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THE RELATIONSHIP BETWEEN SITTING POSITION AND HYPOTENSION DURING SPINAL ANESTHESIA INDUCTION IN CESAREAN SECTION PATIENTS WITH CARDIOVASCULAR PROBLEMS

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ABSTRACT
Hypotension in patients undergoing cesarean section is a dangerous medical condition during surgery. Appropriate treatment must be provided starting from pre-anesthesia planning. The patient's position during spinal anesthesia induction is the first step to successful anesthesia, so it is important to monitor it closely during the pre-, intra-, and post-anesthesia phases. The purpose of this study was to determine the relationship between sitting position and the incidence of hypotension during spinal anesthesia induction in cesarean section patients at Kasih Ibu Hospital in Denpasar. This study used a correlational analytical approach with a cross-sectional design. The sample in this study consisted of 80 respondents selected using non-probability sampling with consecutive sampling. Data were collected using observation sheets and analyzed using the Chi-Square test. This study found that there was a relationship between sitting position and changes in blood pressure during spinal anesthesia induction, with a p-value of < 0.001.

Keywords: cesarean section; hypotension; spinal anesthesia

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INTRODUCTION

Anesthesia services are part of hospital healthcare services that include pre-anesthesia evaluation, intra-anesthesia monitoring during surgery, and post-anesthesia evaluation to ensure optimal patient recovery. In carrying out these three processes, an important indicator that must always be closely monitored is vital signs, which include hemodynamic indicators such as blood pressure, pulse rate, and oxygen saturation (Nagelhout & Plaus, 2014). Various types of anesthesia techniques are currently available, one of which is regional anesthesia.

Regional anesthesia is a new branch of anesthesiology that is still being developed today, ranging from neuraxial anesthesia to peripheral nerve blocks (Mangku & Senapathi, 2018). Regional anesthesia is performed by injecting local anesthesia into the subarachnoid space in the vertebral region at the level of L2-L3 or L3-L4 with the aim of achieving analgesia according to specific dermatomes and skeletal muscle relaxation (Rehatta et al., 2019). Spinal anesthesia can still keep the patient conscious, resulting in a faster recovery period and allowing for rapid mobilization. However, spinal anesthesia can cause hemodynamic changes that decrease peripheral vascular tone and increase the risk of hypotension (Saputri et al., 2019).

Cesarean section is a procedure that has been increasing every year. The rate of cesarean section in 12 teaching hospitals in Indonesia ranges from 2.1% to 11.8%, while one teaching hospital in Bali showed a cesarean section rate over the last ten years ranging from 8.06% to 20.23%, with an annual average of 13.6% (Tanambel et al., 2017). RSU Kasih Ibu Denpasar is a hospital that provides cesarean section services with a significant number of cases.

Regardless of the indications, cesarean section is an option for patients who want to minimize pain during childbirth while remaining conscious (Hafiduddin & Surakarta, 2022).

Spinal anesthesia techniques, while having advantages, also have disadvantages and complications, including the potential to cause back pain, spinal anesthesia failure, and post-dural puncture headache, which are complications of regional anesthesia found in some patients (Rehatta et al., 2019). Based on data collected in the operating room of Jombang General Hospital from October to November 2021, 70% of patients who underwent cesarean section with spinal anesthesia experienced hypotension (Hafiduddin & Surakarta, 2022). The results of a study conducted at Dr. Mohamad Husain Palembang General Hospital on the relationship between general anesthesia and spinal anesthesia techniques and the incidence of hypotension showed a decrease in MAP >20% from the blood pressure before anesthesia was administered, namely 40% for the spinal anesthesia technique and 22% for the general anesthesia technique, while a 38% decrease in MAP occurred below <20% for both the spinal and general techniques.

Hypotension due to spinal anesthesia is a serious problem in cesarean section surgery with a fairly high incidence rate. According to research by Lahida (2014), hypotension is a serious problem that occurs after spinal anesthesia in cesarean section surgery with a reported incidence rate of almost 83%. The process of hypotension is related to the high level of spinal blockade, while the incidence of hypotension after spinal anesthesia in cesarean section patients is influenced by several risk factors, namely age, height and weight, Body Mass Index (BMI), left-tilted uterus position, prehydration fluids, spinal anesthesia puncture site, spinal anesthesia block height, use of ephedrine as a vasopressor, and spinal anesthesia position (Rustini et al., 2016).

The position during spinal anesthesia can be performed in two ways, namely the sitting position and the lateral position. The sitting position is the most commonly used position. The sitting position is performed by bending a pillow or placing the elbow on the thigh while flexing the spine (Rehatta et al., 2019). In patients undergoing cesarean section in the sitting position, there is an advantage in that the midline of the spine is easier to identify, especially in obese patients. The sitting position is not suitable for sedated patients and may cause vasovagal syncope.

The anesthesia team needs to be knowledgeable and equipped with the skills to provide comprehensive anesthesia services, especially pre-anesthesia management, which requires attention and quick action to anticipate hypotension during surgery (Rehatta et al., 2019). So far, researchers have not found any studies that examine the relationship between the sitting position and the occurrence of hypotension during spinal anesthesia induction in cesarean section patients with cardiovascular problems. Based on the above explanation, the research question in this study is related to the relationship between the sitting position and the occurrence of hypotension during spinal anesthesia induction in cesarean section patients with cardiovascular problems at Kasih Ibu Hospital in Denpasar.

METHOD

This study is a quantitative study using a correlational analytical research design with a cross-sectional approach. The data collection method used in this study was an observation sheet. The sample in this study consisted of 80 respondents, who were selected using consecutive sampling. The collected data then underwent a cleaning process to ensure completeness and accuracy. It was then followed by inputting the data into a computer using a coding system. The collected data was then analyzed using the Chi-Square test. This study has obtained ethical approval with Number: 04.0335/KEPITEKES-BALI/IX/2024.

RESULT

Table 1.
General characteristics of respondents (n=80)

characteristics	Parameter	f	%
Age	19-25	17	21,2
	26-35	57	71,3
	36-40	6	7,5
Education	High School	16	20,0
	Diploma	56	70,0
	Bachelor's Degree	8	10,0
Work	Housewife	22	27,5
	Civil Servant/Temporary Employee	46	57,5
	Private Sector Employee	12	15,0
Operational Experience	Never	42	52,5
	Ever	38	47,5

Based on the data in table 1, it can be seen that the majority of respondents were in the 26-35 age range, namely 57 (71.3%). Based on educational level, the majority of respondents had a diploma, namely 56 (70%). In addition, most respondents worked as civil servants/honorary employees, namely 46 (57.5%). Based on surgical experience, 42 (52.5%) respondents had never undergone surgery before. The results of the study show that 37 (46.2%) respondents experienced hypertension prior to spinal anesthesia induction, and 43 (53.8%) respondents had normal blood pressure. This can be seen in the figure below.

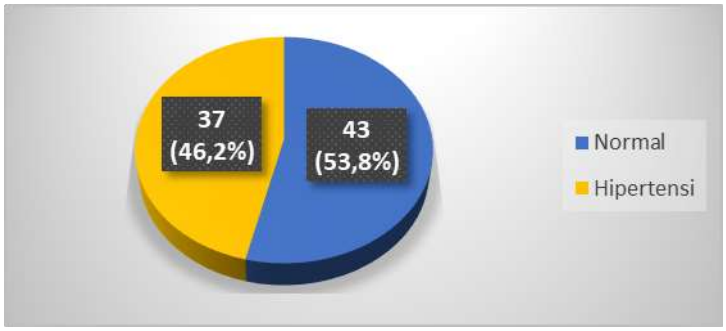

Figure 1. Frequency distribution of blood pressure in respondents prior to spinal anesthesia induction (n=80)

This study shows that 43 (53.8%) respondents experienced hypotension during spinal anesthesia induction, while 37 (46.2%) respondents had normal blood pressure. This can be seen in Figure 2 below.

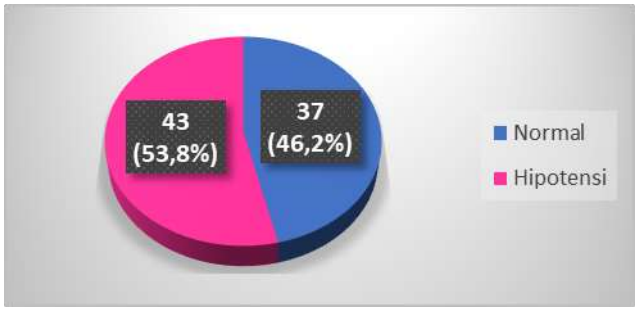

Figure 2. Frequency distribution of respondents' blood pressure during spinal anesthesia induction (n=80)

Based on table 2, the results show that calculations using the Chi-Square test indicate a relationship between sitting position and changes in blood pressure during spinal anesthesia induction. A p-value of < 0.001 was found, which is smaller than α 0.05, so Ho is rejected and Ha is accepted, indicating that there is a relationship between sitting position and changes in blood pressure during spinal anesthesia induction.

Table 2.
Relationship between sitting position and hypotension during spinal anesthesia induction in cesarean section patients with cardiovascular problems (n=80)

Blood Pressure During Induction	Sitting Position		Total f (%)	*p-Value*
	Yes f (%)	No f (%)		
Normal	22 (33,8%)	15 (40,5%)	37 (46,3%)	< 0,001*
Hipotensi	43 (66,2%)	0 (0%)	43 (53,7%)	

DISCUSSION

This study shows that 43 (53.8%) respondents experienced hypotension during spinal anesthesia induction. This indicates that the position during induction is influenced by the injection during spinal anesthesia. The sitting position has disadvantages, namely slower spread of the anesthetic block and a higher risk of hypotension due to pooling of venous blood in the lower extremities (Rehatta et al., 2019). Based on statistical tests using chi-square, the results showed a relationship between the sitting position and changes in blood pressure during spinal anesthesia induction. This indicates that the position given during spinal anesthesia induction has an effect on changes in the patient's blood pressure. According to Obasuyi, et al. (2013), in the sitting position, the anesthetic agent used is more quickly dissolved to the cephalad/upper side of the injection site. Thus, it can be said that in the sitting position, the onset of analgesia and motor blockade is faster. Spinal anesthesia causes sympathectomy, which is exacerbated by gravity that inhibits peripheral blood accumulation, causing significant hypotension in the sitting position.

In spinal anesthesia with a sitting position, hyperbaric bupivacaine remains more under the puncture site, so that when the body is laid down, the anesthetic agent is blocked at a low point, causing low sympathetic blockade and a smaller decrease in vascular resistance, resulting in a smaller decrease in mean blood pressure (Fikran et al., 2016). This is supported by a study conducted by Chandraningrum et al. (2022), which reported 21 cases (35%) of hypotension with spinal anesthesia and 8 cases (13.3%) with general anesthesia.

The use of spinal anesthesia allows the mother to remain awake, but it is associated with sympathetic blockade, which can provoke hypotension and decreased uteroplacental perfusion (Flora et al., 2014). This indicates that the administration of spinal anesthesia itself carries a risk of causing hypotension, supported by other contributing factors, one of which in this study was the sitting position. In spinal anesthesia, acute vasodilation due to sympathetic nervous system blockade increases peripheral vascular capacity, thereby reducing venous return, which is the primary determinant of cardiac output.

CONCLUSION

This study found that most respondents experienced hypotension during spinal anesthesia induction. This was evidenced by the Chi-Square test results, which showed a relationship between sitting position and changes in blood pressure during spinal anesthesia induction, with a p-value of < 0.001. It is hoped that the anesthesia team providing pre-anesthesia care will be able to conduct a thorough pre-anesthesia assessment. Ensure that the patient's medical history is taken, especially for patients with a history of cardiovascular disease. In addition,

provide primary care to prevent conditions that may pose a risk to the patient during intraoperative procedures, such as anticipating hypotension.

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