COMPARISON OF VARIATIONS OF LOW DOSAGE SPINAL ANESTHESIA ON MOBILIZATION SPEED AFTER CAESAREA SECTIO ERACS METHOD AT HERMINA GENERAL HOSPITAL PURWOKERTO

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Abstract

Enhanced Recovery After Caesarian Surgery, or ERACS, is the development of sectio caesarean delivery techniques that offer preoperative, intraoperative, and postoperative care to hasten patient recovery. The ERACS technique is related to using low-dose spinal anesthesia, which is 3.75–7 mg. The use of low doses in sectio caesarean can help the speed of patient mobilization, which can be measured by achieving a Bromage score. The study aims to compare the effectiveness of giving low-dose spinal anesthesia type bupivacaine 6 mg compared to bupivacaine 7.5 mg on the post-sectio caesarea mobilization speed of the ERACS (Enhanced Recovery After Caesarian Surgery) method at Hermina Purwokerto Hospital. This type of research is observational and analytical with a cross-sectional study approach. The sampling technique used was consecutive sampling, so a study sample of 58 respondents was obtained, which was divided into two groups, namely the bupivacaine dose group of 6 mg and the bupivacaine dose group of 7.5 mg. Results were analyzed using the Mann-Whitney test. The results of statistical tests showed that the bupivacaine group at a dose of 6 mg and the bupivacaine group at a dose of 7.5 mg ($p = 0.534$) did not have a significant difference in effectiveness against the onset of post-sectio caesarean mobilization speed of the ERACS method ($P > 0.05$). This study concludes that there is no difference between the comparison of the effectiveness of administering low-dose spinal anesthesia type bupivacaine 6 mg compared to bupivacaine 7.5 mg on the speed of mobilization after caesarean section using the ERACS (Enhanced Recovery After Caesarian Surgery) method at RSU Hermina Purwokerto. The maximum time achieved for the onset of mobilization after ERACS to achieve a bromage score is in the range of 1 – 2 hours (60 – 120 minutes) with the level of mobilization after caesarean section being a score of 1 and a score of 0.

Keywords: Low-dose spinal anesthesia, ERACS caesarean section, Mobilization onset, Bromage score.

INTRODUCTION

SC (Sectio Caesarean) is one of the operative delivery methods performed when the mother's condition is abnormal, making vaginal delivery difficult. One type of SC method, namely ERACS (Enhanced Recovery After Caesarian Surgery) is a development of SC childbirth procedures that provide perioperative, intraoperative, and postoperative care that many pregnant women choose because it can accelerate the recovery of patient recovery (Tika *et al.*, 2022). The recovery rate of SC postoperative patients can be assessed from the speed of postoperative mobilization, where the ERACS technique allows patients to do early mobilization in 2 hours postoperatively so that in less than 24 hours patients can be discharged (Ratnasari, 2022). While conventional SC techniques require 8 hours postoperatively to carry out early mobilization (Razan and Wijianto, 2021).

Early mobilization is one of the factors that play a role in postoperative wound healing, overcoming pain, and reducing postoperative complications so that patients can carry out activities again (Ningsih and Rahmadhani, 2022). Early mobilization can be done with active or passive Range Of Motion (ROM) exercises, with assessment criteria using Bromage scores (Fitria *et al.*, 2019). If mobilization is delayed, it can cause wound healing to be hampered so that it can cause complications, one type of postoperative complication with high morbidity is infection in the wound after surgery (Nadiya and Mutiara, 2018).

The incidence of post-SC infections at the global level is reported to reach 5-20% and will continue to increase in both developing and developed countries. Mothers who gave birth with the SC method were 5 to 20 times more likely to develop the infection compared to mothers who delivered vaginally, this led to increased length of hospitalization, as well as post-discharge care (Bizuayew *et al.*, 2021). The incidence of post-SC

infection is closely related to the speed of mobilization, where 81.8% of post-SC mothers who do not mobilize early cause slow wound healing resulting in infectious complications (Nadiya and Mutiara, 2018).

The ERACS technique can reduce the incidence of post-SC infection because it has a shorter healing duration so that patients can mobilize early faster. The ERACS technique deals with the selection of the type of anesthesia that is one of the services in intraoperative care. The type of anesthesia used is regional anesthesia of neuraxial spinal type in low doses (Low dose spinal anesthesia) (Tika *et al.*, 2022). Regional anesthesia works by temporarily blocking nerve conduction and pain management in certain areas using local anesthesia drugs without causing loss of consciousness (Kayir and Kisa, 2021). The type of spinal anesthesia used in ERACS is bupivacaine anesthesia with a recommended dose of 12-15 mg, but the use of this dose is related to cases of hypotension, nausea, and vomiting in pregnant women (Ferrarezi *et al.*, 2021). So to reduce the side effects that arise give a low dose of bupivacaine which is about 3.75 – 7 mg (Cenkowski *et al.*, 2019). However, some limit the administration of low doses of bupivacaine to 6 -7 mg (Białowolska *et al.*, 2020). The addition of opioids as analgesics to anesthesia has been shown to have mutually reinforcing effects. Opioids that can be used, namely fentanyl types with morphine, aim to increase the analgesic effect of local anesthesia even with inadequate doses of anesthesia (Białowolska *et al.*, 2020).

The application of the optimal low dose used in the ERACS method is not yet known with certainty, so it is necessary to do a dose comparison to find out the optimal low dose to be used in the ERACS method against the onset of post-SC mobilization.

Based on the description above, it is necessary to conduct research on the administration of low-dose spinal anesthesia at doses of 6 mg and 7.5 mg on the speed of post-SC mobilization. This study used a dose comparison of 6 mg and 7.5 mg based on the dose of anesthesia used by Hermina General Hospital Purwokerto, where 6 mg is the standard for using the lowest dose of ERACS anesthesia, while 7.5 mg is the standard for using the highest dose of ERACS anesthesia used at Hermina General Hospital Purwokerto.

METHOD

This research is a type of quantitative research, namely research using secondary data, which is observational analytic with a cross-sectional study design.

The sample in this study was taken from medical record data of patients after the Caesarea section of the ERACS method for the period October - January 2023 at Hermina General Hospital Purwokerto in January 2023. In selecting samples for the study, the consecutive sampling method was used, where there were criteria for fulfilling the sample, namely respondents who carried out the ERACS method SC operation at Hermina General Hospital Purwokerto for the period October 2022 – January 2023. The total population in this study was 58 respondents, with 29 samples for the use of a dose of 6 mg bupivacaine and 29 samples for the use of a dose of 7.5 mg bupivacaine, where the 2 groups will be compared based on the speed of mobilization based on the time of achievement of the full Bromage score, namely score 1 (knee bending and free movement of the legs) and score 0 (full movement).

In this study, the data were tested using univariate statistical tests in the form of descriptive tests, and bivariate with the Mann-Whitney test and processed using JASP 0.14.1 for Windows.

RESULTS AND DISCUSSION

a. Bupivacaine Group 6 mg

In Table 1, it can be seen the distribution of respondents in the form of time to achieve the full bromage score as a measurement of the speed of mobilization against the bupivacaine dose group 6 mg and bupivacaine dose 7.5 mg. Based on the results in table 1 the bupivacaine group dose of 6 mg has a maximum value of 120.0 minute and a minimum value of 60.0 minute. Average value (M) = 84.82 minute, median value (Me) = 60.0 minute, mode (Mo) = 60.0 minute, and standard deviation (SD) = 30.07.

From table 2, it is known that the bupivacaine dose group of 6 mg from 29 respondents recorded the time obtained to achieve the full bromage score, which was 60 minutes (1 hour) as many as 17 respondents (58.62%), and 120 minutes (2 hours) as many as 12 respondents (41.37%). According to the research of Supriyatin *et al.*, (2022) with the title Bromage and Aldrete Score Achievement in Anesthesia at the Central Surgical Installation of Aji Hospital, it was found that the use of low doses of spinal anesthesia can accelerate mobilization recovery by achieving a full Bromage score of 180 minutes (37.9%) with an average of 183.10 minutes.

Both of these studies show that low-dose administration of bupivacaine can increase the speed of mobilization so that the full bromage score can be achieved in less than 12 hours so that patients can be discharged $\leq$ 24 hours (Ratnasari, 2022).

b. Bupivacaine Group 7.5 mg

As seen in Table 1 in the group bupivacaine dose of 7.5 mg has a maximum value of 120.0 and a minimum value of 60.0. Average value (M) = 88.96, mode value (Mo) = 60.0, media value (Me) = 90.0, and standard deviation (SD) = 27.16. From these data, the value obtained by the bupivacaine group dose of 7.5 mg between the mean, median, and mode has a long-distance value, so the data of the bupivacaine group dose of 7.5 mg is not normally distributed.

From Table 2, it is known that the bupivacaine dose group of 7.5 mg from 29 respondents recorded the time obtained to achieve the full Bromage score, which was 60 minutes (1 hour) as many as 12 respondents (41.37%), 90 minutes (1 hour 30 minutes) as many as 6 respondents (20.69%), and 120 minutes (2 hours) as many as 11 respondents (37.93%). Based on the research of Sulistyawan *et al.*, (2020) about the Comparison of the Outcome of Low Dose Spinal Anesthesia Techniques Compared to Ordinary Doses in Emergency Sectio Caesarea at Dr. Saiful Anwar Hospital, one of the results of a dose of bupivacaine 7.5 mg included in the low dose group was obtained in achieving a Bromage score of 0 having a faster time than the usual dose, which was approximately 125.36 minutes.

These two studies have the same time comparison, which is in 120 minutes in achieving the full bromage score. This is because the use of low doses in spinal anesthesia has a short motor blockade onset so that early mobilization can be faster (Sulistyawan *et al.*, 2020).

c. Age

Based on Table 3, showing the characteristics of respondents based on age, the most respondents were obtained between the 6 mg dose bupivacaine group and the 7.5 mg dose bupivacaine group, namely the age range of 26-30 years where there were 13 respondents, 13 respondents (44.82%) of the 6 mg group, and 15 respondents (51.72%) of the 7.5 mg group.

The productive age according to the Ministry of Health of the Republic of Indonesia (2016) is the age range of 15 – 49 years for WUS / PUS or adults 19 – 44 years, with the increasing age of a person, maturity in thinking will also be better so that they are motivated to make efforts that will have a positive impact and improve one's condition.

d. Weight

Based on Table 4 characteristics of respondents based on body weight from 29 respondents in each bupivacaine group dose 6 mg and bupivacaine group dose 7.5 mg, the most respondents were obtained in the 6 mg group in the weight range of 56 – 65 kg and 66 – 75 kg as many as 11 respondents (37.93%), while the 7.5 mg group in the weight range of 56 – 65 kg as many as 16 respondents (55.17%).

According to the research of Huang *et al.*, (2022) body weight is one of the factors affecting the administration of spinal anesthesia doses administered. However, weight is still an interfering factor, in practice mothers give birth with a high body mass index, and weight does not seem to affect the level of sensory or motor blocks.

e. Height

Based on Table 5 characteristics of respondents based on height from the 6 mg dose bupivacaine group and the 7.5 mg dose bupivacaine group, the most respondents were obtained in each group, namely the range of 150 – 155 cm where there were 13 respondents (44.82%) for the 6 mg group, and 12 respondents (41.37%) for the 7.5 mg group.

A person's height has a relationship with the length of the vertebrae bones. The length of the vertebral column can affect the level of the block and the height of the block of spinal anesthesia administered. The shorter a person's height, the dose of spinal anesthesia given is low, if the dose adjustment of bupivacaine given in a low amount that has been adjusted for height, the level of sensory block is lower so that it can recover to <T8 faster so that a full bromage score will be achieved in a faster time (Huang et al., 2022).

f. Body Mass Index

Based on table 6, characteristics of respondents based on body mass index from the 6 mg dose bupivacaine group and the 7.5 mg dose bupivacaine group, the highest number of respondents were obtained in each group, namely the range 25.00 – 29.99 (51.72%).

According to research by Wang et al., (2018) recommends reducing the dose of spinal anesthesia for pregnant women with high BMI levels, this is related to lower cerebrospinal fluid volume which can affect the distribution of bupivacaine during caesarean section.

g. Comparison of Low Dose Spinal Anesthesia (Bupivacaine Dose 6 mg and Bupivacaine Dose 7.5 mg) With Mobilization Speed (Time to Achievement of Full Bromage Score)

Table 2 shows the results of the bivariate analysis test, where $p = 0.534$ is greater than $\alpha = 0.05$ ($p > 0.05$) which means that there is no significant difference between the time of achievement of the bromage score as the level of mobilization with the comparison of the dose of bupivacaine given, namely between the bupivacaine dose group of 6 mg with the bupivacaine dose group of 7.5 mg. Several factors affect the onset and duration of spinal anesthesia on the speed of mobilization, namely drug concentration, dose of anesthesia administered, lipid solubility, PKa, pH, and protein *binding* (Indradata *et al.*, 2021). It is known that the use of bupivacaine in small doses can accelerate the recovery and mobilization of the patient since the motor block caused by spinal anesthesia with such doses is not very strong. In addition, there are other factors, including the age and weight of the patient.

CONCLUSION

Based on the results of research on the comparison of low-dose spinal anesthesia to the speed of mobilization after caesarean section ERACS (Enhanced Recovery After Caesarian Surgery) method at Hermina General Hospital Purwokerto, the following conclusions were obtained:

1. There is no difference between the ratio of low-dose spinal anesthesia (dose of bupivacaine 7.5 mg with dose of bupivacaine 6 mg) to the speed of mobilization after sectio caesarea ERACS (Enhanced Recovery After Caesarian Surgery) method at Hermina General Hospital Purwokerto.
2. The highest time achievement for the onset of post-ERACS mobilization to achieve a bromage score is in the range of 1 – 2 hours (60 – 120 minutes).
3. The achievement of the full bromage score against the level of mobilization after sectio caesarea is a score of 1 (knee flexion and free movement of the legs) and a score of 0 (full movement).

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Table 1: Distribution of Bupivacaine Dose 6 mg and 7.5 mg Respondents to Achievement of Full Bromage Score Time

	6 mg	7,5 mg
Valid	29 Respondent	29 Respondent
Modus	60 minute	60 minute
Median	60 minute	90 minute
Mean	85 minute	89 minute
Std. Deviation	30 minute	27 minute
P-value Shapiro wilk	<.001	<.001
Minimum	60 minute	60 minute
Maksimum	120 minute	120 minute

Table 1: Distribution of Full Bromage Score Time Achievement Bupivacaine and P-value

Time (Minute)	**6 mg**		**7,5 mg**	
	Frequency	**%**	**Frequency**	**%**
60	17	58.6	12	41.3
90	0	0	6	20.6
120	12	41.3	11	37.9
P-value	0.534		0.534	

The data were presented in the form of values tested with the Mann-Whitney Test, $p<0.05$ expressed as significant

Table 3: Distribution of Characteristics by Age

Age	**6 mg**		**7,5 mg**	
	Frequency	**%**	**Frequency**	**%**
17-20	2	6.897	0	0
21-25	6	20.690	7	24.138
26-30	13	44.828	15	51.724
31-35	6	20.690	3	10.345
36-38	2	6.897	4	13.793

Table 4: Distribution of Characteristics Based on Body Weight

Body Weight	**6 mg**		**7,5 mg**	
	Frequency	**%**	**Frequency**	**%**
47 – 55	5	17.241	0	0
56 - 65	11	37.931	16	55.17
66 - 75	11	37.931	3	10.34
76 - 85	2	6.897	5	17.24
86 - 95	0	0	4	13.79
≥112	0	0	1	3.44

Table 5: Distribution of Characteristics by Body Height

Body Height	**6 mg**		**7,5 mg**	
	Frequency	**%**	**Frequency**	**%**
146 – 150	8	27.586	4	13.793
150 – 155	13	44.828	12	41.379
156 – 160	7	24.138	8	27.586
161 - 165	1	3.448	4	13.793
≥166	0	0	1	3.44

Tabel 6: Distribution of Characteristics by Body Mass Index

BMI	**6 mg**		**7,5 mg**	
	Frequency	**%**	**Frequency**	**%**
18.50 – 24.99	8	27.58	4	13.79
25.00 – 29.99	15	51.72	15	51.72
30.00 – 39.99	6	20.69	9	31.03
≥40.0	0	0	1	3.44