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Original article

Ultrasound Guided Modified Pectoral Nerve Block Associated with Serratus Anterior Plane Block Group Compared to Erector Spinae Plane Block for Post Operative Pain Management in Breast Surgeries

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Abstract:

Background: Approximately 60% of women after breast cancer surgery complain of severe acute pain. In addition, failure to manage acute post-operative pain may lead to the development of chronic pain which may be persistent for years. Efficacious techniques such as Modified PECS with Serratus Anterior plane Block and Erector Spinae Plane Block proved to reduce post-operative pain and prevent unnecessary patient discomfort. It may play role in decreasing morbidity, post-operative hospital stay and thus cost. This study aimed to compare the analgesic effectiveness of modified pectoral nerve block with serratus anterior plane block versus erector spinae plane block in post-operative breast surgeries pain management. **Methods:** This randomized controlled trial was conducted at Benha University on 60 female patients scheduled for breast surgeries. All patients were randomly assigned into three groups; control group (I) (perioperative conventional pain management), PECS group (II) (modified pectoral nerve block with serratus anterior plane block), and ESPB group (III) (erector spinae plane block). **Results:** VAS was significantly lower in group II & group III compared to group l ($p<0.05$), with no significant difference between group II & group III. The number of patients required morphine was significantly different among the studied groups, (P=0.016), being lower in group II compared to other groups. **Conclusion:** both the modified pectoral nerve block with serratus anterior plane block and erector spinae plane block significantly improves postoperative pain management and reduce opioid use in breast surgery patients compared to general anesthesia alone.

Keywords: Breast cancer; post-operative pain; Visual Analogue Scale; Modified pectoral nerve block with serratus anterior plane block; Erector spinae plane block.

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Introduction

Approximately 60% of women after breast cancer surgery complain of severe acute pain. In addition, failure to manage acute post-operative pain may lead to the development of chronic pain which may be persistent for years. As chronic persistent pain arises in approximately 50% of patients after breast cancer surgery, it is therefore necessary to explore efficacious techniques that can reduce post-operative pain [(1)].

The innervation of the skin and gland of the breasts is supplied mainly by theT2-T6 spinal nerves. In addition, branches of the brachial plexus, including the long thoracic nerve, thoracodorsal nerve, medial pectoral nerve, and lateral pectoral nerve, are also involved in conveying sensation to the breasts and axillary region. Therefore, to provide complete post-operative analgesia for breast cancer surgery, it is necessary to theoretically block the ten spinal nerve dermatomes from vertebral C5 to T6. Various regional techniques have been widely used to decrease postoperative pain after breast cancer surgery [(2)].

Postoperative pain for surgeries involving chest wall is mostly managed using multimodal analgesia i.e. by using combination of non-steroidal anti-inflammatory drugs (NSAIDS), paracetamol, opioids and local anesthetic infiltration. In extensive surgeries like radical mastectomy and latissimus dorsi flaps, some anesthetists may employ use of ultrasound guided erector spinae plane block, serratus anterior plane block associated with modified pectoral nerves block [(3)].

The erector spinae plane block (ESP) was first described for managing thoracic neuro pathic pain. Subsequently, this technique was applied for pain management for postoperative analgesia after breast cancer surgery. The erector spinae plane block (ESP) block is a new fascia block technique that can engender sensory blockade of multiple segments of the chest wall our findings showed that ESP block exhibited a significant analgesic effect for breast cancer surgery [(4)].

Pectoral nerve block and its variations have been used for various breast surgeries. Regional analgesia was provided by combination of US- guided Modified PECS nerve block with SAPB, a recently described technique in which local anesthetic is deposited in the plane between the latissimus dorsi and serratus anterior muscle. This resulted in excellent intraoperative and postoperative analgesia and a minimum of systemic analgesics [(3)].

The Serratus anterior plane block targets the lateral cutaneous branches of the thoracic intercostal nerves, which arise from the anterior rami of the thoracic spinal nerves and run in a neurovascular bundle immediately inferior to each rib. At the midaxillary line, the lateral cutaneous branches of the thoracic intercostal nerve traverse through the internal intercostal, external intercostal, and serratus anterior muscles innervating the musculature of the lateral thorax. These branches of the intercostal nerves travel through the two potential spaces described above. Local anesthetic inserted into these planes will spread throughout the lateral chest wall, resulting in paresthesia of the T2 through T9 dermatomes of the anterolateral thorax [(5)].

Satisfactory post-operative analgesia prevents unnecessary patient discomfort. It may play role in decreasing morbidity, post-operative hospital stay and thus cost. Inadequate postoperative analgesia has harmful physiologic and psychological consequences that increase morbidity and mortality which subsequently delay recovery and the return to daily life [(6)].

The aim of this study is to compare the analgesic effectiveness of modified pectoral nerve block with serratus anterior plane block versus Erector spinae plane block in post-operative breast Surgeries pain management.

Patients and Methods:

Patients:

This prospective, double blind and randomized controlled study was carried out at Benha University Hospital from May 2022 to May 2023, involving 60 female patients scheduled for breast surgeries. All patients were randomly assigned into three groups; control group (perioperative conventional pain management), PECS group (modified pectoral nerve block with SAPB), and ESPB group (erector spinae plane block). The ethical committee of the Faculty of Medicine, Benha University Hospitals granted approval for this investigation. The ethical approval code number is {M.D.9.4.2022}.

Inclusion criteria were female patients aged between 20 – 60 years old with ASA physical status: I, II scheduled for breast surgeries (radical mastectomy, modified radical mastectomy).

Exclusion criteria were Patients who were unable to communicate with investigators or on current chronic analgesic therapy, or with history of opioid dependence. Patients with past history of Allergy to local anesthetics or opioids or were diagnosed with Morbid obesity and multiple comorbidities. Patients with past history of chest surgery or had skininfection at the puncture site or were diagnosed with bleeding or coagulation disorders. Patients who refused to participate in the study were also excluded.

Methods:

All patients who met the previous criteria were subjected to data collection after an informed consent was taken from every patient.

All studied cases were subjected to detailed history taking, full clinical examination, and routine laboratory investigations [complete blood count, random blood sugar, kidney and liver function tests, Serum CRP level, ESR, PT/ PTT/ INR, Na, K].

Procedure: All procedures were performed by the same surgical team under generalanesthesia.

The Visual Analogue Scale (VAS) was explained to the patients before the procedure.

General anesthesia was conducted for all patients using the same protocol, by propanol 2–3 mg/kg, fentanyl 200 μg IV, and rocuronium 0.5–0.8 mg/kg to facilitate endotracheal intubation. Anesthesia was maintained with isoflurane (1-2%) in 50% air in oxygen mixture. All patients were intubated and mechanically ventilated using volume controlled positive-pressure ventilation with tidal volume of 6-8 mL/kg, I/E ratio 1:2 to maintain end tidal carbon dioxide tension around 35 mmHg, and peak inspiratory pressure below 30 cm H2O.

In group II Pectoral nerve block was performed under ultrasound guidance. The first injection was 5 ml of 0.25% bupivacaine between the pectoralis major and minor muscles at the third rib level on the middle to outer clavicle line, and the second injection was 10 ml of 0.25% bupivacaine between the pectoralis minor and the serratus anterior muscles at the fourth rib level on the anterior axillary line. In the serratus plane block (Serratus group), 15 ml of 0.25% bupivacaine was injected once above the serratus anterior muscle at the fifth rib level on the middle axillary lines.

In group III A 22-gauge insulated needle was inserted till the tip of the needle reach into the fascial plane between erector spinae muscle and transverse process which is confirmed by hydro dissection of 2 ml normal saline, thereafter a total of 30 ml of 0.25% bupivacaine was injected with intermittent aspiration. After the completion of block procedure, the patients were turned to lie supine with all the monitoring connected.

All groups: All patients were reversed with neostigmine (0.04mg/kg) and atropine (0.01
-0.02mg/kg), when visual analogue scale (VAS) became more than 4, morphine (5mg) was given by intravenous route to

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this patient, post-operative.

VAS during rest and patient movement (arm abduction) was used to measure the primary outcome (pain intensity) at 30min, 1 hr., 2hr., 4hr., 6hr., 8hr., 12hr., and 24hrs. They received regular Paracetamol 1 gm/8 hours. Rescue analgesia was provided as morphine IV (0.1 mg/kg) then titration of 1 mg/1 5min as required to keep the VAS scores less than 3.

Regarding secondary outcomes, hemodynamic parameters such as Postoperative heart rate and mean arterial pressure (MAP) were recorded at 0, 15 min, 30 min, 1 hr. and then every 2 hours for 24 hours. Post-operative complications like nausea and vomiting were documented together with frequency of rescue antiemetics, urine retention and itching. Other complications such as Nerve injury, Hematoma formation, Local anesthetic toxicity and Intra vascular injection were also documented. The failure rate of the block was calculated. Patients satisfaction related to the block performance, post-operative pain relief was evaluated by an 11 - point satisfaction score duration of hospital stays was documented.

Statistical analysis

Statistical analysis was done by SPSS v28 (IBM©, Armonk, NY, USA). The Shapiro- Wilks test and histograms were used to evaluate the normality of the distribution of data. Quantitative parametric data were presented as mean and standard deviation (SD) and were analyzed by ANOVA (F) test with post hoc test (Tukey). Quantitative non-parametric data were presented as median and interquartile range (IQR) and were analyzed by Kruskal-Wallis test with Mann Whitney-test to compare each group. Repeated measures ANOVA used to analyze groups of related dependent variables that represent different measurements of the same attribute. Qualitative variables were presented as frequency and percentage (%) and were analyzed utilizing the Chi-square test. A two tailed P value < 0.05 was considered statistically significant.

Results:

In this study, 89 patients were assessed for eligibility, 17 patients did not meet the criteria, and 12 patients refused to participate in the study. The remaining 60 patients were randomly allocated into 3 equal groups (20 patients each group). All allocated patients were followed-up and analyzed statistically. There was an insignificant difference among the studied groups regarding the baseline characteristics (age, weight, height, BMI and ASA). There was an insignificant difference among the studied groups regarding the tumor location. Breast surgeries and surgical time were insignificantly different among the studied groups as show **(Table, 1)**

The postoperative heart rate was significantly different among the studied groups at 4, 6 and 8 h (P<0.001, 0.006, <0.001), with no significant difference among the studied groups at PACU, 15, 30 min, 1, 2, 12 and 24 hrs. The postoperative heart rate at 4, 6 and 8h was significantly higher in group l compared to group II& group III (P<0.05), with no significant difference between group II & group III. The postoperative MAP was significantly different among the studied groups at 4, 6 and 8 h (P<0.001, 0.004, <0.001), with no significant difference among the studied groups at PACU, 15, 30 min, 1, 2, 12 and 24 hrs. The postoperative MAP at 4, 6 and 8h was significantly higher in group I of conventional perioperative pain management compared to group II of modified PECSII BLOCK with SAPB & group III of ESPB (P<0.05), with no significant difference between group II & group III as show **(Table, 2 and 3).**

The time of the 1st rescue analgesic requirement was significantly delayed in group II compared to group I and group III (P<0.001, 0.023), and was significantly delayed in group III compared to group I

(P<0.001). The total morphine consumption was significantly lower in group B and group C compared to group A (P<0.001, <0.001), with no significant difference between group II and group III .Number of patients required morphine was significantly different among the studied groups, (P=0.016), being lower in group II compared to other groups as show **(Table, 4).**

Regarding the adverse events, PONV occurred in 13 (65%) patients in group I, 4 (20%) patients in group II, and 9 (45%) patients in group III. Urine retention occurred in 2 (10%) patients in group I, and did not occur in both groups II and III. Nerve toxicity and local anesthetic toxicity did not occur in any of the studied groups. Incidence of PONV was significantly different among the studied groups (P<0.001), being the lowest incidence rate in group II compared to the other groups. There was an insignificant difference among the studied groups regarding the incidence of urine retention. The patients' satisfaction was significantly different among the studied groups, showing that group II was significantly satisfied compared to group I and group III (P=0.002) as **show (Table, 5).**

Table 1: Baseline characteristics, tumour and Surgical data location among studiedgroups

		group I(n=20)	group II (n=20)	group III(n=20)	*p*-value
	Mean± SD	38.75±12.9	44.05±11.26	36.95±10.76	
Age (years)	**Range**	22-60	20-60	22-57	0.144
Weight (Kg)	**Mean± SD**	76.4±10.9	75.8±12.39	79.65±10.82	
	Range	60-93	59-95	62-97	0.520
	Mean± SD	1.65±0.04	1.65±0.04	1.65±0.04	
Height (m)	**Range**	1.59-1.71	1.59-1.7	1.59-1.71	0.874
BMI (Kg/m^2)	**Mean± SD**	28.04±4.58	28.03±5.14	29.34±4.15	
	Range	21.01-36.39	21.01-37.11	22.5-37.42	0.595
	ASA I	11 (55%)	14 (70%)	12 (60%)	
ASA	**ASA II**	9 (45%)	6 (30%)	8 (40%)	0.610
Tumorlocation	**Left**	12 (60%)	10 (50%)	11 (55%)	0.144
	Right	8 (40%)	10 (50%)	9 (45%)	
	Radical mastectomy	11 (55%)	14 (70%)	12 (60%)	
Breast surgeries	**Modified radical mastectomy**	9 (45%)	6 (30%)	8 (40%)	0.612
Surgical time (min)	**Mean± SD**	117.85±8.88	116±7.25	114.7±10.52	
	Range	100-129	100-128	100-128	0.540

BMI: body mass index, ASA: American Society of Anesthesiologists

VAS during rest was significantly different among the studied groups at 2, 4, 6, 8 and 12h (P<0.05), with no significant difference among the studied groups at PACU, 30 min, 1 hr. and 24 hrs.

VAS during rest was at 2, 4, 6, 8 and 12h was significantly lower in group II & group III compared to group I (P<0.05), with no significant difference between group II & group III.

VAS during movement(arm abduction) was significantly different among the studied groups at 2, 4, 6, 8 and 12h (P<0.05), with no significant difference among the studied groups at PACU, 30 min, 1 hr. and 24 hrs.

VAS during movement (arm abduction) was at 2, 4, 6, 8 and 12h was significantly lower in group II & group III compared to group I (P<0.05), with no significant difference between group II & group III.

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Table 2. Postoperative pain assessment by visual analogue scale (VAS) of the studiedgroups during rest.

	Group I (n=20)	Group II (n=20)	Group III(n=20)	P value	U
At PACU	2 (1-3)	2 (1-3)	2 (1-2.25)	0.556	---
30 min	3 (1-3)	2 (1-2)	2 (1-3)	0.372	---
1 hr.	2 (2-3)	2 (1-3)	2 (2-3)	0.130	---
2 hrs.	4 (3-5)	2 (1-2)	2 (2-2.25)	**<0.001***	**P1<0.001*** **P2<0.001*** P=0.550
4 hrs.	3 (3-4.5)	2 (1.75-2.25)	2 (1.75-3)	**<0.001***	**P1<0.001*** **P2<0.001*** P=0.674
6 hrs.	4 (3-5.25)	2 (2-3)	3 (2-3.25)	**<0.001***	**P1<0.001*** **P2=0.010*** P=0.109
8 hrs.	4.5 (3-5)	3 (2-3)	3 (2.75-4)	**<0.001***	**P1<0.001*** **P2=0.003*** P=0.360
12 hrs.	5 (3.75-6)	3 (3-4)	3.5 (3-4)	**0.019***	**P1=0.010*** **P2=0.025*** P=0.721
24 hrs.	2 (2-3)	2 (1-3)	2.5 (2-3)	0.827	---

Data presented as median (IQR), VAS: visual analogue scale, PACU: post anaesthetic care unit, *:statistically significant as p value <0.05, P1: p value between groups I&II, P2: p value between groups I&III, P3: p value between groups II & III

Table 3: Postoperative pain assessment by visual analogue scale (VAS) of thestudied groups during movement (arm abduction)

	Group I (n=20)	Group II (n=20	Group III (n=20	P value	U
At PACU	2 (2-3)	2 (2-3)	2.5 (1-3)	0.886	---
30 min	3 (2-3.25)	2 (1-3)	2 (2-3)	0.405	---
1 hr.	3 (3-4)	2 (1.75-3.25)	3 (2-3)	0.129	---
2 hrs.	4 (4-5.25)	2.5 (1.75-3)	3 (2-3)	**<0.001***	**P1<0.001*** **P2<0.001*** P=0.603
4 hrs.	4 (3-4.5)	3 (2-3)	3 (2-3)	**<0.001***	**P1<0.001*** **P2=0.001*** P=0.936
6 hrs.	5 (3.75-6)	3 (2-4)	3.5 (3-4)	**0.003***	**P1=0.001*** **P2=0.015*** P=0.419
8 hrs.	4.5 (4-6)	3 (2-4)	3 (3-4)	**0.002***	**P1=0.002*** **P2=0.003*** P=0.874
12 hrs.	5 (3.75-6)	4 (3-4.25)	4 (3-4.25)	**0.019***	**P1=0.012*** **P2=0.019*** P=0.875
24 hrs.	3 (2-4)	3 (2-3)	3 (2.75-3.25)	0.543	---

Data presented as median (IQR), VAS: visual analogue scale, PACU: post anaesthetic care unit, *:statistically significant as p value <0.05, P1: p value between groups A&B, P2: p value between groups I& III P3: p value between groups II&III.

Table 4: Postoperative heart rate, MAP (mmHg) and rescue analgesic requirements.

		Group I (n=20)	Group II (n=20)	Group III (n=20)	P value	Post hoc
At PACU	**Mean± SD**	83.8 ± 5.98	83.6 ± 6.58	82.05 ± 7.98	0.682	---
	Range	74 – 94	73 - 94	70 - 93		
15 min	**Mean± SD**	83.45 ± 7.22	79.45 ± 6.78	82.95 ± 7.69	0.173	---
	Range	71 – 95	71 - 95	70 - 94		
30 min	**Mean± SD**	79.9 ± 5.54	81.55 ± 6.15	80.8 ± 6.3	0.687	---
	Range	70 - 90	70 - 90	71 - 90		
1 hr.	**Mean± SD**	79.1 ± 5.91	81.9 ± 6.19	82.55 ± 5.61	0.155	---
	Range	70 - 90	71 - 90	72 - 90		
2 hrs.	**Mean± SD**	83.55 ± 8.77	80.55 ± 6.13	79.8 ± 6.51	0.230	---
	Range	72 - 111	70 - 90	70 - 90		
	Mean± SD	101.5± 14.8	82.05 ± 4.61	77.55 ± 5.75		**P1<0.001* P2<0.001***
4 hrs.	**Range**	73 - 116	71 - 90	70 - 89	**<0.001***	P=0.303
	Mean± SD	92.2± 14.09	81.55 ± 5.78	83.55 ± 10.96		**P1=0.008* P2=0.036***
6 hrs.	**Range**	70 - 115	71 - 90	70 - 114	**0.006***	P=0.829
	Mean± SD	103.2± 14.3	82.95 ± 9.32	84.65 ± 10.15		**P1=0.008* P2=0.036***
8 hrs.	**Range**	73 - 118	70 - 111	70 - 113	**<0.001***	P=0.886
12 hrs.	**Mean± SD**	87.7 ± 12.14	86.65 ± 10.27	91.15 ± 11.61	0.430	---
	Range	70 - 109	71 - 106	71 - 116		
24 hrs.	**Mean± SD**	93.3 ± 17.14	86.05 ± 9.88	87.35 ± 11.1	0.184	---
	Range	70 - 122	73 - 109	70 - 109		
At PACU	**Mean± SD**	86.75 ± 7.11	84.1 ± 7.95	82.5 ± 9.82	0.276	---
	Range	71 - 100	70 - 100	71 - 100		
	Mean± SD	82.75 ± 9.03	84.65 ± 8.65	85.1 ± 9.45		
15 min	**Range**	71 - 97	70 - 98	70 - 100	0.686	---
30 min	**Mean± SD**	85.05 ± 8.77	79 ± 6.54	84.15 ± 9.22	0.052	---
	Range	70 - 95	70 - 90	70 - 98		
1 hr.	**Mean± SD**	85.45 ± 9	86.45 ± 7.82	87.3 ± 7.69	0.775	---
	Range	70 - 100	72 - 97	70 – 100		
2 hrs.	**Mean± SD**	85.75 ± 12.99	82.8 ± 8.33	83.4 ± 8.24	0.623	---
	Range	70 - 118	70 - 98	73 - 100		
	Mean± SD	103.2± 13.84	83.55 ± 7.93	86 ± 10.09		**P1<0.001* P2<0.001***
4 hrs.	**Range**	71 - 125	70 - 99	71 - 100	**<0.001***	P=0.758
	Mean± SD	97.45 ± 17.04	83.8 ± 10.4	85.35 ± 11.95		**P1=0.006* P2=0.017***
6 hrs.	**Range**	71 - 120	70 - 100	70 - 115	**0.004***	P=0.929
	Mean± SD	103.7 ± 15	86.45 ± 9.88	87.35 ± 11.52		**P1<0.001* P2<0.001***
8 hrs.	**Range**	72 - 123	70 - 99	71 - 106	**<0.001***	P=0.971
12 hrs.	**Mean± SD**	90.8 ± 14.23	91.2 ± 10.9	91.9 ± 15.85	0.968	---
	Range	72 - 119	70 - 108	71 - 122		
24 hrs.	**Mean± SD**	95.1 ± 15.48	92.85 ± 10.01	92.35 ± 12.63	0.258	---
	Range	71 - 123	72 - 103	75 - 119		
Time of 1st rescue analgesic requirement (hr.)		3.8±2.82 2-8 2 (2-8)	17.09±6.71 8-24 12 (12-24)	11.38±5.5 6-24 12 (8- 12)	**<0.001***	**P1<0.001* P2<0.001* P3=0.023***
Total morphine consumption (mg)		3.25±0.79 2-5	1.29±0.47 1-2	1.5±0.82 1-3	**<0.001***	**P1<0.001* P2<0.001*** P3=0.395
No. of patients required morphine		20 (100%)	9 (45%)	16 (80%)	**0.016***	---

PACU: post anesthetic care unit, *: statistically significant as p value <0.05, P1: p value between groups I&II , P2: p value between groups I &III, P3: p value between groups II& III .

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Table 5: Adverse events and patients' satisfaction of the studied groups.

	Group I(n=20)	Group II(n=20)	Group III(n=20)	*p*- value
PONV	13 (65%)	4 (20%)	9 (45%)	**<0.001***
Urine retention	2 (10%)	0 (0%)	0 (0%)	0.126
Nerve toxicity	0 (0%)	0 (0%)	0 (0%)	----
Local anesthetic toxicity	0 (0%)	0 (0%)	0 (0%)	----
Good	4 (20%)	14 (70%)	7 (35%)	
Fair	5 (25%)	4 (20%)	9 (45%)	**0.002***
Not satisfied	11 (55%)	2 (10%)	4 (20%)	

PONV: postoperative nausea and vomiting, *: statistically significant as p value <0.05

Discussion:

This prospective, double-blinded, randomized controlled which compared perioperative pain management alone (control group), modified pectoral nerve block with serratus anterior plane block (PECS group), and erector spinae plane block (ESPB group) found that the mean age for patients undergoing breast cancer surgeries is ranged from 36.95 to 44.05 years.

This is consistent with a study that examined recent trends and variations in breast cancer incidence among young women in the United States. The study found that the majority of breast cancer cases occurred in women aged 40–44 and 45–49 years, accounting for 77.3% of the cases [(7)].

The risk of developing breast cancer increases as follows-the 1.5% risk at age 40, 3% at age 50, and more than 4% at age 70. Interestingly, a relationship between a particular molecular subtype of cancer and a patient's age was observed-aggressive resistant triple- negative breast cancer subtype is most commonly diagnosed in groups under 40 ages, while in patients >70, it is luminal A subtype. Generally, the occurrence of cancer in older age is not only limited to breast cancer; the accumulation of a vast number of cellular alternations and exposition to potential carcinogens results in an increase of carcinogenesis with time **[(8)]**.

Our study found that the mean BMI of patients in the three groups ranged from 28.04 Kg/m2 to 29.34 Kg/m^2. This finding aligns with a study conducted to study the risk of incident breast cancer and subtype-specific breast cancer in relation to excess body weight in a contemporary Swedish prospective cohort study, The Karolinska Mammography Project for Risk Prediction of Breast Cancer, KARMA. It included a total of 35,412 postmenopausal women attending mammography and included in the KARMA study provided baseline data on body mass index (BMI) and potential confounders. They found that women with overweight (BMI ≥ 25-< 30 kg/m2) constituting 34% of the study cohort had an increased risk of incident breast cancer with an adjusted Hazard Ratio (HRadj) 1.19 (95% CI 1.01-1.4). However, they found that both overweight and obesity were associated with risk of estrogen receptor positive (ER+) disease (HRadj 1.20, 95% CI 1.00-1.44 and HRadj 1.33, 95% CI 1.03-1.71, respectively), and low-grade tumors (HRadj 1.25, 95% CI 1.02-1.54, and HRadj 1.40, 95% CI 1.05-1.86, respectively) **[(9)]**.

Recent literature has shown that females with greater Body Mass Index (BMI) are at a greater risk of cancer compared to those with low BMI. Besides, the researchers observed that greater BMI is associated with more aggressive biological features of tumor including a higher percentage of lymph node metastasis and greater size. Increased body fat might enhance the inflammatory state and affects the levels of circulating hormones

facilitating pro-carcinogenic events. Thus, poorer clinical outcomes are primarily observed in females with BMI ≥ 25 kg/m^2. Interestingly, postmenopausal women tend to present poorer clinical outcomes despite proper BMI values but namely due to excessive fat volume. Greater breast cancer risk with regards to BMI also correlates with the concomitant family history of breast cancer **(10)**.

Our study detected that the majority of breast tumors location were found on the left side. Similarly, a study was conducted to evaluate the clinical and pathological differences between left and right sided breast cancer using a large patient cohort difference in cancer biology by computational biological analyses, and also to investigate the clinical relevance of laterality by analyzing a neoadjuvant cohort. It was an institutional retrospective review was conducted on 155 patients treated with neoadjuvant chemotherapy (NACT). They reported that left sided tumors were found to be more prevalent than right sided tumors, however, no major clinic pathological differences were noted by laterality **(11)**.

Our study found that the VAS at 2, 4, 6, 8, and 12 hours was significantly lower in group II and group III compared to group I ($P<0.05$), with no significant difference between group II and group III.

This is consistent with a study that evaluated the effect of the erector spinae plane block (ESPB) on postoperative analgesia following percutaneous nephrolithotomy (PCNL) under spinal anesthesia. This prospective, randomized study included sixty patients with American Society of Anesthesiologists (ASA) physical status I and II, scheduled for PCNL under spinal anesthesia. The patients were randomized into two equal groups of thirty: Group A received ESPB, while Group B was administered tramadol at a dose of 1.5 mg/kg intravenously. The authors reported that the Visual Analog Scale (VAS) score in Group A (ESPB), with a mean of 3.15 ± 0.68, was significantly lower compared to Group B, which had a mean of 6.61 ± 0.50 at 6 hours postoperatively (12).

Furthermore, a systemic review and meta-analysis was conducted to explore the efficacy and safety of ESPB used for perioperative pain management in lumbar spinal surgery. Randomized controlled trials (RCTs) comparing ESPB with placebo or without ESPB in lumbar spinal surgery were included, and nineteen RCTs with 1381 participants were included for final analysis. They found that the ESPB group had significantly lower pain scores at rest and on movement within 48 h after surgery compared with the control group ($P<0.05$) **(13)**.

Moreover, a study was conducted to assess the efficacy of ESP block in improving analgesia following lumbar surgery. PubMed, EMBASE, Cochrane Library, and Web of Science were searched for randomized controlled trials (RCTs) that compared the analgesic efficacy of the ESP block with non-block care for lumbar surgery from inception 3 August 2021. Eleven studies involving 775 patients were included in their analysis. They reported that ESP block reduced pain scores at postoperative time-points up to 24 h. ESP block also prolonged the time to first analgesic request (WMD = 6.93; 95% CI: 3.44 to 10.43, I2 = 99.8%; $P < 0.001$) **(14)**.

Our study revealed that the incidence of PONV was significantly different among the studied groups ($P<0.001$), being the lowest incidence rate in group B compared to the other groups.

Similarly, a study was conducted to assess the potential causal effect of the type of anesthesia (general vs. spinal anesthesia) on the occurrence of postoperative nausea and vomiting (PONV) in patients undergoing total hip arthroplasty (THA). This observational study included all elective THA procedures performed in adults between 1999 and 2008 at a Swiss orthopedic clinic under general or spinal anesthesia. The study found that general anesthesia was associated with a higher

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incidence of PONV compared to regional anesthesia. This was attributed to the greater need for opioid medication to manage postoperative pain following general anesthesia in both adults and children [15].

The performance of peripheral nerve blocks, ganglion block and wound infiltration with local anesthetics has been shown to decrease the incidence of PONV. Surgery-related predictors include prolonged surgical procedures, with each 30 minutes increasing the risk of PONV by 60%. Certain types of surgery have a higher incidence of PONV perhaps because of the longer exposure to general anesthesia and use of larger doses of opioid medications [16].

Our study found that patient satisfaction differed significantly among the studied groups, with Group II being significantly more satisfied compared to Groups I and III (P=0.002). This aligns with a study conducted to test the hypothesis that a preoperative serratus anterior plane block (SAPB) enhances the quality of recovery following breast cancer surgery. The study included seventy-two women scheduled for breast cancer surgery and reported that the preoperative administration of SAPB improved both the quality of recovery and patient satisfaction following the procedure [17].

The limitations of the study are worthy of mention; the study was carried out on a small sample size of 60 patients, which may limit the generalizability of the findings to a larger population. The single-center nature of the study may limit the generalizability of the findings to a broader population. The follow-up period was limited to 24 hours post-operative outcomes, which may not fully assess the long-term outcomes of each anesthesia technique.

Conclusion:

The findings of our study indicate that both the modified pectoral nerve block with serratus anterior plane block and the erector spinae plane block significantly improve postoperative pain management and reduce opioid use in breast surgery patients compared to general anesthesia alone. These results suggest that these regional anesthesia techniques, especially the modified pectoral nerve block, effectively enhance postoperative outcomes by minimizing pain and opioid-related side effects.

Conflict of interest:

None of the contributors declared any conflict of interest

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