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ANALYSIS OF THE IMPACT OF TRANSVERSUS ABDOMINIS PLANE BLOCK AND INTRATHECAL MORPHINE AS POST-CESAREAN

Bambang Sulistyo[1]*, Wisnu Budi Pramono[2], Wahyudin[3]
[1]Department of Anesthesiology, Dirgahayu Hospital, Samarinda, Indonesia
[2]Department of Anesthesiology, Faculty of Medicine, Jenderal Soedirman University
[3]Department of Pharmacology, Faculty of Medicine, Jenderal Soedirman University

ABSTRACT

Background: Surgical wound pain 24 hours after cesarean section is still a problem found in obstetric patients. Many drugs are used to reduce pain scores both orally, intravenously, transdermally and others. However, it is necessary to pay attention to the dosage of the drug so that it does not harm the postoperative patient. Other methods that can be used include preoperative administration of intrathecal morphine and administration of transversus abdominis muscle blocks. Methods :The study's experimental design uses a post-test only control group. Three groups were created from 108 cesarean patients who had no problems. As per standard protocol, the control group (K) had a cesarean section with intravenous analgesia after the procedure. The Intrathecal Morphine (M) group got preoperative intrathecal morphine in addition to the same treatment as the K group. Apart from receiving the same treatment as group K, the Transversus Abdominis Plane Block (B) group also underwent bilateral transversus abdominis muscle blocks guided by ultrasonography. SPSS for Windows Release 26.0 was used to process the data, and differences with a significance level of 0.05 were examined using the One-Way ANOVA test analysis and the Bonferroni Post Hoc test. Outcomes: Group B differed significantly from group K on the visual analogue scale (p value = 0.000). Similar results were obtained for Group M compared to Group K (p value = 0.000). Group B and group M differ significantly from one another, as can be shown, Compared to group M, group B's visual analogue scale is lower (p=0.000). Conclusion: Intrathecal morphine and transversus abdominis block are effective in reducing post-cesarean section pain. Obtained a lower pain score in the administration of transversus abdominis block compared to intrathecal morphine with a significant difference.

Keywords: Post cesarean pain, intrathecal morphine, transversus abdominis plane block

Corresponding author:

Bambang Sulistyo,
Department of Anesthesiology, Dirgahayu Hospital, Samarinda
Jl. Gunung Merbabu No. 62, Kelurahan Jawa, Samarinda Ulu, Kota Samarinda, Kalimantan Timur
Email: b.sulistyo87@gmail.com

INTRODUCTION

Pain after sectio caesarea surgery remains a common clinical problem among obstetric patients. Postoperative pain that is not adequately managed may lead to delayed mobilization, impaired mother–infant bonding, increased risk of thromboembolism, prolonged hospital stay, and decreased patient satisfaction. Therefore, effective postoperative analgesia is essential in enhancing recovery and improving maternal outcomes. Anesthesiologists have various strategies to manage post-cesarean pain, including intrathecal opioids administered preoperatively and regional techniques such as transversus abdominis plane (TAP) block.

One of the commonly used intrathecal agents for post-cesarean analgesia is morphine. Morphine belongs to the opioid class and provides prolonged analgesic effects when administered intrathecally. Although it may cause side effects such as nausea, vomiting, pruritus, and respiratory depression, intrathecal morphine has a relatively long duration of action and demonstrates synergistic effects with spinal anesthesia, resulting in effective analgesia for up to 24–36 hours postoperatively (Butterworth, 2018). Despite its effectiveness, concerns regarding opioid-related side effects necessitate the exploration of alternative or adjunct analgesic techniques.

The transversus abdominis plane (TAP) block is a regional anesthesia technique used to relieve pain in the lower abdominal wall by blocking the sensory nerves of the anterior abdominal wall. This procedure involves bilateral injection of local anesthetic into the fascial plane between the internal oblique and transversus abdominis muscles near the surgical site (Wiisanen, 2022). TAP block has been increasingly used as part of multimodal analgesia due to its ability to reduce opioid consumption and minimize systemic side effects. However, its effectiveness compared to intrathecal morphine in post-cesarean patients remains variable across studies.

Previous studies have reported inconsistent findings regarding the comparative effectiveness of TAP block and intrathecal morphine in controlling post-cesarean pain, particularly in terms of pain scores, duration of analgesia, and opioid-sparing effects. Furthermore, data from developing countries, including Indonesia, are still limited, especially in hospital settings with varying clinical practices.

Therefore, there is a need to evaluate and compare the effectiveness of these two analgesic techniques in a specific clinical setting. This study aims to determine the differences in postoperative outcomes between patients receiving transversus abdominis plane block and intrathecal morphine following cesarean section, particularly in terms of postoperative pain scale. The findings of this study are expected to provide evidence-based recommendations for optimizing postoperative pain management in cesarean section patients.

RESEARCH METHOD

This research is an experimental study with a Post Test Only Control Group Design with patients at Dirgahayu Hospital as research objects. The selected patients were female patients who underwent elective caesarean section with inclusioncriteria aged 25 to 35 years, term pregnant, vital signs within normal limits, no complicating diseases that interfere with the anesthesia process such as preeclampsia, heart defects, infections, obesity, abnormalities in the fetus , not emergency surgery and other complications and no complicatios either during or after surgery. Three groups, each with 36 patients, were created from a total of 108 patients.

As a premedication, the control group (K) received 4 mg of intravenous ondancetron as antiemetic before to caesarean delivery. Preloaded with 500 cc Ringer

lactate infusion. Then spinal anesthesia was performed with intrathecal dose of 12.5 mg bupivacaine. During the duration of the operation, tranexamic acid 500 mg was given intravenously as an anti-bleeding agent, uterotonic methyl ergometrin and oxytocin were given slowly intravenously. Postoperatively given tramadol 100 mg intravenously and ketoprofen suppository as preoperative analgesia. In the treatment room, the patient received ketorolac 30 intravenously and drip tramadol 100 in RL 500 cc with 20 drops per minute on day 0 and day 1 postoperatively. The pain scale was measured 4 hours after surgery assuming the effects of spinal anesthesia had disappeared and whether the patient needed additional analgetic. Before patients received further analgesics, the Visual Analogue Scale was used to quantify their level of discomfort four hours after surgery (Butterworth, 2018).

The Transversus Abdominis Plane Block (B) group, apart from receiving the same treatment as the control group, also received blocks in the left and right transversus abdominis muscles under ultrasound guidance with bupivacaine plane agent 0.25% 15 cc plus dexamethasone 5 mg on each side. In addition to being treated like the control group, the Intrathecal Morphine (M) group also received an additional 2 mg of morphine as an adjuvant for spinal anesthesia which can prolong the anti-pain effect so that it can be used as a postoperative analgesic.

Data is processed using SPSS for Windows Release 26.0. From the data obtained it was found that the distribution was normal so that the data were analyzed with2the One-Way ANOVA. After the data was examined using the One-Way ANOVA test to determine the differences betwen the three groups and the Post Hoc Bonferroni test to determine the differences, it was determined that the distribution of the data was normal at a 0.05 level of significance in each group.

RESULT AND DISCUSSION

Result

Three groups of 108 patients were included in the study. The following table displays the findings of the Visual Analogue Score assessment of patients' postoperative pain.

Table 1. Visual Analogue Scale Post Sectio Caesarian

Group	N	Maximum	Minimum	Mean	SD
K	36	6	3	4,92	0,906
B	36	4	1	2,14	0,899
M	36	4	2	3,06	0,583

From the analysis of the data, it was found that the distribution of data was normal. Statistical analysis using the One Way-ANOVA test found significant differences (p=0.000) in the Visual Analogue Scale of patients between experimental groups where there were 3 groups. Further differences for each experimental group were analyzed with the Bonferroni Post Hoc Test.

Table 2. Bonferroni dan Tamhane Test Visual Analogue Scale Post Caesarian Section

Group		Mean Difference	95% Confidence Lower	95% Confidence Upper	*P*
K	B	2,778	2,31	3,24	0,000
	M	1,861	1,40	2,33	0,000
B	K	-2,778	-3,24	-2,31	0,000
	M	-0,917	-1,38	-0,45	0,000
M	K	-1,861	-2,33	-1,40	0,000
	B	0,917	0,45	1,38	0,000

Group B and group K differed significantly on the visual analogue scale (p value = 0.000). Comparing group M to group K, the results were identical (p value = 0.000). It is evident that group B and group M differ significantly from one another, with the Group B's visual analogue scale is smaller than Group M's (p=0.000).

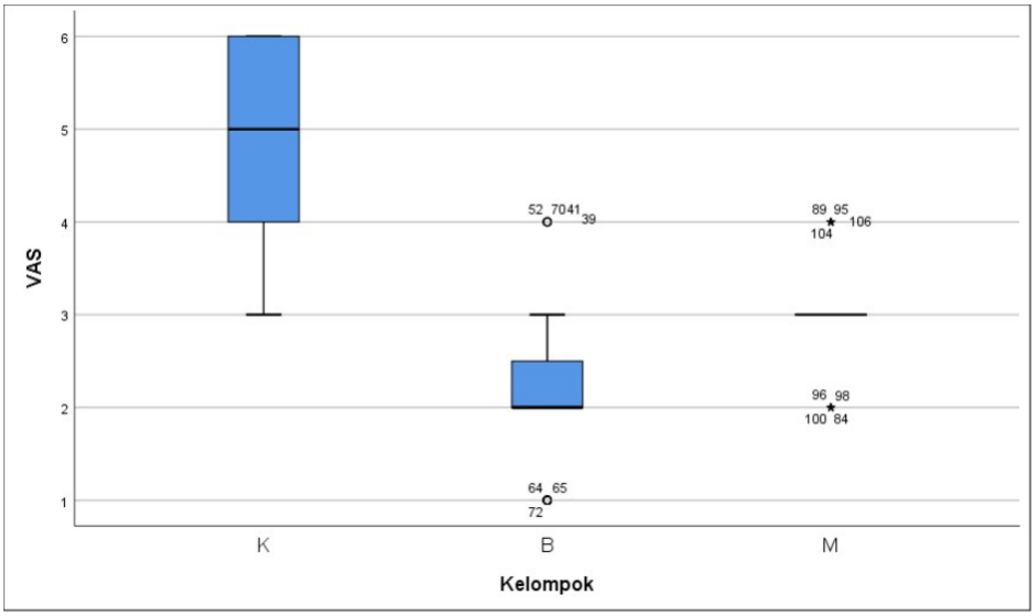

Figure 1. Box plot graph of 3 treatment groups.

Discussion

Post-cesarean section pain is something that must be monitored in the room after vital signs. This relates to the speed of mobility and postoperative patient recovery. However, the administration of various and quite a lot of pain medication apart from having a high risk of side effects, also increases the workload of health workers due to increased attention and monitoring of drug administration in patients with high pain scores. Methods that are sufficient to relieve pain and are expected to reduce the workload of health workers include intrathecal morphine administration and transversus abdominis plane muscle blocks.

An opioid used to treat both acute and chronic pain is morphine. Morphie is frequently used as a spinal anesthetic adjuvant (Butterworth, 2018). Compared to intravenous (IV), oral (PO), or transdermal (TD) opiates, intrathecal (IT) morphine has the benefit of being delivered into direct access to ion channels and opiate receptors in the subarachnoid region. Since intrathecal distribution significantly increases the morphine's

potency, switching from systemic to intrathecal morphine treatment necessitates careful attention to dosage. Patients experiencing neuropathic or nociceptive pain that is well-localized and sensitive to systemic opioids are more likely to benefit from intrathecal morphine. This pain might or might not be related to cancer. By acting directly at the dorsal horn of the spinal cord, intrathecal administration circumvents first-pass metabolism and the blood-brain barrier, allowing morphine to attain compared to large-dosage oral opioids, analgesic impact at a lower dose and maybe less systemic adverse effects. For patients whose pain is not responsive to systemic opioids, intrathecal morphine is less likely to be helpful. Patients who suffer from substance addiction, obstructive sleep apnea, or pulmonary disease should also avoid or utilize intrathecal opiates as little as possible. Because it takes time to titrate, patients with cancer-related pain who have a life expectancy of less than three months should not receive intrathecal morphine delivery by implantable pumps with ideal dosage schedule. The periaqueductal-periventricular gray matter, the ventromedial medulla, and the spinal cord are the three different parts of the central nervous system (CNS) where opioids act. The mu-receptor is the primary site of interaction for morphine. The posterior amygdala, hypothalamus, thalamus, caudate nucleus, putamen, and certain cortical regions all contain large densities of opioid mu-binding sites. In the spinal cord's substantia gelatinosa, they are also found on the terminal axons of primary afferents. Action starts five to ten minutes later. Action duration: Since the pattern is biphasic, the clinical duration of action may extend up to 20 hours (Cummings, 2022).

Intrathecal morphine is frequently used in individuals who have had caesarian sections. In spinal anesthesia, 100 mcg is often administered as a single dose in addition to local anesthetic. Overdosing has led to a greater frequency of adverse effects with little improvement in analgesia quality.Several centers utilize this drug to decrease dose of local anesthetic and improved quality of block (Cosgrave, 2017).

In this study, the morphine pain score was lower than the control. With significant test results (p=0.000). Nermin Girgin’s research proved that intathecal morphine combined with bupivacain has no difference effect than IV morphine PCA for post caesarian section pain (Girgin, 2008).

The VAS score and total fentanyl administration significantly decreased in the intrathecal morphine and combination intrathecal morphine and bupivacain groups, according to Min Gi Ban's study (Ban, 2022).Intrathecal morphine for post-caesarean section analgesia was found by Izumi Sato to reduce the incidence of post-operative delayed ambulation (Sato,2020). According to a meta-analysis, analgesia following caesarian delivery is prolonged by high dosages (0,1-0,25 mg) of intrathecal morphine as opposed to low doses (0,05-0,1 mg). However, adverse symptoms such nausea, vomiting, pruritus, drowsiness, and respiratory depression might arise with high doses of intrathecal morphine(Sultan,2016).

A peripheral nerve block called the transverse abdominis plane (TAP) block is intended to anesthetize the nerves that feed the anterior abdominal wall (T6 to L1). In 2001, it was initially characterized. After that, a local anesthetic is given just deep into the fascial plane—the plane through which the sensory nerves pass—between the internal oblique and transverse abdominis muscles. According to a recent meta-analysis, the TAP block decreases opioid-related adverse effects such drowsiness and postoperative nausea

and vomiting while also increasing the time until the patient requests further analgesia, reducing the need for postoperative opioid use, and improving pain relief. Both general abdominal and gynecologic surgeries were included in the studies. With the advent of ultrasound, healthcare professionals can now more precisely conduct this block and determine the proper tissue plane under direct visualization (Wiisanen, 2018).

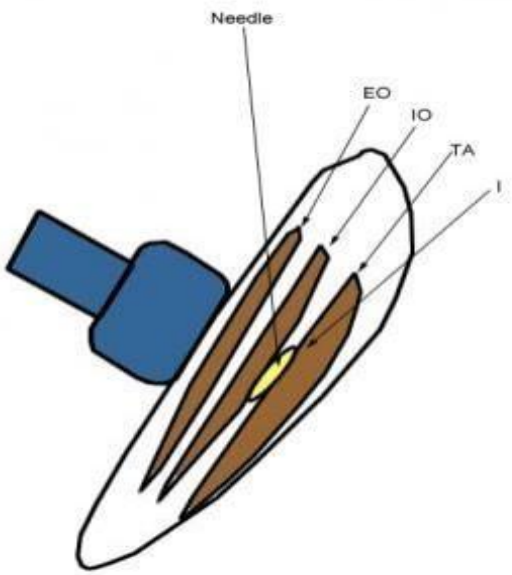

Figure 2. An illustration showing the proper positioning of the local anesthetic and the ultrasonography probe along the abdominal wall.

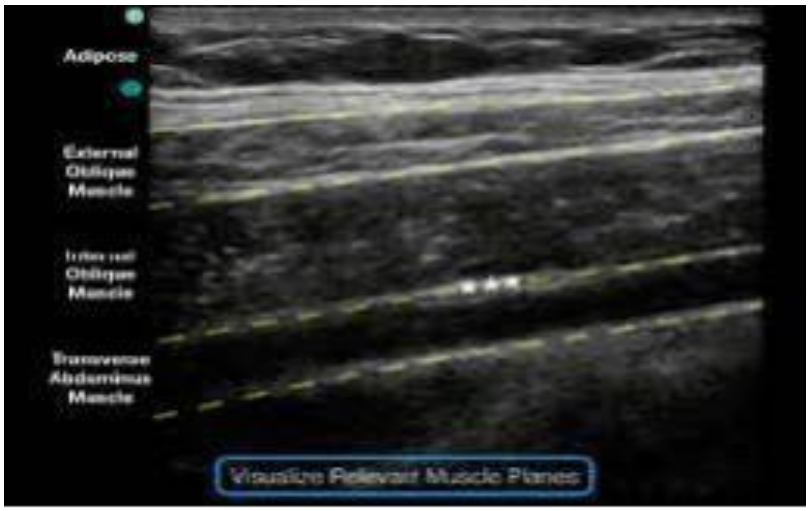

Figure 3. Ultrasonogram of transversus abdominis muscle and block location

A straightforward technique for postoperative pain management in abdominal, gynecologic, or urologic surgeries involving the T6 to L1 distribution is the TAP block.Randomized clinical studies have examined a number of surgical techniques, including laparoscopic cholecystectomy, abdominal hysterectomy, caesarean birth, open appendectomy, and large bowel resection (Wiisanen, 2018).

According to this study, the transversus abdominis muscle block group experienced noticeably less pain than the control group. Additionally, the transversus abdominis block group experienced a considerably lower pain score than the morphine group. It is yet

unknown how transversus abdominis plane (TAP) block affects postoperative pain. The purpose of this meta-analysis was to evaluate TAP block's analgesic effectiveness in patients having colorectal surgery. We discovered that TAP block was a successful strategy for lowering postoperative acute pain and morphine consumption based on seven clinical trials. Research on the analgesic effectiveness of transversus abdominis plane (TAP) block in patients following caesarian section may be conducted (Liu, 2018).

According to Eko Nofiyanto's research, pregnant patients with severe concomitant cardiac mitral stenosis who had sectio caesarean sections experienced safe and efficient analgesia via TAP Block with ropivacaine 0.25 percent. TAP Block has the same length of hospitalization as normal patients, prevents cardiac problems, decreases narcotic consumption, and speeds up mobilization time (Eko, 2020).

Poupak Rahimzadeh's use of 20 cc ropivacaine 0.25 percent for TAP block considerably reduced resting pain scores, particularly between 8 and 12 hours. Regarding analgesic intake, there was no statistically significant difference between the TAP block group and the control group. Compared to preepmtive TAP block, postoperative TAP block may provide superior postoperative analgesia(Rahimzadeh, 2022).

TAP block did not lower the use of intravenous analgesics, antiemetic medications, or pain scores when used as a supplemental strategy for the treatment of acute postoperative pain in the PACU in the current study, according to the other research retrospective study in a single center that examined 718 patients who had elective abdominal surgery with and without TAP block (Zhao Yi, 2018). No significant differences were found in post-operative pain scores (either for the first four hours or for the duration of the hospital stay) or opioid consumption between the pre-induction and post-induction groups in a cohort retrospective study of all adult patients who received TAP block and underwent colorectal procedures (Escudero, 2020).

CONCLUSSION

There was a significant difference in which intrathecal morphine and transversus abdominis muscle block reduced post-cesarean section pain scores. A lower pain score was obtained with the administration of the transverse muscle block compared with the administration of intrathecal morphine. Further research is needed regarding intrathecal morphine and transversus abdominis block in various patient conditions.

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