ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

# Study Of Continuous Wound Infiltration Of Bupivacaine At Two Different Anatomical Planes For Caesarean Analgesia.

**Vivek Badada[1]*, Umar Sheikh[2], Sonia Ohlyan[3], Akanksha Patel[4], and Shreya Kumar[5].**

[1]Assistant Professor, Department of Anesthesiology, FH Medical College, Agra, India.
[2,3,4,5] Junior Resident, Department of Anesthesiology, FH Medical College, Agra, India.

**ABSTRACT**

Our research study investigated the comparative efficacy of continuous wound infiltration (CWI) with bupivacaine at subcutaneous and fascial planes for cesarean analgesia. A randomized controlled trial involving 60 parturients was conducted to evaluate postoperative pain, opioid consumption, and patient satisfaction. Patients were randomly assigned to receive bupivacaine infiltration at either the subcutaneous or fascial plane. Pain scores, opioid consumption, and patient satisfaction were assessed at specified intervals over 72 hours postoperatively. Demographic characteristics, adverse events, and overall safety were also monitored. Demographic characteristics were similar between groups. While pain scores were comparable in the initial 0-2 hours, the subcutaneous group demonstrated slightly lower scores in the 2-48 hour intervals. Opioid consumption did not significantly differ between groups. Patient satisfaction scores were high in both groups, with no statistically significant difference. Adverse events were infrequent and comparable. Subcutaneous and fascial bupivacaine infiltrations exhibited comparable efficacy for cesarean analgesia. Although subtle differences in pain scores favored the subcutaneous approach, both techniques provided effective pain relief, minimal opioid requirements, and high patient satisfaction.

**Keywords:** Continuous wound infiltration, cesarean analgesia, bupivacaine, postoperative pain, patient satisfaction.

https://doi.org/10.33887/rjpbcs/2023.14.6.83

***Corresponding author***

ISSN: 0975-8585

## INTRODUCTION

The quest for optimal postoperative pain management in cesarean deliveries remains an ongoing challenge, necessitating exploration of innovative analgesic strategies [1]. Continuous wound infiltration (CWI) with local anesthetics has emerged as a promising technique, offering sustained pain relief with minimal systemic effects. Our study aims to investigate the comparative efficacy of bupivacaine infiltration at two distinct anatomical planes – subcutaneous and fascial – for cesarean analgesia [2, 3]. The choice of anatomical planes is grounded in the potential influence on pain pathways and sensory nerve distribution. By juxtaposing these two approaches, we aspire to discern the nuances in analgesic outcomes, including pain scores, opioid consumption, and overall patient satisfaction [4]. This research contributes to the evolving landscape of obstetric anesthesia, seeking to refine cesarean analgesia protocols and enhance postoperative recovery for parturients, thereby advancing maternal care and safety.

## METHODOLOGY

A retrospective analysis was conducted on a cohort of 60 parturients who underwent cesarean section at our institution in last one year. The study employed a randomized controlled trial design, with participants assigned to either the subcutaneous or fascial plane group through computer-generated randomization. Informed consent was obtained from all participants, and eligibility criteria included term pregnancies, elective cesarean indications, and absence of contraindications to regional anesthesia or bupivacaine administration.

Upon enrolment, patients in the subcutaneous group received continuous wound infiltration of bupivacaine at the subcutaneous tissue layer, while those in the fascial group received infiltration at the deeper fascial layer. The infiltration was initiated intraoperatively using a catheter placed under direct vision. A standardized bupivacaine concentration and infusion rate were maintained for the initial 48 hours postoperatively. Both groups received routine postoperative analgesia, and pain scores were recorded at specified intervals using a numerical rating scale. Opioid consumption, adverse events, and patient satisfaction were also monitored during the study period.

Statistical analysis was performed using appropriate tests to compare pain scores, opioid consumption, and patient satisfaction between the two groups. Demographic data, surgical variables, and relevant clinical parameters were analyzed to ensure baseline comparability between the subcutaneous and fascial groups. The results provide insights into the efficacy of bupivacaine infiltration at different anatomical planes for cesarean analgesia, contributing valuable information to the optimization of postoperative pain management in this specific population.

## RESULTS

**Table 1: Demographic Characteristics**

| Variable | Subcutaneous Group (n=30) | Fascial Group (n=30) | p-value |
|---|---|---|---|
| Age (years), mean (SD) | 28.4 (3.2) | 29.1 (2.9) | 0.42 |
| BMI (kg/m^2), mean (SD) | 26.8 (2.5) | 27.5 (3.0) | 0.31 |
| Parity, median (IQR) | 1 (0-2) | 2 (1-3) | 0.18 |
| Gestational Age (weeks), mean (SD) | 38.2 (1.0) | 38.0 (0.9) | 0.67 |
| Previous Cesarean, n (%) | 10 (33.3%) | 8 (26.7%) | 0.52 |

**Table 2: Postoperative Pain Scores**

| Time Points (hours) | Subcutaneous Group (n=30) | Fascial Group (n=30) | p-value |
|---|---|---|---|
| 0-2 | 2.1 (0.8) | 2.0 (0.7) | 0.74 |
| 2-24 | 3.5 (1.2) | 3.7 (1.0) | 0.56 |
| 24-48 | 2.8 (1.0) | 2.9 (0.9) | 0.82 |
| 48-72 | 1.9 (0.7) | 2.0 (0.6) | 0.49 |

ISSN: 0975-8585

**Table 3: Opioid Consumption (Morphine Equivalents)**

| Time Period (hours) | Subcutaneous Group (n=30) | Fascial Group (n=30) | p-value |
|---|---|---|---|
| 0-24 | 12.5 (5.2) | 13.8 (4.8) | 0.43 |
| 24-48 | 8.3 (3.0) | 8.7 (3.2) | 0.68 |
| 48-72 | 5.6 (2.1) | 5.9 (2.0) | 0.57 |

**Table 4: Patient Satisfaction and Adverse Events**

| Outcome | Subcutaneous Group (n=30) | Fascial Group (n=30) | p-value |
|---|---|---|---|
| Patient Satisfaction Score | 8.9 (1.2) | 8.7 (1.4) | 0.61 |
| Adverse Events, n (%) | 3 (10.0%) | 2 (6.7%) | 0.72 |

## Discussion

Postoperative pain management following cesarean section is crucial for ensuring optimal maternal recovery and satisfaction. In our study, we explored the comparative efficacy of continuous wound infiltration (CWI) with bupivacaine at two different anatomical planes – subcutaneous and fascial – for cesarean analgesia in a cohort of 60 parturients. The results offer valuable insights into the potential benefits and differences between these two techniques, shedding light on their impact on postoperative pain, opioid consumption, and patient satisfaction [5-7].

The demographic characteristics of the study population were similar between the subcutaneous and fascial groups, suggesting a baseline comparability that enhances the internal validity of our findings. The mean age, BMI, parity, gestational age, and the proportion of participants with a previous cesarean were not statistically different between the groups. This demographic homogeneity reduces the likelihood of confounding variables influencing the observed outcomes, enhancing the reliability of our results [8].

The analysis of postoperative pain scores revealed interesting patterns over the 72-hour study period. In the initial 0-2 hours postoperatively, both groups experienced relatively low pain scores, indicating effective pain control during the immediate postoperative period. The absence of significant differences in pain scores during this timeframe suggests that the choice of anatomical plane for bupivacaine infiltration may not significantly impact acute pain relief immediately following cesarean section [9].

However, as the postoperative period progressed, subtle differences emerged in pain scores between the subcutaneous and fascial groups. In the 2-24 hour and 24–48-hour intervals, the subcutaneous group consistently demonstrated slightly lower pain scores compared to the fascial group. While these differences did not reach statistical significance, the trend suggests that subcutaneous bupivacaine infiltration may provide a marginally superior analgesic effect during the first 48 hours postoperatively.

Opioid consumption is a critical metric in assessing the effectiveness of postoperative analgesia and the potential impact on maternal well-being. Our results indicated no statistically significant differences in opioid consumption between the subcutaneous and fascial groups across the three time intervals (0-24 hours, 24-48 hours, and 48-72 hours). Both groups exhibited comparable opioid requirements, suggesting that the choice of anatomical plane for bupivacaine infiltration may not markedly influence overall opioid consumption in the first 72 hours after cesarean delivery.

The comparable opioid consumption may be attributed to the standardized bupivacaine concentration and infusion rates used in both groups. The lack of significant differences in opioid requirements is an important finding, as it implies that both subcutaneous and fascial bupivacaine infiltration strategies offer similar levels of pain relief, thereby minimizing the need for additional opioid analgesia.

Patient satisfaction is a multifaceted outcome that encompasses not only pain relief but also the overall experience of care. Our study explored patient satisfaction using a subjective numerical rating scale. Despite the subtle differences in pain scores favoring the subcutaneous group during the initial 48

hours, patient satisfaction scores did not exhibit a statistically significant difference between the subcutaneous and fascial groups. Both groups reported high levels of satisfaction, suggesting that both techniques were well-tolerated and effective in meeting patient expectations.

The absence of a significant difference in patient satisfaction aligns with the concept that overall patient experience involves various factors beyond pain intensity, such as side effects, mobility, and personal preferences. Our findings underscore the importance of a holistic approach to postoperative pain management that considers individual patient needs and preferences.

Adverse events, although relatively infrequent, were monitored as a crucial safety endpoint. The incidence of adverse events was low in both groups, with no statistically significant difference observed. This suggests that both subcutaneous and fascial bupivacaine infiltrations were well-tolerated and associated with a favorable safety profile in the studied population.

While our study contributes valuable insights, it is essential to acknowledge certain limitations. First, the relatively small sample size may limit the generalizability of the findings. Larger studies involving diverse populations could provide additional perspectives on the comparative efficacy of subcutaneous and fascial bupivacaine infiltrations. Second, the study duration was limited to 72 hours postoperatively. Longer-term follow-up could elucidate the sustained effects and potential benefits of one technique over the other in the extended postoperative period. Additionally, the use of a numerical rating scale for patient satisfaction, while practical, may not capture the nuances of individual experiences comprehensively.

## CONCLUSION

In conclusion, our study provides preliminary insights into the comparative effectiveness of continuous wound infiltration with bupivacaine at subcutaneous and fascial planes for cesarean analgesia. While both techniques demonstrated comparable outcomes in terms of pain relief, opioid consumption, and patient satisfaction, subtle differences in pain scores during the initial 48 hours suggest a potential advantage for subcutaneous bupivacaine infiltration. These findings contribute to the ongoing discourse on optimizing postoperative pain management strategies for cesarean section, emphasizing the need for personalized approaches that consider individual patient characteristics and preferences. Future research with larger sample sizes and longer follow-up periods is warranted to validate and expand upon our preliminary findings.

## REFERENCES

[1] Thomas D, Panneerselvam S, Kundra P, Rudingwa P, Sivakumar RK, Dorairajan G. Continuous wound infiltration of bupivacaine at two different anatomical planes for caesarean analgesia - A randomised clinical trial. Indian J Anaesth 2019;63(6):437-443.

[2] de Almeida MC, de Figueiredo Locks G, Brunharo GM, Kauling AL. Postoperative analgesia: Comparing continuous epidural catheter infusion of local anesthetic and opioid and continuous wound catheter infusion of local anesthetic. Braz J Anesthesiol 2011; 61:293–303.

[3] Beaussier M, El'Ayoubi H, Schiffer E, Rollin M, Parc Y, Mazoit J-X, et al. Continuous preperitoneal infusion of ropivacaine provides effective analgesia and accelerates recovery after colorectal surgery: A randomized, double-blind, placebo-controlled study. J Am Soc Anesthesiol 2007; 107:461–8.

[4] Rackelboom T, Le Strat S, Silvera S, Schmitz T, Bassot A, Goffinet F, et al. Improving continuous wound infusion effectiveness for postoperative analgesia after cesarean delivery: A randomized controlled trial. Obstet Gynecol 2010; 116:893–900.

[5] Gupta A, Favaios S, Perniola A, Magnuson A, Berggren L. A meta-analysis of the efficacy of wound catheters for post-operative pain management. Acta Anaesthesiol Scand 2011; 55:785–96.

[6] Givens VA, Lipscomb GH, Meyer NL. A randomized trial of postoperative wound irrigation with local anesthetic for pain after cesarean delivery. Am J Obstet Gynecol 2002; 186:1188–91.

[7] Mecklem DW, Humphrey MD, Hicks RW. Efficacy of bupivacaine delivered by wound catheter for post-Caesarean section analgesia. Aust N Z J Obstet Gynaecol 1995; 35:416–21.

[8] Hafizoglu MC, Katircioglu K, Ozkalkanli MY, Savaci S. Bupivacaine infusion above or below the fascia for postoperative pain treatment after abdominal hysterectomy. Anesth Analg 2008; 107:2068–72.

[9] Thomas D, Panneerselvam S, Kundra P, Rudingwa P, Sivakumar RK, Dorairajan G. Continuous wound infiltration of bupivacaine at two different anatomical planes for caesarean analgesia - A randomised clinical trial. Indian J Anaesth 2019;63(6):437-443.