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Introduction:
Inserting local anesthetics into the subarachnoid space with the aim of relieving sensation and inhibiting motor function is known as spinal anesthesia. In the gut, spinal anesthesia leads to increased contraction, intraluminal pressure, and sphincter relaxation by suppressing the sympathetic nervous system (Lekatompessy \textit{et al.}, 2022).

The administration of spinal anesthesia is said to be safer when compared to general anesthesia, however, spinal anesthesia itself has several kinds of special obstacles in performing injection techniques. These obstacles can be caused by several complicating factors including difficulty in marking the injection, failure in needle placement, age, Body Mass Index (BMI), spinal anatomical abnormalities, patient position at the time of needle placement, and the level of experience of spinal performers.

Background: Spinal anesthesia is said to be safer than general anesthesia. However, spinal anesthesia itself has several kinds of special obstacles in performing injection techniques, there are a number of complex variables that can cause these obstacles, including difficulty in marking injections, failure in needle placement, age, Body Mass Index (BMI), spinal anatomical abnormalities, patient position at the time of needle placement, and the level of experience of spinal performers. Purpose: This study was to determine the description of spinal anesthesia injection techniques at RSI Fatimah Cilacap. Methods: This research method uses a quantitative approach with a descriptive type of research. Total sampling was used to select the sample for this study. Total sampling is a sampling method that uses the sample size of the entire population as the sample size. Results: this study indicates that the median injection technique is more dominant in using the median injection technique with the number of respondents as many as 23 (62.1%), while with the paramedian injection technique only 14 (37.8%) respondents based on the age of the respondent, while based on the BMI of the respondent, anesthesia stylists are more dominant in using the median injection technique as many as 23 (62.1%) respondents, on the contrary with the paramedian injection technique as many as 14 (37.8%) respondents. Conclusions: this study shows that anesthesiologists at RSI Fatimah Cilacap more often use spinal anesthesia injection techniques with median techniques compared to paramedian injection techniques at certain ages and Body Mass Indexes.
of needle placement, and the level of experience of the spinal performer (Dedy, 2015).

According to several studies, there are data on failure rates in spinal anesthesia injection techniques. The failure rate of spinal needle placement varies from 0.5% to 17% and the difficulty rate ranges from 31%-38%, causing repeated injections in patients. Repeated injections can cause patient discomfort, increased incidence of spinal hematoma, epidural hematoma, postdural puncture headache, and trauma to neural structures (Sugiarto & Marpaung, 2021).

According to research, spinal anesthesia has two injection techniques using the median and paramedian techniques. The spinous processes are connected to each other at an angle of 80 degrees using the median technique, which involves the insertion of the needle directly in the midline. The surface location of the spinal needle is determined, this time in the interlumbar region, which is located between the lumbar vertebrae. The spinal needle should be inserted at the puncture site in the medial plane at an angle of between 10 and 30 degrees to the horizontal plane in the cranial direction. This will prevent the needle bevel from cutting the longitudinal dura mater fibers (Puspitasari, 2016).

The paramedian (paramedian approach) specifically, 1-2 cm laterally to the superior part of the spinous processus below the selected spinal space is where the spinal needle is inserted. The needle is directed in the same direction as the midline of the approach towards the midpoint of the median line. As the gap is large, only the ligament flavum is penetrated with this approach (Puspitasari, 2016).

Data explaining the effect of repeated injections can cause headache or what is called PDPH, it was found that the results of some respondents experienced headache, in the group that used spinal needle sticks with repeated injections in post-spinal anesthesia, who felt mild headache as much as 21.2% while those who felt headache as much as 75.8%

Based on the results of the researcher’s survey on November 11, 2022 at RSI Fatimah Cilacap, there were 6 patients using spinal anesthesia injection techniques with median and pre-median techniques on the date, there were several complications in performing median and pre-median injection techniques, which affected them such as age in patients and excess body weight.

**Method:**

The research method used in this study is quantitative with a cross sectional design approach. The form of descriptive research design is to see a description of the phenomena that occur in a particular population. The sample technique in this study used total sampling of 37 pre-anesthesia patients. This research has received approval from the Harapan Bangsa University Research Ethics Review Board with approval number No. B.LPPM-UHB/1748/04/2023 on April 20, 2023. The instrument in this study used a questionnaire containing patient initials, age, weight, height and spinal anesthesia injection technique.

**Study Design**

This analysis uses primary data from the results of questionnaires conducted on the respondents studied, namely pre-anesthesia patients with age, weight, height and spinal anesthesia injection techniques. With the inclusion criteria of spinal anesthesia patients, patients aged 17-65 years, and willing to become respondents. The exclusion criteria in this study were that the patient was not willing to be a respondent.

Researchers have identified potential respondents according to the
inclusion and exclusion criteria in the IBS preparation room. After that, continued with the researcher providing an explanation of the rights of respondents, the objectives and procedures of the study. Patients who are willing to become respondents are then given an informed consent sheet as a condition for being willing to become research respondents without coercion and then continue to be given an explanation regarding research procedures. After the respondent was given an explanation of the research procedure, the respondent was asked about his age status, after which the researcher asked the respondent to weigh his body weight and take height measurements with the Goto instrument digital body scales and Deli height meter. After that the researcher recorded the injection technique performed by the anesthesiologist against the respondent taken from the medical record.

After the data was collected, the next step was for the researchers to process the data. Researchers process data using a computer program, then do editing, marking samples, entering data, cleaning data, and tabulating.

**Statistics analyses**

All statistical analysis in this study used SPSS statistics with Version 23.0; IBM. Analysis of age, weight, height and spinal anesthesia injection technique on. Then cross tabulation test was conducted, cross tabulation is one of the correlational analyses used to see the relationship between variables.

**Discussion**
OVERVIEW OF SPINAL ANESTHESIA INJECTION TECHNIQUES AT RSI FATIMAH CIKACAP

1. Overview of Spinal Anesthesia Injection Techniques Based on Respondents' Age at RSI Fatimah Cilacap

The results of the above study showed that the dominant anesthesiologist injected spinal anesthesia using the median injection technique to 10 (27.0%) respondents aged between 26 - 35 years with a total of 13 respondents. Meanwhile, the dominant paramedian injection technique was given to respondents aged between 56 - 65 years with a total of 4 (10.8%) respondents. Researchers assume that in respondents aged 25-36 most anesthesiologists at RSI Fatimah Cilacap more often use the median injection technique because at that age the lumbar condition does not have lumbar abnormalities that can interfere with the technique of injecting spinal anesthesia with the median technique and at that age it is easier to determine the anatomy of the spine. Whereas in respondents with an age range of 56 - 65 years, it is more common to find spinal anatomical abnormalities that can complicate spinal anesthesia injection techniques. The experience of the anesthesiologist in injecting anesthesia can also affect the success in performing the injection technique.

Age is the length of life in years counted from birth to a person's birthday. Age is one of the factors that cause failure in performing injection techniques. The age factor in the analysis has a significant relationship with the difficulty of using spinal anesthesia injection techniques. In patients with an age range of 26 - 35 years, generally there is no spinal disease that can cause narrowing of the interlaminar gap due to sclerotic changes, besides that at the age of 26 - 35 years there are no structural changes in the ligament flavum. So at the age of 26-35 years respondents more often use the median injection technique compared to the paramedian technique (Puspitasari, 2016).

In patients with advanced age, paramedian techniques are generally more often used, paramedian techniques can reduce complications in elderly patients because in the elderly many nerve fibers will be traumatized. Pregnant, elderly, or obese patients who are unable to perform flexion are also helped by this paramedian injection approach. The supra- and intraspinous ligaments, two ligaments that do not pass through the paramedian, will be traumatized less, reducing the risk of fluid leakage (Puspitasari, 2016).

According to Saraswati et al., (2020) the curvature of kyphosis increases with age. Cells and tissues have a lower ability to cause kyphosis, resulting in changes in muscle instability and bone density. An increase in body weight or decrease in fat-free mass indicates a shift in body composition in the elderly. With age, the percentage of muscle mass decreases, leading to a 30-40% decrease in muscle strength.

2. Overview of Spinal Anesthesia Injection Techniques Based on Respondents' Body Mass Index at RSI Fatimah Cilacap

The results of this study found that in respondents who had a body mass index > 18.5-25.0 (Normal) as many as 17 (45.9%) respondents used the median injection technique more often than the paramedian technique. Whereas in respondents who had a body mass index > 25.0-27.0 (Fat) and > 27.0 (Very Fat) with a total of 7 (18.9%) respondents the paramedian injection technique was more
dominantly used than the median technique.

Researchers assume that in normal body mass index the median injection technique is more often used than paramedian, because in normal BMI patients are easier to do the median technique. The anesthesiologist is easier to determine the injection point between the lumbar and at normal BMI the median injection technique is easier to redeem the flesh covering the lumbar cavity.

Marking the anesthetic injection site is more difficult in patients with high BMI scores. Due to the thickness of fatty tissue, palpating the spinous processes and intervertebral spaces in individuals with high BMI scores presents a unique set of challenges. This can be made easier by utilizing ultrasound (USG) tools or by drawing guide lines from the spinous processes of the seventh cervical spine to the patient's curves on the buttocks and back. Practitioners often seat obese patients to make it easier for them to see the midline of the body (Bania Lubis et al., 2021).

So in respondents with body mass index >25.0 - 27.0 and > 27.0 anesthesiologists at RSI Fatimah Cilacap more often use paramedian injection techniques compared to median injection techniques. The reason is because in patients with BMI > 25.0 -> 27.0 anesthesiologists are difficult to determine the location of the marker in patients who will be injected with anesthesia so it is difficult to use the median injection technique because the median injection technique the needle must be inserted at an angle of 80 degrees to the back, right in the middle of the spinous process that connects it, determined the location of the spinal needle surface, namely in the intervertebral space (interlumbar) (Dedy, 2015).

Limitations and Future Research

This study has limitations, namely the limitations of the theories that strengthen this research because this research has only been conducted by researchers, the lack of BPJS patients limits the variation of respondents so that the results of data analysis obtained are not balanced between the categories, the shortcomings of this study are also in measuring height, height measurement should use a microtoise measuring instrument while researchers use a Deli height meter measuring instrument.

Conclusion

1. Overview of Spinal Anesthesia Injection Techniques Based on Respondent Age at RSI Fatimah Cilacap, it was found that the most respondents were found at the age of 26-35 years as many as 13 respondents (35.1%), 10 of the 13 respondents used the median injection technique (27.0%), while only 3 respondents (8.1%) used the paramedian injection technique. Compared to respondents who had an age range between 46 - 65 years, there were 12 (32.4%) respondents, more than half of the respondents used the pre-median injection technique as many as 7 (18.9%) respondents compared to the median of only 5 (13.5%) respondents.

2. Overview of Spinal Anesthesia Injection Techniques based on Respondents' Body Mass Index at RSI Fatimah Cilacap, namely respondents who have a body mass index <17.0 (thin) - > 18.5-25.0 (normal) more often use median injection techniques as many as 21 (56.7%) respondents compared to paramedian techniques.
Meanwhile, respondents who had a body mass index > 25.0-27.0 (obese) and > 27.0 (very obese) predominantly used the paramedian injection technique as many as 7 (18.9%) respondents.

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