was completed at 16.05 WIB with blood pressure reaching 118/68 mmHg.

The results of the study showed that when each participant received spinal anesthetic drug Bupivacaine, namely bunascan 0.5% 20 mg and the injection was done at lumbar 3-4 without

barbotage, there was no administration of adjuvants such as fentanyl or morphine. After five to ten minutes of drug administration, systolic and diastolic blood pressure decreased from the initial value. The first participant experienced a decrease in systolic blood pressure and diastolic blood pressure, while the second participant experienced a decrease in systolic blood pressure and diastolic blood pressure. This is related to the onset time of action of spinal anesthetic drug Bupivacaine, which ranges from five to ten minutes. Therefore, each participant was given vasopressor drug ephedrine 10 mg (IV) to increase blood pressure. After five minutes of vasopressor drug administration, systolic and diastolic blood pressure of each participant began to increase. In the first participant, blood pressure began to increase, while in the second participant, blood pressure also increased [5].

The results of the study showed that after spinal anesthesia, there was a decrease in the level of sensory distribution (SRD) in all patients. The highest percentage of SRD reduction reached 18.18%. Meanwhile, the highest percentage of motor distribution level (SRD) reduction reached 11.11%. There were three patients who did not experience a decrease in SRD after spinal anesthesia.[1].

At 15:50, the first participant was given spinal anesthesia using Bupivacaine, 0.5% bunascan as much as 20 mg. The patient was positioned on the left side, then the drug was injected into the lumbar 3-4 without barbotage. There were no additional drugs such as fentanyl or morphine. Five to ten minutes after the administration of the drug, the Mean Arterial Pressure (MAP) value dropped to 63 mmHg at 16:00. To increase blood pressure, the patient was given ephedrine 10 mg (IV). Five minutes later, at 16:05, blood pressure and MAP began to rise to 66 mmHg. Furthermore, the patient was given two ampoules of oxytocin (20 IU) through a three-way infusion to stimulate uterine contractions. MAP began to stabilize after 20 minutes, namely at 16:25, with a value of 76 mmHg. During the operation, the patient received analgesic drip with two ampoules of tramadol (100 mg) + two ampoules of ketorolac (60 mg) in a 500 ml RL infusion (20 drops per minute) using a blood set. Two ampoules of oxytocin drip 20 IU were also prepared and immediately installed with a three-way during the operation. The operation was completed at 16.45 with a MAP of 76 mmHg.

Meanwhile, the second participant, at 15.10, was given spinal anesthesia using Bupivacaine, with a dose of 0.5% 20 mg. The patient was placed in a left lateral position, then spinal anesthesia was injected into the lumbar 3-4 without barbotage. No additional drugs such as fentanyl or morphine were given. Five to ten minutes after the drug was given, the value decreased to 54 mmHg at 15.20. To increase blood pressure, the patient's Mean Arterial Pressure (MAP) was given ephedrine 10 mg (IV). Five minutes later, at 15.25, the MAP value increased to 57 mmHg. Furthermore, the patient was given two ampoules of oxytocin (20 IU) through a three-way infusion to stimulate uterine contractions. The MAP value began to stabilize after 10 minutes, namely at 16.35, with a value of 84 mmHg. The patient was also given analgesic drip using two ampoules of tramadol (100 mg) + two ampoules of ketorolac (60 mg) in a 500 ml RL infusion (20 drops per minute) using a blood set. Two ampoules of oxytocin drip 20 IU were also prepared and immediately installed with a three-way during surgery. The surgery was completed at 16.05 with a MAP value of 80 mmHg.

Based on the results of these observations, there are several factors that can affect the decrease in blood pressure during spinal anesthesia. These factors include the dose of local anesthetic bupivacaine, the location of spinal anesthesia injection, the duration of spinal anesthesia injection, age, gender, weight, height, patient position during spinal anesthesia procedures, changes in uterine position with pressure to the left using a hip pillow, and the high level of anesthetic blockade. Although age is a risk factor for hypotension during spinal anesthesia, the decrease in blood pressure in younger patients tends to be milder than in older patients. This may be related to the decrease in cardiac output with increasing age, with the incidence of hypotension tending to increase progressively after the age of 50 years.[2].

This reflects the view that various factors influence spinal anesthesia technique, including the amount of drug administered. Scientific literature and articles suggest that the optimal dose of bupivacaine for spinal anesthesia is between 12 and 15 mg, with onset of effect occurring within five

to ten minutes, and duration of effect of approximately 90 to 120 minutes. However, research findings are mixed in establishing the most appropriate dose of bupivacaine, with variations ranging from 5 to 20 mg. The lower dose approach aims to reduce the likelihood of hypotension.[3].

CONCLUSION

The use of hyperbaric bupivacaine doses can be adjusted to the characteristics of the individual patient's weight and height. Other findings in the study also indicated that injecting 10 mg of hyperbaric bupivacaine in a slower manner, either for 60 seconds or 120 seconds, can reduce the possibility of hypotension and its side effects during spinal anesthesia procedures in cesarean section operations.[4]. The administration of adjuncts such as bicarbonate, epinephrine, and opioids may have an impact on several aspects of the anesthetic procedure, such as the time of onset of drug effects, the quality and duration of the block, but do not affect the distribution of anesthetic drugs in the epidural space or the level of spinal block. However, the administration of these adjuncts may contribute to hemodynamic changes in the patient.

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