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Original Article

EVALUATING THE DURATION OF POSTOP ANALGESIA FOLLOWING ULTRASOUND GUIDED TRANSVERSALIS FASCIA PLANE BLOCK IN PATIENTS UNDERGOING OPEN INGUINAL HERNIA SURGERY

Dr. Narmatha Yangtse[1], Dr. Chandrakala[2], Dr K. Kalyanasundaram[3], Dr Naveen Kumar[4]

[1] MD (anaesthesia) Associate professor, coimbatore medical College, Tamilnadu.
[2] MD, assistant professor, coimbatore medical College, Tamilnadu.
[3] MD, Professor, coimbatore medical College, Tamilnadu.
[4] MD, junior resident, coimbatore medical College, Tamilnadu.

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Corresponding Author:

Dr. Narmatha Yangtse
MD (anaesthesia) Associate professor, coimbatore medical College, Tamilnadu.

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ABSTRACT

Background: Regional anaesthesia techniques play a vital role in multimodal postoperative pain management for lower abdominal surgeries. The ultrasound-guided transversalis fascia plane block has emerged as an effective truncal block targeting the ilioinguinal and iliohypogastric nerves, offering prolonged analgesia with minimal complications.
Aim: To evaluate the duration and quality of postoperative analgesia provided by ultrasound-guided transversalis fascia plane block in patients undergoing elective open inguinal hernia repair under spinal anaesthesia.
Materials and Methods: This prospective observational study was conducted over 12 months in the Department of Anaesthesiology at a tertiary care hospital. Fifty adult patients with American Society of Anesthesiologists physical status I and II, aged 18–75 years, scheduled for elective open inguinal hernia repair were included. All patients received spinal anaesthesia followed by ultrasound-guided transversalis fascia plane block using 20 ml of 0.25% bupivacaine at the end of surgery. Postoperative analgesia was assessed using Visual Analogue Scale scores, heart rate, blood pressure, duration of analgesia, and time to first rescue analgesic.
Results: Effective postoperative analgesia was observed for an average duration of 12–13 hours. Pain scores remained minimal in the early postoperative period and increased gradually after block regression. Higher body mass index was associated with increased opioid requirements, while weight and height showed no significant correlation.
Conclusion: Ultrasound-guided transversalis fascia plane block provides effective and prolonged postoperative analgesia following open inguinal hernia surgery and may serve as a reliable component of multimodal pain management strategies.

Keywords*: Transversalis fascia plane block, Ultrasound-guided regional anaesthesia, Postoperative analgesia, Inguinal hernia repair, Multimodal analgesia, Spinal anaesthesia*

INTRODUCTION

Regional anaesthesia techniques have increasingly become a cornerstone in multimodal analgesia strategies, especially in abdominal wall surgeries. A variety of abdominal wall blocks are now used to control postoperative pain after lower abdominal surgeries. These include the Quadratus lumborum block and Transversus abdominis plane (TAP) block. The Transversalis fascia plane block (TFPB), a more recent approach first introduced by Hebbard in 2009, has gained popularity recently and has been successfully applied in procedures like inguinal hernia repair, iliac crest bone grafting, and appendicectomy. The advent of Ultrasound-guided nerve blocks has greatly improved pain management by enabling precise targeting of nerves and fascial layers. This precision not only optimizes drug delivery and block success with fewer attempts but also reduces the local anaesthetic dosage needed and minimizes related complications.

AIM

The purpose of this study is to determine the duration of postoperative analgesia provided by ultrasound-guided transversalis fascia plane block in patients undergoing lower abdominal procedures, specifically open inguinal hernia repair.

Primary Objective

• To evaluate the duration of postoperative analgesia using the Visual Analogue Scale (VAS), heart rate, and blood pressure following ultrasound-guided transversalis fascia plane block.

Secondary Objectives

• To assess the time (in hours) until the requirement of the first rescue analgesic (Inj. Tramadol).

• To compare the variation in the duration of postoperative analgesia across different body mass index (BMI) categories.

MATERILAS AND METHODS

A prospective observational study was carried out in the Department of Anaesthesiology, Coimbatore Medical College Hospital, involving patients undergoing elective open inguinal hernia repair. A total of 50 patients were enrolled in the study group. All the patients received spinal anaesthesia for surgery, followed by an ultrasound-guided transversalis fascia plane block (TFPB) with 20 ml of 0.25% bupivacaine administered at the end of the procedure.

Inclusion Criteria

- Age: 18–75 years
- Gender: Both male and female
- Weight: > 50 kg
- ASA physical status: Class I and II
- Elective open inguinal hernia repair

Exclusion Criteria

- Contraindications to regional anaesthesia
- Patient refusal
- Known allergy to local anaesthetics
- Local sepsis at the injection site
- Psychiatric illness
- Coagulopathy
- Inability to comprehend or adhere to the study protocol
- Failure to meet inclusion criteria

Methodology

Eligible patients were recruited after obtaining informed consent. Upon arrival in the operating room, standard monitors were attached, including an electrocardiogram (ECG), non-invasive blood pressure (NIBP), and pulse oximetry.

All patients received spinal anaesthesia followed by surgery. At the completion of surgery, an ultrasound-guided transversalis fascia plane block (TFPB) was performed in the supine position. A 22-gauge, 80 mm block needle was advanced under ultrasound guidance until the tip was visualized just deep to the transversalis fascia. Subsequently, 20 ml of 0.25% bupivacaine was injected to achieve the block.

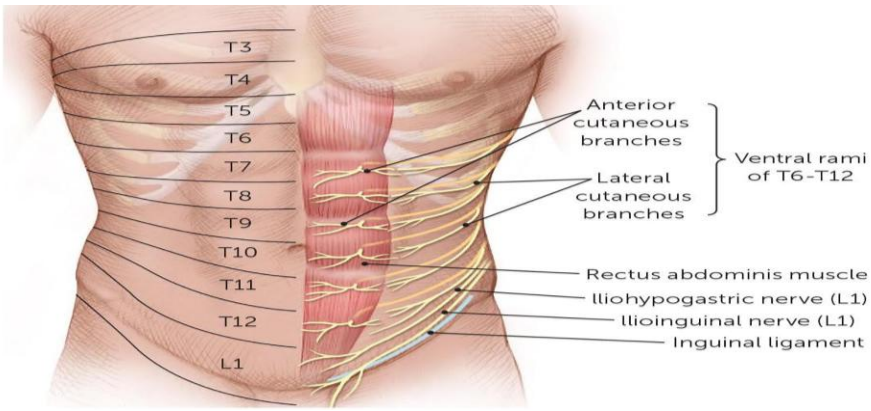


FIGURE 1: CUTANEOUS NERVE SUPPLY OF ANTERIOR ABDOMINAL WALL.

Transversalis Fascia Plane Block

The transversalis fascia plane block (TFPB) is a truncal regional anaesthetic technique designed to provide analgesia by targeting the ilioinguinal and iliohypogastric nerves. These nerves are located between the transversus abdominis muscle

and the transversalis fascia, making this block particularly effective for lower abdominal surgeries such as inguinal hernia repair..

The transversalis fascia is a thin aponeurotic membrane that connects the transversus abdominis muscle to the extraperitoneal fascia. It constitutes one of the principal fascial layers lining the abdominal wall and serves as the anatomical landmark for deposition of local anaesthetic in TFPB.

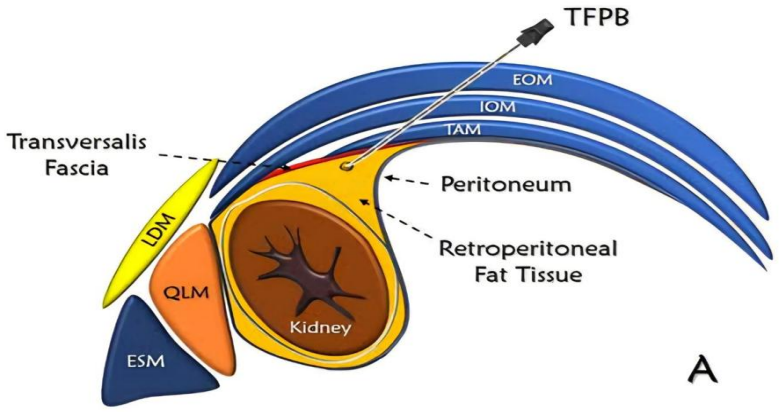


FIGURE 2: TRANSVERSALIS FASCIA PLANE BLOCK.

The transversalis fascia plane block (TFPB) is performed with the patient in supine using an in-plane anterior approach under ultrasound guidance. A linear or curvilinear probe is placed transversely between the iliac crest and costal margin to identify the external oblique, internal oblique, and transversus abdominis muscles, along with the posterior transversus aponeurosis. The needle, typically 100–150 mm, is advanced perpendicular to the ultrasound beam until it passes through the deep surface of the transversus abdominis. Local anaesthetic is then injected to separate the transversalis fascia from the muscle, ensuring spread along the anterior surface of the quadratus lumborum while minimizing the risk of peritoneal or hepatic injury.

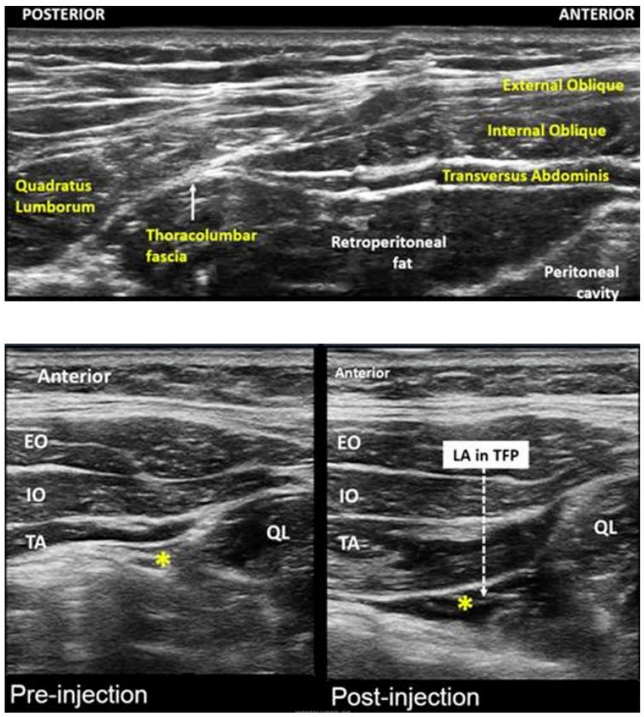
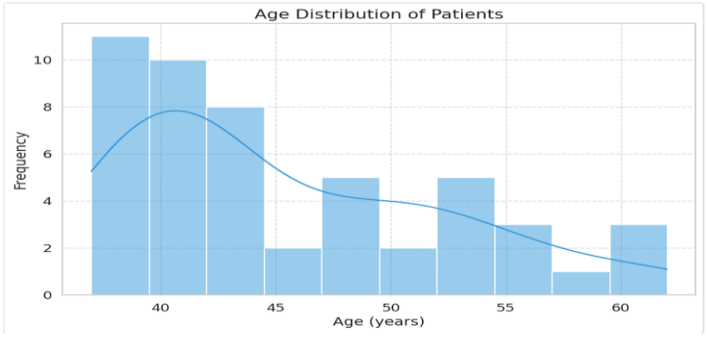


FIGURE 3: USG IMAGE OF TFPB.

STATISTICAL ANALYSIS

The statistical analyses were performed using IBM SPSS version 26. For the normal distribution, data were reported as mean ± standard deviation. An independent sample t-test was used to compare the means of the groups. P-values of <0.05 were considered statistically significant.

CHART 1 : Distribution of age in years



The study included a total of 50 patients. The age range of patients was 37 to 62 with a mean age of 45.4 (SD – 7.5 Years) . This indicates that the study primarily focused on middle aged adults, with no representation of paediatric, young adult, or geriatric populations.

TABLE 1 : ASA CLASSIFICATION BY GENDER

Distribution of ASA physical status classification across gender groups.

GENDER	1.0	2.0
F	3.00	6.00
M	28.00	13.00

The American Society of Anaesthesiologists (ASA) physical status classification provides important information about patients preoperative health status and potential risk factors.

ASA AND OPIOID REQUIREMENTS

The ANOVA analysis examining differences in 24-hour opioid consumption across ASA categories yielded a non-significant result ($F = 0.520419$, $p > 0.05$)

ASA AND HEMODYNAMIC STABILITY - of vital signs trends across ASA categories revealed that patients with higher ASA classification generally exhibited greater variability in heart rate and blood pressure measurements. The ASA classification findings suggest that preoperative health status should be considered when developing individualised pain management protocols.

HEIGHT, WEIGHT AND BMI

TABLE 2 : COMPARISON OF AGE, HEIGHT, WEIGHT AND BMI

Descriptive statistics for age, gender, height, weight, and BMI of all patients.

Variable	count	mean	std	min	25%	50%	75%	max
AGE	50.00	45.40	6.98	37.00	40.25	42.00	50.00	62.00
HEIGHT	50.00	163.88	8.25	146.00	158.25	165.00	169.75	180.00
WEIGHT	50.00	69.14	8.85	53.00	62.25	68.50	76.00	88.00
BMI	50.00	25.80	3.21	19.79	23.60	25.60	28.05	34.45

TABLE 3: KEY CORRELATION BETWEEN VARIABLES

Pearson correlation coefficients and significance for key variable pairs.

Variables	Correlation Coefficient (r)	p-value	Significance
Age vs Weight	-0.04	0.80	Not Significant
Age vs Opioid Consumption	8.3437e-03	0.95	Not Significant
Weight vs Opioid Consumption	0.11	0.43	Not Significant
Height vs Opioid Consumption	-0.10	0.49	Not Significant

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TABLE 4 : BMI CATEGORY STATISTICS

Distribution and opioid consumption statistics by BMI category.

Unnamed: 0	BMI	BMI.1	BMI.2	OPIOID_CONSUMPTION_24HR	OPIOID_CONSUMPTION_24HR.1
N/A	count	mean	std	mean	std
BMI_CATEGORY	N/A	N/A	N/A	N/A	N/A
Underweight	0	N/A	N/A	N/A	N/A
Normal	20	22.721241459120638	1.612515833219581	130.0	47.01623459816273
Overweight	26	27.20272454969809	1.4071989391997424	142.30769230769232	50.38314736557789
Obese	4	32.04952319126593	1.6948724521030067	150.0	57.735026918962575

CHART 1

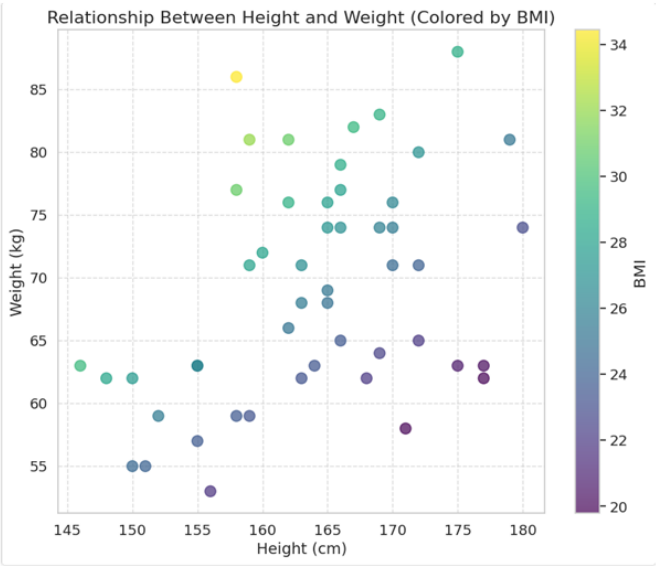


CHART 2

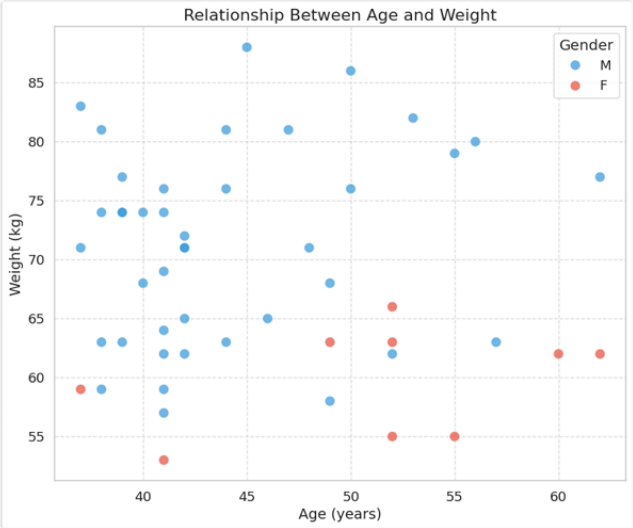


CHART 3

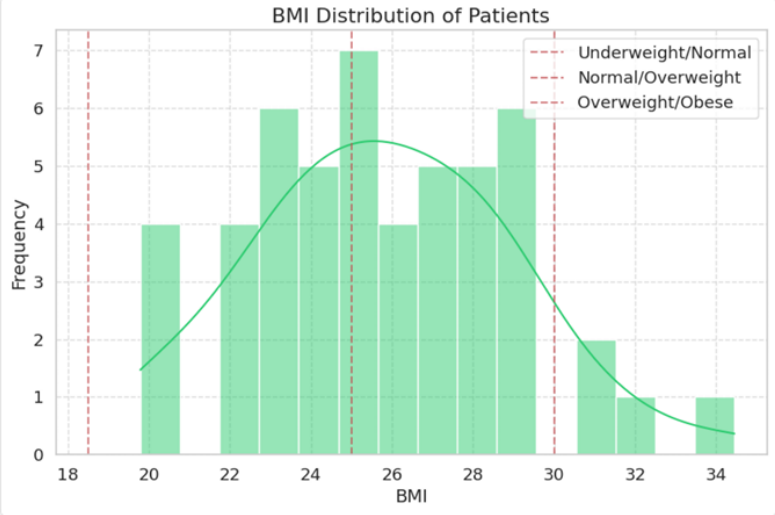
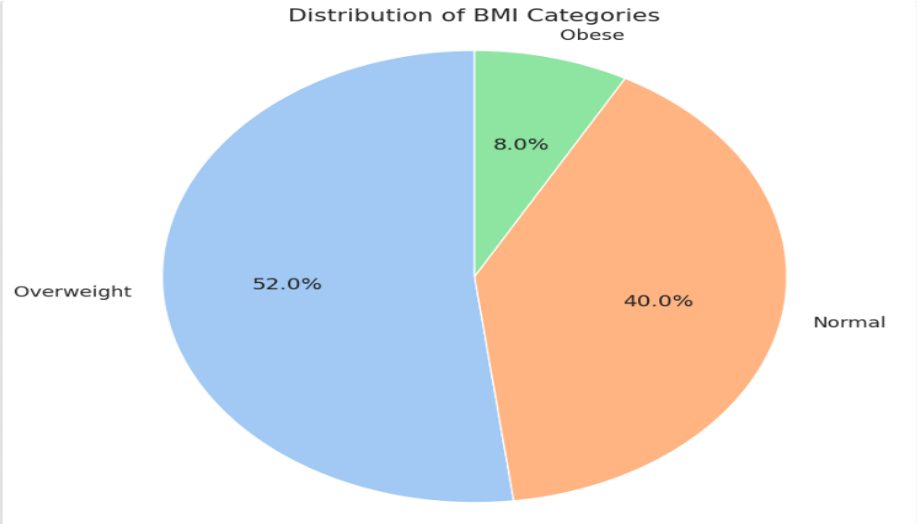


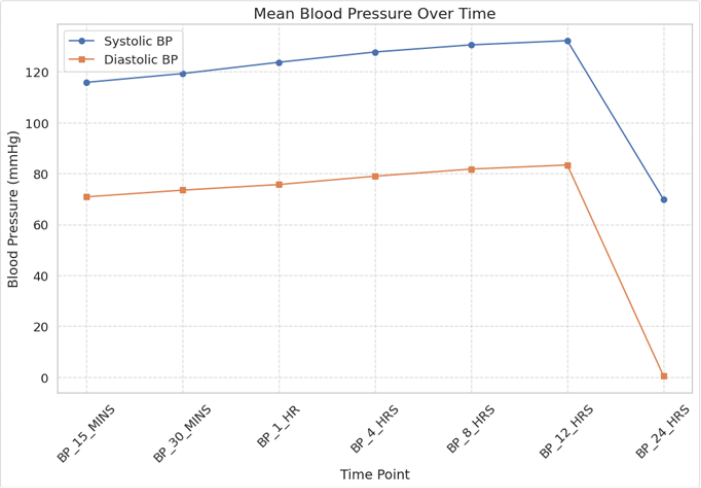
CHART 4



WEIGHT AND OPIOID CONSUMPTION: A non-significant correlation was found between patient weight and opioid consumption ($r = 0.11$, $p > 0.05$) .

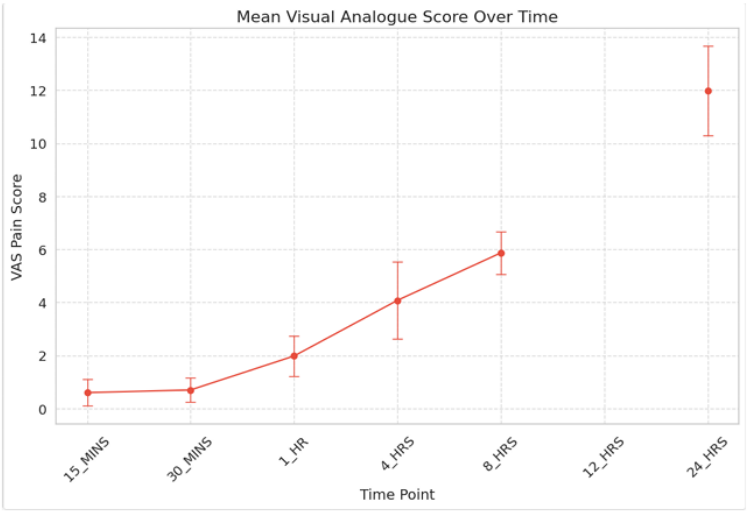
HEIGHT AND OPIOID CONSUMPTION :The correlation between height and opioid consumption was not statistically significant (r = -0.10, p > 0.05).
BMI AND OPIOID REQUIREMENTS :Analysis found a favourable link between BMI and 24-hour opioid intake, with patients with higher BMIs requiring more opioid analgesics. This finding is consistent with pharmacokinetic principles as lipophilic opioid medications have larger volumes of distribution in patients with higher body fat percentages, potentially necessitating larger doses for equivalent analgesic effect.
BMI AND HEMODYNAMIC PARAMETERS :Patients with higher BMI values tend to exhibit higher baseline blood pressure readings, particularly systolic pressure which aligns with the established association between excess body weight and hypertension.

CHART 5



Both systolic and diastolic blood pressure measurements demonstrated notable trends. Systolic BP showed an initial reading around 110 mmHg at 15 minutes, with a 58 progressive increase over time, reaching approximately 128 mmHg by the 24 hour mark. Diastolic BP followed a similar pattern but with less pronounced changes, starting around 70 mmHg and increasing to approximately 80 mmHg by 24 hours.

CHART 6



Pain scores demonstrated a characteristic temporal pattern, with minimal pain reported during the initial measurements (15 minutes and 30 minutes), suggesting effective immediate post-intervention analgesia. A notable increase in pain scores began at the 4-hour mark and continued to rise through the 8- and 12-hour measurements, reaching peak intensity at the 24-hour assessment. This pattern aligns with the expected duration of initial analgesic effectiveness and the natural progression of post-procedural pain.

CHART 7

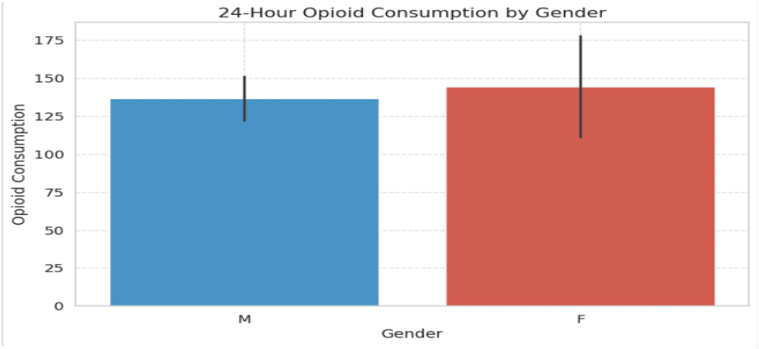
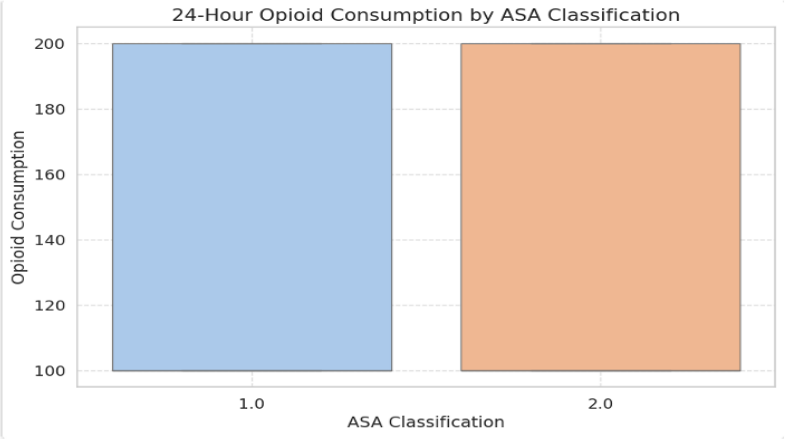
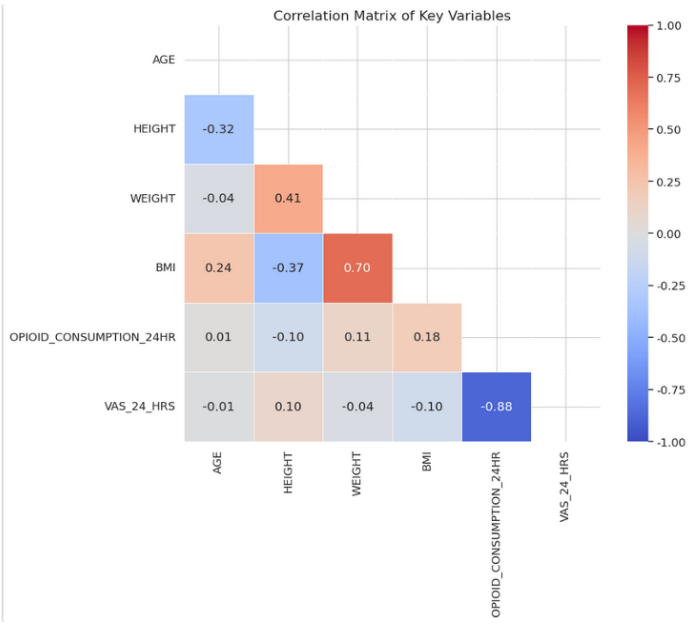


CHART 8



The 24-hour opioid consumption data reveal considerable variability among patients, with a mean consumption of approximately 100 mg. This variability likely reflects individual differences in pain perception, analgesic metabolism, and response to initial intervention. Notably patients with higher BMI values tends to require greater amount of opioids, suggesting a potential relationship between
body composition and analgesic requirements

CHART 9



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The observed pattern of increasing pain scores over time, coupled with the need for rescue analgesia in most patients, suggests that the current analgesic protocol may benefit from refinement to provide more consistent pain control

throughout the entire 24 hour period. Consideration should be given to scheduled supplementary analgesia at around 8 to 10 hour mark, before pain scores reach moderate levels, rather than waiting for breakthrough pain to occur.

This prospective observational study was conducted over 12 months in the Department of Anaesthesiology, Coimbatore Government Medical College and Hospital, Tamil Nadu, involving 50 ASA I–II patients aged 18–75 years undergoing elective open inguinal hernia repair under spinal anaesthesia. At the end of surgery, all patients received an ultrasound-guided transversalis fascia plane block (TFPB) with bupivacaine, and postoperative analgesia was assessed using VAS scores, heart rate, and blood pressure, along with the duration of analgesia and time to first rescue analgesia. The study population had a mean age of 45.4 years (SD 7.5), representing predominantly middle-aged adults. ANOVA analysis showed no significant difference in 24-hour opioid consumption across ASA categories ($F = 0.520$, $p > 0.05$), though patients with higher ASA status exhibited greater variability in vital signs, suggesting that preoperative health status may influence postoperative physiological responses without altering opioid requirements.

The study found no significant correlation between patient weight or height and opioid consumption, but a positive association was observed between BMI and 24-hour opioid use, with higher BMI patients requiring greater doses. This is consistent with pharmacokinetic principles, as lipophilic opioids distribute more widely in individuals with increased body fat. Additionally, patients with higher BMI values tended to show elevated baseline blood pressure, particularly systolic readings, reflecting the established link between excess body weight and hypertension.

The study indicates that BMI plays a key role in postoperative outcomes, with higher BMI patients requiring greater opioid doses due to altered pharmacokinetics and showing elevated baseline blood pressure, particularly systolic values. These findings highlight the need for individualized pain management protocols, including careful opioid titration and closer hemodynamic monitoring in patients with higher BMI. Vital signs analysis also revealed gender differences, with females showing slightly higher heart rates and males higher systolic pressures. Heart rate trends followed a distinct pattern—moderate at baseline, dipping at 30 minutes, then gradually rising to about 95 bpm at 24 hours—suggesting initial stabilization followed by progressive physiological adaptation.

In the study, systolic blood pressure rose gradually from about 110 mmHg at 15 minutes to 128 mmHg at 24 hours, while diastolic pressure increased modestly from 70 to 80 mmHg over the same period. These changes, along with a parallel rise in heart rate, reflected recovery physiology, pain response, or the waning effect of the block, but overall patients maintained hemodynamic stability without adverse deviations.

Pain scores in the study showed minimal levels during the first 30 minutes, indicating effective immediate post-intervention analgesia. From 4 hours onward, scores began to rise steadily, peaking at 24 hours, consistent with the expected decline in initial analgesic effect and the natural progression of post-procedural pain. The average duration of effective pain relief was 12–13 hours, after which most patients required rescue analgesia, suggesting that the initial approach provided adequate control for about half of the 24-hour observation period

In our study, The 24-hour opioid consumption data reveal considerable variability among patients, with a mean consumption of approximately 100 mg. This variability likely reflects individual differences in pain perception, analgesic metabolism, and response to initial intervention. Notably, patients with higher BMI values tend to require a greater amount of opioids, suggesting a potential relationship between body composition and analgesic requirements.

López-González et al. compared transversus abdominis plane (TAP) block with ultrasound-guided transversalis fascia block (TFB) in outpatient inguinal hernia repair and found comparable postoperative outcomes in terms of rescue analgesia, morphine use, and pain scores, though TFB produced a higher sensory block.

Similarly, Scimia et al. demonstrated that ultrasound-guided TFB effectively anesthetizes T12–L1 dermatomes and proposed its use as an alternative to both general anesthesia and conventional regional techniques for inguinal hernia repair.

In an adult experiment, Fouad et al. examined the postoperative analgesic characteristics of TFB and QLB in patients scheduled for unilateral inguinal hernia surgery using a similar methodology. They discovered that the proportion of patients in both groups who required rescue analgesia and their postoperative pain levels were similar.

Huang et al. showed that TFPB produced analgesia for a longer period of time than QLB. This is because the injected LA spreads more locally and more successfully targets IIIH and subcostal neurons. Because the block may have travelled across the femoral nerve, it effectively provided analgesia for pediatric patients with dysplastic hip in this investigation.
Rahimzadeh et al. discovered that following an elective caesarean section, TFB and TAP block had comparable postoperative analgesic effects and satisfaction rates.

According to Abdelbaser et al. in their randomised double blind study, they found out that TFP block decreases postoperative analgesic consumption and postoperative pain intensity after pediatric inguinal herniorrhaphy when he compared TFP block with a control group using saline.

Aydin et al. in his randomised double blind study showed that postoperative TFP block reduce opioid consumption and relieves acute pain after a caesarean section under spinal anaesthesia when he compared TFP block with control group using saline.

Chilkoti et al. in his randomised control trial found out that TFP block was efficacious for management of both acute and chronic post-caesarean pain when he compared TFP block with wound infiltration in the local site.

Huang et al. done a randomized controlled trial where he compared the quadratus lumborum block with the transversalis fascia plane block. He concluded that TFP block could be superior to QL block for DDH repair In this study, the Transversalis fascia plane block (TFPB) offers good postoperative analgesia in patients who underwent open inguinal hernia surgery under spinal Anaesthesia.

CONCLUSION

The study suggests that the Transversalis fascia plane block (TFPB) gives a longer duration of postoperative analgesia, as evidenced by the time required for initial rescue analgesia. The considerable reduction in VAS score, systolic blood pressure, heart rate, and the number of rescue analgesia for transversalis fascia plane block suggests that it provides good postoperative analgesia. Transversalis fascia plane block can thus be used as an alternate approach for managing post-operative pain in individuals undergoing elective open inguinal hernia surgery.

Declaration:
Conflicts of interests: The authors declare no conflicts of interest.
Author contribution: All authors have contributed in the manuscript.
Author funding: Nill.

REFERENCES

1. Chin KJ, McDonnell JG, Carvalho B, Sharkey A, Pawa A, Gadsden J. Essentials of our current understanding: Abdominal wall blocks. Reg Anesth Pain Med 2017;42:133-83
2. Fernandes HDS, Azevedo AS, Ferreira TC, Santos SA, Rocha-Filho JA, Vieira JE. Ultrasound-guided peripheral abdominal wall blocks. Clinics (Sao Paulo) 2021;76:e2170.
3. Hebbard PD. Transversalis fascia plane block, a novel ultrasound-guided abdominal wall nerve block. Can J Anaesth 2009;56:618–20.
4. Urits I, Ostling PS, Novitch MB, Burns JC, Charipova K, Gress KL, et al. Truncal regional nerve blocks in clinical anaesthesia practice. Best Pract Res Clin Anaesthesiol 2019;33:559-71.
5. Peksöz U, Yayık AM, Çelik EC. Efficacy of ultrasound-guided transversalis fascia plane block in pediatric ureteroneocystostomy surgery. Korean J Anesthesiol 2022;75:188-90.
6. Ahiskalioglu A, Aydin ME, Doymus O, Yayik AM, Celik EC. Ultrasound guided transversalis fascia plane block for lower abdominal surgery: First pediatric report. J Clin Anesth 2019;55:130-1.
7. Singh S, Singh S, Sharma M. Successful use of Transversalis fascia plane block for iliac crest bone harvesting in a Polytrauma patient-A case report. Saudi J Anaesth 2020;14:107-8.
8. Tian Y, Zhan Y, Liu K, Bu S, Tian Y, Xiong C, et al. Analgesic effects of different concentrations of ropivacaine in transversalis fascia plane block during laparotomy. BMC Anesthesiol 2022;22:54.
9. Singh S, Singh S, Sharma M. Successful use of Transversalis fascia plane block for iliac crest bone harvesting in a Polytrauma patient-A case report. Saudi J Anaesth 2020;14:107-8.
10. Sequera-Ramos L, Ruby JM, Jackson OA, Ganesh A, Gurnaney H, Kraemer FW, et al. Continuous transversalis fascia plane catheter infusion in a pediatric patient undergoing alveolar cleft repair with iliac crest bone graft: A case report. A A Pract 2019;13:162-5.
11. S, Serifsoy TE. Transversalis fascia plane block provides effective postoperative analgesia for cesarean section: New indication for known block. J Clin Anesth 2018;48:13-4
12. Choudhary J, Mishra AK, Jadhav R. Transversalis fascia plane block for the treatment of chronic postherniorrhaphy inguinal pain: A case report. A A Pract 2018;11:57-9.
13. Vasques F, Stecco C, Mitri R, De Caro R, Fusco P, Behr AU. Blocking around the transversalis fascia: Behind the scene. Minerva Anestesiol 2019;85:15-20
14. Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Syst Rev 2015;4:1.
15. Chin KJ, Chan V, Hebbard P, Tan JS, Harris M, Factor D. Ultrasound-guided transversalis fascia plane block provides analgesia for anterior iliac crest bone graft harvesting. Can J Anaesth 2012;59:122-3.
16. Sterne JAC, Savović NS, J, Page MJ, Elbers RG, Blencowe Boutron I, et al. RoB 2: A revised tool for assessing risk of bias in randomised trials. BMJ 2019;366:l4898.

17. Stang A. Critical evaluation of the Newcastle-Ottawa scale for the assessment of the quality of nonrandomized studies in meta-analyses. Eur J Epidemiol 2010;25:603-5.
18. Deeks JJ, Higgins JP, Altman DG, Cochrane Statistical Methods Group. Analysing data and undertaking meta-analyses. Cochrane handbook for systematic reviews of interventions. 2019 Sep 23:241-84.
19. López-González JM, López-Álvarez S, Jiménez Gómez BM, Areán González I, Illodo Miramontes G, Padín Barreiro L. Ultrasound-guided transversalis fascia plane block versus anterior transversus abdominis plane block in outpatient inguinal hernia repair. Rev Esp Anestesiol Reanim 2016;63:498-504.
20. Abdelbaser I, Mageed NA, El-Emam EM, ALseoudy MM, Elmorsy MM. Preemptive analgesic efficacy of ultrasound-guided transversalis fascia plane block in children undergoing inguinal herniorrhaphy: A randomized, double blind, controlled study. Korean J Anesthesiol 2021;74:325-32.
21. Carvalho B, Cohen SE, Lipman SS, Fuller A, Mathusamy AD, Macario A. Patient preferences for anesthesia outcomes associated with cesarean delivery. Anesth Analg 2005;101(4):1182-1187. 73.