

## THE DIFFERENCES OF PAIN CHARACTERISTICS AMONG POST-SURGERY CLIENTS WITH GENERAL AND REGIONAL ANESTHESIA

Andi Eka Pranata<sup>1</sup>, Feri Ekaprasetya<sup>2\*</sup>

<sup>1</sup>Medical Surgical Nursing Department, Faculty of Health Science, Universitas dr. Soebandi, Indonesia

<sup>2</sup>Emergency Nursing Department, Faculty of Health Science, Universitas dr. Soebandi, Indonesia

\*e-mail: feriekaprasetya05@gmail.com

---

### ABSTRACT

#### Keywords:

general anesthesia  
pain characteristics  
post surgery client  
regional anesthesia

Surgery is one of the medical options for improving health. Surgery has broken the main chain that causes health problems. Patients undergoing surgery always receive anesthetic management to relieve pain sensations. Pain sensations will be felt again after the period of anesthesia gradually disappears. Post-surgery clients are feeling pain that varies widely. This study aims to determine differences in the characteristics of postoperative client pain with general anesthesia and regional anesthesia. The method used was observational in postoperative clients with a cross-sectional design. Pain characteristics were observed after 4 hours postoperative. The observation sheet is used to observe pain which consists of pain intensity, pain onset, pain quality, and pain coping pattern. Observations were made on 30 postoperative clients with general anesthesia and 30 postoperative clients with regional anesthesia. The pain characteristics of the two groups after surgery were compared and the differences were seen. The results of the study generally showed that the characteristics of postoperative client pain with regional anesthesia (mean score = 18.1) were higher than clients who received general anesthesia (mean score = 17.5). The results of the Mann Whitney test showed that the value of  $p = 0.000$  (pain scale),  $p = 0.017$  (pain time range),  $0.000$  (pain onset),  $p = 0.018$  (pain intensity),  $p = 0.000$  (pain depth),  $p = 0.000$  (coping pattern). The characteristics of postoperative pain with regional anesthesia is more severe than with general anesthesia. The length of time of surgery and the level of depth of the surgical incision have a very significant effect on the characteristics of postoperative pain.

### BACKGROUND

The operation left a new complain about the client. Postoperative clients always feel a sensation of pain. This condition is different from the intra-operation phase when the client is still getting anesthesia. General anesthesia that works on the central nervous system and regional anesthetics that work on the subarachnoid can relieve pain sensation during surgery. The clients feel the pain sensation again after the operation is complete. Pain arises due to tissue injury during surgery (Slikker et al., 2018).

General anesthesia causes the client's condition to be unconscious for a certain period time. General anesthetic drugs act on the central nervous system in a variety of ways, depending on the type of

drug. For example, giving propofol sedation will have the effect of sleeping longer. Propofol is a selective modulator against GABA (gamma-aminobutyric acid) which affects the sleep cycle in the hypothalamus. Propofol induction will increase the sleep phase and cause the client to become unconscious (Rothrock & McEwen, 2015).

In contrast to general anesthesia, subarachnoid block, which is a regional anesthetic, acts on the local lumbar area. The anesthetic works by blocking the nerve fibers that pass through the cerebrospinal. The blockage consists of a sensory, motor, and autonomic impulse transmission so that the client will feel temporary numbness. A client with regional anesthesia will lose pain sensation during surgery, but do not lose consciousness (Mariotti, 2013).

The difference in the mechanism of action of the two anesthetic groups affects the client's recovery time and safety effect. Regional anesthesia has a lower risk than general anesthesia. Regional anesthesia has a shorter effect and less blood loss than general anesthesia. Fast postoperative recovery time makes client stability more quickly achieved. Minimal blood loss during surgery can improve postoperative hemodynamic stability. The two conditions above certainly affect the pain response and postoperative safety (Pierce et al., 2017)

According to (Donauer et al., 2018), postoperative pain for clients with total knee arthroplasty is lighter in clients who receive regional anesthesia compared to those who receive general anesthesia. The use of opioid analgesics after total knee arthroplasty surgery was also lower in clients who received regional anesthesia than in those who received general anesthesia. Postoperative clients with regional anesthesia feel more comfortable than clients who get general anesthesia.

According to (Greimel et al., 2017), the degree of pain and comfort in clients after hip arthroplasty surgery is better in clients who receive regional anesthesia and combination anesthesia than a client who receive general anesthesia ( $p < 0.001$ ). Postoperative hip arthroplasty clients with general anesthesia required more opioids than clients who received regional anesthesia ( $p < 0.001$ ). The use of regional anesthesia is more beneficial to the client and reduces the use of opioids.

The aim of the study is to look at the difference of pain characteristics in postoperative clients between those receiving general anesthesia and regional anesthesia. Pain characteristics that will be assessed include pain intensity, pain onset, pain quality, and coping patterns with pain.

## METHODS

The research design was observational with a cross-sectional approach. The research was conducted in the operating room of one hospital in Jember Regency in 2019. The research subjects were clients with postoperative general anesthesia and regional anesthesia. There are 2 sample groups in this study, namely clients with post-surgery general anesthesia and post surgery clients with regional anesthesia. The number of samples in each group is 30 respondents. All respondents had met the inclusion requirement including the same type of operation and first-time operating experience, including receiving the same type of anesthetic drug in each group. This

research has obtained ethical feasibility with the number of 222/SDS/KEPK/TL/X/2019.

Sampling using a quota sampling technique. Sampling was carried out for 5 months. Data collection for the first time used secondary data from the operation report to obtain information related to the implementation of anesthesia and operation. Furthermore, the main data collection method used the pain characteristic observation sheet to determine the characteristics of postoperative pain. Observation of pain characteristics was carried out on the client after 4 hours from the end of the surgery.

The pain characteristic observation sheet is the development of a pain measurement instrument that includes pain intensity, pain duration (time span, onset time, onset intensity), pain quality (depth, characteristic), and coping patterns for pain (pharmacological, non-pharmacological). The pain characteristics observation sheet was developed by the researcher and has been publicly tested with good results. Observation is done directly once the client postoperatively by the nurse. Each observation indicator was presented according to the data pattern. The pain scale is written with a ratio scale based on the client's pain score among 0 until 10. The duration of pain is written on an ordinal scale and there are 4 categories. Pain quality is written on a nominal scale and there are 2 categories. The coping pattern for pain is written on a nominal scale and there are 2 categories. The difference in pain characteristics can be seen from the differences in each pain indicator so that it is more detailed in discussing it.

Univariate analysis was carried out on the aspects of anesthesia implementation and surgery. Mann Whitney test was carried out on the pain characteristics of postoperative clients by comparing 2 groups of postoperative clients, namely clients who received general anesthesia and those who received regional anesthesia. The analysis is carried out on each indicator of the characteristics of pain so that the differences will be increasingly visible. All analysis tests used IBM SPSS Statistics 26 version.

## RESULTS

Table 1 shows that the number of respondents in this study was 30 clients post-surgery with general anesthesia and 30 clients post-surgery with regional anesthesia. Data on the time lag between anesthesia and the operation of the client who received general anesthesia. Most clients with general anesthesia have a time lag between anesthesia and the time to start surgery is 5 minutes (40%).

Table 1. The Surgery of The General Anesthesia Client

<b>The Surgery of The General Anesthesia Client</b>	<b>f</b>	<b>%</b>
<b>The Time Lag Between Anesthesia and Surgery:</b>		
5 minutes	12	40
10 minutes	11	37
15 minutes	6	20
> 15 minutes	1	3
<b>Length of Surgery Time:</b>		
10-45 minutes	12	40
46-81 minutes	16	53
82-117 minutes	0	0
118-150 minutes	2	7
<b>The Interval Between Anesthesia and Surgery:</b>		
5 minutes	16	53
10 minutes	7	23
15 minutes	2	7
> 15 minutes	5	17
<b>Length of Surgery Time:</b>		
10-23 minutes	2	7
24-37 minutes	20	67
38-51 minutes	3	10
52-65 minutes	5	17

Most of the clients with general anesthesia underwent surgery time of 46-81 minutes (53%). Most of the clients with regional anesthesia had an interval of anesthesia with the initiation time of 5 minutes (53%).

Most of the clients with regional anesthesia underwent surgery for 24-37 minutes (67%). Based on the distribution of the time lag between anesthesia and the time to start the surgery, clients with general anesthesia and regional anesthesia have the same time lag, which is 5 minutes. Based on the length of surgery time, the length of time to operate clients with general anesthesia is longer than clients who receive regional anesthesia.

Table 2 shows that the pain scale in postoperative clients with regional anesthesia was heavier than in clients who received general anesthesia. Most of the postoperative pain in clients with general anesthesia was mild (97%), and in clients with regional anesthesia were moderate (83%). The results of the normality test using the Shapiro-Wilk obtained the Sig. General Anesthesia (GA) 0.000 and Regional Anesthesia (RA) 0.004 (Sig. >0.05) groups. In conclusion, the data distribution for the pain scale is not normal and the analysis test uses the Mann-Whitney test. The result is Asymp value. Sig. (2-tailed) 0.000 ( $p < 0.05$ ). The conclusion is that there are differences in pain scales in postoperative clients between those

who get GA and RA.

Postoperative pain was more common in clients with regional anesthesia. Most of the postoperative clients with regional anesthesia felt continuous pain for 24 hours (33%), whereas postoperative clients with general anesthesia reported pain that occurred every 1-2 hours (33%). The results of the analysis using the Mann-Whitney test obtained the Asymp value. Sig. (2-tailed) 0.017 ( $p < 0.05$ ). The conclusion is that there is a difference in the duration of pain in postoperative clients between those who get GA and RA.

Postoperative pain onset was shorter in clients receiving regional anesthesia. Most of the postoperative clients with regional anesthesia reported pain onset of fewer than 1 minute (43%), whereas postoperative clients with general anesthesia had pain onset of more than 15 minutes (40%). The results of the analysis using the Mann-Whitney test obtained the Asymp value Sig. (2-tailed) 0.000 ( $p < 0.05$ ). The conclusion there is difference in pain onset in postoperative clients between those who get GA and RA.

Based on the client's subjectivity, the intensity of the onset of postoperative pain was more intense in clients with regional anesthesia (Table 8). Most of the postoperative clients with regional anesthesia reported the intensity of the onset of pain was frequent (70%), while the postoperative clients with

Table 2. Differences Between General Anesthesia and Regional Anesthesia

<b>Differences Between General Anesthesia and Regional Anesthesia</b>	<b>General Anesthesia</b>		<b>Regional Anesthesia</b>	
	<b>f</b>	<b>%</b>	<b>f</b>	<b>%</b>
<b>The Scale of Postoperative Client Pain:</b>				
Mild (1-4)	29	97	5	17
Moderate (5-8)	1	3	25	83
Severe (9-10)	0	0	0	0
<b>Pain Duration Based on Timespan in Postoperative Clients:</b>				
Continuously 24 hours	7	23	10	33
15 minutes – 1 hour	4	13	10	33
1 hours – 2 hours	10	33	9	30
> 2 hours	9	30	1	3
<b>Duration of Pain Based on Pain Onset in Postoperative Clients:</b>				
Continuously 24 hours	7	23	7	23
< 1 minutes	0	0	13	43
≥ 1 minute – 5 minutes	6	20	10	33
≥ 5 minutes – 10 minutes	4	13	0	0
≥ 10 minutes – 15 minutes	1	3	0	0
> 15 minutes	12	40	0	0
<b>The Duration of Pain Based on The Intensity of The Onset of Pain in The Postoperative Client:</b>				
Constantly	7	23	5	17
Frequently	6	20	21	70
Sometimes	17	57	4	13
<b>The Quality of Pain Based on The Depth of Postoperative Clients:</b>				
Parietalis	23	77	5	17
Visceralis	7	23	25	83
<b>The Quality of Pain Based on The Characteristics of Pain in Postoperative Clients:</b>				
Intermittent	23	77	27	90
Persistent	7	23	3	10
<b>The Use of Pharmacological Techniques as Coping with Pain in Post Surgery Clients:</b>				
Yes	23	77	29	97
No	7	23	1	3

general anesthesia had the intensity occasionally. The results of the analysis using the Mann-Whitney test obtained the Asymp value Sig. (2-tailed) 0.018 ( $p < 0.05$ ). The conclusion is that there are differences in the intensity of pain in postoperative clients between those who get GA and RA.

The depth of postoperative pain is deeper/visceral in clients with regional anesthesia (Table 9). Most of the postoperative clients with regional anesthesia expressed visceral pain (83%), while postoperative clients with general anesthesia only had parietal pain (77%). The results of the analysis using the Mann-Whitney test obtained the Asymp value Sig. (2-tailed) 0.000 ( $p < 0.05$ ). In conclusion, there are differences in the level of pain depth in postoperative clients between those who get GA and RA.

Pain characteristics in postoperative clients with general anesthesia and regional anesthesia both have intermittent types (Table 10). On average, the pain characteristics of postoperative clients with regional anesthesia (90%) were greater than those of postoperative clients with general anesthesia (77%). The results of the analysis using the Mann-Whitney test obtained the Asymp value. Sig. (2-tailed) 0.073 ( $p > 0.05$ ). In conclusion, there is no difference in the type of pain in postoperative clients between those who get GA and RA.

Postoperative clients with both general and regional anesthesia use the pharmacological techniques as a coping pattern for postoperative pain (Table 11). On average, the use of the pharmacological techniques is more dominant in postoperative clients with regional anesthesia (97%) compared to general anesthesia (77%). The results of the analysis using the Mann-Whitney test obtained the Asymp value. Sig. (2-tailed) 0.000 ( $p < 0.05$ ). In conclusion, there are differences in coping patterns used to treat pain in postoperative clients between those receiving GA and RA. Therefore, postoperative pain management must adjust to the anesthesia received by the patient so that pain control is more effective.

## DISCUSSION

The results showed that there were differences in the characteristics of pain in postoperative clients between those who received general anesthesia and regional anesthesia, including pain scale, pain duration (pain time range, pain onset, and pain intensity), pain quality (pain depth level), and patterns pharmacological coping with pain. The pain scale in postoperative clients with regional anesthesia was higher than in clients who received general anesthesia. The

duration pain in postoperative clients with regional anesthesia was longer than in clients who received general anesthesia. The pain onset in postoperative clients with regional anesthesia was shorter than in clients who received general anesthesia. The pain intensity in postoperative clients with regional anesthesia was often than in clients who received general anesthesia. The pain quality in postoperative clients with regional anesthesia was deeper than in clients who received general anesthesia. The use of pain medication is more in regional anesthesia than general anesthesia.

Postoperative pain is a common thing for clients after undergoing surgery. The results of a survey in the Netherlands stated that 80% of postoperative patients complained of pain. The pain that occurs varies, ranging from mild to severe. Surgical incisions that injure the tissue from the skin, fat, muscle to the peritoneum will stimulate a local tissue inflammatory response. The injured tissue will secrete chemical substances such as mast cells (histamine, leukotriene), platelets, and plasma components (bradykinin) which cause vasodilation and permeability of blood vessels. This inflammatory response also causes symptoms such as redness, fever, swelling, and pain (Layzell, 2014).

Postoperative pain is included in the category of acute pain. Postoperative acute pain is a definite problem that will be faced by clients. Losing the effect of anesthesia slowly after leaving the operating room will restore the performance of the sensory and nervous systems. Luo's (2017) research states that 41% of patients who are in the recovery room experience pain ranging from moderate to severe (Luo & Min, 2017). Li's research results explain that the effect of pain caused by regional anesthesia is better than general anesthesia (Li et al., 2020).

In this study, most of the characteristics of pain were more severe in the group of clients with regional anesthesia than those with general anesthesia. This is different from the results of Kilic (2019) study which stated that regional anesthesia is more effective in controlling postoperative pain compared to general anesthesia. This is indicated by the lower use of tramadol in patients with regional anesthesia, so anesthesia is safe (k!l?c, 2019).

Likewise, the results of Khosrou's study stated that the level of postoperative pain in clients of abdominal surgery with spinal anesthesia (bupivacaine 0.5%) was lighter than general anesthesia. This is indicated by the lower consumption rate of morphine as a pain reliever in the spinal anesthesia group compared to general anesthesia in the first 6 hours post-

operatively. The lower postoperative pain rates in the regional anesthetics group were due to the slower postoperative inflammatory response to regional anesthesia compared with general anesthesia (Naghbi et al., 2013).

The results of Wang's study also stated that postoperative pain with regional anesthesia was lighter than general anesthesia in post-laparoscopic cholecystectomy patients. There are 2 reasons that the degree of regional anesthesia pain is lighter than general anesthesia. First, the effect of neuraxial blockade is longer in post regional anesthesia patients compared to general anesthesia. Second, the regional effect of anesthesia on pneumoperitoneal pressure is lower than general anesthesia (Wang et al., 2016).

The conclusion is theoretically that the characteristics of pain between regional anesthesia and general anesthesia are different and milder in regional anesthesia. This is because in regional anesthesia the effect of neuraxial block is longer and the effect of pneumoperitoneal pressure is lower. It is known that the neuraxial is a point in the placement of anesthetic blockage around the central nervous system which is used as a technical basis in the management of regional anesthesia. Pain can be minimized because the anesthetic blocks the pain directly at the point of interest, making it more effective (Wang, 2016).

The above theoretical review differs from the results of this study. In this study, the characteristics of pain were higher in the regional anesthesia group than in the general anesthesia group. This could be due to differences in the depth of the incision, because the deeper of the incision will cause greater tissue brushing as well.

The surgical procedure has caused tissue damage and triggered the release of prostaglandins, histamine, serotonin, bradykinin, substance P, and other mediators, produces noxious stimuli, and irritates nerve fibers and nociceptors. The type of postoperative pain will be greatly influenced by stimulation of the injury area so that it is parietal and visceral. The level of tissue damage is closely related to the type of surgery so that the variation in postoperative pain is closely related to the procedure during surgery (Málek, 2019).

Franco's research result (2017) explains that postoperative pain that occurs in clients depends on the age, type of surgery, and type of anesthesia obtained. Age contributes to aspects of psychological maturity in receiving a stimulus, thereby determining the response pattern it generates. The type of surgery is related to the depth of tissue injury, thus impacting the postoperative inflammatory response. The

management of anesthesia is related to the blockade system and postoperative time release, so it has an impact on the return of sensory stimulation to pain (Franco et al., 2017).

Buvanendran (2011) explains that consideration of the length of time of surgery and the level of depth of surgery is needed to determine the anesthesia that will be received by the patient. Appropriate management of anesthesia will reduce the impact of postoperative pain so that it is not too heavy for the client to feel. Choosing the right type of anesthesia will also increase the safety of the patient during surgery. Therefore, all preparations in the preoperative phase must be done properly to determine clinical decisions during surgery (Buvanendran, 2011).

Regional anesthesia has advantages over general anesthesia. These advantages include reduced intraoperative blood loss, decreased respiratory and cardiac rhythm disorders, decreased postoperative nausea and vomiting, and better analgesic effects. Regional anesthesia can reduce postoperative pain well (Berry & Lieberman, 2019).

However, in this study, most of the characteristics of postoperative pain were heavier in clients who received regional anesthesia than in clients who received general anesthesia. This is because the duration of surgery in clients with regional anesthesia is longer and the depth of the incision is deeper than that of clients with general anesthesia so that the level of tissue injury is heavier in clients with regional anesthesia.

According to Smeltzer (2010), the postoperative pain response felt by clients depends on the pattern and depth of the incision, surgical technique, level of injury, type of anesthesia, and postoperative medication. The assessment of the surgical action plan during the preoperative phase is needed. The results of this assessment will determine decisions regarding the use of anesthesia techniques and postoperative pain management so that postoperative pain is minimized (Smeltzer et al., 2012).

## CONCLUSION

There are differences in the characteristics of postoperative pain between clients who receive general anesthesia with regional anesthesia on the aspects of the pain scale, pain duration (pain time span, pain onset, and pain intensity), pain quality (pain depth level), and pharmacological coping patterns of pain. The pain characteristics of regional anesthesia was higher than general anesthesia. This condition is caused by several factors that can affect such as

technique incision and surgery time. This is a limitation of researchers who cannot homogenize the type of surgery in the surgical client group. Therefore, it is necessary to have a preoperative analysis including the type of operation, the estimated length of operation, and the depth of the operation to determine the right type of anesthesia in patients who will undergo surgery.

## REFERENCES

- Berry, D. J., & Lieberman, J. 2019. *Surgery of The Hip E-Book* (2nd ed.). Elsevier Health Sciences.
- Buvanendran, A. 2011. Post-Operative Pain; Research From A. Buvanendran and Co-Author Reveals New Finding on Post-Operative Pain. NewsRx.
- Donauer, K., Bomberg, H., Wagenpfeil, S., Volk, T., Meissner, W., & Wolf, A. (2018). Regional vs. General Anesthesia for Total Knee and Hip Replacement: An Analysis of Postoperative Pain Perception from the International PAIN OUT Registry. *Pain Practice*. <https://doi.org/10.1111/papr.12708>
- Franco, L. V. de S., Sugai, R. F. B., Silva, S. C. e, Silva, T. de C. da, Silva, R. B. V., Guimarães, R. S. de S., Cerdeira, C. D., & Santos, G. B. 2017. Postoperative pain at a university hospital: perspectives toward health promotion. *Revista Brasileira Em Promocao Da Saude*.
- Greimel, F., Maderbacher, G., Zeman, F., Grifka, J., Meissner, W., & Benditz, A. 2017. No Clinical Difference Comparing General, Regional, and Combination Anesthesia in Hip Arthroplasty: A Multicenter Cohort-Study Regarding Perioperative Pain Management and Patient Satisfaction. *Journal of Arthroplasty*. <https://doi.org/10.1016/j.arth.2017.05.038>
- ertugrul. 2019. Laminektomi operasyonu olan ileri ya? hastalarda genel anestezi ile spinal anestezinin postoperatif a?r? ve analjezik tüketimi üzerine etkileri: retrospektif deneyimlerimiz. *Dicle T?p Dergisi*. <https://doi.org/10.5798/dicletip.420540>
- Layzell, M. 2014. Rectus sheath catheter infusions for post-operative pain management. *Nursing Standard (Royal College of Nursing (Great Britain)?: 1987)*. <https://doi.org/10.7748/ns.28.42.37.e8617>
- Li, L., Pang, Y., Wang, Y., Li, Q., & Meng, X. 2020. Comparison of spinal anesthesia and general anesthesia in inguinal hernia repair in adult: A systematic review and meta-analysis. *BMC Anesthesiology*, 20(1), 1-13. <https://doi.org/10.1186/s12871-020-00980-5>
- Luo, J., & Min, S. 2017. Postoperative pain management in the postanesthesia care unit: An update. In *Journal of Pain Research*. <https://doi.org/10.2147/JPR.S142889>
- Málek, J. 2019. Perioperative pain management. *Klinicka Farmakologie a Farmacie*. <https://doi.org/10.36290/far.2019.012>
- Mariotti, N. A. 2013. *Drain's Perianesthesia Nursing: A Critical Care Approach*. AORN Journal. <https://doi.org/10.1016/j.aorn.2013.01.004>
- Naghibi, K., Saryazdi, H., Kashefi, P., & Rohani, F. 2013. The comparison of spinal anesthesia with general anesthesia on the postoperative pain scores and analgesic requirements after elective lower abdominal surgery: A randomized, double-blinded study. *Journal of Research in Medical Sciences*.
- Pierce, J. T., Kosiratna, G., Attiah, M. A., Kallan, M. J., Koenigsberg, R., Syre, P., Wyler, D., Marcotte, P. J., Kofke, W. A., & Welch, W. C. 2017. Efficiency of spinal anesthesia versus general anesthesia for lumbar spinal surgery: A retrospective analysis of 544 patients. *Local and Regional Anesthesia*, 10, 91-98. <https://doi.org/10.2147/LRA.S141233>
- Rothrock, J. C., & McEwen, D. R. (Eds.). 2015. *Alexander's Care of The Patient in Surgery E-Book* (15th ed.).
- Slikker, W., Wang, C., & Paule, M. G. 2018. Handbook of developmental neurotoxicology. In *Handbook of Developmental Neurotoxicology*. <https://doi.org/10.1016/C2015-0-04830-4>
- Smeltzer, susanne C., Bare, B. G., Hinkle, J. L., & Cheever, kerry H. 2012. *Brunner & Suddarth's textbook of medical-surgical nursing*. - 12th ed. /. In *Journal of Chemical Information and Modeling*.
- Wang, X. X., Zhou, Q., Pan, D. B., Deng, H. W., Zhou, A. G., Guo, H. J., & Huang, F. R. 2016. Comparison of Postoperative Events between Spinal Anesthesia and General Anesthesia in Laparoscopic Cholecystectomy: A Systemic Review and Meta-Analysis of Randomized Controlled Trials. *BioMed Research International*. <https://doi.org/10.1155/2016/9480539>