THE EFFECT OF ELECTRIC SAND PILLOWS ON THE SHEVERING LEVEL OF SECTIO CAESARIA SPINAL ANESTHESIA PATIENTS

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THE EFFECT OF ELECTRIC SAND PILLOWS ON THE SHEVERING LEVEL OF SECTIO CAESARIA SPINAL ANESTHESIA PATIENTS

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ABSTRACT

According to WHO, the rate of delivery by sectio caesarea is quite large, which is around 24%-30% of all childbirth processes, for developed countries such as the Netherlands it is around 9-13%. In Indonesia, the percentage is still large, which is more than 50%. Sectio caesaria surgery can cause physiological changes in the body such as a decrease in body temperature. Hypothermia affects several organ systems initially causing an increase in metabolic rate, tachycardia in the cardiovascular system, peripheral vascular resistance, causing shivering. Based on the preliminary study, 195 patients (75%). Shivering if not treated immediately will cause discomfort, shivering can also develop into serious complications. This study aims to determine the effect of an electric sand pillow on the shivering level of sectio caesarea patients after spinal anesthesia at Budhi Asih Hospital, Jakarta in 2021. The research method used is a quasi-experimentalresearch with a two-group pre-test-post-test design. The sample in this study were some pot SC patients at Budhi Asih Hospital as many as 70 people, the sampling technique was purposive sampling. There was a significant difference between before and after giving the electric sand pillow (p=0.000). There is an effect of an electric sand pillow on decreasing the shivering level.

Keywords: Electric Sand Pillow, Shivering, Spinal Anesthesia

Background

According to the World Health Organization (WHO) the rate of delivery by the sectio caesarea method is quite large, around 24% to 30% of all deliveries, while for developed countries such as the Netherlands the percentage of sectio caesarea is small, which is around 9-13%. In Indonesia, the percentage is still large, which is more than 50%, especially in private hospitals. The high incidence of sectio caesarea from year to year in several hospitals throughout Indonesia, through information from the Indonesian Ministry of Health which states that the sectio caesarea rate for teaching or referral hospitals is 20% and private hospitals 15% (Ministry of Health, 2018).

Sectio caesaria is a surgical procedure to give birth to a fetus by opening the abdominal wall and uterine wall. Sectio caesaria can be carried out if the mother cannot give birth through a natural process (vaginal delivery). The operation is carried out with the aim that the safety of the mother and baby can be handled properly. In practice, prior to cesarean section, the patient received spinal or epidural anesthesia for elective surgery or general anesthesia in an emergency (Sarwono, 2018).

Spinal anesthesia is a procedure for administering anesthetic drugs to relieve pain in patients undergoing surgery by injecting local anesthetic drugs into the cerebrospinal fluid in the subarachnoid space. This spinal anesthetic technique is still the choice for cesarean section, abdominal and lower extremity surgery because this technique keeps the patient awake so that the recovery period is faster and can be mobilized more quickly (Marwoto and Primatika, 2013).

In addition to having advantages, spinal anesthesia can cause complications. Complications of spinal anesthesia are divided into 2 categories, namely major and minor. The major complications are local anesthetic drug allergy, transient neurologic syndrome, nerve injury, subarachnoid hemorrhage, subarachnoid hematoma, infection, total spinal anesthesia, respiratory failure, cauda equina syndrome, and other neurological dysfunctions. Minor complications include hypotension, Post Operative Nausea and Vomiting (PONV), post-puncture headache, anxiety, chills, back pain and urinary retention. The high

complication rate results in increased mortality and morbidity. (Hayati, et al, 2015).

Then the sectio caesaria surgery can cause physiological changes in the body such as a decrease in body temperature / hypothermia. Hypothermia affects several organ systems. Hypothermia initially causes an increase in metabolic rate, tachycardia occurs in the cardiovascular system, peripheral vascular resistance, causing shivering (Rositasari, et al, 2017).

Shivering is the body's compensation mechanism for hypothermia. Shivering causes discomfort and is a complication that often occurs after general or regional anesthesia in patients undergoing elective or emergency surgery. After giving spinal anesthesia, shivering usually occurs in the intraoperative period until the postoperative period. The incidence varies greatly between 5% to 65%, shivering causes very detrimental physiological effects such as peripheral vasoconstriction, with oxygen reserves increasing the body's physiology to increase body temperature so that Shivering does not occur (Maulana, 2018).

In Indonesia, so far no concrete data has been obtained about the incidence of postoperative Shivering in patients receiving spinal anesthesia. More than 80% of operations are performed using spinal anesthesia techniques compared to general anesthesia. From the results of statistical data and research, it is found that 60-75% of the causes of morbidity from surgery are due to postoperative complications. One of the postoperative complications is the occurrence of Shivering (Wiyono, 2019).

The impact of shivering is very detrimental to the patient, including increased bleeding risk, myocardial ischemia, longer post-anesthesia recovery, impaired wound healing, and increased risk of infection. Shivering will also increase oxygen demand, carbon dioxide production, and increase levels of catecholamines in the plasma which will be followed by an increase in pulse rate, blood pressure and cardiac output and more dangerously can cause death (Sari, 2018).

For handling shivering in postoperative patients so as not to exceed the safe limit, an electric sand pillow is used, which is a tool to maintain stability so that shivering does not occur. This tool is an electric sand pillow, a modern medical device that contains quartz sand, magnets and traditional ingredients, and can generate heat with a temperature of 40oC, is able to reduce shivering, improve blood circulation and is beneficial for sick body parts. Therefore, with the use of an electric sand cushion, intravenous fluids become warm when the flow enters the blood vessels, and the patient's condition is maintained in a warm state so that it is expected to reduce shivering/shivering, this is the reason for using an electric sand pillow in the treatment of postoperative patients. Sectio caesarea surgery to reduce shivering.

The data obtained from the medical records of patients who underwent delivery by sectio caesarea at Budhi Asih Hospital Jakarta was the most common type of surgery compared to other types of surgery, in the last three years sectio caesarea patients in 2018 were 1,846 patients, in 2019 there were 880 patients and in 2020 as many as 624. From these data it can be seen that sectio caesarea patients experienced a decline due to the covid 19 pandemic. Based on a preliminary study conducted by researchers from March 5 to June 14 2021, it was found that 260 post sectio caesarea patients experienced shivering as many as 195 patients (75%). Shivering if not treated immediately will cause discomfort, shivering also develop into serious complications. Based on the explanation above, the researcher is interested in conducting a study entitled "The effect of giving an electric sand pillow on the shivering level of sectio caesarea patients after spinal anesthesia".

Material and Methods

The research method uses a quasi-experimental research with a two-group pre-test-post-test design. Data collection was carried out using primary data, namely data obtained from observations. The data collection instrument used was an observation sheet. The population in this study were all post sectio caesarea patients at the hospital. Budhi Asih Jakarta in September 2021 with a total sample of 70 people (35 people as the experimental group and 35 people as the control group) so the sampling method used purposive sampling. The analytical method used is univariate analysis and bivariate analysis with t test.

RESULT

Frequency Distribution of Respondents' Characteristics in the Experimental Group and Control Group

Characteristics	Experimental Group		Control Group	
	n = 35	%	n = 35	%
Shivering				
Derajat 0	5	14,3	6	17,1
Derajat 1	15	42,9	7	20,0

Derajat 2	11	31,4	13	37,1
Derajat 3	2	5,7	7	20,0
Derajat 4	2	5,7	2	5,7
Age				
< 20 years	2	5,7	1	2,9
20-35 years	27	77,1	31	88,6
> 35 years	6	17,1	3	8,6
SC history				
No history of SC	24	68,6	21	60,0
There is a history of SC	11	31,4	14	40,0
Operation Time				
Fast	16	45,7	17	48,6
Currently	12	34,3	15	42,9
Long	7	20,0	3	8,6

Based on the table above, it can be seen that the characteristics of respondents who experienced shivering in the experimental group were mostly with grade 1 shivering as much as 42.9%, and in the control group most of them experienced grade 2 shivering as much as 37.1%. Based on the age in the experimental group, the majority of respondents aged 20-35 years were 77.1%, and in the control group, the majority of respondents aged 20-35 years were 88.6%. Based on the history of SC in the experimental group, most of the respondents who did not have a history of SC were 68.6% and in the control group, the majority of respondents who did not have a history of SC were 60%. Based on the length of operation in the experimental group, most of the respondents who had fast operation time were 45.7%, while in the control group, most of the respondents who had fast operation time were 48.6%.

Frequency Distribution of the Average Shivering Level in the Experimental Group and Control Group

Group	N	Pre test Mean±SD	Post test Mean±SD	Different Mean±SD	p-value
Experimental	35	1,46± 1,01	0,71±0,86	0,75±0,15	0,000
Control	35	1,77± 1,14	1,71±1,10	0,06±0,04	0,422

Signifikan p-value <0,05

The results of the t-test analysis in the table above can be seen that the value of p< which can be concluded that there is a significant difference between before and after giving the electric sand pillow (p-value <0.05), while the cloth blanket does not show any significant difference. significant difference between before and after being given a thick blanket (p-value > 0.05). This can be seen from the mean ± SD in the experimental group before and after treatment, namely the pre test results were 1.46 ± 1.01 and the post test results were 0.71 ± 0.86. The results of the mean±SD values in the pre-test and post-test control groups were 1.77±1.14 and 1.71±1.10 which indicated that the treatment group could reduce the shivering level, while the control group did not show any reduction in the shivering level. . The results of the analysis also prove that the electric sand pillow has more effect in reducing the shivering level in post SC patients with an average of 0.71 and the provision of thick blankets only decreased 1.71. Based on the results of the t-test analysis in the table above, the average difference in the difference in the decrease in shivering levels in the experimental group was 0.75±0.15 and the control group was 0.06±0.04. The results of the analysis in the experimental group also showed p-value <α (0.000 < 0.05), then Ho was rejected and Ha was accepted, which means that there is an effect of electric sand cushion on the decrease in shivering levels.

DISCUSSION

Before the experiment, the researcher first tested whether the characteristics in the experimental group and the control group were comparable or not. The results of the analysis show that in terms of frequency, each characteristic is comparable. This proves that there is no significant difference of each characteristic in both the experimental group and the control group so that the two groups are comparable to be tested.

Based on the age of the respondents in this study, it was found that most of them were aged between 20-35 years, of which the age of 20-35 years was a good productive age for a woman to get pregnant and give birth. Based on the history of SC, most of them did not have a history of SC and

based on the length of operation, most of them were classified as fast surgery (60 minutes).

The results of this study are in accordance with Sarwono's (2018) theory which says that in the period of healthy reproduction it is known that the safe age for pregnancy and childbirth is 20-35 years. The results of this study are also in accordance with the results of research by Cahyawati (2019) which said that most of the respondents aged 20-35 years (46.7%).

According to the assumption of researchers, the age of women who are good for pregnancy and childbirth is the productive age, which is between the ages of 20-35 years. This is because pregnant women in productive age are a safe age for pregnancy and childbirth, while pregnant and maternity women aged <20 years and >35 years are at risk and will cause maternal death.

In this study, it was found that there were 4 respondents who experienced grade 4 shivering. This was because many patients underwent surgery with spinal anesthesia so that in the recovery room they did not get blanket warmers because the availability of blanket warmers in hospitals was still very limited. In addition, a high degree of shivering can be caused by other factors such as the patient's body mass index, resulting in a high degree of shivering. Patients who experience degree 4 shivering are immediately given warm intravenous administration so that the shivering does not continue.

Based on the results of data analysis that has been carried out, it shows that before the electric sand pillow was given the average shivering level was 1.46 ± 1.01 and after the electric sand pillow was given the average shivering level was 0.71 ± 0.86. The analysis also showed p-value <0.05 so that Ho was rejected. Thus, it can be concluded that there is a significant difference between the average shivering level before and after being given an electric sand pillow, which is 0.75. When compared with cloth blankets, the average difference in shivering levels before and after being given a cloth blanket was 0.06. However, the analysis showed that there was no significant difference between the average shivering level before and after being given a cloth blanket (p-value >0.05). In addition, it is known that the average difference between respondents who were given an electric sand pillow was 0.75 ± 0.15 with a p-value<0.05 and a cloth blanket was 0.06 ± 0.04 with a p-value>0.05 which means that there is an effect of the electric sand pillow on the decrease in shivering levels.

The results of the t test analysis can be seen that the p value < which can be concluded that there is a significant difference between before and after giving the electric sand pillow (p-value < 0.05), while the cloth blanket does not show a significant difference between before and after giving the electric sand pillow. and after being given a thick blanket (p-value > 0.05).

Shivering is an increase in muscular activity that causes skeletal muscle contractions or tremors in the face, chin and extremities for approximately 15 minutes and often occurs after anesthesia, especially in patients undergoing surgery under spinal anesthesia. This condition is a normal thermoregulatory response to a combination of anesthesia and surgery. The combination causes impaired function and regulation of body temperature which causes shivering. The incidence of shivering is also still often found in patients in the recovery room after caesarean section (Cahyawati, 2019).

The results of this study are in line with the results of a study conducted by Fitnaningsih Endang Cahyawati (2019) that warm intravenous fluids can reduce the degree of shivering. The results of the study are also supported by the results of research conducted by Indriana Puspita Dewi (2020) which states that aluminum foil blankets can reduce shivering degrees.

The results of this study can occur because the electric sand pillow can cause blood vessel dilation (vasodilation) thereby increasing blood circulation, relieving ischemia in myometrial cells, decreasing myometrial smooth muscle contraction, increasing muscle relaxation and reducing shivering. In addition, giving an electric sand pillow to the upper abdomen can transmit warmth throughout the body and thereby reduce the level of shivering. The temperature on the electric sand cushion reaches 40ºC. The local response to heat occurs through the stimulation of nerve endings in the skin, which are sensitive to temperature. This stimulus will send impulses from the periphery to the hypothalamus, which will cause awareness of local temperature and trigger an adaptive response to maintain normal body temperature. The body can tolerate a wide range of temperatures.

The difference in the average shivering level was quite large between the experimental and control groups because a local response to heat was needed to provide warmth so as to reduce the shivering level. Local response to heat can reduce shivering level most significantly at 40˚C. This is why cloth blankets cannot reduce shivering levels as much as electric sand babies because the temperature of cloth blankets can only increase blood circulation. So the shivering level is only reduced very slightly. Body-fitting cloth blankets prevent further heat loss and the heating process relies solely on heat production from within the body. Cloth blankets only help prevent the release of heat that has been produced in the body and there is no transfer of heat from the cloth blanket into the patient's body (Kesuma, 2013).

The results of this study are in line with the results of Dafriani's research (2020) which states

that the T test results obtained a p value of 0.000, which means that there is a significant comparison between the use of hot blankets and ordinary blankets on changes in body temperature in postoperative hypothermic patients in the recovery room of Sawahlunto Hospital.

. The results of this study are also supported by the results of Cahyawati's research (2019) with the results of the study. Analysis of the different degrees of shivering between the intervention group and the control group obtained a P value <0.05 which means, there is a difference in the degree of shivering between the intervention group who received additional intervention with warm intravenous fluids compared to the control group. controls who received intervention according to hospital protocol. Giving warm intravenous fluids has been shown to significantly reduce the degree of shivering in patients in the intervention group

.However, the results of this study are not in line with the results of a study by Zhiming Zhang (2021) in Southern China which said that giving Dexmedetomidine at a dose of 0.2 g/kg could not reduce the incidence of shivering during cesarean section without affecting the baby's Apgar score.

According to the researcher's assumption, not all surgeries will experience shivering. But most surgeries that use anesthetic drugs have the risk of shivering, especially since the operating room will be set to a cooler temperature than usual. From the observations of researchers in the field, the use of hot blankets will usually be chosen with cases that have a more severe incidence of shivering. Because in some cases the surgery will be carried out simultaneously and it is possible that shivering in postoperative patients will occur in more than one person at the same time. Usually these hot blankets or warmer blankets are available in limited quantities, so the staff must choose which patient should be given a hot blanket or warmer blanket first.

The use of ordinary blankets will increase the ambient temperature of the patient's skin area. Ordinary blankets can prevent heat loss from the patient's body. The disadvantage of ordinary blankets is that they are unable to maintain body warmth for long periods of time. Warm blankets will make the body retain body heat rather than releasing it. This is because the warm blanket also provides heat to the patient's body (Maulana (2018) & Buraimoh, MA, Nash, A., Howard, B., Yousaf, I., Koh, E., Banagan, K., & Ludwig (2019).

Therefore, the intervention of providing a hot blanket is more recommended in an effort to overcome hypothermia that occurs in surgical patients in particular. However, although there are differences between the provision of ordinary blankets and hot blankets to treat postoperative hypothermia in patients, both of these interventions can help accelerate the increase in body temperature of hypothermic patients. Where these two interventions prevent the skin from being exposed to cold temperatures again so that there is no release of body heat (Shariffuddin et al. 2016).

With limited hot blankets that have been provided at the hospital for the treatment of shivering in post sectio caesarea patients, this time the researchers tried to use an electric sand pillow and the results were very significant in reducing the degree of shivering. Thus, if there is a delivery by sectio caesarea at the same time the nurse can use an electric sand pillow as a substitute for a blanket warmer whose availability is very limited. So that this research can be used as an alternative other than blanket warmers in the suppression of shivering in post sectio caesarea patients.

In this study, the incidence of shivering was more common in respondents with 60 minutes of operation. This is in accordance with the theory which states that shivering is a response to hypothermia during surgery between blood and skin temperature and core body temperature. Surgery with long spinal anesthesia increases the body's exposure to cold temperatures, causing changes in body temperature (Potzu, et al., 2017). In addition, spinal anesthesia also inhibits the release of catecholamine hormones so that it will suppress heat production due to metabolism. The longer an operation can increase the possibility of intraoperative hypothermia, thereby increasing the possibility of Post Anesthetic Shivering (PAS) (Nugroho et al., 2016).

The incidence of shivering occurs mostly in post sectio caesarea, this is because SC surgery uses spinal anesthesia where spinal anesthesia reduces heat production, while heat loss is very large in open respondents who underwent long operations and were in cold operating rooms. The results showed that respondents who experienced shivering were more than those who did not. Regional anesthetics cause vasodilation, causing distribution of heat from the core to the periphery. Thus, hypothermia in regional anesthesia is caused by redistribution of body heat from the core to the (peripheral) surface.

The results of the t test analysis can be seen that the p value=0.000 which means there is a significant difference between before and after the electric sand pillow, while the cloth blanket does not show a significant difference with the p=0.422. So from the results of this study it can be concluded that the use of an electric sand pillow has a significant effect in overcoming shivering in post sectio caesarea patients. With the discovery of an electric sand pillow that can overcome shivering in postoperative patients, it can add knowledge on how to handle shivering non-pharmacologically in postoperative patients in addition to blanket warmers and aluminum blankets.

Research conducted by Rabi'u MB, S Ado, Chabiya B (2019) in Nigeria said that the use of prophylactic ketamine significantly reduces shivering due to spinal anesthesia, for this reason ketamine can be an alternative prophylaxis against postoperative shivering. Future studies may find optimal ketamine doses for this purpose with minimal or no side effects

Shivering is an involuntary, repetitive activity of the skeletal muscles. Shivering after anesthesia is one of the main causes of discomfort for patients after spinal anesthesia. The main causes of intra and postoperative shivering during regional anesthesia are decreased sympathetic tone resulting in vasodilation and there is a redistribution of heat from the core to the peripheral tissues of the trunk. Both of these effects predispose the patient to hypothermia and chills. Shivering is associated with various undesirable physiological changes such as increased cardiac and systemic energy expenditure, resulting in increased oxygen consumption, carbon dioxide, and lactic acid production. There is also an associated increase in metabolic rate of up to 400%, resulting in hypoxia and hypercapnia. This can cause problems in patients with low cardiopulmonary reserves. Prevention of intra and postoperative shivering can be accomplished by controlling the ambient operating room temperature, use of warmed IV and irrigation fluids if possible, external heating using forced air heating and pharmacological interventions.

Arina Qona's research (2019) in Surabayan said that warm fluid therapy and warm blankets were very important in terms of increasing the patient's body temperature after spinal anesthesia. Warm liquids are more effective than heating blankets. Warming blankets and warm fluid therapy can be used as a way to increase the body temperature of hypothermic sufferers.

Shivering is part of the body's defense mechanism by regulating the heat center in the body which can produce harmful effects in terms of systemic oxygen consumption, oxygen in brain tissue and intracranial pressure. Spinal and general anesthesia can cause chills. Spinal anesthesia causes redistribution of heat from the center of the body to the periphery because spinal anesthesia induces vasodilation. The rapid decrease in core body temperature due to the transfer of body heat from the core to the perimeter can cause vasodilation. After that, the decrease slows down the core temperature, causing heat loss due to excessive heat production (Zaman et al., 2018).

Conclusion

There was a difference in the average shivering level before and after treatment in the experimental group and the control group. There was a difference in the average decrease in shivering levels between the experimental group and the control group. So from these results it can be concluded that there is an effect of an electric sand pillow on decreasing shivering levels

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