



## Overview of Changes in Blood Pressure and Pulse in Spinal Anesthesia Sectio Caesarea Patients at Banjarnegara Islamic Hospital

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### CROSS-SECTIONAL DESIGN

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**Background:** Sectio Caesarea is still a frightening problem, but with the development of sophistication in the field of obstetric medicine, this view has begun to shift. Sectio Caesarean delivery is now often the delivery of choice. Hypotension is one of the complications that often occurs after induction of spinal anesthesia. **Purpose:** This study aims to determine changes in blood pressure and pulse spinal anesthesia in sectio caesarea patients at Banjarnegara Islamic Hospital. **Methods:** This study used descriptive quantitative method with cross-sectional approach. This research was conducted in June 2023. The research sample was 44 respondents. The sampling technique was purposive sampling. This research instrument is by observing and recording the results of observations to the research observation sheet and matching observation data with medical records. **Results:** The results of this analysis showed a change in blood pressure and pulse, namely a decrease in blood pressure in the 15th minute on Systolic Blood Pressure as many as 17 people (38.6%) and Diastolic Blood Pressure as many as 15 people (34.1%). The pulse frequency before induction was predominantly normal as many as 36 respondents (81.8%) and when giving spinal anesthesia induction increased at minute 0 as many as 27 people (61.4%). **Conclusion:** blood pressure and pulse have changes when given spinal induction of anesthesia.



Keywords: Blood Pressure, Caesarean Section, Hypotension

#### Introduction:

Sectio Caesarea is still a frightening problem, but with the development of sophistication in the field of obstetric medicine, this view has begun to shift. Sectio Caesarean delivery is now often the delivery of choice (1).

Cesarean delivery rates are increasing worldwide and exceed the 10% to 15% range recommended by the World Health Organization (WHO) to save the lives of mothers and babies. Latin America and the

Caribbean recorded the highest number of caesarean sections at 40.5% followed by Europe (25%), Asia (19.2%) and Africa (7.3%). In Indonesia, based on the results of the 2018 Basic Health Research (Riskesdas), the prevalence of sectio caesarea was 17.6%, the highest in the DKI Jakarta region (31.3%) and the lowest in Papua (6.7%) (2).

Spinal anesthesia is a local anesthetic drug injected into the subarachnoid space in the area between the lumbar spine L2-L3 or

L3-L4 or L4-L5. Spinal anesthesia can give unexpected complications, while the complications of spinal anesthesia are divided into 2 categories, namely major and minor (3).

Spinal anesthesia that reaches a certain block height, successfully achieving a block in certain sympathetic nerves will cause widespread vasodilation and of course there will be significant hemodynamic changes. Complications of spinal anesthesia are generally related to sympathetic nerve blockade, namely hypotension, bradycardia, nausea and vomiting (4).

The incidence of hypotension in SC according to Subhan (2022) in his research obtained an incidence of hypotension of 76.9% (5). Furthermore, Situmeang's research (2022) also discussed the incidence of hypotension by 80% (6).

Research on changes in blood pressure and pulse in spinal anesthesia of cesarean section patients at RSI Banjarnegara has never been done, so research on changes in blood pressure and pulse in spinal anesthesia of cesarean section patients is needed to be a scientific update based on real evidence. Therefore, from the phenomenon and the overall facts above, the researcher is interested in studying further about the description of changes in blood pressure and pulse in spinal anesthesia of cesarean section patients at RSI Banjarnegara.

### **Method:**

This research design uses descriptive quantitative. Quantitative descriptive research method is a method that aims to create a picture or descriptive of a situation objectively using numbers, starting from data collection, interpretation of the data and appearance and results. This study has used a cross-sectional time approach method. Cross-sectional research is a study to study the dynamics of the correlation between risk factors and effects, by means

of approaches, observations, or data collection.

The sampling technique in this study used purposive sampling as many as 44 sectio caesarea patients. Purposive sampling is a sampling technique with inclusion and exclusion criteria. This research instrument uses observation sheets and table formats for measuring blood pressure and pulse. In addition, this study has passed the ethical feasibility test from Harapan Bangsa University Purwokerto with letter number B.LPPM-UHB/1684/04/2023.

### **Study Design**

This analysis uses primary data from the results of observations made to the respondents studied, namely sectio caesarea patients at the Banjarnegara Islamic Hospital and secondary data on research respondent data in the medical record. With inclusion criteria, respondents were sectio caesarea patients with ASA I-II and respondents were willing to become respondents.

This study was conducted by observing monitors on blood pressure and pulse to determine changes in blood pressure and pulse during the respondents in this study.

### **Data Collection and Outcome Measurement**

In this study there are several stages of data collection, namely preparation, explanation, collection, and processing. Data collection was carried out using observation sheets and tabular formats for measuring blood pressure and pulse and then for processing including editing, coding, scoring, processing, and cleaning.

This study focuses on changes in blood pressure and pulse.

### **Statistical analyses**

All statistical analysis in this study used SPSS statistics with Version 23.0; IBM. The data analysis used in this study is

descriptive statistics which aims to analyze data by describing or describing the data that has been collected as it is. The data analysis method used in this study was analyzed using univariate analysis. Descriptive statistics were performed to determine the description of changes in blood pressure and pulse before and after the induction of spinal anesthesia in sectio caesarea patients at RSI Banjarnegara.

**Result**

**Table 1.** Frequency Distribution of Respondent Characteristics

Karakteristik Umum	f	%
<b>Usia</b>		
Remaja Akhir	26	59.1
Dewasa Awal	16	36.4
Dewasa Akhir	2	4.5
<b>Bekerja</b>		
Ya	29	65.9
Tidak	15	34.1

Table 1 provides details of the general characteristics of the majority of sectio caesarea patients aged late adolescence (aged 17-25 years) as many as 26 respondents (59.1%). In the working category, the majority of sectio caesarea patients were working as many as 29 respondents (65.9%).

**Table 2.** Frequency of Systolic and Diastolic Blood Pressure before and after spinal induction

Tekanan Darah	F	%
<b>Sistolik</b>		
Pre Induksi		
Rendah	1	2.3
Normal	15	34.1
Tinggi	28	63.6
Pasca Induksi Menit ke-0		
Penurunan	16	36.4
Stabil	28	63.6
Pasca Induksi Menit ke-5		
Penurunan	11	25.0
Stabil	26	59.1
Kenaikan	7	15.9
Pasca Induksi Menit ke-10		
Penurunan	5	11.4
Stabil	33	75.0
Kenaikan	6	13.6
Pasca Induksi Menit ke-15		
Penurunan	17	38.6
Stabil	21	47.7
Kenaikan	6	13.6
<b>Diastolik</b>		
Pre Induksi		
Rendah	19	43.2
Normal	12	27.3
Tinggi	13	29.5
Pasca Induksi Menit ke-0		
Penurunan	8	18.2

Pasca Induksi Menit ke-5	Stabil	35	79.5
	Kenaikan	1	2.3
	Penurunan	5	11.4
Pasca Induksi Menit ke-10	Stabil	37	84.1
	Kenaikan	2	4.5
	Penurunan	13	29.5
Pasca Induksi Menit ke-15	Stabil	25	56.8
	Kenaikan	6	13.6
	Penurunan	15	34.1
	Stabil	24	54.5
	Kenaikan	5	11.4
	Penurunan	5	11.4

Table 2 presents the results of this study of systolic and diastolic blood pressure in patients before induction of spinal anesthesia. Before induction, systolic blood pressure was mostly in the high group as many as 28 respondents (63.6%) and in the normal group as many as 15 respondents (34.1%). While diastolic blood pressure before induction was prioritized in the low group as many as 19 respondents (43.2%) and high as many as 13 respondents (29.5%). Then for the results of the study after the induction of spinal anesthesia at the 10th minute the most systolic blood pressure in the stable group was 33 respondents (75.0%) and as many as 17 respondents (38.6%) experienced the most decrease in the 15th minute, while in diastolic blood pressure at the 5th minute the most occurred in the stable blood pressure group of 37 respondents (84.1%) while in the most decrease in the 15th minute with a total of 15 respondents (34.1%).

**Table 3.** Frequency distribution of pulse before and after spinal anesthesia induction

Nadi	f	%
Pre Induksi		
Normal	36	81.8
Tinggi	8	18.2
Pasca Induksi Menit ke-0		
Penurunan	9	20.5
Stabil	8	18.1
Kenaikan	27	61.4
Pasca Induksi Menit ke-5		
Penurunan	6	13.6
Stabil	12	27.3
Kenaikan	26	59.1
Pasca Induksi Menit ke-10		
Penurunan	8	18.2
Stabil	7	15.9
Kenaikan	29	65.9
Pasca Induksi Menit ke-15		
Penurunan	7	15.9
Stabil	12	27.3

Table 3 shows a description of the pulse at the time before and after the administration of spinal anesthesia induction, the results of this study the pulse in patients before the administration of spinal anesthesia induction was predominantly in the normal category as many as 36 (81.8%) while for the results after the administration of spinal anesthesia induction the pulse occurred at minute 0 with an increasing category of 27 respondents (61.4%) and the most occurred in the stable group at minute 5 and minute 15 as many as 12 respondents (27.3%).

## Discussion

### Overview of Changes in Blood Pressure and Pulse in Spinal Anesthesia Section Caesarea Patients at Banjarnegara Islamic Hospital

#### 1. Respondent Characteristics

In table 1, 59.1% were in the age group of 17-25 years. According to research Tanambel et,al., shows that the most respondents in the 20-35 year group were 11 respondents (73.3%) (7).

Age 20-35 years is a productive age where at that age a person has high activity so that they are more at risk of experiencing conditions that require surgery (8).

In terms of work in table 1, this study also found that the majority were working as many as 29 respondents (65.9%). In line with research (9) , 154 respondents in the working category out of 295 respondents.

A person, especially a working woman, will have a wide socialization so that mothers will always be able to exchange about their own experiences so that each other get more information than mothers who do not work, so that the mindset of working women can also be broader, especially in dealing with something that happens to them (10).

#### 2. Systolic and Diastolic Blood Pressure before and after induction of spinal anesthesia

In table 2, it was found that systolic and diastolic blood pressure before spinal induction of anesthesia showed that 28 respondents (63.6%) had high systolic blood pressure, while the results of diastolic blood pressure found 19 respondents (43.2%) in the low group. The results of blood pressure after spinal induction on systolic blood pressure as many as 17 respondents (38.6%) and diastolic blood pressure as many as 15 respondents (34.1%) experienced the most decrease at the 15th minute. The decrease in blood pressure occurs because the administration of spinal induction anesthesia blood pressure triggers a decrease in systemic vascular resistance (SVR) and or cardiac output so that it often causes hypotension (11).

The results of this study are in line with the results of research conducted by Ramdan et,al., the results of his research found the incidence of hypotension in systolic and diastolic blood were 50% and 45.5%. In research Sumardi et,al., which found also that the incidence of hypotension as a result of giving spinal anesthesia occurred at the 15th minute with a 20% decrease from the initial blood pressure. (12)(13)

This decrease in blood pressure should be anticipated by anesthesiologists, including anesthesiologist. Continuous blood pressure monitoring needs to be done in cesarean section patients with spinal anesthesia, especially at 0-15 minutes after spinal anesthesia. According to the Standard Operating Procedure of this hospital, vasopressor is administered at the 0th minute to minimize the occurrence of complications due to hypotension.

One of the vasopressor drugs often used in this hospital is ephedrine because it is safe to use, easy to obtain, and often used by anesthesiologists. The effect of ephedrine will not only increase muscle contractility, heart rate, and cardiac output through  $\beta_1$ -receptors, but peripheral vasoconstriction and increased blood pressure also occur through  $\alpha$ -receptor activity (13).

This is in line with research Wijaya et,al., in Bandung which states that continuous administration of ephedrine infusion given after spinal anesthesia is better than colloidal liquid coloadng in preventing hypotension in spinal anesthesia in sectio caesarea patients (14).

### 3. Pulse rate before and after induction of spinal anesthesia

Table 3 shows that the pulse rate before the induction of spinal anesthesia was normal (60-100 beats/minute) as many as 36 respondents (81.8%) and after the induction of spinal anesthesia experienced the most increase at minute 0 as many as 27 respondents (61.4%).

The results of this study are similar to research conducted by Sumardi et,al., on pulse frequency increased in intravenous bolus vasopressor administration compared to continuous infusion vasopressor administration (13)

The heartbeat originates from the heart's specialized conducting system and spreads through this system to all parts of the myocardium. The structures that make up the conducting system are the sinoatrial node (SA node), the diatrial inter-node pathway, the antioventricular node (VA node), the HIS bundle and its branches, and the purkinje system. The SA node is the normal pacemaker, the speed of which determines heart rate frequency. In

general, stimuli that increase heart rate also increase blood pressure, while those that decrease heart rate also decrease blood pressure. But there can be exceptions such as the occurrence of hypotension and tachycardia due to stimulation of atrial stretch receptors. In general, bradycardia is caused by a failure in the generation of impulses by the sinoatrial node (SA Node) or a failure in the delivery (conduction) of impulses from the SA node to the ventricles.

### Limitations and Future Research

At the time of the study, there was less significant intervention on blood pressure and pulse due to the administration of vasopressors. In this study only identified blood pressure and pulse, further research needs to be developed using more varied variables and using different methods.

### Conclusion

Based on the results of the study, 44 respondents had changes in blood pressure and pulse during spinal anesthesia of sectio caesarea patients at RSI Banjarnegara.

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