



Transabdominal Plane Block for Postoperative Pain Management: A Case Series

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ABSTRACT

Introduction: Post-surgery pain is the most common problem found in patients in the treatment room, which can provide patients with emotional experiences that have an impact on the recovery process. This study aims to present a case series of post-operative pain management with transversus abdominis plane (TAP) block and its outcomes. **Case presentation:** This study was conducted at the Polewali General Hospital, West Sulawesi, Indonesia. There were three patients who participated in this study, namely elective Caesarean section (C-section), emergency C-section and herniorrhaphy. The first patient had adequate analgesia, although the onset of the anesthetic drug worked perfectly two hours after the injection. In the second patient, the patient did not complain of severe pain the day after the transversus abdominis block action. The third patient made an excellent recovery. This patient was not given opioids for post-operative analgesia, only using Dexketoprofen every eight hours intravenously. The next day the patient could be scheduled for outpatient treatment. **Conclusion:** TAP block is one of the post-operative analgesia techniques that have good analgesia quality, especially when combined with other analgesic drugs in multimodal analgesia techniques.

Keywords: analgetic, transversus abdominis plane block anesthesia, pain, C-section.

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Introduction

Effective post-operative pain management is an essential requirement in the surgical process.¹ Good post-operative pain management will accelerate patient mobility, reduce the length of stay, provide cost-effective treatment and provide patient satisfaction. The main goal of post-operative pain management is to maximize the analgesic effect of the drug with minimal side effects. Pain management still has several obstacles in its implementation, such as inadequate information and education, fear of complications related to available analgesics, and poor pain assessment.^{2,3}

Regional anesthesia for abdominal wall procedures has several options for peripheral nerve block. This block uses ultrasonography to guide needle insertion and local anesthetic to block interfascial planes. The transversus abdominis plane (TAP) block is an injection of local anesthetic between the transversus abdominis (TA) and internal oblique (IO) muscles.^{4,5} TAP block can also be performed with an anatomically marked approach using a petit triangle. This interfascial plane includes the intercostal, subcostal, iliohypogastric, and ilioinguinal nerves. These nerves provide pain sensation in the lateral and anterior walls up to the parietal peritoneum but inhibit only somatic pain and not visceral pain.⁶

Clinical applications TAP blocks are now being used frequently for the management of post-operative pain in the abdominal wall area. This is due to relatively inexpensive tools and materials, a simple injection technique, and an ultrasound-guided block process to make the injection more precise. This technique has become increasingly popular since it was included in one of the pain management tools for enhanced recovery after surgery (ERAS). This study aims to present a case series of post-operative pain management with a transversus abdominis plane (TAP) block.

Case Presentation

This research was conducted at the Polewali General Hospital, West Sulawesi, Indonesia. There were three patients who participated in this study, namely elective Caesarean section (C-section), emergency C-section and herniorrhaphy. All patients had given informed consent regarding pain management measures and agreed to participate in this study.

The first patient

A 23 years old woman was hospitalized with a referral letter from a gynecologist. The patient is planned for a C-section with an indication of breech presentation to the fetus. The



results of the patient's preoperative examination, vital signs were within normal limits with a visual analog score (VAS) of 1/10. Based on the results of the physical and supporting examinations before anesthesia, the patient was categorized as ASA PS II. The patient was asked to fast for 8 hours before the procedure and was given a premedication of 40 mg omeprazole injection. The morning before surgery, the patient was given pregabalin 150 mg tablet, 5 mg dexamethasone injection, and 40 mg ondansetron injection. Anesthesia was carried out using a regional method of subarachnoid block anesthesia in the lumbar insertion area 3-4 with an injection of 0.5% Bupivacaine 10 mg dose with adjuvant fentanyl 25 mcg obtained motor and sensory block as high as thoracic 6.

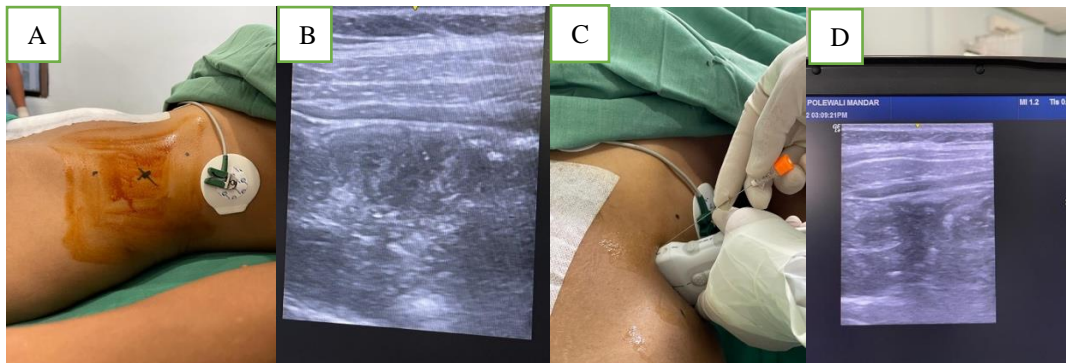


Figure 1. (A-D) TAP block procedure with ultrasound guidance in the first patient.

Post-operative pain management is carried out with trans-abdominal plane block action guided by ultrasound. The patient was prepared in the recovery room. The patient was in the supine position, and then the needle insertion site was identified between the SIAS and the eighth rib arch. After finding the trans-abdominal area, the insertion was carried out with ultrasound guidance using the in-plane method with the tip of the needle in the trans-abdominal fascia on both the left and right sides of the abdomen. Injection of local anesthetics with ultrasound guidance using Levobupivacaine with a concentration of 0.25% with a volume of 20 cc in the right TAP and 20 cc in the left TAP.

Patients were observed in the recovery room with an Alderette score of 8/10 with a Bromage scale of 1/4. The patient left the recovery room without any post-operative complications and post-TAP block with vital signs, BP 128/87mmHg, SpO₂ 99%, pulse rate 87x/min, respiratory rate 16x/min. Furthermore, in the treatment room, multimodal analgesia was given in the form of fentanyl 25mcg/hour/IV and Ibuprofen 400mg/8hour/intravenously



(IV). Follow-up on the first post-operative day, the patient was able to mobilize with no complaints of post-operative wound pain and was planned to go home the day after surgery.

The second patient

A 26 years old woman with a diagnosis of term G1P0A0 with preeclampsia not yet inpartum will be planned for a transperitoneal cesarean section on indications of failed acceleration of labor. Based on the evaluation of the physical examination and support, the patient was included in the ASA PS III status with systemic disorders of high blood pressure 200/110mmHg during labor.

In intraoperative, spinal anesthesia was performed using the local anesthetic bupivacaine 0.5% 10 mg added with 25 mcg of Fentanyl adjuvant. Evaluation of vital signs before anesthesia is as follows; blood pressure 180/110mmHg, heart rate 99 beats/minute, Bromage score 4/4 at the onset of 2 minutes. During surgery, vital signs were within normal limits, and there were no problems during the operation.

A post-operative transabdominal plane block procedure is accompanied by pain evaluation using a numerical rating scale every hour for the first 24 hours after surgery and injection. Pain management in the second patient included multimodal analgesics, namely, TAP block plus opioid analgesics such as fentanyl 25 mcg/hour intravenously and ibuprofen 400 mg/8 hour intravenously (Figure 2).

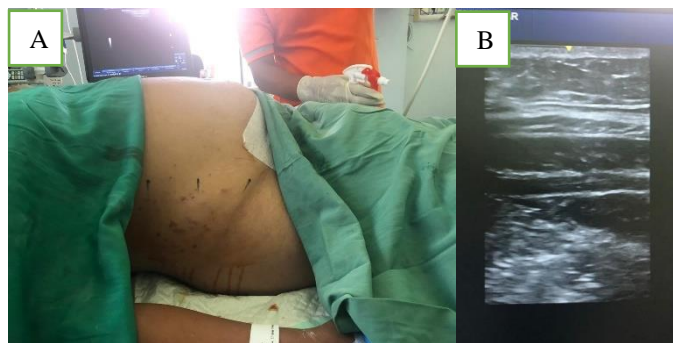


Figure 2. (A-B) TAP block procedure in the second patient.

Evaluation of post-operative pain 12 hours after transabdominal plane block, the patient still had complaints of visceral and somatic pain in the surgical wound area with mild to moderate pain intensity. Evaluation with a numerical rating scale measuring instrument obtained an NRS score of 2-4/10, especially when the patient was active and coughed, but the



patient was able to do activities in the treatment room. Follow-up on the second post-operative day, there were no complaints of pain, and the administration of opioids was discontinued. The analgesic given was dexketoprofen/8 hour intravenously. Observations were still carried out because the patient was included in the high-risk category, namely severe preeclampsia. On the third day, the patient was allowed to go home with a follow-up recommendation one week later.

The third patient

A 30 years old man was treated with a diagnosis of right lateral inguinal hernia, and herniorrhaphy will be performed. The patient was included in the ASA PS I category, and there was no risk of complications from anesthesia. Anesthesia for the subarachnoid block was performed with local anesthetic 0.5% bupivacaine at a dose of 12.5 mg plus adjuvant Fentanyl 25 mcg. The block was obtained at the level of the 4th thoracic dermatome, then a herniorrhaphy was performed with a duration of 50 minutes, and post-operative analgesia was administered in the form of Ibuprofen 400 mg/8 hours intravenously. A transversus abdominis plane block was added to the right side of the unilateral abdomen. The procedure for the action of the TAP block is as follows; The patient is in the supine position, then the needle insertion site is marked between the iliac crest and the costal arch, then the injection area is disinfected using betadine and alcohol. Insertion using a 25G spinal needle with ultrasound guidance with a posterior approach. Spinocan 25G needle insertion seen on ultrasound penetrates the skin, external oblique, and internal oblique muscles until the tip of the needle is positioned in the plane of the transversus abdominis muscle, then injection of local anesthetic Levobupivacaine 0.25% with a volume of 20 cc, after the injection the patient returned to treatment for post-operative monitoring and post-injection (Figure 3).

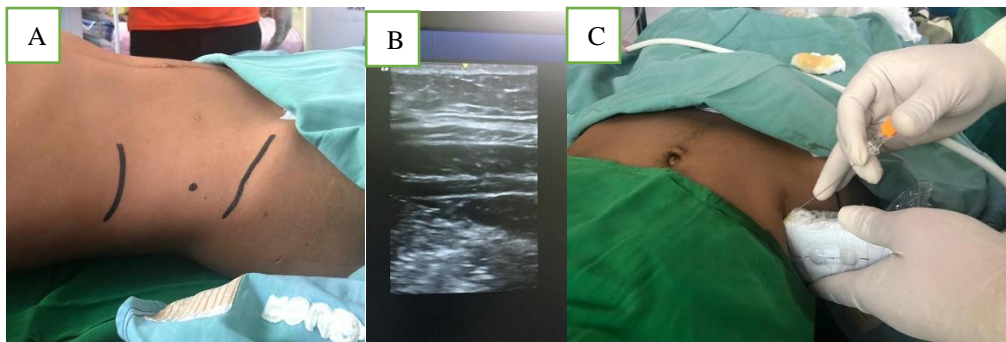


Figure 3. (A-C) TAP block procedure in the third patient.



One hour after the injection, the patient did not complain of pain in the surgical wound and had begun to take fluid and soft intake gradually as an intravenous analgesic. Used ketorolac 30mg/8hour/iv for 2x24 hours. This patient did not use intravenous opioids for post-operative pain management.

Discussion

The use of the transversus abdominis plane (TAP) block technique is one of the methods of choice for post-operative pain management with multimodal techniques, where this technique provides many advantages and good effects during the post-operative recovery period.⁵⁻⁸ The use of TAP blocks reduces the need for the use of opioids and accelerates the mobilization process so as to reduce the length of the patient's stay in the hospital, where the impact will also reduce the cost of patient and hospital care.

Pregnant women who undergo cesarean section are generally treated for 3-5 days in care from admission to discharge. A complaint that is often found in the treatment room which makes the patient long hospitalized is pain, which makes the patient afraid to mobilize early because of severe pain, even until the patient is disturbed from sleep. The first patient had adequate analgesia, although the onset of the anesthetic drug worked perfectly two hours after the injection. During post-injection observation, the patient did not complain of pain at the surgical site and was able to mobilize early during the monitoring period.

In the second patient, there was pain at the edge of the surgical wound on the first post-operative observation day, but the patient was able to mobilize out of bed and to the bathroom. Within 24 hours after the transversus abdominis block, the patient did not complain of severe pain. The opioid analgesic fentanyl 25 mcg/hour was used only during the first 24 postoperatively.

In the third patient with post-operative herniorrhaphy, the patient was treated with a unilateral TAP block on the right side of the patient using a lateral approach. The procedure was relatively short, only five minutes. This is because the identification of Plane Transversus abdominis is not too difficult because the patient is not obese. The analgesic effect of the local anesthetic Levobupivacaine 0.25% with a volume of 20cc was well distributed. The patient did not feel pain 20 hours postoperatively and was able to mobilize in the treatment room and start a soft diet. This patient was not given opioids for post-operative analgesia, only using



Dexketoprofen every eight hours intravenously. The next day the patient could be scheduled for outpatient treatment.

TAP block is a technique that is generally simple and not too difficult to perform, with a high probability of success with little risk. It can be performed with or without ultrasound, although the accuracy and precision of local anesthetic deployment are better with ultrasound guidance. A study reporting the efficacy of TAP block in laparoscopic adrenalectomy concluded that minimally invasive TAP block could reduce opioid use and improve pain control. 7 TAP block provides an analgesic effect on the abdominal wall, so it is recommended for post-abdominal pain management.⁹ TAP block is a simple procedure with moderate difficulty and less risk when compared to epidural analgesia techniques. TAP block can be done unilaterally in cases of surgery on one side of the abdomen, such as appendectomy, herniorrhaphy in cases of lateral inguinal hernia, cholecystectomy. or surgery performed on both sides or bilateral abdomen, for example, in cesarean section, exploratory laparotomy, and laparoscopy, with the needle insertion approach obliquely, laterally, and posteriorly.

Transversus abdominis plane (TAP) block provides analgesia in the abdominal wall area in some upper or lower abdominal operations and can be performed on open abdominal surgery as well as laparoscopic procedures. Contraindications to the TAP block technique are patient refusal, infection at the injection site, and allergy to local anesthetics. Relative contraindications that need to be considered are patients who are taking anticoagulant drugs, pregnant patients, patients who are anatomically difficult to identify, such as thin and short patients, and geriatric patients.^{10,11}

The transversus abdominis plane block can be performed blindly using a petit triangle as a marker for needle insertion for injection or by using ultrasonography (USG) to guide the needle in the transversus abdominis plane. The classical approach was first described by Rafi and McDonell as a double pop sensation with a blind technique using a blunt needle inserted through the external oblique muscle, internal oblique muscle, and fascia in the iliolumbar triangle of petit. The triangle is bounded posteriorly by the latissimus dorsi muscle and anteriorly by the external oblique muscle, with the iliac crest forming the base of the triangle. The use of ultrasound modifies this technique, and the TAP block can be accessed anywhere between the iliac crest and the costal margin behind the anterior axillary line.¹¹⁻¹⁴



Conclusion

TAP block is one of the post-operative analgesia techniques that has good analgesia quality, especially when combined with other analgesic drugs in multimodal analgesia techniques. The different TAP block insertion approaches provide many options for officers to take action according to the needs of the blocked area, as well as the ability to use whichever technique is easier to master.

References

1. Levy N, Mills P, Rockett M. Post-surgical pain management: time for a paradigm shift. *Br J Anaesth*. 2019; 123(2): e182-6.
2. White PF, Kehlet H. Improving post-operative pain management. What are the unresolved issues? *Anesthesiology*. 2010; 112: 220–5.
3. Gerbershagen HJ, Aduckathil S, van Wijck AJ, Peelen LM, Kalkman CJ, et al. Pain intensity on the first day after surgery: a prospective cohort study comparing 179 surgical procedures. *Anesthesiology*. 2013; 18: 934–44.
4. Sinha A, Jayaraman L, Punhani D, Chowbey P. Transversus abdominis plane block for pain relief in patients undergoing in endoscopic repair of abdominal wall hernia: A comparative, randomized double-blind prospective study. *J Minim Access Surg*. 2018; 14(3): 197-201.
5. Uppal V, Sancheti S, Kalagara H. Transversus abdominis plane (TAP) and rectus sheath blocks: a technical description and evidence review. *Current Anesthesiology Reports*. 2019; 9(4): 479-87.
6. Ekmekçi P, Bengisun ZK, Kazbek BK, Han S, Tüzüner F. Ultrasound guided TAP block for the treatment of post-operative prolonged pain-an alternative approach. 2012.
7. Ozciftci S, Sahiner Y, Sahiner IT, Akkaya T. Is right unilateral transversus abdominis plane (TAP) block successful in post-operative analgesia in laparoscopic cholecystectomy?. *International Journal of Clinical Practice*. 2022.
8. Erten O, Isiktas G, Avci SN, Berber E. The efficacy of laparoscopic transversus abdominis plane block on reducing post-operative narcotic usage in patients undergoing minimally invasive adrenalectomy. *Surgical Endoscopy*. 2022; 1-6.
9. Lochel J, Janz V, Leopold VJ, Kramer M, Wassilew GI. Transversus abdominis plane block for improving early post-operative pain management after periacetabular osteotomy: a randomized clinical trial. *J Clin Med*. 2021; 10(3): 394.



10. Brogi E, Kazan R, Cyr S, Giunta F, Hemmerling TM. Transversus abdominal plane block for post-operative analgesia: A systematic review and meta-analysis of randomized-controlled trials. *Can J Anaesth*. 2016; 63: 1184–96.
11. Covotta M, Claroni C, Costantini M, Torregiani G, Pelagalli L, et al. The effects of ultrasound-guided transversus abdominis plane block on acute and chronic postsurgical pain after robotic partial nephrectomy: a prospective randomized clinical trial. *Pain Med*. 2019.
12. Mujukian A, Truong A, Tran H, Shane R, Fleshner P, et al. A standardized multimodal analgesia protocol reduces perioperative opioid use in minimally invasive colorectal surgery. *J Gastrointest Surg*. 2019; 24: 2286–94.
13. Tubog TD, Harenberg JL, Mason-Nguyen J, Kane TD. Opioid-sparing effects of transversus abdominis plane block in elective hysterectomy: a systematic review and meta-analysis. *AANA J*. 2018; 86: 41–55.
14. Shibata Y, Sato Y, Fujiwara Y, Komatsu T. Transversus abdominis plane block. *Anesth. Analg*. 2007; 105: 883.