Mean Arterial Pressure of Preloading and Co loading Intravenous Ringer's Lactate in Spinal Anaesthesia: Study in Cut Meutia Hospital, Lhokseumawe

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Abstract: ***Spinal anaesthesia can lead to severe hypotension. One of the most popular and widely used methods to overcome hypotension are administration of ringer's lactate. This study aimed to determine the difference in mean arterial pressure [MAP] between pre-load and co-load 20cc/bodyweight of ringer's lactate in spinal anaesthesia patients in District Hospital of Cut Meutia Lhokseumawe, Aceh. This study was an experimental study of 60 respondents using the consecutive sampling technique and then divided into two groups [n=30]. Measurement of mean arterial pressure [MAP] using digital tension meter was performed before and after spinal anaesthesia and continued every three minutes until fifteen minutes. Data were analysed using independent t test and expressed significantly different if p <0.05. There was no significant difference [p> 0.05] for mean arterial pressure [MAP]between pre-load and co-load administration of 20cc/kg IV of ringer's lactate in spinal anaesthesia patients at District Hospital of Cut Meutia Lhokseumawe, Aceh.***

I. INTRODUCTION

Hypotension is the most common acute physiological complication in spinal anaesthesia, occured due to sympathic dan parasymphatic activity, causing decreased systemic vascular resistence [1,2]. Incidence of hypotension in spinal anaesthesia was estimated 25-75% of general population and higher in pregnant population with cesarean section procedure[1],[3]. Several techniques have been used to prevent this neuraxial hypotension, such as the administration of intravenous fluids to optimize the bloodvolume during sympathectomy, to be administrated before and duringthe administration of spinal anaesthesia, thus named pre-load and co-load. These methodes can prevent hypotension, once then measured as mean arterial pressure. Mean arterial pressure [MAP]is able to measure both systolic and diastolic blood pressure [4].This study aimed to identify the differences of MAP of preload and coload of 20cc/kg intraveous ringer's lactate in post spinal anaesthesia in District Hospital of Cut Meutia Lhokseumawe.

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II. METHODS

A. Design

This study was an experimental study using prospective randomized clinical trial. Inclusion criteria were age between 20-59 years old, ASA I-II, body mass index [BMI] 18.5-22.9 kgm^{-1}, elective scheduled for lower extremities operation procedure, and agree to be included in this study. All patients are administrated using bupivacaine 5% 15 mg, and had spinal anaesthesia. Exclusion criteria were patients with cardiovascular and renal dysfunction, patients with complication during operation and anaesthesia [dyspnea, apnea, loss of consciousness], and pregnant. All subjects parents were informed about the objectives and procedures of the study, and written consents were collected prior to this study.

B. Samples

Consecutive sampling was used in this study. All samples are collected from patients with spinal anaesthesia in District Hospital of Cut Meutia Lhokseumawe. Samples were divided into play pre-load and co-load group.Each group consisted of 30 patients.

C. Data Collection and Measurements

Data collection and measurement was performed from March to May 2018. Primary data was based on mean arterial pressure measured before and after spinal anaesthesia, continued every 3 minutes up to 15 minutes, for each groups [pre-load and co-loadof 20cc/kg intravenous ringer's lactate in post spinal anaesthesia]. Blood pressure was measured using digital sphygmomanometer. Other data such as age, sex, and BMIwere documented.

D. Analysis

Subjects characteristics were presented in tables. p-value less than 0.05 was considered to indicate statistical significance. Data were analysed using statistical software to determine significant differences of MAP.

III. RESULTS

Table 1 summarizes subject characteristics. Most of subjects were male, with average age of 38.8 years, and average BMI of 20.98

Table 1 Characteristic of subjects

Variabel	n [%]	Mean	Median	Standard Deviation	Min	Max
Sex						
Female	23 [38,3]					
Male	37 [61,7]					
Age		38,80	40	13,14	20	58
BMI		20,98	20,8	1,284	19	24

Table 2 show the preload and coload MAP of all subjects post spinal anaesthesia.

Table 2Mean Arterial Pressure of Pre-load and Co-load

Measurement time	Mean [mmHg]	Median [mmHg]	Standar Deviation	Minimum [mm Hg]	Maximum [mm Hg]
Preload MAP					
Preanaesthesia	99,77	97,00	9,141	85	116
0'	95,97	94,50	9,257	79	116
3'	92,60	96,00	10,460	67	118
6'	88,00	88,00	8,971	73	109
9'	88,47	85,50	10,994	67	113
12'	87,73	88,50	10,651	65	108
15'	88,77	87,50	11,193	67	112
Coload MAP					
Preanaesthesia	99,40	100,50	9,705	75	120
0'	98,60	98,00	8,962	82	120
3'	92,53	94,00	10,023	59	112
6'	90,17	89,50	10,685	61	112
9'	87,00	88,00	11,231	59	112
12'	88,37	90,00	11,848	64	121
15'	87,83	90,50	12,597	51	113

Table 3 indicated the mean differences of pre-load and co-load MAP

Table 3Mean Arterial Pressure of Pre-load and Co-load

Variable	Time	*Preoload[mean ± s.d,]*	*Coload [mean ± s.d]*	*p*
TAR	0' PA	95,97 ± 9,257	98,60 ± 8,962	0,268[1]
	3' PA	92,60 ± 10,460	92,53 ± 10,023	0,959[2]
	6' PA	88,00 ± 8,971	90,17 ± 10,685	0,398[1]
	9' PA	88,47 ± 10,994	87,00 ± 11,231	0,611[1]
	12' PA	87,73 ± 10,651	88,37 ± 11,848	0,828[1]
	15' PA	88,77 ± 11,193	87,83 ± 11,193	0,679[2]

[1] = *Independent Sample T Test*

[2] = *Mann-Whitney Test*

PA = *Post Spinal Anesthesia*

$p < 0,05$

IV. DISCUSSION

Statistical analysis used to determine the differences of pre-load and co-load grops showed no significant differences [$p > 0.05$], both for time of 0 minute [$p = 0,489$], 3 minutes [$p = 0,216$], six minutes [$p = 0,193$], 9 minutes [$p = 0,260$], 12 minutes [$p = 0,567$] and 15 minutes [$p = 0,894$.

Ringer's lactate once administrated rapidly increase intrascular volume up to 10%, but can be decreased once the ringer's lactate was stop, since it is only can increase the stroke volume temporary [5]. In this study, the amount of of ringer's lactate was 20 cc/kg and no sudden stop of intravenous administration during the the operation, in order to avoid the reduction of blood pressure so that hypotension was able to be prevented. This study showed similar result in other hospitals [6,7].

The expand of sympathic blockade can be caused by the type of anaesthetic agent, patient himself, and procedure, dose of anaesthetic agent, and patient position. This study used bupivacaine, considered isobaric in 24ºC. The higher the barisity of the agent, causing more chances of hypotension [8]. Hypotension in spinal anaesthesia is related to the neuroaxial bloackade affecting vascular pheripheral resistancei and heart volume. Blockade in mid thoracic or lower thoracic can lead to vasodilation of lower extremities[9].

V. CONCLUSION

There is no significant differences found between pre-load and co-load administration of 20 cc/kg of pre-load and co-load of 20cc/kg intravenous ringer's lactate in post spinal anaesthesiain District Hospital of Cut Meutia Lhokseumawe.

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