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INFLUENCE FACTORS OF HYPOTENSION IN PATIENTS WITH SPINAL ANESTHESIA

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ABSTRACT

Background : Post-spinal anesthesia hypotension is the most common incident, approximately 15 - 33% with each spinal anesthetic injection (Mercier et al., 2013). Post – spinal anesthesia hypotension was influenced by several factors, there were sympathetic block nerve height, patient position, Body Mass Index, length of operation, prehydration fluid, location of stabbing, and used of vasopressor

Objective : The aim of study to investigated the factors that most influence of hypotension in patients with spinal anesthesia.

Method : This retrospective study was carried out 80 medical records with purposive sampling at Soeradji Tirtonegoro Hospital Klaten, Center of Java. The data collected includes sympathetic block nerve height, patient position, Body Mass Index, length of operation, prehydration fluid, location of stabbing, and used of vasopressor. Data were analyzed using Chi-Square test and Logistic Regression test.

Result : Incidence of hipotension in patient with spinal anesthesia was 56.25%. Factors influencing hypotension were sympathetic block height (OR = 3.391; 95% CI = 1.121-10.262), BMI (OR = 4,166; 95% CI = 1,625-10,676), prehydrated fluid (OR = 0.339; 95% CI = 0.135 -0,850), location of stabbing (OR = 0,136; CI 95% = 0,016-1,145) and use of vasopressors (OR = 0,303; CI 95% = 0,116-0,789) with $p < 0,05$, while position factors and duration of operation have no effect . The factors that most influenced incidence of hypotension in patients with spinal anesthesia are prehydration fluids with a significance value of 0.002 and Exp (B) 8.221.

Conclusion : Factors that influence the incidence of hypotension in patients with spinal anesthesia were namely sympathetic block height, BMI, prehydration fluid, location of stabbing, and use of vasopressors.

Keywords : *Spinal Anesthesia, Hypotension, Influence Factors*

Introduction

One of the most common complications of acute spinal anesthesia was hypotension.⁴ Post-spinal anesthesia hypotension was the most common occurrence, approximately 15-33% for each spinal anesthesia injection.⁵ Factors influencing incidence of hypotension in spinal anesthesia were a type of local anesthetic drug, the level of sensory block, age, sex, body weight, patient's physical condition, patient position, surgical manipulation and duration of surgery.¹

Hypotension if not treated properly will caused hypoxia of tissues and organs. If this condition worst it will be result in a state of shock or death.¹ Techniques commonly used to hypotension include leg elevation and compression, preloading or coloadng, uterine displacement, reducing the dose of anesthesia and giving vasopressors.³

Based on the results of a preliminary study at RSUP Dr. Soeradji Tirtonegoro was known to average 50 operations with spinal anesthesia patients every month. 60% of patients experience hypotension post spinal anesthesia. The aim of this study was to determine the factors and the most factor that influence hypotension in patients with spinal anesthesia

Methods

This study was a retrospective study. This study was conducted by taking data from the patient's Medical Records of Dr. RSUP Soeradji Tirtonegoro Hospital on March 1, 2019 until April 1, 2019

Sampling by purposive sampling. The sample size was 80 patient medical records. The study was conducted using a checklist sheet. The data were

tested by Chi-Square test and Logistic Regression test

Result

Table 1. Characteristics of respondents

No	Characteristic	Hipotension		Normal		p
		f	%	f	%	
1	Age					
	≥ 45 year old	21	26,3	10	12,5	0,112
	> 45 year old	24	30,0	25	31,3	
Sex						
2	Female	21	26,3	18	22,5	0,822
	Male	24	30	17	21,3	
3	ASA					0,805
	ASA 1	13	16,3	9	11,2	
	ASA 2	32	40,0	26	32,5	

Based on table 1. 80 respondents were mostly in the age group > 45 years both experiencing hypotension or not. Most sexes were male. ASA is the most widely known as ASA II. Both of responden were homogen

Table 2. Incidence of Hipotension after spinal anesthesia

No	Hipotension	f	(%)
1	Hipotension	45	56,25
2	Non Hipotension	35	43,75
Total		80	100

Based on table 2, respondents who experienced hypotension were 45 respondents (56.25%) and those who did not experience hypotension were 35 respondents (43.75%)

Influencing factors of hipotension Based on table 3. Showed that the level of the sympathetic block, BMI, prehydration fluid, location of stabbing, and the use of vasopressors influencing of hypotension in patients post spinal anesthesia (p <0.05)

Table 3. Influencing factors of hipotension

Variable	Hipotension				Total		p	OR
	Yes		No		f	%		
	f	%	f	%	f	%		
Level of Simphatetics block								
Blokade < T4	39	48,75	23	28,75	62	77,5	0,026	3,391
Blokade > T4	6	7,5	12	15	18	22,5		
Patient position								
Sitting position	45	56,25	35	43,75	80	100		
Tilted position	0	0	0	0	0	0		
BMI								
BMI > 23kg/m ²	32	40	13	16,25	45	56,25	0,002	4,166
BMI 18-22,9 kg/m ²	13	16,25	22	27,5	35	43,75		
Duration of operation								
Quickly <60 minute	22	27,5	11	13,75	33	41,25	0,116	2,087
Long >60 minute	23	28,75	24	30	47	58,75		
Prehydration fluid								
Yes	14	17,5	20	25	34	42,5	0,019	0,339
No	31	38,75	15	18,75	46	57,5		
Location of stabbing								
L3-L4	37	46,25	34	42,5	71	88,75	0,036	0,136
L4-L5	8	10	1	1,25	9	11,25		
Used Vasopresor								
Yes	21	26,25	26	32,5	47	58,75	0,013	0,303
No	24	30	9	11,25	33	41,25		

The most factor that influencing hipotension in spinal anesthesia patients

Based on table 4. the most influential factor on the incidence of hipotension in patients with spinal

anesthesia is the prehydration fluid Exp (B) value of 8.222

Table 4. The most factor that influencing hipotension in spinal anesthesia patients

Sub variable	Sig.	Exp(B)
Level of simphatetic block	0,146	0,340
BMI	0,001	0,100
Prehydration fluid	0,002	8,221
Location of stabbing	0,353	2,917
Used vasopresor	0,038	3,136
Constant	0,238	0,537

Discussion

Incidence of hypotension

Incidence of hypotension in patients with spinal anesthesia were 45 respondents (56.25%): Hypotension is a decrease in arterial blood pressure > 20% below the absolute value of systolic blood pressure below 90 mmHg and diastolic below 60 mmHg or MAP below 60 mmHg.⁴ Insiden of hypotension in patients undergoing Cesarean Section with spinal anesthesia was 49%.¹⁴ From the results The incidence of hypotension in spinal anesthesia is still high and often occurs

2. Factors that influence the incidence of hypotension in patients undergoing spinal anesthesia

The level of the sympathetic block an influence on the incidence of hypotension in patients with spinal anesthesia OR : 3.391 ($p = 0.026$) which means that hypotension can occur 3 times more often in patients with level of sympathetic block > T4

Spinal anesthesia that extends to the middle thoracic level results decrease in blood pressure. High spinal anesthesia above thoracic 4-5 causes sympathetic blockade of the fibers that innervate the heart, resulting in a decrease in heart frequency and cardiac contractility resulting in venous return which results in decreased cardiac output.⁷ The ascension rate of an SBL of $\geq T8$ at the 3rd minute after spinal injection is as a predictor of hypotension in parturients¹³

BMI affects the incidence of hypotension in patients with spinal anesthesia. In this study, respondents who experienced hypotension with BMI $> 23 \text{ kg / m}^2$ were 32 respondents (40%) and those who experienced hypotension with BMI $18-22.9 \text{ kg / m}^2$ there were 13 respondents (16.25%). Results OR = 4.116 ($p = 0.002$) indicate that the incidence of hypotension will have a 4 times more frequent chance in patients with a BMI $> 23 \text{ kg / m}^2$. The risk of experiencing hypotension in spinal anesthesia is greater in patients who have a Body Mass Index (BMI) of more than 30 kg / m^2 . At the same BMI patients have a lot of body fat compared to a younger age.²

Prehydration fluids had an influence on the incidence of hypotension. Respondents who experienced hypotension with prehydration were 14 respondents (17.5%) and those who had hypotension were not given prehydration 31 respondents (38.75%) OR :0.339 ($p = 0.019$)

Rational administration of fluid was used to increase the volume of blood circulation in order to compensate for the decrease in peripheral resistance.⁷

13.3% of patients given pre-loading has experience hypotension.⁸

The location of stabbing also affected the incidence of hypotension in patients with spinal anesthesia. Respondents who experienced hypotension with L3-L4 stabbing sites were 37 respondents (46.25%) while with L4-L5 stabbing locations there were 8 respondents (10%) OR : 0.136 ($p = 0.036$).

Vasopressors affect the incidence of hypotension in patients with spinal anesthesia. 21 respondents (26.25%) who were given vasopressors were hypotensive and 24 respondents (30%) were not given vasopressor OR : 0.303 ($p = 0.013$). Vasopressors are an option for treating hypotension, one of which is ephedrine. Ephedrine has a strong beta adrenergic effect and a weaker alpha adrenergic effect. The use of ephedrine will increase cardiac output, heart rate, and systolic and diastolic blood pressure.⁹

The most influential factor on the incidence of hypotension

The factors that most influence the incidence of hypotension in patients with spinal anesthesia was prehydration fluid ($p = 0.002$; Exp (B) 8.222) That is means hypotension will be 8 times more common in patients who are not given prehydration fluids

Prehydration by using crystalloid or colloid fluids has been widely carried out to prevent hypotension in spinal anesthesia.⁷ Prehydration fluids will compensate for blood pooling in venous blood vessels due to sympathetic block so as to prevent hypotension because it has an effect

in increasing cardiac output. The basis for administering the fluid is rationally used to increase the volume of blood circulation in order to compensate for the decrease in peripheral resistance.¹¹

Preloading still causes hypotension. In his study, 14 out of 18 respondents in the preloading group experienced hypotension marked by a decrease in systolic blood pressure of 20% or more than the initial systolic blood pressure.¹¹ Several other studies showed the incidence of hypotension decreased significantly from 71% in patients who were not given preloading to 55 % of patients given preloading¹³

Conclusion

1. The incidence of hypotension in patients with spinal anesthesia was 56.3% ¹
2. Factors influencing the incidence of hypotension in patients with spinal anesthesia were the level of the sympathetic block , BMI, prehydration fluids, location of the stabbing and the use of vasopresor ¹⁵
3. The most influential factor in the incidence of hypotension in patients with spinal anesthesia was prehydration fluid

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