DOI -10.21276/obgyn.20252024.11.1.08 *ISSN Print – 2454-2334; ISSN Online – 2454-2342*

RESEARCH ARTICLE

Postoperative analgesic efficacy between transversus abdominis plane block and wound site local anesthesia infiltration in total abdominal hysterectomy under spinal anesthesia - a comparative study

Bidyut Borah, Keshav Upadhyaya, Nilotpal Das, Rezaul Karim Ahmed

Corresponding author: Dr. Rezaul Karim Ahmed,Registrar, Department of Anaesthesiology, Dhubri medical college, Dhubri, Assam, India; Email – chinmoyee127@gmail.com

ABSTRACT

Objectives: This prospective comparative hospital-based study aimed to assess the postoperative analgesic effectiveness of transversus abdominis plane block compared to wound site local anesthesia infiltration in total abdominal hysterectomy under spinal anesthesia. The primary objectives included comparing the time to the first request for rescue analgesia and the total postoperative analgesic requirement over 24 hours. **Methods:** The study included 60 patients divided into two groups, A and B, with 30 patients in each. Patients aged 18-60 yeras, belonging to ASA status I and II, scheduled for elective total abdominal hysterectomy under spinal anesthesia were enrolled. Both groups received spinal anesthesia with 0.5% bupivacaine heavy. In group A, bilateral transversus abdominis plane (TAP) block using 10 ml 0.25% bupivacaine on each side was administered, while in group B, 20 ml (10 ml on each side) of 0.25% bupivacaine was subcutaneously infiltrated just before skin wound closure. The study recorded the time to first rescue analgesia, total analgesic consumption in 24 hours, postoperative VAS score, and any systemic side effects. **Results:** Patient demographics and intraoperative parameters showed no significant differences between the two groups. The TAP block in group A significantly prolonged postoperative analgesia (299.13±24.35 minutes) compared to group B (182.43±24.88 minutes). The total rescue analgesic (IV tramadol) received in 24 hours postoperatively was significantly lower in group A (123.33±43.01mg) compared to group B (233.33±71.11mg). VAS scores indicated a substantial difference in postoperative pain between groups A and B from the 2nd hour onwards. Adverse effects were low in both groups, with group A showing fewer side effects (16.67%) than group B (33.33%). Notably, nausea and vomiting were observed in 2 patients in group A and 4 patients in group B, while other complications were not observed in the study population. **Conclusion:** In conclusion, TAP block demonstrated better postoperative analgesia, reflected in prolonged duration, improved quality (lower VAS score), and reduced total rescue analgesic requirement compared to wound site local anesthesia infiltration.

Keywords: Tap block, local anaesthesia, bupivacaine.

Total abdominal hysterectomy, a commonly performed major surgical procedure, often leads to significant postoperative discomfort and pain[1], necessitating effective pain management to facilitate quicker ambulation and prevent complications such as pneumonia and myocardial infarction[2]. According to the International Association for the Study of Pain (IASP), pain is defined as an unpleasant sensory and emotional experience associated with actual or potential tissue damage [3]. Surgical pain, a universal phenomenon, has adverse effects on respiratory, cardiovascular, metabolic, and psychological systems [4]. Recognizing pain as the "5th vital sign," the American Pain

Received: 1st August 2024, Peer review completed: 20th November 2024, Accepted: 25th November 2024.

Borah B, Upadhyaya K, Das N, Ahmed RK. Postoperative analgesic efficacy between transversus abdominis plane block and wound site local anesthesia infiltration in total abdominal hysterectomy under spinal anesthesia - a comparative study. The New Indian Journal of OBGYN. 2024; 11(1): 41 - 5.

Society recommends regular monitoring alongside pulse and blood pressure [5].

Given its impact on patient satisfaction, timely discharge, and healthcare costs, managing postoperative acute pain is crucial [6]. Common approaches involve systemic opioids and/or NSAIDs, although these can have side effects such as drowsiness, nausea, and urinary retention [7]. Regional anesthesia with local anesthetics presents an alternative to mitigate opioid-related side effects [8]. Techniques like transversus abdominis plane block have demonstrated safety and efficacy in providing postoperative analgesia for various surgeries, including total abdominal hysterectomy.

The transversus abdominis plane block, administered using the 'double pop' technique at the triangle of Petit, offers a wide sensory block over the abdominal wall, effectively alleviating pain [9 - 11]. Another strategy to control postoperative pain and reduce opioid usage is the infiltration of local anesthetics at the wound site before closure. This technique minimizes hyperalgesia, reduces wound inflammation, and contributes to decreased postoperative pain without compromising wound healing[12].

The main objective of the research is to evaluate both groups concerning their initial rescue analgesia needs and the total postoperative analgesic requirement within 24 hours. Additionally, the secondary goal is to assess and compare any adverse effects in both groups.

Materials and methods

This clinical trial, titled "A comparative study of postoperative analgesic efficacy between transversus abdominis plane block and wound site local anesthesia infiltration in total abdominal hysterectomy under spinal anesthesia," was conducted at the department of Anesthesiology and Critical Care, Fakhruddin Ali Ahmed Medical College and Hospital over a one-year period from September 02, 2021, to September 01, 2022. The study, authorized by the institutional ethics committee and with informed written consent from participants, took place in the obstetrics and gynecology operation theatre and its allied wards.

For participant selection, adult females meeting inclusion criteria underwent elective total abdominal hysterectomy surgery under spinal anesthesia, while exclusion criteria were defined. The sample size calculation, based on the time to first analgesia request, involved utilizing data from a previous observational study. The study was designed prospectively as a comparative hospital-based clinical trial to assess postoperative analgesic efficacy.

Patients were randomly assigned to two groups, A (TAP block) and B (wound site LA infiltration), with 30 patients in each. The allocation was concealed using sealed envelopes. The study technique involved preoperative evaluations, standardized anesthesia procedures, and postoperative assessments using Visual Analogue Scores (VAS) at different time intervals.

The operating room was equipped with various materials, including anesthesia devices, suction equipment, monitors, laryngoscopes, LMAs, endotracheal tubes, syringes, emergency drugs, and a spinal tray with necessary supplies. The trial aimed to compare the efficacy of analgesia between the two techniques, and data were collected and analyzed to draw conclusions from the study.

Statistical analysis: Information from the case record proforma was input into Microsoft Excel spreadsheet version 2021 and analyzed with IBM-SPSS version 26. The Kolmogorov-Smirnov test was used to assess data normality. Categorical data was presented as frequency and proportion (percentages). Numerical data was shown as mean and standard deviation for parametric data, or median and IQR for non-parametric data. A Chi-square test or Fisher Exact test was used to determine statistical correlation in categorical data. The student t-test was employed to calculate significant mean differences for normally distributed continuous data, while the Mann-Whitney U test was used for non-normal continuous data. A p - value < 0.05 was considered significant for all statistical comparisons.

Results

Analyses of patients demographics, including age, weight, height, and duration of surgery, revealed statistically insignificant differences, establishing baseline comparability (table 1).

Table 1: Demographic variables

Variables	Group A	Group B	P value
Age (in years)	45.5+/-5.75	43.3+/-7.25	0.198
Weight (in kgs)	57.03+/-6.14	58.37+/-5.77	0.248
Height (in cms)	156.6+/-5.49	155.63+/-5.40	0.493
Duration of surgery (in mins)	90+/-7.35	95.73+/-8.41	0.486

The intraoperative physiological parameters, such as systolic and diastolic blood pressure, mean arterial pressure, heart rate, and oxygen saturation, demonstrated no significant variations between groups at different time intervals, indicating similar responses to spinal anesthesia.

Postoperative evaluations, including mean systolic and diastolic blood pressure, heart rate, oxygen saturation, visual analog scale (VAS) scores (figure 1), time to first rescue analgesic, and adverse effects, exhibited no statistically

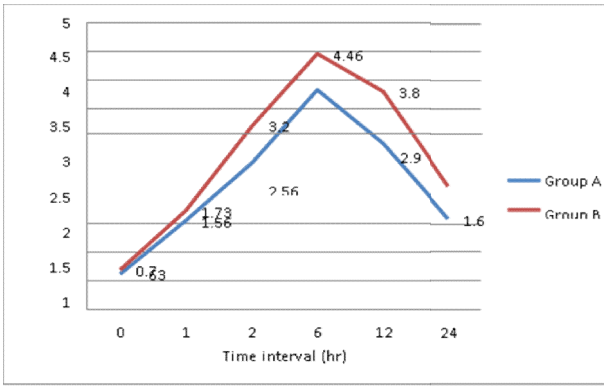

Figure 1 : Visual analogue scale (vas) between the two groups

significant differences between the two groups, except for the VAS scores from the 2nd postoperative hour onward, suggesting superior analgesia in group A. Time period for first rescue analgesia in both the group in post operative period was compared and studied with unpaired t test and found to be significant with p value <0.001 (table 2). Time for first rescue analgesia in group A is longer indicating better post operative analgesia.

Table 2: Time of first rescue analgesic

	Group A (in min) Mean ± SD	Group B (in min) Mean ± SD	P value
Time (min)	299.13±24.35	182.43±24.88	<0.001

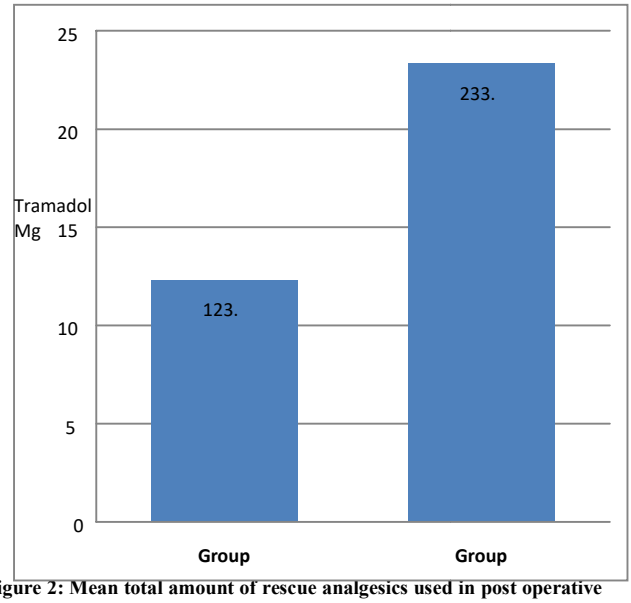

Figure 2: Mean total amount of rescue analgesics used in post operative 24 hours

The two groups were statistically compared for the number of times rescue analgesic was needed in each patient in both groups within 24 hours following surgery (figure 1). In group A, 76.67 per cent of patients required analgesics once, while 13.33 per cent in group B. Similarly in group A, 23.33 per cent of patients required analgesics twice, while 40 per cent in group B. In group B, 46.67 % patients required analgesic thrice and in group A it is 0%. The p value found to be 0.03% (<0.05), which is statistically significant.

The amount of rescue analgesia received in 24 hours post operatively in both the group was compared statistically and found to be significantly less in group A (p <0.001) indicating better post op analgesia.

Table 3: Side effects between two groups

Side effects	Group A		Group B		Total		p-value
	Number	%	Number	%	Number	%	
Urinary retention	1	3.33%	1	3.33%	2	3.33%	
Nausea	2	6.66%	4	13.33%	6	10%	
Pruritus	0	0%	1	3.33%	1	1.66%	
Vomiting	2	6.66%	4	13.33%	6	10%	0.141
None	25	83.35%	20	66.68%	45	75%	
Total	30	100%	30	100%	60	100%	

Both the group were compared statistically for number of patients having post operative side effect in first 24 hour (table 3). Fischer's test was conducted and side effect were found to be not significant with p value of 0.295(>0.05).

Furthermore, the number of doses of tramadol administered within 24 hours postoperatively and the total amount of rescue analgesics used were significantly lower in Group A, emphasizing its better postoperative analgesic efficacy. Additionally, the incidence of side effects was comparable between groups, with no statistically significant difference.

Discussion

This clinical trial demonstrated that group A, receiving TAP block, exhibited improved postoperative analgesia compared to group B, receiving wound site local anesthetic infiltration, as evidenced by lower VAS scores and reduced rescue analgesic requirements.

The study found a significant difference in the time of the first request for rescue analgesic, with the TAP block group experiencing a longer duration of postoperative analgesia compared to the wound site LA infiltration group. This aligns with similar findings in other studies by Paul D et al[13], Wayu B et al[14], and Sivapurapu V et al[15].

Additionally, the amount of rescue analgesics received in the TAP block group was significantly less than the LA infiltration group, consistent with findings from Paul D et al[13], Das N et al[16], Wayu B et al[14], and Sivapurapu V et al[15].

The study also revealed lower VAS scores in the TAP block group during the postoperative period, aligning with results from Wayu B et al[14], Das N et al[16], and Sivapurapu V et al[15], although differing from the findings of Paul D et al[13].

Regarding adverse effects, the incidence was generally low, with the TAP block group showing fewer side effects than the LA infiltration group. This corresponds with observations in the study by Sivapurapu V et al[15].

The study acknowledges its limitation as a single-hospital study, emphasizing the need for multi-hospital studies to evaluate the factors considered. Furthermore, it solely focused on postoperative analgesia within the first 24 hours, highlighting the necessity for future research to address broader outcomes such as patient satisfaction, return to function time, and recovery quality.

Conclusion

In this comparative study, it can be concluded that both TAP block and wound site LA infiltration can be use as postoperative analgesic however TAP block provides better postoperative analgesia as shown by increased duration of analgesia, quality of analgesia and patient comfort (decreased VAS score) and decreased need of total rescue analgesic. So TAP block is a better technique for postoperative pain management. In conclusion TAP block is a better modality for anticipation of postoperative pain with less opioids and NSAIDs related side effects,

Conflict of interest: None. **Disclaimer:** Nil.

References

1. Farzi F, Naderi Nabi B, Mirmansouri A, Fakoor F, Atrkar Roshan Z, Biazar G, et al. Postoperative pain after abdominal hysterectomy: A randomized, double-blind, controlled trial comparing the effects of tramadol and gabapentin as premedication. Anesth Pain Med. 2016 Feb; 6(1): e32360.
2. Kehlet H, Dahl JB. Anaesthesia, surgery, and challenges in postoperative recovery. The Lancet. 2003 Dec 6; 362(9399): 1921-8.
3. Merskey HA. Pain terms: a list with definitions and notes on usage. Recommended by the IASP Subcommittee on Taxonomy. Pain. 1979 Jun; 6: 249-52.
4. Barash PG, Cullen BF, Stoelting RK. Clinical Anaesthesia. 4th ed. Management of Acute Postoperative Pain. London: Lippincott and Wilkins; 2001.
5. Walid MS, Donahue SN, Darmohray DM, Hyer Jr LA, Robinson Jr JS. The fifth vital sign—what does it mean?. Pain Practice. 2008 Nov; 8(6): 417-22.
6. Allegri M, Clark MR, De Andrés J, Jensen TS. Acute and chronic pain: where we are and where we have to go. Minerva Anestesiol. 2012 Feb 1; 78(2): 222-35.
7. Meera A. Pain and Opioid Dependence: Is it a Matter of Concern. Indian J Palliat Care. 2011 Jan;17(Suppl): S36-8.
8. Elvir-Lazo OL, White PF. The role of multimodal analgesia in pain management after ambulatory surgery. Curr Opin Anaesthesiol. 2010 Dec; 23(6): 697 - 703.
9. Atim A, Bilgin F, Kilickaya O, Purtuloglu T, Alanbay I, Orhan ME, et al. The efficacy of ultrasound-guided transversus abdominis plane block in patients undergoing hysterectomy. Anaesth Intensive Care. 2011 Jul; 39(4): 630 - 4.
10. McDonnell JG, O'Donnell BD, Farrell T, Gough N, Tuite D, Power C, et al. Transversus abdominis plane block: a cadaveric and radiological evaluation. Reg Anesth Pain Med. 2007 Sep; 32(5): 399 - 404.
11. McDonnell JG, O'Donnell B, Curley G, Heffernan A, Power C, Laffey JG. The analgesic efficacy of transversus abdominis plane block after abdominal surgery: a prospective randomized controlled trial. Anesth Analg. 2007 Jan; 104(1): 193 - 7.
12. Scott NB. Wound infiltration for surgery. Anaesthesia. 2010 Apr; 65: 67-75.
13. Paul D, Kulkarni SN, Gupta N, Singh T, Dwivedi D, Singh S. Comparison of postoperative analgesic effect of transversus abdominis plane block versus direct wound infiltration with local anesthetic for lower segment cesarean section. J Mar Med Soc. 2020 Jul; 22:170-4.
14. Wayu B, Germa B, Shitemaw T, Dendir G. A comparative study between transversus abdominis plane block and wound site local anesthesia infiltration for effective post-operative pain control for lower abdominal surgery: a prospective cohort study, Ethiopia. J Anesth Clin Res. 2018; 9(859): 2.
15. Sivapurapu V, Vasudevan A, Gupta S, Badhe AS. Comparison of analgesic efficacy of transversus abdominis plane block with direct infiltration of local anesthetic into surgical incision in lower abdominal gynecological surgeries. Journal of Anaesthesiology, Clinical Pharmacology. 2013 Jan; 29(1): 71.

16. Das N, Shukla U, Singh D, Yadav U. Comparison of analgesic efficacy between TAP block and local site infiltration post operatively in caesarean section. Int J Res Med Sci. 2018 Apr; 6(4):1407.

Bidyut Borah [1], Keshav Upadhyaya [2], Nilotpal Das [3], Rezaul Karim Ahmed [4]

[1] Assistant professor, Department of Anaesthesiology, FAA medical college, Barpeta, Assam, India; [2] Assistant professor, Department of Anaesthesiology, FAA medical college, Barpeta, Assam, India; [3] Professor and HOD, Department of Anaesthesiology, FAA medical college, Barpeta, Assam, India; [4] Registrar, Department of Anaesthesiology, Dhubri Medical College and Hospital, Dhubri, Assam, India.