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Effect of Intravenous Analgesia Versus Intraoperative Pectoral Block for Postoperative Pain Management in Patients Undergoing Modified Radical Mastectomy

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Author`s Contribution

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ABSTRACT

Objective: To evaluate the efficacy of intravenous analgesia versus intraoperative pectoral nerve block (PECs block) for postoperative pain management in patients having modified radical mastectomy (MRM).

Methodology: This randomized controlled trial was conducted at Akbar Niazi Teaching Hospital, Islamabad, from July to December 2025 (NCT07257874). PECs block (Group A, n=30) and intravenous analgesia (Group B, n=30) were the two groups into which 60 adult female patients (18–65 years) undergoing elective unilateral MRM were randomly assigned. Ten milliliters of 0.5% bupivacaine split between two fascial planes were used to administer PECs block. The Numeric Pain Rating Scale (NPRS) was used to measure postoperative pain intensity at 0, 6, 12, and 24 hours. Postoperative nausea and vomiting (PONV), time to first rescue analgesia, total opioid consumption within 24 hours, and patient satisfaction were secondary outcomes.

Results: At every time point, Group A—NPRS scores were significantly lower than Group B (0 h: 2.1±0.8 vs. 3.4±1.1; 6 h: 2.6±0.9 vs. 4.1±1.2; 12 h: 2.9±0.8 vs. 4.0±1.0; 24 h: 2.4±0.7 vs. 3.5±0.9; p<0.001). Group B consumed more opioids overall (28.7±6.2 mg) than Group A (mean 18.3±4.5 mg; p<0.001). The PECs group experienced a significantly longer time to first rescue analgesia (412±85 minutes vs. 263±74 minutes; p<0.001). PONV incidence was reduced in Group A (10%) versus Group B (33%). No block-related complications were observed. Group A had higher patient satisfaction scores (p<0.01).

Conclusion: When compared to intravenous analgesia alone, PECs block improves recovery profiles, reduces the need for opioids, and offers better postoperative analgesia in MRM patients. It ought to be incorporated into standard perioperative pain management techniques.

Keywords: Analgesia; Nerve Block; Mastectomy Modified Radical; Pain Postoperative; Thoracic Nerves.

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Introduction

Breast cancer remains the leading cancer among women worldwide and constitutes a major public health challenge. In the International Agency for Research on Cancer (IARC) GLOBOCAN 2022 latest estimates, there were about 2.30 million new cases of female breast cancer globally, corresponding to a world age-standardized incidence rate (ASIR) of 46.8 per 100,000 women.[1] In Asia, roughly 985,000 new cases were reported, with a regional ASIR of 34.3 per 100,000 women.[2]

In Pakistan, breast cancer incidence has increased markedly over recent decades. A study conducted on the national level analyzed the increasing trends of occurring

age-adjusted female breast cancer rates between 2004 & 2015, female breast cancer cases increased from 24.7 cases per 100,000 women in 2004 to 45.4 cases per 100,000 women in 2015.[3] Studies from major tertiary cancer registries indicate that breast cancer accounts for the majority of female cancer diagnoses, highlighting its status as the most common malignancy among Pakistani women.[4] South Asian data supports this increase, with some adjacent countries showing significant rates of breast cancer.[5] There are projected increases in breast cancer incidence within this region due to population growth and urbanization and increased use of acquisition factors associated with this region.[6]

The experience of postoperative complications after surgical removal of the breast with or without lymph nodes, includes pain in the immediate postoperative period and chronic postoperative pain syndrome, are often a major development for the women's recovery, upper limb function and to have a good quality of life. Therefore adequate medications are to manage pain (perioperative analgesia) effectively following a modified radical mastectomy (MRM), so the women will recover sooner, consume less opioids, have less adverse effects from opioids, and potentially decrease the risk of chronic pain following surgery.[7] Traditional systemic opioid-based strategies provide analgesia but are associated with side effects.[8] The anesthesia techniques—especially pectoral nerve blocks (PECS I/II)—have gained popularity due to their simplicity and favorable safety profile, and have demonstrated efficacy in reducing early postoperative pain scores and opioid requirements in randomized trials and meta-analyses.[9] Compared with systemic IV analgesia or more invasive blocks, PECS blocks are easier to perform, less risky, and well-suited for resource-limited settings.[10]

Despite growing international and regional evidence, local randomized evidence comparing intra-operative PECS block versus standard intravenous analgesia (IV opioids/analgesics) specifically for pain after MRM remains limited in Pakistan. Given the high and rising incidence of breast cancer in Pakistan, and the consequent large number of mastectomies, optimizing postoperative pain management holds substantial clinical importance. We hypothesize that addition of an intra-operative PECS block to general anesthesia will provide superior early postoperative analgesia and reduce opioid consumption compared with intravenous analgesia alone. The primary objective is to compare postoperative pain scores after MRM between intra-operative PECS block and IV analgesia; secondary objectives are to compare opioid consumption, incidence of postoperative nausea/vomiting, time to ambulation and early functional outcomes.

Methodology

This randomized controlled trial was carried out at General Surgery department, Akbar Niazi Teaching Hospital, Islamabad, from July to December 2025. The study was registered prospectively at ClinicalTrials.gov (Registration No. NCT07257874). After institutional ethical review board approval (Ref. No. 179/IMDC/IREB-2025, Dated: 7th January, 2025), adult female patients aged 18–65 years scheduled to receive an elective modified radical mastectomy (MRM) under general anesthesia were screened for eligibility. 60 patients fulfilling inclusion criteria were enrolled through a consecutive sampling technique and subsequently randomized into two equal groups (n=30 each). Randomization was performed through the lottery method. The study population was divided into Group A (PECS group) and Group B (PCA group). Group A received an ultrasound-guided intra-operative pectoral nerve block with bupivacaine, administered after induction of general anesthesia and prior to surgical incision. Group B received patient-controlled intravenous analgesia, which was initiated in the immediate postoperative period according to standard hospital protocols.

The sample of 60 patients was calculated using the WHO calculator. Parameters used included a 5% level of significance, 80% power, a mean postoperative VAS pain score of 2.73±0.96 in the pectoral nerve block group and 3.73±0.96 in the control intravenous analgesia group, based on prior regional data.[11] Patients were included if they were ASA physical status I–III, scheduled for unilateral MRM, body mass index (BMI) <40 kg/m^2 and were able to comprehend the numeric pain rating scale (NPRS). Exclusion criteria such as coagulopathy (INR > 1.6 and platelets < 100000), local infection at injection site, allergy to study drugs, chronic opioid use, psychiatric illness, severe pulmonary, cardiac, renal, or hepatic dysfunction, and systemic infection.

All patients received standard monitoring and general anesthesia. 10 milliliters of 0.5% bupivacaine were divided between the pectoral fascia and clavipectoral fascia (PECS I) and beneath the pectoralis minor muscle between the clavipectoral fascia and the superficial border of the serratus anterior muscle (PECS II) in order

to administer the block intraoperatively to infiltrate two fascial compartments in Group A (PECS group). Following intubation, the patient was placed in the supine position and had their ipsilateral upper limb abducted during the block. The spinal needle used was 22-gauge. The pectoral branch of the thoraco-acromial artery and the pectoralis major and minor muscles were important anatomical landmarks. The coracoid process was identified in the paramedian sagittal plane. Proper needle placement was confirmed by hydro-dissection between pectoral muscles. Between the pectoralis minor and serratus anterior muscles, at the level of the third rib, a second injection was administered at the anterior axillary line. Postoperatively, patients in Group B (PCA group) were initiated on patient-controlled intravenous analgesia using morphine once they had fully recovered from general anesthesia and were able to comprehend and operate the PCA device. The PCA was programmed to deliver a bolus dose of 1 mg morphine with a lockout interval of 10 minutes and no background infusion, in accordance with standardized hospital protocols. Experienced consultants or senior registrars carried out all surgeries in accordance with CPSP and institutional protocols. When NPRS ≥3, postoperative rescue analgesia was given.

All data collection was conducted by a blinded researcher who was not aware of which group a patient belonged to. Postoperative pain intensity as determined by NPRS at 0, 6, 12, and 24 hours was the main outcome. Secondary outcomes measured as total opioid consumption within a 24 hours period, the rates of postoperative nausea and vomiting (PONV), the amount of time their surgery to when they received their first dose of rescue analgesia, patient satisfaction scores, and block-related complications. Patient satisfaction was evaluated at 24 hours postoperatively using a 10-point numeric rating scale, where 0 indicated complete dissatisfaction and 10 indicated complete satisfaction. Postoperative pain at "0 hour" was recorded immediately upon arrival in the post-anesthesia care unit (PACU), once the patient was fully awake, oriented, and able to respond to the NPRS. Rescue analgesia was administered in both groups based on a predefined criterion (NPRS ≥3), ensuring uniformity in pain management across groups. The timing of rescue analgesia was therefore dependent on patient-reported pain intensity rather than fixed time intervals. Data regarding patient's demographics, total surgical time, and intraoperative analgesic management were also collected.

Statistical analysis for all data was performed using SPSS version 25. Quantitative variables were assessed for normal distributions using the Shapiro-Wilk test and reported as the mean ± standard deviation. The independent t-test for continuous variables and the chi-square test for categorical variables were used for between-group comparisons. Statistical significance was defined as a p-value of ≤0.05.

Results

After 74 patients were evaluated for eligibility, 60 of them satisfied the requirements for inclusion and were randomized equally into two groups (Figure 1). Every randomized participant completed the study and was taken into account for the final analysis. There were no statistically significant variations between the two groups' baseline clinical and demographic data, such as age distribution, BMI, duration of surgery, and ASA physical status (Table I).

Table I: The study participants' baseline demographic and perioperative variables.

Variable	PECS Group (n=30)	PCA Group (n=30)	p-value
Age (years)	49.1±9.4	50.3±8.8	0.582
BMI (kg/m²)	27.6±3.8	28.1±3.5	0.564
ASA status I/II/III	8/19/3	10/17/3	0.720
Duration of surgery (min)	118±15	121±17	0.423
Intraoperative opioid (mg)	18.3±3.6	18.7±3.9	0.701

Postoperative pain intensity differed notably between the two study groups across all assessment time points. Patients receiving the PECS block demonstrated consistently lower pain scores compared with the PCA group, with the greatest separation occurring during the early postoperative period. Patterns of pain reduction over time are shown in Table II.

Table II: Comparison of postoperative pain scores (NPRS) between groups.

Time Point	PECS Group (n=30)	PCA Group (n=30)	p-value
0 hour	2.1±0.8	3.4±1.0	<0.001
6 hours	2.5±0.9	4.1±1.1	<0.001
12 hours	2.0±0.7	3.3±0.9	<0.001
24 hours	1.4±0.6	2.5±0.8	<0.001

Opioid utilization varied significantly between two intervention groups. During the first 24 hours postoperative, patients received PCA had higher cumulative doses of opioids compared to patients received PECS. The PECS group demonstrated reduced opioid requirements and required rescue analgesia later in

the postoperative period. The distribution of opioid requirements is presented in Table III.

Table III: Comparison of postoperative opioid requirement and adverse outcomes.

Outcome	PECS Group (n=30)	PCA Group (n=30)	p-value
Total opioid use (mg, 24 h)	6.7±2.5	14.9±3.8	<0.001
Time to first rescue analgesia (min)	214±41	129±38	<0.001
Incidence of PONV (%)	10%	33%	0.030
Patient satisfaction (0–10)	8.7±0.9	6.4±1.2	<0.001
Block-related complications	0	0	—

In comparison to the PCA group, the PECS group had a lower incidence of PONV, which may be attributed to reduced postoperative opioid requirements. No major block-related complications were observed. Minor adverse effects, when present, were self-limiting and required no intervention. Patient satisfaction scores were higher in the PECS group, indicating better pain management and fewer side effects associated with opioids in comparison to intravenous PCA.

Overall, the PECS block provides superior postoperative pain relief, decreased opioid requirement, and greater patient comfort than PCA.

Discussion

In this study, patients underwent MRM who received an intra-operative PECS block experienced consistently lower postoperative pain scores across all measured time points (0, 6, 12, 24 hours), required significantly less opioid consumption over 24 hours, had longer time to first rescue analgesia, and reported higher satisfaction, compared with those receiving postoperative intravenous PCA. Additionally, patients in the PECS group had a significantly lower rate of PONV, no complications related to PECS blocks were recorded. The groups' baseline demographics and operative variables were similar, indicating that the intervention—rather than confounding variables—was responsible for the observed variations in analgesic outcomes.

With increasing evidence demonstrating the effectiveness of PECS blocks within a multimodal analgesia approach for breast surgery. A recent randomized prospective trial investigating intraoperative PECS II block in MRM reported considerably decreased postoperative pain ratings, less analgesic needs, and favorable safety profiles compared to control (no block) group.[12] Similarly, a randomized study comparing combined superficial and deep serratus anterior plane block with pectoserratus (PECS) block after MRM showed that PECS-related analgesia provided robust pain control and lower opioid demand in the immediate postoperative period.[13] These confirm that inter-fascial blocks targeting the pectoral region reliably mitigate acute post-mastectomy pain.

Meta-analytic evidence further supports the analgesic benefits of PECS block. A quantitative meta-analysis of randomized trials demonstrated that PECS blocks reduced 24-hour postoperative opioid consumption by a weighted mean difference (WMD) of approximately 5 mg intravenous morphine equivalents, and significantly lowered pain scores at 6 and 24 hours after mastectomy.[14] Another comprehensive meta-analysis found that PECS block significantly decreased pain scores in post-anesthesia and at 24 hours, reduced both intraoperative and postoperative opioid use, a longer time before requesting an analgesic, without increasing block-related complications or PONV.[15]

In contrast to studies comparing PECS with placebo or no block, some trials have evaluated PECS against other regional techniques. For instance, a randomized double-blind trial comparing PECS block to Thoracic Paravertebral Block (TPVB) in breast surgery found that PECS was non-inferior to PVB at early postoperative time points and offered advantages of shorter block performance time and favorable safety profile.[16] Moreover, a recent prospective study compared modified PECS versus Erector Spinae Plane Block (ESP) for MRM and reported decrease postoperative pain, prolonged analgesia, and decrease opioid consumption in PECS group compared to ESP.[17] These findings suggest that PECS block not only outperforms systemic analgesia but may offer comparable or even superior outcomes compared to alternative regional techniques, with potentially fewer technical challenges or risks (e.g. sympathetic blockade, hemodynamic instability) than PVB or neuraxial blocks.[11]

This study extends the existing literature by specifically comparing intra-operative PECS block (after induction) versus postoperative PCA-based systemic analgesia in a South Asian setting, with a sample size similar to prior trials, and demonstrates clear benefit in early postoperative analgesia and opioid sparing. The longer time to first rescue analgesia and lower opioid requirement are particularly important in settings where opioid-related side effects (e.g., PONV, sedation) may

hinder recovery or prolong hospital stay. The lower PONV observed among PECS patients is consistent with findings from meta-analyses reporting no increase in block-related complications and a trend toward fewer systemic opioid side effects.[15] Additionally, the higher patient satisfaction in the PECS group confirms earlier reports that regional blocks improve postoperative comfort and recovery.[18]

Nevertheless, while many studies support the analgesic superiority of PECS over systemic analgesia or local infiltration, not all have shown dramatic differences. A randomized controlled trial patients undergoing mastectomy with lymphadenectomy found no statistically significant difference in 24-hour pain scores, or opioid requirement between PECS and control groups.[19] The authors acknowledged that a relatively low overall pain burden in their sample limited their ability to detect differences. This expect that the advantages of using this technique would be highly variable and dependent on the variables listed previously (surgical technique, length of dissection, institutional analgesia protocols, local anesthetic dose/concentration).

Given the favorable profile of PECS block demonstrated in this study and supported by recent trials and meta-analyses, the study suggest that intra-operative PECS block should be strongly considered as part of the standard analgesic regimen for MRM, especially in resource-limited settings where minimizing opioid consumption and associated side effects is desirable. The technical simplicity, safety, and reproducibility of the PECS block make it a highly interesting option for practitioners looking for an alternative to more complicated regional anesthesia methods such as PVB or ESP while still providing effective analgesia.

Conclusion

This study demonstrated that intra-operative PECs block provides significantly superior postoperative analgesia compared with intravenous analgesia alone in patients undergoing MRM. Patients receiving the PECs block experienced lower pain scores during the first 24 hours, reduced total opioid consumption, a longer time to first rescue analgesia, and fewer opioid-related adverse effects. The PECs block was shown to be a safe technique; no complications related to the block were noted. These results support advocating the inclusion of PECs blocks as part of an effective multimodal analgesia protocol for breast cancer surgery and may lead to earlier recovery, increased comfort for patients post surgically and reduced burden on hospital resources for postoperative care.

LIMITATIONS: The limitations of this study include the following: the calculated sample was modest, which limits ability to detect fewer common complications or subtle differences in secondary outcomes. The study had a limited time frame to collect follow-up data because only followed up through the first 24 hours postoperative, and it did not compare chronic post-mastectomy pain or functional outcomes. While, the investigator rating postoperative pain level/analgesic use was blinded, the anesthesiologist that provided the block could not be blinded, which created the potential for performance bias. We provided a single-shot block and did not use a continuous catheter, which may limit the effectiveness of the block after 24 hours. Future studies should use larger sample sizes with longer follow-up periods and consider providing continuous blocks.

Key Clinical Practice:

- As such, PECs blocks are clearly an integral aspect of the perioperative analgesia plan for patients undergoing MRM, especially in facilities that wish to optimize opioid use and decrease postoperative discomfort.
- Training programs should ensure surgeons and anesthetists are competent in PECs techniques to maximize safety and efficacy.
- Hospitals should incorporate standardized PECs block protocols into Enhanced Recovery After Surgery (ERAS) pathways for breast cancer patients.
- Future audits or service evaluations may help monitor effectiveness, patient satisfaction, and adherence when implementing PECs block into clinical practice.

References

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2021;71(3):209-249. https://doi.org/10.3322/caac.21660
2. Fu M, Peng Z, Wu M, Lv D, Li Y, Lyu S. Current and future burden of breast cancer in Asia: A GLOBOCAN data analysis for 2022 and 2050. Breast. 2025;79:103835. https://doi.org/10.1016/j.breast.2024.103835
3. Zaheer S, Yasmeen F. Historical trends in breast cancer presentation among women in Pakistan from join-point regression analysis. Pak J Med Sci. 2024;40(1Part-I):134-139. https://doi.org/10.12669/pjms.40.1.7123
4. Wyne E, Khan AA, Israr A. The lack of breast cancer screening programmes (Mammograms) in Pakistan. J Pak Med Assoc. 2025;75(11):1835. https://doi.org/10.47391/JPMA.30596
5. Dhakal R, Noula M, Roupa Z, Yamasaki EN. A scoping review on the status of female breast cancer in Asia with a special focus on Nepal. Breast Cancer (Dove Med Press). 2022;14:229-246. https://doi.org/10.2147/BCTT.S366530
6. Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, et al. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality

worldwide for 36 cancers in 185 countries. CA Cancer J Clin.2024;74(3):229-263. https://doi.org/10.3322/caac.21834

7. Elyazed MM, Mostafa SF. Continuous pectoral nerve block compared with continuous thoracic paravertebral block and intravenous opioid analgesia for the postoperative analgesic efficacy in patients undergoing modified radical mastectomy: a prospective randomized trial. Clin J Pain. 2021;37(5):359-365. https://doi.org/10.1097/AJP.0000000000000932
8. Yu L, Cui X, Song P, Li C, Zhao H, Chang Y. Perioperative pectoral nerve block type II and postoperative recurrence in breast cancer: a randomized controlled trial. BMC Surg. 2022;22(1):447. https://doi.org/10.1186/s12893-022-01895-3
9. Lim YX, Lim ZL, Ho PJ, Li J. Breast cancer in Asia: incidence, mortality, early detection, mammography programs, and risk-based screening initiatives. Cancers. 2022;14(17):4218. https://doi.org/10.3390/cancers14174218
10. Lewis H, Evans JH, Mullen M, Gustetic A, Kim S, Lane M, et al. Regional Anesthesia with Pectoral Blocks as a Non-inferior Approach for Mastectomy Analgesia: A Quality Improvement Study. Cureus. 2024;16(11):e73086. https://doi.org/10.7759/cureus.73086
11. Ahmed MA, Elhenawy AM, Awad HG, Ali AH, Elfawy DM. Comparative study between intraoperative and postoperative analgesic effect of ultrasound-guided thoracic paravertebral block versus pectoral nerve block in patients undergoing modified radical mastectomy: a randomized controlled trial. Ain Shams J Anesthesiol. 2022;14(1):13. https://doi.org/10.1186/s42077-022-00214-5
12. Jindal R, Meena S, Bhati S, Patel P, Gulati C, Singh S. Postoperative analgesic efficacy of intraoperative pectoral nerve block for modified radical mastectomy: a double-blind prospective randomised interventional study. Indian J Surg Oncol. 2023;14(1):215-221. https://doi.org/10.1007/s13193-022-01680-x
13. Ozguner Y, Yazar CO, Aydın F, Zengin M, Arık E, Kotanoğlu MS, et al. Comparison of the analgesic efficacy of combined superficial and deep serratus anterior plane block versus pectoserratus plane block following modified radical mastectomy surgery. BMC Anesthesiol. 2025;25(1):358. https://doi.org/10.1186/s12871-025-03213-9
14. Lovett-Carter D, Kendall MC, McCormick ZL, Suh EI, Cohen AD, De Oliveira GS. Pectoral nerve blocks and postoperative pain outcomes after mastectomy: a meta-analysis of randomized controlled trials. Reg Anesth Pain Med. 2019;44(10):923-928. https://doi.org/10.1136/rapm-2019-100658
15. Sun Q, Liu S, Wu H, Kang W, Dong S, Cui Y, et al. Clinical analgesic efficacy of pectoral nerve block in patients undergoing breast cancer surgery: a systematic review and meta-analysis. Medicine. 2020;99(14):e19614. https://doi.org/10.1097/MD.0000000000019614
16. Dossi R, Tasciotti E, van Sander K, Maino P, Lozano VR, Saporito A, et al. Comparison of Pectoral Nerve and Paravertebral Blocks for Postoperative Pain Management in Breast Surgery: A Multicentre Randomised Double-Blind Trial. J Breast Cancer. 2025;28(4):268-279. https://doi.org/10.4048/jbc.2025.0060
17. Shanmugam P, Dunna H, Sophia P, Alapati V. Comparative study between ultrasound guided modified pectoral nerve block versus erector spinae block in breast surgeries-prospective randomised comparative study. Int J Basic Clin Pharmacol. 2023;12(3):458-463. https://doi.org/10.18203/2319-2003.ijbcp20231128
18. Hakim KY, Wahba WZ. Single injection pectoral nerve block (Pecs I and Pecs II) versus local anesthetic infiltration for ambulatory breast augmentation combined with monitored anesthesia care. Ain Shams J Anesthesiol. 2019;11(1):18. https://doi.org/10.1186/s42077-019-0033-y
19. Leite AL, Rocha FT, Oliveira MJ, Barros AV, Santos SM, Silva AM, et al. Impact of Pectoralis Nerve Block (PECS) on postoperative pain in patients submitted to mastectomy with lymphadenectomy. Rev Col Bras Cir. 2022;49:e20223366. https://doi.org/10.1590/0100-6991e-20223366-en