Supplementary Table 1. Study Characteristics. Abbreviations: CAB, complete antethoracic block; CTB, costotransverse block; ESPB, erector spinae plane block; IPP, interpectoral plane block; ITP, intertransverse process block; NSAID, non-steroidal anti-inflammatory drug; MINB, modified intercostal nerve block; MTP, mid-transverse point block; NRS, numeric rating scale; PECS, pectoral nerve block; PIFB, pecto-intercostal fascial block; PONV, postoperative nausea and vomiting; PSP, pecto-serratus plane block; RIB, rhomboid intercostal block; RISS, rhomboid intercostal and subserratus plane block; RLB, retrolaminar block; SAPB, serratus anterior plane block; SPPB, serratus posterior plane block; STIL, subtransverse interligamentary block; STS, segmental thoracic spinal anesthesia; TAP, transverse abdominis plane block; TE, thoracic epidural; TPVB, thoracic paravertebral block; TTP, transverse thoracic plane block; VAS, visual analog score; QoR, quality of recovery

Title	Authors	Year of Publication	Country	Study design	Sample size	Surgical Procedures	Regional Anesthetic Techniques	Systemic Analgesic Method	Systemic Analgesic Agents	Key Findings
The impact of ultrasound-guided erector spinae plane block on hemodynamic stability and postoperative pain in	A Nikolić, M Stošić, J Živadinović, M Gmijović, M ĐorĐević, R Janković, A Karanikolić, B Stošić	2024	Serbia	Comparative Analysis	48	Modified Radical Mastectomy	ESPB	Multimodal Analgesia	Opioids; NSAIDs; Acetaminophen	Ultrasound-guided ESPB application proved effective in preserving hemodynamic stability and managing postoperative pain in modified radical breast cancer surgery.

patients undergoing modified radical mastectomy for breast cancer										
A Comparative Analysis of Opioid-Based Anesthesia (OBA) and Opioid-Free Anesthesia (OFA) in Modified Radica	Achmad Yusuf Toba, Syafruddin Gaus, Andi Muhammad Takdir Musba, Muhammad Ramli Ahmad, Alansyah A. A. Husain, Madonna D. Datu	2026	Indonesia	Randomised Controlled Trial	30	Modified Radical Mastectomy		Multimodal Analgesia	Opioids; Dexmedetomidine; Other: Lidocaine	OFA is better than OBA in modified radical mastectomy surgery. OFA significantly reduced IL-6 levels as a marker of inflammation, resulted in lower recurrence of breast cancer, reduced the degree of postoperative pain, maintained hemodynamic stability during the procedure,

l Mastectomy: Effect on Hemodynamics Changes Intraoperative, Inflammatory Cytokine (IL-6) Levels, Pain Degree, and Postoperative Opioid Requirements										and reduced postoperative opioid requirements. These findings suggest that OFA is a more effective and safe anesthetic option in controlling pain and surgical stress response.

Pectoral nerve block and pecto-intercostal fascial block versus thoracic paravertebral block for postoperative analgesia in modified radical mastectomy: A randomised controlled trial	Adarsh M Sheshagiri, Ajeet Kumar, Chandni Sinha, Abhyuday Kumar, Poonam Kumari, Amarjeet Kumar, Chandan Jha	2025	India	Randomised Controlled Trial	49	Modified Radical Mastectomy	TPVB; PECS I; PECS II; PIFB	Multimodal Analgesia	Opioids; Dexamethasone; Acetaminophen	Compared to thoracic PVB, the combination of Pecs and PIFB block prolonged the duration of analgesia and decreased postoperative opioid consumption in patients undergoing MRM surgeries. There was no statistical increase in complications in patients receiving this block.

Comparison between erector spinae plane block and paravertebral block regarding postoperative analgesic consumption following breast surgery: a randomized controlled study.	Ahmed M. Elewa, Mohammed Faisal, Folke Sjöberg, Mohamed E. Abuelnaga	2022	Egypt	Randomised Controlled Trial	90	Modified Radical Mastectomy	TPVB; ESPB	Multimodal Analgesia	Opioids; Acetaminophen	ESPB and PVB provide effective postoperative analgesia for women undergoing MRM. The ESPB appears to be as effective as the PVB.

Analgesic efficacy of ultrasound-guided retrolaminar block and erector spinae plane block in modified radical mastectomy: a randomized controlled study	Ahmed Mohamed Soliman, Ahmed Zaghloul, Mahmoud Saad Mohamed, Mahmoud Badry Ahmed	2024	Egypt	Randomised Controlled Trial	60	Modified Radical Mastectomy	ESPB; RLB	Multimodal Analgesia	Opioids; NSAIDs; Acetaminophen	Ultrasound-guided single-point retrolaminar block and erector spinae plane block are safe and effective postoperative analgesic techniques for patients undergoing modified radical mastectomy with comparable effects in terms of opioid consumption, duration of analgesia, pain intensity, and occurrence of PONV.
Analgesic effect of	Ahmed Soliman, Samuel B.	2024	Egypt	Randomised Contr	60	Modified Radical Mastectomy	PECS II; SAPB	Multimodal Analgesia	Opioids; NSAIDs; Acetaminophen	Ultrasound-guided SAPB plus PECS II block provides safer

adding modified pectoral nerve block to serratus anterior plane block in modified radical mastectomy: Randomized double-blinded trial	Moawad, Noha M. Abdelmoneim, Ahmed A. Mohamed, Ahmed S. Ragab, Michael W. Wadid			olled Trial						and more efficient analgesia in MRM than SABP alone, as evidenced by decreased postoperative morphine consumption, pain scores, and intraoperative fentanyl consumption.
Impact of Pectoralis Nerve Block (PECS)	Amanda Lira dos Santos Leite, Frederico Theobaldo Ramos	2022	Brazil	Randomised Controlled Trial	82	Sentinel Lymph Node Biopsy; Axillary Lymph Node	PECS I; PECS II	Multimodal Analgesia	Opioids; NSAIDs; Acetaminophen	Not possible to demonstrate better results with the association of the PECS block with total

on postoperative pain in patients submitted to mastectomy with lymphadenectomy	Rocha, Michelle Jacintha C. Oliveira, Aldo Vieira Barros, Silvio Marcos Lima Dos Santos, Alberson Maylson Ramos Da Silva, Diego Windson de Ara√ʃjo Silvestre, Elson A C Folha Filho, Caroline C Ferro, Taina Santos Bezerra, Laercio P Fachin, Dalmir					Dissection; Mastectomy				intravenous analgesia. Need further studies to assess the efficacy of the nerve block.

	Cavalcanti Santos, Carlos Alberto de Carvalho Fraga, Carolinne Sales Marques									
A Randomized Trial Comparing Ultrasound Guided Modified Pectoral Block Versus Erector Spinae Block for Post	Annet Susan Abraham, Punit Mehta, Gautam Girotra, Neeraj Yadav	2025	India	Randomised Controlled Trial	80	Unilateral Modified Radical Mastectomy	PECS I; PECS II; ESPB	Multimodal Analgesia	Opioids; Acetaminophen	While the modified PECS block offered better postoperative pain relief, the ESP block facilitated physiotherapy, although this advantage was achieved at the cost of less effective pain management. Both blocks showed no adverse effects.

Mastectomy Pain Management: A Comparative Analysis										
A randomized double-blind controlled study comparing erector spinae plane block and thoracic paravertebral block for	Aumjit Wittayapairoj, Nattanan Sinthuchao, Ongart Somintara, Viriya Thincheelong, Wilawan Somdee	2022	Thailand	Randomised Controlled Trial	44	Unilateral Mastectomy	TPVB; ESPB	Multimodal Analgesia	Opioids; Dexamethasone	Compared to ESPB, PVB provided lower postoperative opioid requirements, lower pain scores, and wider sensory blockade after mastectomy.

postoperative analgesia after breast surgery.										
The Effects of Serratus Posterior Superior Intercostal Plane Block on Postoperative Analgesia in Patients Undergoing Breast Cancer	Bengü G. Köksal, Çağdaş Baytar, Emine Bayraktar, Hakan Balbaloğlu	2025	Turkey	Randomised Controlled Trial	60	Modified Radical Mastectomy; Axillary Lymph Node Dissection	SPPB	Multimodal Analgesia	Opioids; Acetaminophen	Serratus posterior superior intercostal plane block significantly reduced opioid use, and improved recovery quality after oncoplastic breast surgery.

Surgery										
Comparison of postoperative pain in 70 women with breast cancer following general anesthesia for mastectomy with and without serratus anterior plane	Binggao Chai, Hongmei Yu, Yafen Qian, Xiaoli Chen, Zhenqiang Zhu, Jianlong Du, Xianhui Kang, Shengmei Zhu	2022	China	Comparative Analysis	65	Modified Radical Mastectomy	SAPB	Multimodal Analgesia	Opioids; NSAIDs	At a single center, preoperative SAP block can significantly reduce postoperative pain after modified radical mastectomy for breast cancer.

nerve block										
Analgesic efficacy of superficial versus deep serratus plane block for modified radical mastectomy under general anaesthesia: A randomised comparative study	Debesh Bhoi, Dhruv Jain, Anjolie Chhabra, Virender K. Mohan, Praveen Talawar, Kamal Kataria	2022	India	Comparative Analysis	40	Unilateral Modified Radical Mastectomy	SAPB	Multimodal Analgesia	Opioids; Dexamethasone; Acetaminophen	There was no difference in analgesic efficacy when SAP block was given superficial or deep to serratus anterior muscle for modified radical mastectomies. However, deep SAP block required less time and number of attempts to perform than superficial technique.

Comparison of 0.375% and 0.2% Ropivacaine for Postoperative Analgesia Using Ultrasound-Guided Pectoral Nerve Block in Patients Undergoing Breast Cancer Surgery: A Rando	Deepak Aggarwal, Amit Singhal, Chetan Saraya, U K. Valecha, Ashish Goel	2025	India	Randomised Controlled Trial	50	Mastectomy	PECS I; PECS II	Multimodal Analgesia	Opioids; Acetaminophen	This study found no significant difference in postoperative pain, antiemetic requirements, or patient satisfaction between 0.375% and 0.2% ropivacaine.

mized Controlled Study.										
A Randomized Clinical Study to Compare the Perioperative Analgesic Efficacy of Ultrasound-Guided Erector Spinae Plane Block Over Thoracic Epidur	Deepshika R, Aruna Parameswari, Balasubramanian Venkitaraman, Mahesh Vakamudi, Akilandeswari Manickam	2023	India	Randomised Controlled Trial	42	Unilateral Modified Radical Mastectomy	TE; ESPB	Multimodal Analgesia	Opioids; Acetaminophen	Our investigation concludes that the ESF offers equivalent analgesic efficacy to the thoracic epidural during both surgery and the postoperative period without inducing any significant hemodynamic instability. Considering the lower complication rate associated with paraspinal blocks compared to neuraxial blocks, the ESB presents itself as a promising alternative method for effective pain

al in Modified Radical Mastectomy.										relief in mastectomy procedures.
Comparison of the Efficacy of UltrasoundGuided Serratus Anterior Plane Block Versus Erector Spinae Plane Block for Postoperative Analgesia	Deepti Ahuja, Vinod Kumar, Nishkarsh Gupta, Sachidanand Jee Bharati, Rakesh Garg, Seema Mishra, Maroof Ahmad Khan, Sushma Bhatnagar	2022	India	Randomised Controlled Trial	80	Modified Radical Mastectomy	SAPB; ESPB	Multimodal Analgesia	Opioids; Dexamethasone; Acetaminophen	Ultrasound-guided serratus anterior plane block and erector spinae plane block have comparable postoperative analgesic efficacy after modified radical mastectomy.

After Modified Radical Mastectomy: A Randomised Controlled Trial.										
Efficacy of PNS guided PEC-I and SAP block for post-operative analgesia in MRM - A randomized contro	Devyani J. Desai, Velmayil Murugesan Ananda Jyothi, Ruchi Pathak	2024	India	Randomised Controlled Trial	60	Modified Radical Mastectomy	PECS I; SAPB	Multimodal Analgesia	Opioids; Acetaminophen	PEC 1 and SAP blocks given under peripheral nerve stimulator guidance have a high success rate and are reliable in providing adequate postoperative analgesia for patients undergoing modified radical mastectomy.

lled study										
Efficacy of bi-level erector spinae plane block versus bi-level thoracic paravertebral block for postoperative analgesia in modified radical mastectomy: a prospective	Domenico P. Santonastaso, Annabella de Chiara, Roberto Righetti, Diego Marandola, Andrea Sica, Claude T. Bagaphou, Chiara Rosato, Andrea Togn√π, Annalisa Curcio, Leonardo Lucchi, Emanuele Russo, and Vanni Agnoletti	2023	Italy	Randomized Comparative Study	82	Modified Radical Mastectomy; Axillary lymph Node Dissection	TPVB; ESPB	Multimodal Analgesia	Opioids; Acetaminophen	Both thoracic paravertebral block and erector spinae plane block can be effectively used in controlling post-mastectomy pain with no significant differences between the two blocks.

randomized comparative study.										
Serratus Posterior Superior Intercostal Plane Block, Versus Erector Spinae Facial Plane Blocks A Comparative Study for Postoperative Pain Control and	Emine Arık, Musa Zengin, Gaye Şeker, Onur Küçük, Ezgi Güngördü, Yusuf Özgüner, Ali Alagöz, Jülide Ergil	2026	Turkey	Randomised Controlled Trial	50	Sentinel Lymph Node Biopsy; Mastectomy	SPPB; ESPB	Multimodal Analgesia	Opioids; NSAIDs	The SPSIPB may provide postoperative analgesia that is comparable in efficacy to the ESPB technique in breast surgery. Based on the findings of this study, SPSIPB provided postoperative analgesia comparable to ESPB and was associated with lower opioid consumption within the first 24 h after surgery.

Opioid Consumption for Patient Undergoing Modified Radical Mastectomy Surgery										
Intra-operative esmolol and pain following mastectomy: A randomised clinical trial	Fabricio T. Mendonca, Alex J. Tramontini, Henrique I. Miake, Luciano F. Seixas, Luiz Sergio F. de Carvalho and	2021	Brazil	Randomised Controlled Trial	66	Mastectomy		Multimodal Analgesia	Opioids; Esmolol	Esmolol was well tolerated, allowed a notable reduction in the dose of rescue analgesics and demonstrated superior efficacy compared to placebo for pain management after mastectomy.

	Andrei C. Sposito									
Ultrasound-guided thoracic paravertebral block enhances the quality of recovery after modified radical mastectomy: A randomized controlled trial	Fudong Rao, Zongjie Wang, Xijuan Chen, Linwei Liu, Bin Qian, Yanhua Guo	2021	China	Randomised Controlled Trial	68	Unilateral Modified Radical Mastectomy	TPVB	Multimodal Analgesia	Opioids; Dexamethasone	A single preoperative injection of TPVB with ropivacaine enhances the quality of recovery and postoperative analgesia in patients following modified radical mastectomy.

A Study on the Efficacy of Erector Spinae Plane Block with Ropivacaine as Post-op Analgesia for Modified Radical Mastectomy Surgery	G.Poonkuzhali, E.Elakkiya, M.Nalina, S.Radha	2023	India	Randomised Controlled Trial	60	Modified Radical Mastectomy	ESPB	Multimodal Analgesia	Opioids; Dexamethasone	ESP block combined with ropivacaine treatment effectively reduced early postoperative pain and improved recovery after mastectomy surgery.
Investigation of the analgesic effects	Gokcen Kulturoglu, Savas Altinsoy, Julide Ergil,	2024	Turkey	Randomised Controlled Trial	81	Unilateral Modified Radical Mastectomy; Axillary	PECS II; RIB	Multimodal Analgesia	Opioids; Acetaminophen	Compared to local anesthetic infiltration, the RIB and PECS blocks applied as part of

of rhomboid intercostal and pectoral nerve blocks in breast surgery	Derya Ozkan, Yusuf Ozguner					Lymph Node Dissection				multimodal analgesia in MRM surgery reduced opioid consumption in the first 24 h and improved the quality of recovery in the early period.
Effect of single intravenous injection of esketamine on quality of recovery during early period after	Guofang Fei, Wei Yan, Huaqi Yao	2023	China	Cohort Study	80	Modified Radical Mastectomy		Multimodal Analgesia	Opioids; Ketamine	Single intravenous injection of esketamine can improve the quality of the recovery of breast cancer patients during the early period after the modified radical mastectomy.

modified radical mastectomy for breast cancer: A retrospective study										
Evaluating dexmedetomidine's opioid-sparing effect with ropivacaine in ultrasound-guided erector spinae	Hanane Barakat, Rony Al Nawwar, Linda Gholmieh, Caroline Chahine, Mariam Karake, George Assaf, Yara Al Jalbout	2025	Lebanon	Randomised Controlled Trial	44	Partial Mastectomy; Radical Mastectomy; Sentinel Lymph Node Biopsy	ESPB	Multimodal Analgesia	Opioids; Acetaminophen	Dexmedetomidine, in safe doses, with ropivacaine in erector spinae block reduces immediate opioid consumption and postoperative pain in mastectomy patients.

block during mastectomy - A randomized clinical trial										
Dexmedetomidine vs dexamethasone as adjuvants to levobupivacaine in ultrasound-guided erector spinae plane block for patients	Heba Ismail Ahmed, Ashgan Raouf Ali, Norhan Hisham El Emam, Mohamed Magdy, Reham Mohamed Gamal	2022	Egypt	Randomised Controlled Trial	90	Modified Radical Mastectomy	ESPB	Multimodal Analgesia	Opioids; NSAIDs; Acetaminophen	As an adjuvant to levobupivacaine in erector spinae plane block, dexmedetomidine reduces pain at rest and with movement, reduces intraoperative fentanyl and postoperative morphine consumption, and prolongs the analgesia duration. It is superior to dexamethasone in pain reduction and duration of analgesia.

undergoing modified radical mastectomy: a randomized double-blind study										
Comparison between ultrasound-guided multi-injection intertransverse process and thoracic paravertebral	Hongye Zhang, Zongyang Qu, Yongsheng Miao, Yuelun Zhang, Lulu Qian, Bin Hua, Zhen Hua	2022	China	Randomised Controlled Trial	88	Total Mastectomy; Unilateral Mastectomy; Sentinel Lymph Node Biopsy; Axillary Lymph Node Dissection	TPVB; ITP	Multimodal Analgesia	Opioids; Dexamethasone; NSAIDs	Compared with a multi-injection thoracic paravertebral block, the multi-injection intertransverse process block provided non-inferior analgesia within 30min in the recovery room and recovery quality at 24 hours following major breast cancer surgery in females.

blocks for major breast cancer surgery: a randomized non-inferiority trial										
Effect of balanced anaesthesia with and without modified pectoralis nerve block on postoperative analge	Jeetinder K. Makkar, Divya Dahiya, Divya Jain, Aswini Kuber, Kamal Kajal, Narinder P. Singh	2021	India	Randomised Controlled Trial	49	Unilateral Modified Radical Mastectomy	PECS II	Multimodal Analgesia	Opioids; Acetaminophen	Balanced anaesthesia supplemented with modified PEC block performed after general anaesthesia did not improve the postoperative pain in patients undergoing modified radical mastectomy.

sia after breast surgeries: A randomised controlled trial										
Ultrasound-guided Double-point Versus Single-point Serratus Anterior Plane Block for Modified Radical Mastectomy:	Jianghui Xu, Dandan Ling, Qiannan Xu, Pengfei Sun, Shiyou Wei, Lingling Gao, Feifei Lou, Jun Zhang	2025	China	Randomised Controlled Trial	60	Modified Radical Mastectomy; Axillary Lymph Node Dissection	SAPB	Multimodal Analgesia	Opioids; NSAIDs	Double-point SAPB offers wider anesthetic spread but shows no significant clinical advantage in pain or axillary comfort over single-point SAPB after MRM.

A Randomized Controlled Trial										
Effect of opioid-free anesthesia combined with pectoral nerve block on the quality of recovery in patients after mastectomy: A randomized,	Jiawei Chen, Lewei He, Yuying Shi, Jing Jiao, Shaoqiang Huang, Jianhua Zhou, Qingyan Luo	2025	China	Randomised Controlled Trial	132	Total Mastectomy; Partial Mastectomy; Sentinel Lymph Node Biopsy; Axillary Lymph Node Dissection	PECS II	Multimodal Analgesia	Opioids; Dexmedetomidine; NSAIDs	In conclusion, while OFA contributes to a reduction in adverse events, its integration with PECS blocks does not improve QoR or postoperative analgesia at 24h post-mastectomy. Moreover, OFA was associated with a prolonged extubation time.

controlled trial										
General anesthesia with S-ketamine improves the early recovery and cognitive function in patients undergoing modified radical mastectomy: a prospective	Junxia Zhang, Danting Jia, Wenbin Li, Xiaohui Li, Qian Ma, Xuexin Chen	2023	China	Randomised Controlled Trial	80	Modified Radical Mastectomy		Multimodal Analgesia	Opioids; Ketamine	General anesthesia with S-ketamine as a potential strategy showed high safety and could not only improve the quality of recovery mainly through improving pain, physical comfort, and emotional state but also promote the recovery of cognitive function on POD1 in patients undergoing MRM.

randomized controlled trial.										
Effects of Esketamine Combined with Ultrasound-Guided Pectoral Nerve Block Type II on the Quality of Early Postoperative Recovery in Patients Under	Lili Yu, Qi Zhou, Wei Li, Qin Zhang, Xiuling Cui, Yulin Chang, Qiujun Wang	2022	China	Randomised Controlled Trial	136	Unilateral Modified Radical Mastectomy	PECS II	Multimodal Analgesia	Opioids; Ketamine; NSAIDs	Esketamine combined with Pecs II block can be used for anesthesia in MRM for breast cancer, thus, improving patient quality of early postoperative recovery.

going a Modified Radical Mastectomy for Breast Cancer: A Randomized Controlled Trial										
Effect of different doses of intravenous dexmedetomidine as an adjunct to the	Lvdan Huang, Shishi Zhao, Weijuan Zhu, Xiaona Zhu, Linmin Pan, Quangang Wang, Kejian Shi	2025	China	Randomised Controlled Trial	85	Modified Radical Mastectomy	SAPB	Multimodal Analgesia	Opioids; Dexmedetomidine; NSAIDs	Administration of 1.0μg/kg intravenous dexmedetomidine as an adjunct to SAPB significantly reduces the postoperative pain intensity in patients undergoing modified radical mastectomy and decreases the

serratus anterior plane block in patients undergoing modified radical mastectomy: a randomized controlled trial										postoperative consumption of analgesics.
Ultrasound guided erector spinae plane block versus thoraci	Mahmoud A. Kamel, Eman Abdulfattah Mohammed Ismael, Somia	2025	Egypt	Randomised Controlled Trial	44	Unilateral Modified Radical Mastectomy	TPVB; ESPB	Multimodal Analgesia	Opioids; NSAIDs; Acetaminophen	ESPB is an acceptable analgesic alternative to paravertebral block after MRM. ESPB is equally effective as TPVB in the duration of

c paravertebral block for perioperative analgesia for modified radical mastectomy: a randomized trial	Mohammed Abdel Aziz El Sheikh, Mai M. Elrawas, Ehab Hanafy Shaker Gendy									analgesia and postoperative pain and morphine usage during the first postoperative day.
Dexmedetomidine effect on opioid consumption in breast reconstruction	Malek Younsi, Jean-Philippe Rives, Anna Ilenko, Migena Demiri	2023	France	Cohort Study	90	Autologous Flap Reconstruction	TPVB; TAP	Multimodal Analgesia	Opioids; Dexmedetomidine; NSAIDs; Acetaminophen	In the postoperative period, the total opioid consuming was decreased by 50% in the dexmedetomidine group within 72 h (0.18 mg/kg vs 0.39 mg/kg, $p < 0.01$).

surgery										
Is there a difference in the postoperative quality of recovery and analgesia between erector spinae and serratus anterior plane blocks following modified	Mehtap Gürler Balta, Vildan Kölükçü, Ahmet Tuğrul Şahin, Ali Genç, Mustafa Süren, İsmail Okan	2025	Turkey	Randomised Controlled Trial	68	Modified Radical Mastectomy	SAPB; ESPB	Multimodal Analgesia	Opioids; Acetaminophen	Preoperative administration of ESPB and SAPB in breast cancer surgery improved the quality of recovery and effectively reduced analgesic requirement. Future studies should investigate how local anesthetic type and volume affect postoperative recovery and analgesia.

radical mastectomy: a randomized controlled study										
The Erector Spinae Plane Block with 20 or 30 mL of 0.25% Bupivacaine Provides Equivalent Postoperative Analgesia after Maste	Merve Bıdak, Bahadır Çiftçi, Pelin Basım, Birzat Emre Gölboyu, Yunus Oktay Atalay	2025	Turkey	Randomised Controlled Trial	43	Unilateral Mastectomy; Axillary Lymph Node Dissection	ESPB	Multimodal Analgesia	Opioids; NSAIDs	A similar analgesic effect is achieved by performing ESPB using 20 or 30 mL of local anaesthetic at the same concentration.

ctomy: A Prospective Randomized Trial										
A Comparative Analysis of Erector Spinae Plane (ESP) Block and Serratus Posterior Superior Intercostal Plane (SPSIP) Block in Breast	Mihrican SAYAN, Ozan SAYAN, Mesut ERBAS, Ipek ERCAN KILINC, Eser Can AY, Nihal Tekin, Özge Naz AY, Ali KILINC	2026	Turkey	Randomised Controlled Trial	75	Unilateral Mastectomy; Axillary Lymph Node Dissection	SPPB; ESPB	Multimodal Analgesia	Opioids; NSAIDs; Acetaminophen	Both fascial plane blocks relieved pain after surgery in comparison to the control group. The Serratus Posterior Superior Intercostal Plane block group had better outcomes in the first 24 hours

Surgery										
Effects of the Different Doses of Esketamine on Postoperative Quality of Recovery in Patients Undergoing Modified Radical Mastectomy: A Randomized, Double-Blin	Min Zhu, Siqi Xu, Xia Ju, Shengbin Wang, Xitong Yu	2022	China	Randomised Controlled Trial	99	Modified Radical Mastectomy		Multimodal Analgesia	Opioids; Ketamine	Esketamine infusion improved to some extent the quality of recovery on POD1 and POD3 in patients undergoing modified radical mastectomy, especially 4 μg/kg/h esketamine was better, but the BIS value and incidence of drowsiness were significantly increased.

d, Controlled Trial										
Prevention of Acute Postoperative Pain in Breast Cancer: A Comparison between Opioids versus Ketamine in the Intraoperatory Analgesia	Mirian Lopez, Maria Luz Padilla, Blas Garcia, Javier Orozco, Ana Maria Rodilla	2021	Spain	Comparative Analysis	71	Partial Mastectomy; Quadrantectomy; Modified Radical Mastectomy; Bilateral Mastectomy; Sentinel Lymph Node Biopsy; Mastectomy		Multimodal Analgesia	Opioids; Ketamine; Dexamethasone	Ketamine could reduce the incidence of APP in breast cancer surgery, compared to opioids.

Serratus anterior plane block for postoperative analgesia in modified radical mastectomy	Mochamat, Johan Arifin, Taufan Pramadika, Chandra Hermawan Manapa, Widya Istanto, Satrio Adi Wicaksono, Taufik Eko Nugroho	2023	Indonesia	Randomised Controlled Trial	44	Modified Radical Mastectomy	SAPB	Multimodal Analgesia	Opioids; NSAIDs; Acetaminophen	Serratus anterior plane block reduced pain significantly up to 24 h postoperatively compared to the control group. The patients in this group needed rescue analgesia after longer duration and needed lower doses of rescue analgesia. There was lower frequency of PONV than the control group.
A Comparative Study of Placebo Versus Opioid-Free Analgesic	Monisha B, Sujatha Munireddy Papireddy, Sreeramulu P N, Sumanth Tarigonda	2023	India	Comparative Analysis	66	Modified Radical Mastectomy	ESPB	Multimodal Analgesia	Opioids; NSAIDs	Multimodal analgesia with erector spinae plane block and opioid-free analgesic mixture provides effective perioperative analgesia and a better intraoperative

Mixture for Mastectomies Performed Under General Anesthesia Along With Erector Spinae Plane Block.										hemodynamic profile in patients undergoing breast cancer surgery under general anesthesia.
Comparison of the Postoperative Analgesic Effects of Serratus Posterior	MUSTAFA SIRRI KOTANOĞLU, MUSA ZENGİN, ONUR KÜÇÜK, ATAKAN SEZGİ, İBRAHİM TOPCU	2026	Turkey	Randomised Controlled Trial	60	Unilateral Mastectomy	TPVB; SPPB	Multimodal Analgesia	Opioids; NSAIDs	TPVB provided a transient early-phase analgesic advantage at 1 h and 2 h, while SPSIPB was associated with late-phase opioid sparing. The comparable cumulative pain burden across 24

Superior Intercostal Plane Block and Thoracic Paravertebral Block in Mastectomy Operations										h suggests that SPSIPB may serve as a periparavertebral alternative to TPVB when sustained analgesia and opioid reduction are clinical priorities.
Paravertebral block versus erector spinae plane block for analgesia in modified radical	Nükhet Sivrikoz, Özlem Turhan, Ahmet Ali, Demet Altun, Mustafa Tökenmez, Zerrin Sungur	2022	Turkey	Randomised Controlled Trial	86	Unilateral Modified Radical Mastectomy	TPVB; ESPB	Multimodal Analgesia	Opioids; Acetaminophen	Thoracal paravertebral block reduced morphine consumption compared to ESPB after MRM, albeit a small difference. A through coverage of TPVB may be preferred with experienced operators in

mastectomy: a randomized, prospective, double-blind study										MRM due to lower pain scores.
Analgesic efficacy of adding adjuvants to local anesthetics in bi-level erector spinae plane block for breast surgeries: a	Nahla N. Shehab, Reham M. Fahmy, Ayman S. Abdelrahman, Azza F. Omran, Walaa Y. Elsabeeny	2025	Egypt	Randomised Controlled Trial	68	Modified Radical Mastectomy; Axillary Lymph Node Dissection	ESPB	Multimodal Analgesia	Opioids; NSAIDs; Acetaminophen	In MRM, adding dexmedetomidine as an adjuvant to bupivacaine in ultrasound-guided bi-level ESPB showed a better analgesic profile compared to no adjuvant, dexamethasone, and conventional opioid analgesia with lower pain scores and lower intraoperative opioid consumption.

randomized controlled study										
Quality and Efficacy of General Anesthesia Versus Segmental Thoracic Spinal Anesthesia in Modified Radical Mastectomy Surgery: A Single-center Obser	NAMITA GUPTA, SONIA AGARWAL, GAURAV GOYAL	2024	India	Observational Study	58	Modified Radical Mastectomy	STS	Multimodal Analgesia	Opioids; Dexamethasone; Acetaminophen; Magnesium Sulfate	STS anesthesia is feasible for breast carcinoma surgeries but it is easier for surgeon and anesthesiologist to manage patient under general anesthesia. STS anesthesia has advantage in terms of early post-operative analgesia and will definitely be helpful in cases where patient is not fit for general anesthesia.

vational Study										
Comparison of Analgesic Efficacy of Ultrasound Guided Rhomboid Intercostal Block Versus Serratus Anterior Plane Block for Mastectomy Surgery	Nevert Abdel Ghaffar, Tamer Farahat	2025	Egypt	Comparative Analysis	60	Modified Radical Mastectomy	SAPB; RIB	Multimodal Analgesia	Opioids; NSAIDs	US-guided RIB with 20ml of bupivacaine 0.25% in patients with mastectomy can effectively decrease the need for fentanyl with a longer time of first request. While comparing with SAB, the dose of ketorolac was lower, and the level of patient's satisfaction was better.

Efficacy of Ultrasound-Guided Erector Spinae Plane Block for Postoperative Analgesia in Modified Radical Mastectomy: A Prospective, Randomized, Clinical Study	Nidhi Dabhi, Bhavesh Dalwadi, Anup Chandnani, and Chiragi Bumiya	2023	India	Randomised Controlled Trial	72	Modified Radical Mastectomy	ESPB	Multimodal Analgesia	Opioids; Acetaminophen	We concluded from our study that USG'Äêguided erector spinae plane block with general anaesthesia provided a safe and effective postoperative analgesia modality with decreased opioid requirements and better patient satisfaction scores, without complications in patients undergoing MRM surgery.

Opioid-free anesthesia versus opioid-inclusive anesthesia for breast cancer surgery: a retrospective study.	Pia Di Benedetto, Massimiliano Pelli, Chiara Loffredo, Rosaria La Regina, Federico Policastro, Silvia Fiorelli, Roberto Alberto De Blasi, Flaminia Coluzzi, Monica Rocco	2021	Italy	Cohort Study	89	Quadrantectomy		Multimodal Analgesia	Opioids; Ketamine; Magnesium Sulfate; Clonidine	A combination of ketamine, magnesium, and clonidine could be more effective than opioid-based analgesia in reducing postoperative pain and lowering PONV occurrence after quadrantectomy for breast cancer.
Assessment of ultrasound guided erector spinae plane block	Prashant Kumar, Anu Singh, Jyoti Sharma, Sanjeev Parshad, Sanjay Johar,	2024	India	Randomised Controlled Trial	58	Modified Radical Mastectomy	ESPB	Multimodal Analgesia	Opioids; Acetaminophen	Post-operative additional analgesics and intra-operative fentanyl were significantly reduced in patients receiving erector spinae plane block. Time to

for early post-operative analgesia for modified radical mastectomy: a prospective, randomized, controlled study	Kiranpreet Kaur									rescue analgesia was significantly delayed. Visual Analog Scale score was significantly lower at all time intervals.
Postoperative recovery after breast cancer surgery: A randomised contro	Qingfen Zhang, Yaqing Wu, Haiyan An, Yi Feng	2023	China	Randomised Controlled Trial	80	Total Mastectomy; Unilateral Mastectomy; Sentinel Lymph Node Biopsy; Axillary Lymph	TPVB	Multimodal Analgesia	Opioids; Dexmedetomidine; NSAIDs; Lidocaine	TPVB-based opioid-free anaesthesia im-proved early postoperative quality of recovery without compromising pain control in patients undergoing

lled trial of opioid-based versus opioid-free anaesthesia with thoracic paravertebral block						Node Dissection				breast cancer surgery.
Role of Pectoral Block in Postoperative Analgesia after Modified Radical Mastectomy	Rachana C Nair, Asha KS, Thomas Joseph	2025	India	Cohort Study	60	Modified Radical Mastectomy	PECS I; PECS II	Multimodal Analgesia	Opioids; Acetaminophen	The Pecs block is an effective adjunct to general anaesthesia for MRM, significantly enhancing postoperative pain relief, minimizing analgesic requirements, improving hemodynamic stability, and reducing PONV.

Comparison of efficacy of ultrasound-guided single-level thoracic paravertebral block and complete antethoracic block for postoperative analgesia in modified radical mastectomy: A	Ruchi Singh, Wasimul Hoda, Sachidanand Jee Bharti, Sushma Bhatnagar, Seema Mishra, Rakesh Garg, Nishkarsh Gupta, Vinod Kumar, Maroof A. Khan, Sunil Kumar	2026	India	Randomised Controlled Trial	70	Modified Radical Mastectomy	TPVB; CAB	Multimodal Analgesia	Opioids; Acetaminophen	CAB is a potential alternative technique for providing analgesia for breast surgeries and can be considered in breast surgeries where PVB is not feasible.

noninferiority randomized controlled trial										
The Effect of Intraoperative Infusion of Dexmedetomidine on Acute and Chronic Postoperative Pain After Simple Mastectomy: A	Saeed Khademi, Maryam Noorizadeh, Naeimeh ossadat Asmarian, Ali Akbari and Reza Jouybar	2022	Iran	Randomised Controlled Trial	110	Total Mastectomy		Multimodal Analgesia	Opioids; Dexmedetomidine	According to the finding of this study, the use of dexmedetomidine during simple mastectomy reduces pain, decreases, and delays in requirement of analgesia at the first 24 hours post-operation. However, it did not have a significant effect on chronic pain.

Randomized Double-Blind Clinical Trial										
Comparison of Ultrasound-guided Erector Spinae Plane Block Versus Rhomboid Intercostal Block for Perioperative Analgesia in Breast Cancer	Satish Kumar, Shagufta Naaz, Nishant Sahay, Sarfaraz Ahmad, Chandan Kumar Jha, Akhil VP, George Paul	2026	India	Randomised Controlled Trial	68	Unilateral Modified Radical Mastectomy	ESPB; RIB	Multimodal Analgesia	Opioids; Dexamethasone; Acetaminophen	Our study's outcome demonstrates ultrasound-guided ESPB to be more effective than RIB in terms of lower perioperative fentanyl consumption.

Surgery										
Comparison of Erector Spinae Plane Block and Serratus Anterior Plane Block for Modified Radical Mastectomy: A Prospective Randomised Study	Saurabh Sagar, Sandeep Loha, Anil Paswan, Arvind Pratap, Shashi Prakash, Amrita Rath	2022	India	Randomised Controlled Trial	40	Unilateral Modified Radical Mastectomy	SAPB; ESPB	Multimodal Analgesia	Opioids; Acetaminophen	In our study, we concluded that USG-ESPB is superior to USG-SAPB in the post-operative period in patients undergoing unilateral MRM.

Modified pectoral nerve block versus bi-level erector spinae plane block for postoperative analgesia after radical mastectomy surgery: a prospective, randomized, controlled trial	Sevim Cesur, Can Aksu, Sertaç Ata Güler, Alparslan Kuş	2023	Turkey	Randomised Controlled Trial	67	Radical Mastectomy; Unilateral Mastectomy	PECS I; ESPB	Multimodal Analgesia	Opioids; Acetaminophen	Ultrasound-guided bi-level ESPBs provided better postoperative analgesia than PECS blocks after radical mastectomy surgery.

Rhomboid Intercostal versus Serratus Anterior Plane Block for Analgesia After Thoracodorsal Artery Perforator Flap Following Partial Mastectomy: A Randomized Contro	Shereen E. Abd Ellatif, Emad Salah Ibrahim, Heba M. Fathi	2025	Egypt	Randomised Controlled Trial	84	Partial Mastectomy; Autologous Flap Reconstruction	SAPB; RIB	Multimodal Analgesia	Opioids; Acetaminophen	Because of its ability to block both the anterior and posterior hemithorax, the RIB, is more efficient than the SAB at controlling acute pain and reducing opioid consumption in patients undergoing BCS followed by TDAP flaps; thus, the RIB can be employed as a potential alternative in these surgeries.

lled Trial										
The comparison of the efficacy of ultrasound-guided paravertebral block versus erector spinae plane block for postoperative analgesia in modified radical mastectomy: A rando	Shilpi Agarwal, Sachidanand Jee Bharati, Sushma Bhatnagar, Seema Mishra, Rakesh Garg, Nishkarsh Gupta, Vinod Kumar, Maroof Ahmad Khan	2021	India	Randomised Controlled Trial	80	Modified Radical Mastectomy	TPVB; ESPB	Multimodal Analgesia	Opioids; Acetaminophen	ESP block can be used as a safe and easy to perform alternative analgesic technique over paravertebral block in breast cancer surgeries.

mized controlled trial										
A Hospital Based Randomized Clinical Assessment Of Deep Versus Superficial Erector Spinae Block For Modified Radical Mastectomy	Shiv Shankar, Vivek Ranjan, Akriti Singh, Nitin Kumar	2022	India	Randomised Controlled Trial	50	Modified Radical Mastectomy	ESPB	Multimodal Analgesia	Opioids; Dexamethasone	Injection of drugs deep to erector spinae muscle provides more cranio-caudal blockade of posterior and lateral chest wall than superficial group.

The effect of different nerve block strategies on the quality of post-operative recovery in breast cancer patients: A randomized controlled study	Shun Wang, Jinghong Shi, Yunke Dai, Jie Zhang, Qiaoli Liu, Pingliang Yang, Na Zhu	2024	China	Randomised Controlled Trial	148	Unilateral Modified Radical Mastectomy	TPVB; SAPB; TTP	Multimodal Analgesia	Opioids; Esmolol; Atropine, Norepinephrine, Urapidil	Serratus anterior plane block combined with transverse thoracic muscle plane block and paravertebral block both have better effects than serratus anterior plane block alone in improving patients' early post-operative recovery quality, and also have an advantage in improving early post-operative pain.
Randomized controlled trial compa	Sudivya Sharma, Shashank Tiwari, Kailash	2021	India	Randomised Controlled Trial	60	Unilateral Modified Radical Mastectomy	PECS I; PECS II	Multimodal Analgesia	Opioids; Acetaminophen	Pectoral nerve block benefits patients undergoing mastectomy by achieving similar

ring the efficacy of pectoral nerve block with general anesthesia alone in patients undergoing unilateral mastectomy	Sharma, Nita Nair									post-operative pain scores with decreased consumption of intraoperative and post-operative opioids.
The efficacy of ultrasound-guided erector spinae	Sukhee Park, Joohyun Park, Ji Won Choi, Yu Jeong Bang, Eun Jung	2021	Korea	Randomised Controlled Trial	58	Unilateral Mastectomy; Tissue Expander Reconstruction	ESPB	Multimodal Analgesia	Opioids; NSAIDs	The ESPB decreased postoperative opioid consumption and increased patient satisfaction without

plane block after mastectomy and immediate breast reconstruction with a tissue expander: A randomized clinical trial	Oh, Jiyeon Park, Kwan Young Hong2, Woo Seog Sim									significant complications after IBR with a tissue expander after mastectomy.
Comparison of the Efficacy of Ultrasound-guided Pectoral versus Erecto	V Bhavani, Sangeeta Dhanger, Namrata Gupta, I Joseph Raajesh, Saravanan Pandian	2022	India	Randomised Controlled Trial	60	Modified Radical Mastectomy	PECS II; ESPB	Multimodal Analgesia	Opioids; Acetaminophen	The ESP block had better pain control, reduced postoperative pain scores and rescue analgesia than PECS II when given as preventive analgesia in mastectomy surgeries.

r Spinae Plane Blocks for Postoperative Analgesia in Patients undergoing Modified Radical Mastectomy: A Randomised Controlled Trial										
Effects of S-ketamine on Postoperative	Wuyou Gao, Huiting Li, Ting Li, Lili Zhang, Tianhua	2023	China	Randomised Controlled Trial	137	Modified Radical Mastectomy		Multimodal Analgesia	Opioids; Ketamine; NSAIDs	A high dose of s-ketamine improved the quality of recovery at 24 h after surgery, as well as alleviated

Recovery Quality and Inflammatory Response in Patients Undergoing Modified Radical Mastectomy	Zhang, Wenqian Lin, Zhesheng Wen, Longhui Cao, Hongying Tan									the inflammatory response without increasing the incidence of adverse effects.
Efficacy and Safety of Ultrasound Guided-Deep Serratus Anterior	Xia Xu, Xingfang Chen, Wenchao Zhu, Jing Zhao, Yanchao Liu, Caiping Duan, and Yingying Qi	2022	China	Randomised Controlled Trial	95	Unilateral Modified Radical Mastectomy; Axillary Lymph Node Dissection	SAPB	Multimodal Analgesia	Opioids; Dexmedetomidine; NSAIDs	We discovered that 1 μg¬∑kg'àí1 (not 0.5 μg¬∑kg'àí1) DEX combined with 20 mL of 0.5% ropivacaine and 5 mg of dexamethasone in USG-DSAPB could provide superior postoperative

Plane Blockade With Different Doses of Dexmedetomidine for Women Undergoing Modified Radical Mastectomy: A Randomized Controlled Trial										analgesia for patients undergoing MRM. However, the quality of postoperative functional recovery and prevalence of chronic pain were similar.
Comparison of serrat	Yesiltas S, Türköz A, ÇalımM, Yılmaz S,	2021	Turkey	Randomised Contr	60	Modified Radical Mastectomy;	PECS I; SAPB	Multimodal Analgesia	Opioids; Dexamethasone; NSAIDs; Acetaminophen	These results suggest that SPB application and PECS I provide

us plane block alone and in combination with pectoral type 1 block for breast cancer surgery: a randomized controlled study	Esen A, Daşkaya H, Karaaslan K			olled Trial		Sentinel Lymph Node Biopsy; Axillary Lymph Node Dissection; Mastectomy				more effective and reliable perioperative analgesia and increase patient satisfaction in breast cancer surgery.
Impact of Ultrasound-Guided Deep Serratus Anteri	Yu Wu, Yuling Kang, Yanli Li and Bohan Fu	2022	China	Randomised Controlled Trial	73	Modified Radical Mastectomy	SAPB	Multimodal Analgesia	Opioids; Dexamethasone	The ultrasound-guided dSAPB combined with dexmedetomidine plus ropivacaine may improve the QoR-15 in patients

or Plane Block Combined With Dexmedetomidine as an Adjuvant to Ropivacaine Inpatient Quality of Recovery Scores Undergoing Modified Radical Mastectomy: A Randomized										undergoing modified radical mastectomy and indicates that it may be a useful intervention to aid recovery following breast cancer surgery. Furthermore, participants in the ropivacaine with DEX group met the superior pain relief in the early postoperative period, reduced postoperative cumulative opioid consumption, increased patient satisfaction, and no increase in the incidence of complications.

Controlled Trial										
The effect of low-dose ketamine on postoperative quality of recovery in patients undergoing breast cancer surgery: A randomised, placebo-controlled trial	Zijian Zhao, Qiqi Xu, Yao Chen, Chen Liu, Fangfang Zhang, Yuan Han, Junli Cao	2021	China	Randomised Controlled Trial	100	Modified Radical Mastectomy		Multimodal Analgesia	Opioids; Ketamine	Intraoperative low-dose ketamine infusion did not improve the overall quality of recovery on POD 1 in patients undergoing breast cancer surgery.

Comparative analgesic efficacy of adding magnesium sulphate to bupivacaine in serratus anterior plane block to reduce pain after mastectomy.	A Alshawadfy, ME Abdel-Ghaffar, N Magdy	2022	Egypt	Randomised Controlled Trial	40	Modified Radical Mastectomy	SAPB	Opioid-Based Analgesia	Opioids	Adding magnesium sulphate during SAP blockade can enhance the analgesic effect and prolong the time to first analgesic request in patients undergoing radical mastectomy.
The Effect of Retrolaminar	Abdelghany M. S., Ahmed S. A., Magdy A. A., Elgarf	2026	Egypt	Randomised Controlled Trial	60	Unilateral Modified Radical Mastectomy	TPVB	Opioid-Based Analgesia	Opioids	The retrolaminar approach of PVB has the same effect on the postoperative morphine

Thoracic Paravertebral Block on Postoperative Analgesia after Breast Surgeries: Prospective Randomized Study	S. M., Belal A. M.									consumption, the postoperative pain score, and the duration of postoperative analgesia as the ordinary approach in patients undergoing unilateral breast surgery without significant effect on the incidence of complications.
Comparing the Quality of Analgesia With Ultrasound-guided Pectoral	Abdelrhman Alshawadfy, Shimaa A. Al-Touny	2022	Egypt	Randomised Controlled Trial	50	Modified Radical Mastectomy	PECS II; SAPB	Opioid-Based Analgesia	Opioids	Following MRM, US-guided SAP block provided a delayed time to first rescue analgesia with better acute pain control and lower total analgesic consumption compared to the PECS II block.

Nerve Block and Serratus Plane Block in Patients Undergoing Modified Radical Mastectomy										
Comparison Between Erector Spinae Plane Block versus Serratus Anterior	Ahmed Abd Elmohsen Bedewy, Maged Salah Mohamed, Hesham Mohamed Sultan, Moataz	2024	Egypt	Randomised Controlled Trial	60	Unilateral Modified Radical Mastectomy	SAPB; ESPB	Opioid-Based Analgesia	Opioids	Demonstrates that ESPB provides superior analgesic effects compared to SAPB in patients undergoing MRM, with reduced morphine use and lower postoperative cortisol levels.

Plane Block Regarding Analgesia and Stress Response After Modified Radical Mastectomy: Randomized Controlled Trial	Salah Khalil									Both blocks offer more effective pain control than intravenous morphine alone.
Erector Spinae Plane Block Versus PECS Block Type II for	Ahmed Bakeer, Nasr Mahmoud Abdallah	2022	Egypt	Randomised Controlled Trial	60	Modified Radical Mastectomy	PECS II; ESPB	Opioid-Based Analgesia	Opioids	The PECS-II block is more effective in postoperative pain control after breast cancer surgery than the ESP block. It also prolongs the duration of

Breast Surgery: A Randomized Controlled Trial										analgesia and reduces the need for morphine 24 hours after the surgery.
Effects of Adding Dexamethasone Plus Ketamine to Bupivacaine for Ultrasound-guided Serratus Plane Block as Analgesia in Major	Ahmed Hussein Bakeer, Ahmed Fakher Abdou, Jehan Mohamed Abdelhaleem, Doaa Abdeltawab Abdou	2024	Egypt	Randomised Controlled Trial	60	Modified Radical Mastectomy	SAPB	Opioid-Based Analgesia	Opioids	Adding ketamine to bupivacaine plus dexamethasone in ultrasound-guided SAPB is associated with better analgesic outcomes in patients undergoing MRM, including prolonged duration of analgesia and decreased post-operative morphine consumption and pain scores at rest and movement.

Breast Surgery: A Randomized, Double-blind Trial										
Comparison of the analgesic efficacy of superficial and deep serratus anterior plane blocks in patients undergoing breast cancer	Ahmet Taşar, Gamze Talih, Ersin Sönmez, Mustafa Gök, Ayşe Ülgey	2026	Turkey	Randomised Controlled Trial	63	Total Mastectomy; Modified Radical Mastectomy; Sentinel Lymph Node Biopsy	SAPB	Opioid-Based Analgesia	Opioids	Although cumulative morphine consumption was similar, deep SAPB yielded slightly lower NRS scores, reduced the need for antiemetics, and modestly higher patient satisfaction, warranting further studies to determine the clinical advantage.

surgery: a prospective randomized single blind study										
Analgesic efficacy of ultrasound-guided PECS II and transe versus thoracic plane blocks compared to serratus anterior plane block	Alshaimaa Soliman Alasrag, Amira Mahfouz Elkeblawy, Mohammed Mohye Eldin Abo Elyazid, Hoda Alsaid Ahmed Ezz	2023	Egypt	Randomised Controlled Trial	70	Unilateral Modified Radical Mastectomy	PECS II; SAPB; TTP	Opioid-Based Analgesia	Opioids	The PECS II-TTP blocks provide effective and long-lasting postoperative analgesia than SAP block in modified radical mastectomy.

for modified radical mastectomy: A randomized prospective study										
Comparing Effect of Adding Ketamine Versus Dexmedetomidine to Bupivacaine in Pecs-ＩＩ Block on	Amira F. Hefni, Abeer M. Eldeek, Shereen A. Ismael, Ahmed R. Shaban	2022	Egypt	Randomised Controlled Trial	159	Modified Radical Mastectomy	PECS II	Opioid-Based Analgesia	Opioids	Adding dexmedetomidine to bupivacaine provides more effective postoperative pain control than adding ketamine during Pecs-II blocks for breast cancer surgery.

Postoperative Pain Control in Patients Undergoing Breast Surgery.										
Comparing postoperative pain control after modified radical mastectomy: a pilot study of ultra-sound guided erector	Ana Cvetković, Marković Ivan, Žegarac Milan, Marko Jevrić, Zoran Bukumirić, Mirčić Dijana, Andrej Jokić, Badnjarević Damjana, Marko Buta	2025	Serbia	Comparative Analysis	49	Unilateral Modified Radical Mastectomy	ESPB	Opioid-Based Analgesia	Opioids	Overall, ESPB demonstrates superior early postoperative pain control and improved patient satisfaction compared to Tramadol. Further studies are needed to confirm these findings.

spinae plane block vs intraoperative tramadol administration in oncology patients										
A comparison of post-operative analgesia with intraoperative pectoral nerve	Ankita Guatam, Daisy Karan, Swarna Banerjee, Prerna Biswa, Nupur Moda	2021	India	Randomised Controlled Trial	60	Modified Radical Mastectomy; Axillary Lymph Node Dissection	PECS II	Opioid-Based Analgesia	Opioids	PECS block has similar analgesic efficacy as opioids but with better ability to mobilize the respective arm, better patient satisfaction score, and lesser adverse effects.

block versus conventional technique in patients undergoing modified radical mastectomy: A prospective, randomized, and double-blinded study										
Effect of preoperative ultrasound-guided	Areeg Kotb Ghalwash, Naglaa Khalil Yousef, Sabry	2023	Egypt	Randomised Controlled Trial	90	Unilateral Modified Radical Mastectomy	SAPB; ESPB; PIFB	Opioid-Based Analgesia	Opioids	TIFPB and ESPB were comparable, both were superior to control in terms of lower

thoracic interfacial plane block versus preoperative thoracic erector spinae plane block on acute and chronic pain after modified radical mastectomy: A randomized contro	Mohammed Amin, Mohamed Alaa Barrima, Taysser Mohmoud Abdalraheem									intraoperative fentanyl consumption, pain score, first analgesic requirement onset is delayed, lower total consumption of morphine, chronic pain 3 and 6 months postoperatively. TIFPB showed a lower pain score at 12 hr. postoperatively compared to ESPB.

lled trial										
Serratus anterior plane block (posterior approach) versus erector spinae plane block in modified radical mastectomy; A randomized comparative trial	Bakinam Wagih Gamal, Magda Mohamed Abo-Ollo, Wessam Zakaria Alamraway, Adel Ibrahim Hozien	2024	Egypt	Randomised Controlled Trial	60	Unilateral Modified Radical Mastectomy	SAPB; ESPB	Opioid-Based Analgesia	Opioids	We concluded that SAPB (posterior approach) and ESPB are safe and effective analgesic modalities for MRM with insignificant differences except for the more blocked dermatomes in the ESPB group.

Comparison of rhomboid intercostal nerve block, erector spinae plane block and serratus plane block on analgesia for modified radical mastectomy: A prospective randomised	Chen-Wei Jiang, Fen Liu, Qinghe Zhou, Wei Deng	2021	China	Randomised Controlled Trial	90	Modified Radical Mastectomy	SAPB; ESPB; RIB	Opioid-Based Analgesia	Opioids	US-guided rhomboid intercostal block (US-RIB) and ESP block can effectively reduce the dosage of tramadol within 24 hours after MRM, and they can effectively relieve pain within 24 hours after MRM compared with SAB.

controlled trial										
Comparison of ropivacaine alone versus dexmedetomidine or ketamine as an adjuvant for pectoral type II nerve blocks in patients undergoing mastectomy - A	Dharani Lenin, Rajnish Kumar, Nishant Sahay, Abhyuday Kumar, Poonam Kumari, Prashant Kumar Singh	2025	India	Randomised Controlled Trial	75	Modified Radical Mastectomy	PECS II	Opioid-Based Analgesia	Opioids	We conclude that dexmedetomidine with 0.2% ropivacaine in the PECS-II block provides better postoperative analgesia and has less sedative effects than ketamine with 0.2% ropivacaine.

randomized controlled trial										
The Efficacy of Ultrasound-Guided Rhomboid Intercostal Block Versus Serratus Plane Block in Patients Undergoing Modified Radical Maste	Dina H. Alhassanin, Amr A. Elbadry, Hoda A. Ezz, Naglaa K. Mohamed	2024	Egypt	Randomised Controlled Trial	125	Unilateral Mastectomy	SAPB; RIB	Opioid-Based Analgesia	Opioids	Both rhomboid intercostal and serratus anterior plane blocks were efficient for analgesia after modified radical mastectomy. However, RIB had better analgesic efficacy compared to SPB.

ctomy: A Prospective Randomized Controlled Study.										
The impact of dexamethasone as a perineural additive to ropivacaine for PECS II blockade in patients undergoing unilateral radical	Elisabeth Hoerner, Lukas Gasteiger, Michael Ortler, Vitaliy Pustilnik, Simon Mathis, Christine Brunner, Sabrina Neururer, Andreas Schlager, Daniel Egle, Guenther Putz	2021	Austria	Randomised Controlled Trial	60	Radical Mastectomy; Skin-Sparing Mastectomy; Nipple-Sparing Mastectomy	PECS II	Opioid-Based Analgesia	Opioids	Dexamethasone 8 mg when added to ropivacaine 0.2% for PECS II block in unilateral radical mastectomy was not found to reduce total opioid consumption over 72 postoperative hours or to prolong duration of analgesia as compared to pure ropivacaine 0.2%.

mastectomy - A prospective, randomized, controlled and double-blinded trial.										
Quality of recovery scores in deep serratus anterior plane block vs. sham block in ambulatory	F. W. Abdallah, Patel, Madjdpour, T. Cil, R. Brull	2021	Canada	Randomised Controlled Trial	40	Total Mastectomy; Partial Mastectomy; Sentinel Lymph Node Biopsy	SAPB	Opioid-Based Analgesia	Opioids	There were no differences in the quality of recovery-15 scores between patients in the serratus and control groups, with mean (SD) scores of 96 (14) and 102 (20) for the control and serratus groups, respectively.

breast cancer surgery: a randomised controlled trial										
Comparison of Erector Spinae Plane Block and Pectoral Nerve Block for Acute and Chronic Pain in Mastectomies Outco	Fabrcio T. Mendonca, Marcus Alexandre B. de Aviz, Ana Paula S. Bezerra, Lucas G. Silva, Estefane E. Gaspar, Barbara N. Terol, Lucianna R. e Silva, Liliana M. Andrade	2025	Brazil	Randomised Controlled Trial	99	Partial Mastectomy; Modified Radical Mastectomy; Axillary Lymph Node Dissection; Mastectomy	ESPB; PSP	Opioid-Based Analgesia	Opioids	PSPB and ESP block resulted in similar overall opioid consumption among women undergoing mastectomy. However, PSPB was associated with lower postoperative tramadol consumption.

mes: a Randomized Clinical Trial										
Efficacy of type-I and type-II pectoral nerve blocks (PECS I and II) in patients undergoing mastectomy: a prospective randomised clinical trial.	Fabricio Tavares Mendonça, Antonio Vinicius de Assis Feitosa Junior, Huana Christina Rosa Nogueira, Heloisa Helena Roncolato, Catia Sousa Goveia	2022	Brazil	Randomised Controlled Trial	80	Total Mastectomy; Quadrantectomy; Unilateral Mastectomy; Axillary Lymph Node Dissection; Breast Reconstruction (unspecified)	PECS I; PECS II	Opioid-Based Analgesia	Opioids	PECS I/II blockade with high-dose local anaesthetic is efficacious and safe, resulting in lower levels of perioperative pain after mastectomy compared to standard general anaesthesia.

Effect of adding a superficial parasternal intercostal plane block to the serratus anterior plane block on postoperative analgesic outcomes in breast cancer surgery: a prospective,	Fazil Ahmet Akbulut, Hüsnü Kürşad, Muhammed Emin Sözüak, Ali Ahiskalioglu	2026	Turkey	Randomised Controlled Trial	64	Unilateral Modified Radical Mastectomy	SAPB; Parasternal Intercostal Plane Block	Opioid-Based Analgesia	Opioids	Although the addition of a superficial parasternal intercostal plane block to SAPB resulted in wider anterior chest wall dermatomal coverage, it did not confer additional benefit in terms of postoperative pain scores or opioid consumption under a multimodal analgesia regimen.

randomized, double-blind trial										
Effectiveness of the medial approach to PECS block in modified radical mastectomy: a retrospective study	Georges Assaf, Linda Gholmieh, Rony Al Nawwar, Sandra Nassif, Jenyfer Daoud, Yara Ghabour, Walid Maroun, Hanane Barakat	2024	Lebanon	Cohort Study	116	Modified Radical Mastectomy	PECS I; PECS II	Opioid-Based Analgesia	Opioids	The medial approach of PECS I and II nerve block is effective and safe demonstrating reduced postoperative morphine requirement.
Efficacy of opioid-free anesthesia in modified	Georges R. Assaf, Fares Yared, Mary-Joe Dib, Tony Mouawad, Oriana	2023	Lebanon	Cross-Sectional Study	116	Modified Radical Mastectomy	PECS I; PECS II	Opioid-Based Analgesia	Opioids	OFA could be considered in modified radical mastectomy management in female patients; nerve block seemed to act as

radical mastectomy: A cross-sectional observational study	Tarabay, Jean-Paul Noujeim, Etienne El-Helou, Jean Kaady, Bassam Abboud									morphine sparing in operative and postoperative settings by providing significantly less time to extubate with less postoperative morphine requirement.
Evaluation of Postoperative Pain in Patients Undergoing Erector Spinae Plane Block in Breast Surgeries	Gizem Kara, Metin Alkan, Ramazan Kozan, Nuray Camgöz Eryılmaz, Mustafa Arslan	2025	Turkey	Cohort Study	94	Radical Mastectomy; Axillary Lymph Node Dissection	ESPB	Opioid-Based Analgesia	Opioids	VAS scores at postoperative 1st, 2nd, and 4th hours were significantly higher in the control group than the ESP group (p=0.002, p<0.0001, p=0.005, respectively).

Comparison of erector spinae plane block and rhomboid intercostal block for postoperative pain management in patients undergoing unilateral breast surgery	Glnihal Avcı, Sevim Cesur Okan, Hadi Ufuk Yörükoğlu, Can Aksu, Alparslan Kuş	2026	Turkey	Comparative Analysis	84	Unilateral Modified Radical Mastectomy; Axillary Lymph Node Dissection	ESPB; RIB	Opioid-Based Analgesia	Opioids	Within a standardized multimodal analgesia regimen for unilateral breast surgery, ESPB and RIB yielded comparable postoperative opioid consumption and pain scores.

Less use of rescue morphine when a combined PSP/IPP-block is used for postoperative analgesia in breast cancer surgery: A randomised controlled trial	Hans Ahlberg, Daniel Wallgren, Magnus Hultin, Tomi Myrberg and Joakim Johansson	2023	Sweden	Randomised Controlled Trial	185	Partial Mastectomy; Radical Mastectomy; Sentinel Lymph Node Biopsy; Axillary Lymph Node Dissection	PECS II	Opioid-Based Analgesia	Opioids	The use of a combined PSP/IPP-block block before breast cancer surgery reduces the need for postoperative rescue morphine, even when compared with the use of intra-operative morphine.

Analgesic Efficacies of Intraoperative Pectoralis Nerve II Block under Direct Vision in Patients Undergoing Robotic Nipple-Sparing Mastectomy with Immediate Breast Recon	Jiae Moon, Hyung Seok Park, Jee Ye Kim, Hye Sun Lee, Soyoung Jeon, Dongwoo Lee, Sun Joon Bai, Na Young Kim	2022	Korea	Randomised Controlled Trial	30	Nipple-Sparing Mastectomy; Immediate Implant Reconstruction	PECS II	Opioid-Based Analgesia	Opioids	An intraoperative PECS II block under direct vision could provide effective analgesia and reduce postoperative 24-h opioid consumption in patients undergoing robotic NSM with prepectoral IBR using DTI or TE.

struction: A Prospective, Randomized Controlled Study										
Effects of rhomboid intercostal nerve, serratus anterior plane, and paravertebral block on the quality of recovery after breast	Jiali Yu, Yi Qi, Yiwei Shen, Dan Wang, Jingyu Xiao, Qi Chen1 and Ran	2025	China	Randomised Controlled Trial	132	Radical Mastectomy; Modified Radical Mastectomy; Sentinel Lymph Node Biopsy; Axillary Lymph Node Dissection	TPVB; SAPB; RIB	Opioid-Based Analgesia	Opioids	Rhomboid intercostal nerve block and paravertebral block were able to provide similar analgesic effects and QoR-40 scores in breast cancer surgery. However, the blocking effect of the serratus anterior plane block was inferior to the rhomboid intercostal nerve block and paravertebral block. Rhomboid intercostal nerve

cancer surgery: a randomized controlled clinical trial.										block may be one of the best alternatives to paravertebral block as a fascial plane block.
Intraoperative methadone administration for total mastectomy: A single center retrospective study	Juan P. Cata, Yusuf Zaidi, Juan Jose Guerra-Londono, Evan D. Kharasch, Matthew Piotrowski, Spencer Kee, Nicolas A. Cortes-Mejia, Jose Miguel Gloria-Escobar, Peter F. Thall,	2024	United States	Cohort Study	266	Total Mastectomy		Opioid-Based Analgesia	Opioids	Our study suggests that the unique pharmacological properties of methadone, including a short onset of action when given intravenously, long-acting pharmacokinetics, and multimodal effects, are associated with better acute pain management after a total mastectomy.

	Ruitao Lin									
Analgesic efficacy of the superficial versus deep serratus plane blocks for mastectomy with axillary clearance: A randomized controlled trial.	Kok Wang Tan, Syarifah Noor Nazihah Sayed Masri, Qurratu Aini Musthafa, Azrin Mohd Azidin, Amiruddin Nik Mohamed Kamil, Azarinah Izaham, Nadia Md Nor	2022	Malaysia	Randomised Controlled Trial	58	Unilateral Mastectomy; Axillary Lymph Node Dissection	SAPB	Opioid-Based Analgesia	Opioids	Superficial serratus plane block provides better analgesic efficacy than deep serratus plane block in mastectomy and axillary clearance.

A Comparative Study of Analgesic Efficacy of Ultrasound-Guided Serratus Anterior Plane Block Versus Landmark-Guided Thoracic Paravertebral Block for Modified Radica	Manshi Gandhi, Chiranjib Bhattacharyya, Soumik Mazumder, Basanta Kumar Gandhi	2023	India	Randomised Controlled Trial	78	Modified Radical Mastectomy	TPVB; SAPB	Opioid-Based Analgesia	Opioids	Preincisional conventional anatomical landmark-guided TPVB is significantly superior to preincisional US-guided SAPB in terms of duration of analgesia and overall morphine consumption in post-MRM patients.

l Mastectomy under General Anesthesia.										
A Comparative Study Between Ultrasound-guided Serratus Anterior Plane Block and Conventional IV Analgesics in Postoperative Pain	Mennat-Alla Ahmed Fouad Abdel Rahman, Hala Gomaa Salama, Rehab Abdel Fattah Abdel Razik, Reham Fathy Galal, Hanan M. Farag	2022	Egypt	Comparative Analysis	40	Modified Radical Mastectomy	SAPB	Opioid-Based Analgesia	Opioids	The serratus anterior plane block can be used as one of the modalities in managing the pain of patients undergoing MRM surgery. This procedure was effective in reducing the need for post-operative opioids usage, better patient satisfaction with fewer side effects as post-operative nausea and vomiting. It is simple and

Management in Modified Radical Mastectomy										easy-to-learn technique.
Ultrasound-guided subtransverse interligamentary (STIL) block versus erector spinae plane (ESP) block for postoperative analgesia in	Neelesh Anand, Amrita Rath, Reena, Divesh Arora, Annie Horo, Sanjay Bhaskar	2025	India	Comparative Analysis	120	Modified Radical Mastectomy	ESPB; STIL	Opioid-Based Analgesia	Opioids	The STIL block is associated with a lower NRS score and decreased postoperative opioid consumption compared to the ESP block in patients undergoing MRM.

patients undergoing modified radical mastectomy (MRM) - A randomised comparative study										
Effect of erector spinae plane block and thoracic epidural anesthesia on hospit	Nicolas Ajkay, Neal Bhutiani, Laura L. Clark, Michelle Holland, Kelly M. McMasters, Michael E. Egger	2024	United States	Comparative Analysis	316	Unilateral Mastectomy; Bilateral Mastectomy; Immediate Implant Reconstruction; Sentinel Lymph Node Biopsy; Axillary Lymph	TE; ESPB	Opioid-Based Analgesia	Opioids	Regional analgesia is not significantly associated with decreased opioid use or hospitallength of stay.

al length of stay and postoperative opioid use after mastectomy						Node Dissection				
Analgesic and opioid sparing effects of preoperative thoracic paravertebral block: A double blind evaluation of 0.5% bupiva	Nnaemeka Ugonna Okoye, Adetinuwe A. Majekodunmi, Iniabasi U. Ilori	2021	Nigeria	Randomised Controlled Trial	59	Unilateral Mastectomy	TPVB	Opioid-Based Analgesia	Opioids	The study showed that bupivacaine-based TPVB provided an effective post-operative analgesic and opioid-sparing effect for simple mastectomy when compared with a saline-based control group that received only intravenous morphine patient controlled

caine with adrenaline in patients scheduled for simple mastectomy										analgesia and paracetamol.
Opioid-free anaesthesia protocol based on thoracic paravertebral block enhances postoperative recovery after	Panpan Tong, Ying Guo, Yun Wang, Yuerou Feng, Xiong Song, Guanli Luo, Weiyi Qin, Xiaofan Lu, Liquan Zheng, Haidong Wang, Yali Lu,	2025	China	Randomised Controlled Trial	233	Total Mastectomy; Modified Radical Mastectomy; Sentinel Lymph Node Biopsy; Axillary Lymph Node Dissection	TPVB	Opioid-Based Analgesia	Opioids	OFA based on TPVB improved the postoperative quality of recovery in patients undergoing breast cancer surgery.

breast cancer surgery: A two-center, prospective, randomized, controlled trial	Renchun Lai									
Interpectoral and Pectoserratus Plane Block vs. Local Anesthetic Infiltration for Partial Mastectomy: A	Patryk Eisler, Stephan Zimmermann, Ragnar Henningsson	2024	Sweden	Randomised Controlled Trial	57	Partial Mastectomy; Sentinel Lymph Node Biopsy	PSP; IPP	Opioid-Based Analgesia	Opioids	Our study showed decreased intraoperative opioid use in the IPP/PSP group and no diference in postoperative pain scores up to 24 hours. Both groups reported low postoperative pain scores

Prospective Randomized Trial										
Ultrasound Guided Rhomboid Intercostal Nerve Block Versus Erector Spinae Plane Block for Postoperative Analgesia in Modified Radical Mastectomy:	Poonam Kumari, Athira Ramesh, Amarjeet Kumar, Rahul Jain, Chandni Sinha, Deepak Kumar	2026	India	Randomised Controlled Trial	40	Modified Radical Mastectomy	ESPB; RIB	Opioid-Based Analgesia	Opioids	The RISS block can be used as an alternative to the ESP block in patients scheduled for a MRM.

A Comparative Study										
Comparison of Analgesic Efficacy of Ultrasound Guided PEC II Block Using Dexamethasone as an Adjuvant to Ropivacaine Versus Plain Ropivacaine in Patien	Porika Prashanth Nayak, Sarita Ramchandani, Radhakrishna Ramchandani, Chandan Kumar Dey, Rashmi Dubey, Swati Vijapurkar	2024	India	Randomised Controlled Trial	64	Unilateral Modified Radical Mastectomy	PECS II	Opioid-Based Analgesia	Opioids	In comparison to plain ropivacaine, the addition of dexamethasone as an adjuvant to ropivacaine for PEC II block in patients undergoing MRM significantly reduced perioperative opioid consumption and postoperative NRS scores

ts Undergoing Modified Radical Mastectomy: A Double-Blind, Randomized Controlled Trial.										
Mastectomy pain blocks: A comparison of preoperative versus intraoperative	Priya Bhakta, Sabry Ayad, Mir Shanaz Hossain, Nicholette Black, Debra Pratt, Steven Bernard, Richard L. Hofstra,	2026	United States	Cohort Study	122	Unilateral Mastectomy; Bilateral Mastectomy; Sentinel Lymph Node Biopsy; Axillary Lymph Node	PECS I; PECS II	Opioid-Based Analgesia	Opioids	PNBs are safe and effective for multimodal mastectomy analgesia. Block timing did not influence opioid requirements, suggesting timing may be guided by workflow, while multimodal

pectoralis nerve blocks: Mastectomy pectoralis nerve blocks comparison	Jorge Araujo-Duran, Chao Tu, Stephanie A. Valente					Dissection				strategies remain critical.
Comparison of midpoint transverse process to pleura (MTP) block and erector spinae plane block (ESP) for	Priyanka Sethi, Manbir Kaur, Pradeep K. Bhatia, Shilpa Goyal, Ankur Sharma, Shipra Roy, Narender Kaloria	2024	India	Randomised Controlled Trial	66	Modified Radical Mastectomy	ESPB; MTP	Opioid-Based Analgesia	Opioids	ESP block is more efficacious when compared to MTP block for postoperative analgesia in MRM patients.

postoperative analgesia in modified radical mastectomy patients: A double-blinded, randomized control trial										
Effectiveness of adding magnesium sulfate to bupivacaine in ultrasound guided	Rehab Abd El-Raof Abd El-Aziz, Mohamed Frouk Asal, Ayman M. Maaly	2023	Egypt	Randomised Controlled Trial	80	Unilateral Mastectomy	SAPB	Opioid-Based Analgesia	Opioids	Magnesium sulfate with bupivacaine in serratus anterior plane block produced prolonged analgesia postoperatively without significant hemodynamic instability with significant

serratus anterior plane block in patients undergoing modified radical mastectomy										decline in the total dose of rescue analgesic with minimal side effects.
Comparison of Pectoral Nerve and Paravertebral Blocks for Postoperative Pain Management	Roberto Dossi, Edoardo Tasciotti, Kuijk van Sander, Paolo Maino, Vladimir Reyes Lozano, Andrea Saporito, Eva Koetsier	2025	Switzerland	Randomised Controlled Trial	42	Total Mastectomy; Quadrantectomy; Unilateral Mastectomy; Axillary Lymph Node Dissection; Tumorectomy; Prostheti	TPVB; PECS I; PECS II	Opioid-Based Analgesia	Opioids	Our study shows that the PECS block is non-inferior to the PVB in managing postoperative pain after breast surgery, offering advantages such as reduced administration time and a favorable safety profile. These findings support

in Breast Surgery: A Multicentre Randomised Double-Blind Trial						c Reconstruction				the integration of the PECS block into pain management strategies for breast cancer surgery.
Postoperative Analgesic Efficacy of Intraoperative Pectoral Nerve Block for Modified Radical Mastectomy: a	Rohit Jindal, Sushila Meena, Sushil Bhati, Pinakin Patel, Chanchal Gulati, Suresh Singh	2022	India	Randomised Controlled Trial	60	Modified Radical Mastectomy	PECS I; PECS II	Opioid-Based Analgesia	Opioids	PECs II block with bupivacaine administered intraoperatively under direct vision is not only safe and time-saving but it also significantly reduces postoperative pain and analgesic requirement.

Double-Blind Prospective Randomised Interventional Study										
Utility of Pecs Block for Perioperative Opioid-Sparing Analgesia in Cancer-Related Breast Surgery: A Randomized Contro	Roshan K. Kurien, Serina Ruth Salins, Paul Mazhuvanchary Jacob, Kurien Thomas	2021	India	Randomised Controlled Trial	60	Radical Mastectomy; Axillary Lymph Node Dissection	PECS I; PECS II	Opioid-Based Analgesia	Opioids	The findings showed that a two-level PECS block is safe, effective, dependable and simple to perform in breast cancer surgery, reducing morphine consumption, improving post-operative pain and increasing patient satisfaction, thereby, achieving the

lled Trial										primary outcome
The new serratus anterior plane block is more effective than the SPB block for early postoperative analgesia following modified radical mastectomy	Ruizhen Gao, Gang Zhou, Wanting Zhu, Mingyu Zhang, Aihua Shu & Mi Zhou	2025	China	Randomised Controlled Trial	60	Unilateral Modified Radical Mastectomy	SAPB; SPPB	Opioid-Based Analgesia	Opioids	The VAS scores with movement at 2 h postoperation were significantly lower in the SAP group than in the SPB group (P=0.027). The patients in the SAP and SPB groups had lower VAS scores compared with the Control group at 2 and 6 h after MRM, both at rest and with movement (P<0.001). The SPB and SAP blocks significantly reduced the consumption of opioid analgesics during surgery compared with the control

surgery										group (P<0.001). This study revealed that both SPB and SAP blocks had good postoperative analgesic effects on modified radical mastectomy surgery, reduced the consumption of opioids, and decreased the stress response during surgery compared with the control group. Compared with SPB, the SAP block may have better analgesic effects during the early postoperative period of modified radical mastectomy surgery.

The Effectiveness of Combined U.S. Guided Erector Spinae and Pecto-intercostal Fascial Plane Blocks Versus U.S.Guided Thoracic Paravertebral Block in Controlling Perioperative	Sara Habib, Yasmin Khaled, Sahar Badawy, Nashwa Talaat, Amr Abdelkader	2024	Egypt	Randomised Controlled Trial	30	Unilateral Mastectomy; Axillary Lymph Node Dissection	TPVB; ESPB; PIFB	Opioid-Based Analgesia	Opioids	thoracic PVB provided superior analgesia to ESPB despite the latter supplementation with pecto-intercostal plane block.

Pain in Modified Radical Mastectomy, a Blinded Randomized Controlled Trial										
Ultrasound Guided Transversus Thoracic and Pectoral Nerve Block Versus Pectoral Nerve Block	Sayed M. Abed, Ahmed M. Soliman, Mai M. Elrawas, Somia A. Elsheikh, Ahmed A. Abdallah, Reda H. Tabashy, Mahmoud A. K	2025	Egypt	Randomised Controlled Trial	34	Unilateral Mastectomy	PECS II; TTP	Opioid-Based Analgesia	Opioids	Adding TTPB to the PECS II block was superior to the PECS II block alone for patients undergoing MRM. The combined block reduced postoperative pain and morphine consumption. The patients were more well-sedated

in Modified Radical Mastectomy										with improved hemodynamics.
Analgesic effect of ketorolac as an adjuvant to bupivacaine in ultrasound-guided pectoral nerve block (I + II) for patients undergoing	Shimaa A. Al-Touny, Amira G. Abd Elnasser, Ezzat M. Al-Taher, Ahmed A. El-lilly	2023	Egypt	Randomised Controlled Trial	46	Unilateral Modified Radical Mastectomy	PECS I; PECS II	Opioid-Based Analgesia	Opioids	Adding ketorolac to bupivacaine in pectoral nerve block safely increases postoperative duration of analgesia.

modified radical mastectomy: A randomized controlled clinical trial										
Efficacy of Erector Spinae Plane Block in Modified Radical Mastectomy for Postoperative Analgesia: A Rando	Shrawan Soni, Archana Roy, Anindya Mukherjee, Keka Pandey, Dipankar Mukherjee	2024	India	Randomised Controlled Trial	64	Modified Radical Mastectomy	ESPB	Opioid-Based Analgesia	Opioids	The US-guided ESPB is a simple and easy procedure that provides prolonged duration of postoperative analgesia with reduced overall analgesic requirement in the postoperative period after MRM surgery.

mised Controlled Study										
Ultrasound-guided modified intercostal nerve block improves analgesia after radical mastectomy: A randomized controlled trial	Sihui Zhu, Yang Liu, Xin Da, Menglei Shan, Xiao Yang, Jiawei Wang, Guanghong Xu	2024	China	Randomised Controlled Trial	65	Radical Mastectomy	MINB	Opioid-Based Analgesia	Opioids	Preoperative ultrasound-guided MINB markedly improved analgesia and concurrently reduced rescue analgesia demands and better recovery in patients undergoing radical mastectomy.
Efficacy of serratus anteri	Suman Aroraa, Ronithung Ovung, Neerja	2021	India	Randomised Contr	40	Total Mastectomy; Axillary Lymph	TPVB; SAPB	Opioid-Based Analgesia	Opioids	We found that the serratus anterior plane block was more effective than

or plane block versus thoracic paravertebral block for postoperative analgesia after breast cancer surgery - a randomized trial	Bharti, Sandhya Yaddanapudi, Gurpreet Singh			olled Trial		Node Dissection				the thoracic paravertebral block for postoperative analgesia after breast cancer surgery.
A Prospective Randomised Study to Assess the Analge	Swati Bhan, Seema Mishra, Nishkarsh Gupta, Rakesh Garg, Saurabh Vig,	2021	India	Randomised Controlled Trial	100	Modified Radical Mastectomy	SAPB	Opioid-Based Analgesia	Opioids	SAP block improved perioperative analgesia in patients undergoing MRM

sic Efficacy of Serratus Anterior Plane (SAP) Block for Modified Radical Mastectomy Under General Anaesthesia.	Sanjay Thulkar, Rajeev Kumar, Sushma Bhatnagar									
Analgesic Efficacy Comparison Between Ultrasound-	Swati Vijapurkar, Sarita Ramchandani, Radhakrishna Ramchandani, Subrata	2024	India	Randomised Controlled Trial	60	Unilateral Modified Radical Mastectomy	ESPB; RLB	Opioid-Based Analgesia	Opioids	Both groups were similar in terms of the time to rescue analgesia, fentanyl consumption intraoperatively, and side effects. Thus, the ESPB is

Guided Erector Spinae Plane Block and Retrolaminar Block in Patients Undergoing Modified Radical Mastectomy: A Randomized Controlled Trial.	K. Singha, Mayank Kumar									comparable to and not better than RLB for providing postoperative analgesia in patients with carcinoma breast undergoing MRM.

Role of bilevel erector spinae with high thoracic block vs conventional unilevel block in analgesia and reduction of pain in axilla in breast cancer surgeries: a randomized contro	Walaa Y. Elsabeeny, Reham M. Fahmy, Fatma H. Elshamy, Nahla N. Shehab, Sayed M. Abed, Walid S. Taha, Mostafa A. Ibrahim, Ahmed F. Gad	2025	Egypt	Randomised Controlled Trial	126	Modified Radical Mastectomy	ESPB	Opioid-Based Analgesia	Opioids	Both conventional unilevel and high thoracic bilevel ESPB had better analgesic profile when compared with opioids. Although the bilevel ESPB had additional merits to the unilevel ESPB in analgesic effects, both can be used effectively.

lled trial.										
Application of a new serratus anterior plane block in modified radical mastectomy under ultrasound guidance: A prospective, randomized controlled trial.	Weixiang Tang, Guangtao Luo, Yao Lu, Chen Chen, Hu Liu, Yuanhai Li	2021	China	Randomised Controlled Trial	87	Unilateral Modified Radical Mastectomy; Axillary Lymph Node Dissection	SAPB	Opioid-Based Analgesia	Opioids	SAP block significantly attenuated post-operative pain and decreased opioids consumption in breast cancer patients undergoing modified radical mastectomy.

Comparative evaluation of PECS II versus RISS block for postoperative analgesia in breast cancer surgery: a randomized controlled trial	Xiaoyu Zhang, Yulong Jia, Chenxu Chou, Xiaguang Duan	2025	China	Randomised Controlled Trial	60	Unilateral Modified Radical Mastectomy	PECS I; PECS II; RISS	Opioid-Based Analgesia	Opioids	PECS II block appears to be a more effective analgesic technique than RISS block for patients undergoing breast cancer surgery, providing better pain control, reducing opioid consumption, and potentially facilitating faster recovery.
Hydromorphone combined with ropivacaine for erecto	Xue Cao, Malian Bao, Yuhua Ma, Jie Ren, Weiwei Ma, Yongli Bao,	2024	China	Randomised Controlled Trial	90	Modified Radical Mastectomy	ESPB	Opioid-Based Analgesia	Opioids	Hydromorphone combined with ropivacaine for ESPB achieved a greater postoperative analgesic effect for patients receiving MRM

r spinae plane block in patients undergoing modified radical mastectomy: A prospective randomized controlled trial	Changfei Ma, Xin Sui, Yongzhen Nie									under general anesthesia.
The Effect of Ultrasound-Guided Erector Spinae	Xunxun Wang, Guo Ran, Xia Chen, Cuiyu Xie, Jing Wang, Xuesheng Liu, Yao Lu,	2021	China	Randomised Controlled Trial	60	Modified Radical Mastectomy	ESPB	Opioid-Based Analgesia	Opioids	Dexmedetomidine as an adjunctive to ESPB can effectively relieve pain and significantly reduce the need for opioids during modified

Plane Block Combined with Dexmedetomidine on Postoperative Analgesia in Patients Undergoing Modified Radical Mastectomy: A Randomized Controlled Trial	Weiping Fang									radical mastectomy for breast cancer.

Ultrasound-guided transversus thoracic muscle plane-pectoral nerve block for postoperative analgesia after modified radical mastectomy: a comparison with the thoracic	Ying Zhao, Weilin Jin, Peng Pan, Shuquan Feng, Danyun Fu, Junyan Yao	2022	China	Randomised Controlled Trial	80	Unilateral Modified Radical Mastectomy; Sentinel Lymph Node Biopsy; Axillary Lymph Node Dissection	TPVB; PECS I; PECS II; TTP	Opioid-Based Analgesia	Opioids	Compared with the TPVB, TTP-PECS can provide better postoperative analgesia in patients undergoing MRM, simultaneously reduce the inflammatory response, and prompt early recovery. These results suggest that TTP-PECS is an attractive alternative to TPVB for postoperative analgesia of modified radical mastectomy.

paravertebral nerve block										
Efficacy of Ultrasound-Guided Intercostal Nerve Block on Pain Management and Physiological Outcomes in Breast Cancer Mastectomy A retrospective study	Yinhua Liu, Gang Li, Zhongyu Liu, Jianmei Hu, Yan Quan	2024	China	Cohort Study	120	Radical Mastectomy	PECS II	Opioid-Based Analgesia	Opioids	Ultrasound-guided intercostal nerve block significantly improves hemodynamic stability, reduces postoperative inflammatory markers, lowers the need for sufentanil, and minimizes adverse reactions in patients undergoing radical mastectomy for breast cancer.

Effects of TTP-PECS Block Under Opioid-Sparing General Anesthesia on Postoperative Analgesia and Early Recovery Quality in Patients Undergoing Modified Radical	Yu Ma, Chunpei Wu, Zhengxia Sun, Lin Zhang, Miao Zhou, Jiaqi Chang, Hui Liu, Qingming Bian	2025	China	Randomised Controlled Trial	100	Modified Radical Mastectomy	PECS II; TTP	Opioid-Based Analgesia	Opioids	Except for 48 h postoperatively, patients in the TO group had significantly lower VAS scores than those in the GA group at 2 h, 6 h, 12 h, and 24 h postoperatively at rest and during movement ($P < 0.05$).

Mastectomy										
Comparison of the analgesic efficacy of combined superficial and deep serratus anterior plane block versus pectoserratus plane block following modified radical	Yusuf Ozguner, Can Ozan Yazar, Ferit Aydın, Musa Zengin, Emine Arık, Mustafa Sırrı Kotanoğlu, Savaş Altınsoy, and Julide Er	2025	Turkey	Randomised Controlled Trial	60	Modified Radical Mastectomy	SAPB; PSP	Opioid-Based Analgesia	Opioids	The CSAPB and the pectoserratus plane block provided comparable analgesic efficacy in patients undergoing MRM. This approach may serve as an effective alternative to the pectoserratus plane block.

mastectomy surgery.										
Comparison of the analgesic efficacy of ultrasound-guided retrolaminar block with serratus anterior plane block in patients undergoing radical mastectomy	Zewu Ding, Xihui Wang, Dongdong Han, Can Zhang, Kangjie Xie, Huidan Zhou, Xiaohong Yuan, Xiaochun Mao, Weifeng Yu, Zhangxiang Huang	2025	China	Randomised Controlled Trial	61	Radical Mastectomy; Modified Radical Mastectomy	SAPB; RLB	Opioid-Based Analgesia	Opioids	Retrolaminar block and Serratus anterior plane block provide comparable postoperative analgesia following radical mastectomy. However, RLB offers a broader sensory block range, particularly over the medial chest wall.

Comparison of costotransverse block and erector spinae plane block for perioperative analgesia in patients scheduled for modified radical mastectomy-A pilot study	Aanchal R. Bharuka, Dhanya G. Nayak, Vibhavari Milind Naik, Basanth K. Rayani	2026	India	Randomised Controlled Trial	60	Modified Radical Mastectomy	ESPB; CTB	Opioid-Free Analgesia	Dexamethasone; Acetaminophen; Magnesium Sulfate	Both CTB and ESPB are comparable in providing post-operative analgesia for MRM patients. However, CTB likely offers better intra-operative analgesia as observed by the lower intra-operative opioid requirement.

Combined pectoralis II block and transversus thoracic plane block compared to erector spinae plane block for post-operative analgesia in patients undergoing modified radical	Abualauon M. Abedalmohsen, Abdelrahman H. Mohammed, Mohamed H. Bakri, Ahmed H. Othman, Mohammed A. Osman, Ola M. Wahba	2023	Egypt	Randomised Controlled Trial	64	Modified Radical Mastectomy	PECS II; ESPB; TTP	Opioid-Free Analgesia	Dexamethasone; NSAIDs; Acetaminophen	ESPB is as effective as PECS II-TTP with lower morphine consumption in the first 24 hours and comparable NRS, time to first analgesic request, and interleukin-6 levels. Both blocks were safe without any major complications.

mastectomy: A randomized clinical trial										
A randomised comparative study of erector spinae plane block versus low-dose ketamine-dexmedetomidine intravenous infusion as intrao	Ahmed Medhat Mohasseb, Mona G. Elebiedy, Mohammed N. Mohammed	2024	Egypt	Randomised Controlled Trial	72	Unilateral Modified Radical Mastectomy	ESPB	Opioid-Free Analgesia	Ketamine; Dexmedetomidine	Intravenous low-dose ketamine-dexmedetomidine infusion intraoperatively with inhalational-based general anaesthesia provides superior opioid-sparing analgesia to that of ESPB in patients undergoing unilateral non-reconstructive modified radical mastectomy, with less postoperative opioid

perativ e opioid -free analge sia for modifi ed radical maste ctomy										consumption and stress response
Comp arative evalua tion of two differe nt conce ntratio ns of levobu pivacai ne on analge sic efficac y of ultraso und guided erecto	Amanpre et Kaur, Gagan Deep, Dr.Sarvje et Kaur, Amanjot Singh, Kewal Krishan Gupta	2023	India	Rand omis ed Contr olled Trial	60	Unilateral Modified Radical Mastecto my	ESPB	Opioid-Free Analgesia	Acetaminophen	Although use of both concentrations of levobupivacaine (0.25% and 0.375%) in ESP block can provide effective postoperative analgesia but the 0.375% levobupivacaine has significantly prolonged analgesia and lesser postoperative analgesic consumption without any

r spinae block for breast surgery										significant adverse effects in unilateral breast surgery.
Comparison of erector spinae plane, paravertebral, and pectoral nerve blocks on postoperative analgesia and Quality of Recovery-15 in	Bilal Atilla Bezen, Merve Ay, Ali Kaynak, Murat Akici, Remziye Sivaci	2026	Turkey	Randomised Controlled Trial	90	Unilateral Modified Radical Mastectomy; Axillary Lymph Node Dissection	TPVB; PECS II; ESPB	Opioid-Free Analgesia	Dexamethasone; Acetaminophen	Both PECS and TPVB provided superior postoperative analgesia and better quality of recovery scores compared to ESPB in patients undergoing modified radical mastectomy. These findings support the use of PECS or TPVB as effective components of multimodal analgesia strategies for breast cancer surgery.

patients undergoing mastectomy: a prospective randomized trial.										
Pectoserratus plane block versus erector spinae plane block for postoperative opioid consumption and acute and	Caner Genc, Cengiz Kaya, Sezgin Bilgin, Burhan Dost, Yasemin Burcu Ustun, Ersin Koksal	2022	Turkey	Randomised Controlled Trial	90	Partial Mastectomy; Sentinel Lymph Node Biopsy	ESPB; PSP	Opioid-Free Analgesia	NSAIDs; Acetaminophen	US-guided ESPB and PSPB performed in patients who underwent breast cancer surgery showed similar and modest analgesic effects on the postoperative opioid consumption and acute and chronic pain scores.

chronic pain after breast cancer surgery: A randomized controlled trial.										
Regional anesthesia without opioid administration in mastectomy surgeries followed by breast reconstruction with	Domagoj Eljuga, Rhea Marie Mužar, Ivo Jurišić, Jasminka Peršec3, Ksenija Eljuga, Josip Jaman, Željka Roje, Krešimir Martić, Zlatko Vlajčić, Rado Žic	2025	Croatia	Randomised Controlled Trial	38	Skin-Sparing Mastectomy; Nipple-Sparing Mastectomy; Tissue Expander Reconstruction	TPVB; PECS I; SAPB	Opioid-Free Analgesia	Dexamethasone	Regional anesthesia using a combination of a TBVP, PECS I, and SAP has a long-lasting and satisfactory analgesic effect without the introduction of opioids. In the future, a novel gold standard protocol should be established that can be offered to every patient undergoing breast surgery.

implants: a randomized controlled study										
Efficacy of Ketamine versus Magnesium Sulphate as Adjuvants to Levobupivacaine in Ultrasound Bilevel Erector Spinae Block in Breast Cancer Surger	Fatma Adel El Sherif, Hamdy Abbas Youssef, Khaled Mohamed Fares, Sahar Abdel-Baky Mohamed, Ali Rabiee Ali, Ahmed M Thabet	2022	Egypt	Randomised Controlled Trial	60	Modified Radical Mastectomy; Axillary Lymph Node Dissection	ESPB	Opioid-Free Analgesia	Acetaminophen	Magnesium sulphate and ketamine seem to be both effective adjuvants to levobupivacaine in ESP blocks for postoperative analgesia in patients undergoing MRM, with slightly better analgesia provided by magnesium sulphate.

y (a Double-Blinded Randomized Controlled Study)										
Effect of Erector Spinae Block and Pectoralis Block on Quality of Recovery and Analgesia After Modified Radical	Hammad Mohsin, Reetu Verma, Hemlata, Dinesh Singh, Sarita Singh, Kulranjan Singh	2023	India	Randomised Controlled Trial	90	Unilateral Modified Radical Mastectomy	PECS I; PECS II; ESPB	Opioid-Free Analgesia	Acetaminophen	Both ESP and PECS blocks were effective in improving the QoR score and in reducing the consumption of rescue analgesia after modified radical mastectomy.

Mastectomy: A randomised controlled study										
Superficial vs. deep serratus anterior plane block for analgesia in patients undergoing mastectomy: A randomized prospe	Jason T. Edwards, Xuan T. Langridge, Gloria S. Cheng, Mandy M. McBroom, Abu Minhajuddin, Anthony T. Machi	2021	United States	Randomised Controlled Trial	64	Unilateral Mastectomy; Bilateral Mastectomy; Tissue Expander Reconstruction; Axillary Lymph Node Dissection	SAPB	Opioid-Free Analgesia	Ketamine; Dexmedetomidine; Dexamethasone; NSAIDs; Acetaminophen; Gabapentin; Other: Methocarbamol	Subjects in the deep SAPB group had lower pain scores at 12 h; however, the difference was not statistically significant at other time points.

ctive trial.										
Erector spinae plane block versus thoracic paravertebral block for pain management after total bilateral mastectomies.	Jesse W. Stewart, Jenny Ringqvist, Rachel D. Wooldridge, Deborah E. Farr, Mary Sunna, Cedar Schulz, John C. Alexander, Abu Minhajuddin, Irina Gasanova, and Girish P. Joshi	2021	United States	Comparative Analysis	25	Bilateral Mastectomy	TPVB; ESPB	Opioid-Free Analgesia	Dexamethasone	Both ESPB and PVB confer equal analgesic effects in patients undergoing mastectomies. ESPB provides an alternative to PVB in reducing postoperative pain in patients undergoing mastectomy as part of an enhanced recovery pathway.
Analgesic efficacy of perioperative esmolol as	JOSE TANIA, VADAKKOOT RAGHAVAN HEMA, PRABHAK	2021	India	Prospective Observational Study	140	Modified Radical Mastectomy		Opioid-Free Analgesia	Esmolol	Perioperative esmolol infusion when used as an adjunct to morphine decreased postoperative pain and

adjunct to morphine in mastectomy-A prospective observational study	ARAN VINEETHA									analgesic requirements for the first 24 hours without any haemodynamic disturbances.
Effectiveness of Ultrasound Guided Erector Spinae Plane Block Compared to Ultrasound Guided Modifi	Mohamed Elsaid Abdel Fattah, Osama Sayed Ibrahim, Nevine Mahmoud Gouda, Mohamed Mohamed Abdel-Hak	2022	Egypt	Randomised Controlled Trial	60	Modified Radical Mastectomy	PECS II; ESPB	Opioid-Free Analgesia	NSAIDs; Acetaminophen	MPECB provides safe and more effective analgesia in MRM compared to ESPB in the form of lower postoperative morphine consumption and low NRS scores.

ed Pectoral Nerves Block in Modified Radical Mastectomy: A Randomized Single Blinded Study										
Efficacy of Thoracic Segmental Spinal Anesthesia Along with Unilateral	Nandini Deshpande, Kapil Agarwal, Rohit Hatgaonkar, Naresh Paliwal	2023	India	Cohort Study	40	Unilateral Modified Radical Mastectomy; Axillary Lymph Node Dissection	TPVB; Thoracic segmental spinal anesthesia	Opioid-Free Analgesia	Ketamine; Dexmedetomidine	Thoracic segmental spinal anesthesia combined with unilateral erector spinae block is an excellent option for patients undergoing modified radical mastectomy

Erector Spinae Block in Patients Undergoing Unilateral Modified Radical Mastectomy and Axillary Dissection: A Novel Multicentric Study										with axillary dissection.
Direct Pectoral Nerve Block versus	Nidhi Arun, Raushan, Richa Singh,	2026	India	Randomised Controlled Trial	53	Modified Radical Mastectomy	TPVB; PECS I; PECS II	Opioid-Free Analgesia	Acetaminophen	Direct-PECS provided prolonged postoperative analgesia with lesser total

Ultrasound-Guided Paravertebral Block for Analgesia and Improved Recovery after Modified Radical Mastectomy: A Randomized Clinical Trial	Mukesh Kumar									opioid consumption and a better recovery profile than USG-TPVB after breast surgery.
Effectiveness of Erector	Nitu Puthenvettil, Asif Hassan, Sunil	2022	India	Randomised Contr	60	Modified Radical Mastectomy	ESPB	Opioid-Free Analgesia	Acetaminophen	Ultrasound-guided ESPB with 20ml of 0.2% ropivacaine is superior to local

Spinae Plane Block for Post-Operative Analgesia in Breast Surgeries-A Randomized Control Study	Rajan, Dilesh Kadapamannil, Jerry Paul, Sundeep Vijayaraghavan			olled Trial						infiltration in providing postoperative analgesia in patients undergoing breast surgery. It also decreases postoperative tramadol requirement.
To Compare the Post-operative Analgesic Efficacy of USG Guided Thoracic	Prashant Kumar Rai, Pallav Singh, Abhay Raj Yadav, Suhas Kumar Mall, Astha Gupta, Anubhav Bhushan, Pushpraj	2023	India	Randomised Controlled Trial	60	Unilateral Modified Radical Mastectomy	TPVB; SAPB	Opioid-Free Analgesia	Acetaminophen	The results obtained in our study indicate TPVB provides effective postoperative analgesia for patients undergoing modified radical mastectomy. TPVB offer significant advantages in terms of postoperative

Paravertebral Block (TPVB) vs Serratus Anterior Plane Block (SAPB) in Modified Radical Mastectomy	Singh, Abhilasha Barthwal, Shahbaz Ahmad, Santosh Kumar Sharma									pain, postoperative fentanyl consumption and patient satisfaction.
Comparative efficacy of two doses of dexmedetomidine as an adjuvant to	Sangeeta Chakraborty, Saurabh Taneja, Ashish Walian	2026	India	Randomised Controlled Trial	60	Modified Radical Mastectomy	TPVB	Opioid-Free Analgesia	Acetaminophen	The addition of dexmedetomidine (0.5 µg/kg or 1 µg/kg) to ropivacaine for TPVB significantly prolongs postoperative analgesia compared to ropivacaine alone. The lower

ropivacaine in paravertebral block for post-mastectomy analgesia: A randomized, double-blind study										dose (0.5 μg/kg) provides comparable analgesic benefits to the higher dose (1 μg/kg) while offering a superior hemodynamic stability profile, making it the more favorable adjuvant for this block.
The effect of perioperative lidocaine during modified radical mastectomy on postop	Seyed Mohammad, Reza Hadavi, Mohammad Ali Sahmeddini, Saeed Khademi, Nazila Boostani	2026	Iran	Randomised Controlled Trial	90	Modified Radical Mastectomy		Opioid-Free Analgesia	Lidocaine	Perioperative systemic lidocaine infusion in patients with breast cancer could modulate the production of IL-6, and through the reduction of this cytokine, patients experienced better pain

erative pain and immune response: A randomized clinical trial										control in the immediate postoperative period.
A Comparison of Erector Spinae Block and Pectoralis Nerve Block in Breast Cancer Patients Undergoing Modifi	Sonai Datta Kakati, Marie Ninu; Anupam Das; Dokne Chintey	2024	India	Randomised Controlled Trial	60	Unilateral Modified Radical Mastectomy	PECS I; PECS II; ESPB	Opioid-Free Analgesia	Acetaminophen	Both PECS and ESPB are effective in modified radical mastectomy as there is no difference found between both groups.

ed Radical Mastectomy: A Randomized Controlled Trial										
A comparative study between ultrasound-guided thoracic paravertebral block, pectoral nerves block, and erector	A. Eskandr, K. Mahmoud, Z. Kasemy, K. Mohamed, T. Elhennawy	2022	Egypt	Randomised Controlled Trial	80	Unilateral Modified Radical Mastectomy	TPVB; PECS II; ESPB			ESPB has a shorter duration of analgesia than PECS block with no significant statistical difference compared with group TPVB. Morphine consumption is increased in ESPB compared to the PECS group, with an insignificant difference compared to group TPVB.

spinae block for pain manag ement in cancer breast surgeri es. A rando mized contro lled study.										
Effect of adding dexme detom idine as an adjuva nt to bupiva caine in ultraso und-g uided erecto	Abanoub Mouris Feltaoos, Hatem Said Abdelha med, Karim Youssef Kamal, Ashraf Elsayed Elagamy, Ahmed Mostafa	2026	Egypt	Rand omis ed Contr olled Trial	60	Modified Radical Mastecto my	ESPB			Our study results indicated that adding dexmedetomidin e to bupivacaine in ESPB enhanced its efficacy, extended postoperative pain relief, and reduced the need for nalbuphine.

r spinae plane block for postoperative pain management following modified radical mastectomy: a randomized controlled trial	Abdulmageed									
Comparison of the Analgesic Efficacy of Ultrasound-	Agâh Abdullah Kahramanlar, Mehmet Aksoy, Ilker Ince, Aysenur Dostbıl,	2022	Turkey	Randomised Controlled Trial	90	Unilateral Mastectomy	TPVB; MTP			It was concluded that ultrasound-guided PVB and MTP blocks have similar postoperative analgesic efficacy in

guided Paravertebral Block and Mid-point Transverse Process Pleura Block in Mastectomy Surgery	Erdem Karadenız									patients undergoing breast surgery. The MTP block may be preferred as an alternative to PVB for breast surgeries with less risk of complications.
Could Wound Instillation Provide an Efficient Analgesia Comparable to	Ahmad M Abd El-Rahman, Saif Eldeen Gamal Khalaf, Mohamed H Bakri	2025	Egypt	Randomised Controlled Trial	60	Modified Radical Mastectomy	PECS II			Local wound instillation provided a comparable analgesia to PECS-II block following modified radical mastectomy. Ketamine–bupivacaine combination prolonged

That Provided by PECS-II Block for Modified Radical Mastectomy Using Ketamine-Bupivacaine Combination ? A Pilot Study										analgesia for almost 2 days.
Analgesia and spread of erector spinae plane block	Ahmed Mohamed Mohamed Rabah Abdella, Emad Eldin Abd El Monem	2022	Egypt	Randomised Controlled Trial	60	Modified Radical Mastectomy; Axillary Lymph Node Dissection	ESPB			Preoperative ESPB is an excellent analgesic modality and it can also attenuate both postoperative agitation and sedation.

in breast cancer surgeries: a randomized controlled trial	Arida, Nagwa Ahmed Megahed, Wessam Zakaria El-Amraw y, Walid Mohamed Ahmed Mohamed									Doubling the injectate volume enhances the craniocaudal spreading and may be useful for surgeries requiring multiple dermatomes. However, larger volume has no effect on analgesic efficacy or patient satisfaction as there is no further spread to the PV, epidural spaces or spinal nerve rami.
Analgesic Efficacy of Ultrasound Guided Serratus	Alaa Aldine M. S. Ahmed, Mohamed A. A. Aboelsuod, Ahmed E. A. Amer	2025	Egypt	Randomised Controlled Trial	99	Unilateral Modified Radical Mastectomy	TE; PECS II; SAPB			The PECS block demonstrated superior efficacy for post-mastectomy pain management, with optimal hemodynamic stability, better

Anterior Plane Block and Pectoral Nerve Block II Compared to Thoracic Epidural Block After Unilateral Modified Radical Mastectomy										pain control, a decrease in opioid usage, and a lengthened duration before the onset of rescue analgesia, while SAPB showed inferior outcomes with higher pain scores, increased opioid requirements, and poor hemodynamic control, making PECS the preferred choice for modified radical mastectomy procedures.

Fentanyl versus dexamethasone or both as adjuvants to bupivacaine in an ultrasound-guided paravertebral block in patients undergoing modified radical mastectomy: a randomized	Amani H. Abdel-Wahab, Amonios K. Gegres, Rasha Hamed, Mohamed M. Abdellatif	2021	Egypt	Randomised Controlled Trial	60	Modified Radical Mastectomy	TPVB			Dexamethasone and fentanyl combination enhances the analgesic effect of bupivacaine in TPVB.

double-blind clinical study										
Effectiveness of Regional Blocks for Postoperative Pain Control and Recovery in Breast Cancer Surgery in a Resource-Limited Setting: A Prospective Observation	Amila P. Nellihela, Ruchika N. Seneviratne, Vathsal Bandaranayake, Vishaka Kerner, Aruna Jayasena, Pirahanthan Karunanithy, Kasun A. Rajapakshe, Sachini Weddagala, Sayomi Warnakula, Mahesh	2025	Sri Lanka	Non-Randomised Experimental Study	56	Total Mastectomy; Modified Radical Mastectomy; Immediate Implant Reconstruction; Axillary Lymph Node Dissection	TPVB; PECS I; PECS II; ESPB			Paravertebral, erector spinae plane, and pectoral nerve blocks, significantly improved postoperative outcomes in breast cancer surgery within a resource-limited setting.

al Study.	Senarathna									
Comparison of postoperative analgesia between general anesthesia and pectoralis minor and pectoralis major block for mastectomy in Al Sadder teaching hospit	Amjed Qasim Mohammed, Mohamed Kahloul, Mohammed Abbas Kadhim, Mohammed Sadeq Karam Al-Ghanimi, Hussein Ali Hussein, Majid Fakher Alhamaidah, Haider Muhy Albareh, Ammar Hoom Mahdi	2024	Iraq	Randomised Controlled Trial	75	Mastectomy	PECSI; PECS II			The results of this study are consistent with previous research indicating that the utilization of regional anesthetic methods, such as the pectoral nerves (PEVS) block, may present certain benefits in comparison to general anesthesia alone.

al in Iraq: A randomized clinical trial (RCT)										
Single Shot Pectoral Plane Block Type 2 (PECS II) Versus Serratus Anterior Plane Block for Postoperative Analgesia Following Modified	Aparna Bagle, Yashwant Nankar, Kshitija Devendra Bora	2026	India	Randomised Controlled Trial	46	Modified Radical Mastectomy	PECS II; SAPB			Both Pecs II and SAPB offer effective acute postoperative pain control following MRM, while Pecs II provides superior long-term analgesia.

Radical Mastectomy for Postoperative Acute and Long-Term Pain: A Randomized Clinical Trial.										
Randomized Double Blinded Prospective Study to Compare the Efficacy of Bupiva	Arulmani Ayyamperumal	2024	India	Randomised Controlled Trial	80	Axillary Lymph Node Dissection; Mastectomy	PECSI; PECS II; TTP			The results of our study is supportive, in proving, that 0.125% Ropivacaine is superior to 0.125% Bupivacaine for post-operative analgesia using PECS block and TTP block for breast cancer surgery. It should be considered as

caine and Ropivacaine for Post-operative Analgesia										an adjuvant therapy multimodal analgesic technique to general anaesthesia.
Intraoperative pectoral block versus thoracic paravertebral block for postoperative analgesia after breast cancer surgery: A	Aslinur Sagun, Sebnem Rumeli, Levent Ozdemir, Mustafa Azizoglu, Mustafa Berkesoglu, Veli Mutlu	2022	Turkey	Randomised Controlled Trial	41	Total Mastectomy; Unilateral Modified Radical Mastectomy; Sentinel Lymph Node Biopsy	TPVB; PECS I	Multimodal Analgesia	Opioids; Acetaminophen	It was observed that intraoperative PECS block was as effective as TPV in providing postoperative analgesia and additional analgesic requirements were similar. This result suggests PECS block may be a good alternative to TPV.

randomized controlled trial										
Comparison Between Intra-Operative Pectoral Block and Intravenous Analgesia for Post-Operative Pain Relief in Patients Undergoing Modified Radica	Atiq ur Rehman, Sohaib Haider, Rizwan Aziz, Zarnab Fatima Aftab, Munazzah Aziz, Taimoor Ahmed	2026	Pakistan	Randomised Controlled Trial	60	Modified Radical Mastectomy	PECS I; PECS II			When compared to intravenous analgesia alone, PECs block improves recovery profiles, reduces the need for opioids, and offers better postoperative analgesia in MRM patients

l Mastectomy										
Comparison of Feasibility of Ultrasound Guided Erector Spinae Plane Block versus Paravertebral Plane Block in Modified Radical Mastectomies by Anaesthesiol	Chiranjeevi Yendrapati, Chembeti Gopalakrishnaiah, Vindhya K., Neela Jyothi Mylabathula	2024	India	Randomised Controlled Trial	100	Modified Radical Mastectomy	TPVB; ESPB			The ultrasound-guided erector spinae plane block is a safer, more straightforward alternative to the thoracic paravertebral plane block because of its easily identifiable sonoanatomy, distinct terminus, and lack of critical structures in the needle trajectory. It also results in lower postoperative pain scores.

ogy Residents - A Randomised Control Trail										
Efficacy of dexmedetomidine as adjuvant to ropivacaine in paravertebral block for post-operative analgesia in breast cancer surgery	Deepti Swain, Asitkumar Sethi, Prasantkumar Bal, Kamalakanta Swain, Sidharth Sraban Routray	2023	India	Comparative Analysis	60	Modified Radical Mastectomy	TPVB			Dexmedetomidine in PVB provides prolonged pain relief after MRM.

Post-operative Analgesic Efficacy of Erector Spinae Plane Block Versus Serratus Anterior Plane Block in Patients Undergoing Modified Radical Mastectomy: A Prospe	Divya Vincent, Aaron Dsouza, Hezil Saldanha, Antony Eapen, Kishan Shetty	2025	India	Comparative Analysis	60	Unilateral Modified Radical Mastectomy	SAPB; ESPB			Ultrasound-guided ESPB demonstrates superior analgesic efficacy compared to SAPB for MRM surgery, providing longer duration of analgesia and reduced intraoperative analgesic requirements.

ctive Comparative Study										
Erector Spinae Plane versus Pectoralis Nerve Block for Mastectomy in Cancer Patients: A Retrospective, Multicenter Cohort Study	Edward N Yap, Julia Wei, Curtis Darling, Elizabeth Linehan, Matthias Behrends, Kevin P Ng	2025	United States	Cohort Study	517	Total Mastectomy; Unilateral Modified Radical Mastectomy; Bilateral Modified Radical Mastectomy; Skin-Sparing Mastectomy; Nipple-Sparing Mastectomy; Sentinel Lymph Node Biopsy; Axillary Lymph	PECS II; ESPB			Compared to the PECS block, the ESP block demonstrated no significant difference in acute pain outcomes and recovery in patients undergoing mastectomy for breast cancer, with similar hospital discharge times and long-term outcomes.

						Node Biopsy				
Comparative Study Between Dexmedetomidine and Ketamine in Erector Spinae Plane Block for Postoperative Analgesia Following Modified Radical Mastectomy. A	Ehab Hanafy Shaker, Ahmed M Soliman, Ahmed Abd Elmohsen Bedewy, Suzan Adlan	2024	Egypt	Randomised Controlled Trial	75	Modified Radical Mastectomy	ESPB	Opioid-Free Analgesia	NSAIDs; Acetaminophen	In MRM surgery, the postoperative opioids consumption and VAS values were lower in both groups DEX and ketamine as an adjuvant to bupivacaine which enhanced the analgesic profile and prolonged ESPB duration compared to ESPB alone, with DEX being superior to ketamine.

Prospective Randomized Controlled Study										
Paravertebral or serratus anterior plane block combined with PECS I (interpectoral) blocks versus paravertebral block for mastectomy: A	Hanae K. Tokita, Melissa J. Assel, Joanna Serafin, Emily Lin, Leslie Sarraf, Geema Masson, Jonas A. Nelson, Tracy-Ann Moo, Taylor McCready, Cameran Vakassi, Lee Hingula, Jacob Jackson, Storm	2025	United States	Randomised Controlled Trial	1506	Bilateral Mastectomy; Tissue Expander Reconstruction	TPVB; PECS I; SAPB			Paravertebral or serratus anterior plane blocks combined with PECS I blocks were not superior to paravertebral block alone in reducing high opioid use after bilateral mastectomy with expander reconstruction. All three block approaches are acceptable techniques for this procedure.

cluster-randomized trial of 1507 patients	Horine, Aisha Baqai-Stern, Alexandra Lewis, Danielle Nadav, Howard Teng, Justin Kim, John Hagen, Madeline Scanlon, Vinay Puttanniah, Aron Legler, Cosmin Gauran, Brett A. Simon, Andrew Vickers									
Paravertebral and erector spinae plane	Haripriya S Ayyala, Melissa Assel, Joseph Aloise, Joanna	2024	United States	Cohort Study	122	Autologous Flap Reconstruction; Mastectomy	TPVB; ESPB			Replacing surgical infiltration with PVB and ESP blocks for autologous breast

blocks decrease length of stay compared with local infiltration analgesia in autologous breast reconstruction	Serafin, Kay See Tan, Meghana Mehta, Vinay Puttanniah, Patrick McCormick, Vivek Malhotra, Andrew Vickers, Evan Matros, Emily Lin									reconstruction reduces LOS.
Ultrasound guided serratus anterior plane block versus erector spinae	Hend Saad Rizk Farhat, Hoda Alsaid Ahmed Ezz, Amir Abo Zekri Elsyed, Mohammad Fouad Algyar	2025	Egypt	Randomised Controlled Trial	40	Mastectomy	SAPB; EPSB			With dexmedetomidine added to bupivacaine, ESPB gives delayed absence of pain, lower torment scores and postoperative pain-relieving prerequisites, and better

plane block with bupivacaine plus dexmedetomidine for postoperative pain after mastectomy										hemodynamics with practically no distinction in after effects compared to SAPB in in mastectomy patients.
Comparison of the Analgesic Efficacy of Ultrasound-Guided Superficial Serratus Anteri	Indugumelli Jayadeep, Gnanasekaran Srinivasan, Adinarayanan Sethuramachandran, Lenin Babu Elakkumanan,	2022	India	Randomised Controlled Trial	73	Modified Radical Mastectomy	SAPB			Deep serratus plane block was associated with better NRS scores for pain on rest and coughing and prolonged duration of analgesia after a modified radical mastectomy.

or Plane Block With Deep Serratus Anterior Plane Block in Patients Undergoing Modified Radical Mastectomy: A Randomized Clinical Trial.	Srinivasan Swaminathan, Prasanna Bidkar									

A Randomized Single-Blinded Study Comparing Preoperative with Post-Mastectomy PECS Block for Post-operative Pain Management in Bilateral Mastectomy with Immediate Recon	Ingrid M. Lizarraga, K. Huang, B. Yalamuru, S. L. Mott, Z. A. Sibenaller, J. N. Keith, S. L. Sugg, L. M. Erdahl, M. Seering	2023	United States	Randomised Controlled Trial	34	Bilateral Mastectomy; Immediate Implant Reconstruction	PECS I; PECS II			No significant differences between the two groups were noted in average pain score during PACU (p=0.57)

structi on										
Comp arison of fascial plane blocks (ESPB vs. TPVB) for pain relief followi ng modifi ed radical maste ctomy	Jayakrish nan S, Amit Dua, Alok Kumar	2024	India	Rand omis ed Contr olled Trial	60	Unilateral Modified Radical Mastecto my	TPVB; ESPB			Both ESPB and TPVB provided adequate analgesia in patients undergoing MRM; however, TPVB had better efficacy and opioid-sparing effect when compared to ESPB.
Comp arison of Analge sic Effect of Clonidi ne as an Adjuva	Lalit Kumar Raiger, Pooja Jain, Sandeep Sharma	2023	India	Rand omis ed Contr olled Trial	120	Modified Radical Mastecto my	TPVB			Addition of clonidine to ropivacaine in TPVB during breast cancer surgery results in lower pain scores, prolong duration of analgesia and reduce

nt with Different Concentration of Ropivacaine (0.35% and 0.2%) in Thoracic Paravertebral Block among Modified Radical Mastectomy Patients: A Randomised Double Blinde										postoperative requirement of rescue analgesics. Both lower (0.2%) and higher (0.35%) concentrations of ropivacaine provide equally effective postoperative analgesia.

d Clinical Study										
Efficacy of Ketamine As an Adjuvant to LocalAnesthetic in Modified Pectoral Block for Management of Postoperative Pain in Patients Undergoing Modified Radica	Manoj Kumar S, Ramanathan Rangasamy, S. Karthick	2024	India	Observational Study	60	Modified Radical Mastectomy	PECS II			The addition of ketamine to modified Pecs block prolonged the time to first request of analgesia and reduced total opioid consumption without serious side effects in patients undergoing modified radical mastectomy.

l Mastectomy										
Analgesic Efficacy of Ketamine Versus Neostigmine as Adjuvants to Bupivacaine During Ultrasound-guided Serratus Anterior Plane Block in Modified Radical	Mohamed Saleh, Mohammed Saeed Abd Elaziz, Eman Rafat Sonbol, Aya Hisham Moussa	2024	Egypt	Comparative Analysis	74	Modified Radical Mastectomy	SAPB			In serratus anterior plane block, adding 50 mg ketamine to bupivacaine decrease 24 h nalbuphine consumption and numeric pain scale, adding 0.5 mg neostigmine to bupivacaine has lower rate of requesting rescue analgesia following ketamine.

Mastectomy										
Comparative study of analgesic effect of epidural ketamine vs. epidural tramadol in patients undergoing mastectomy under thoracic epidural anesthesia	Mohammed A Raheem, Fawzy Abbas Badawy, Hitham MA. Elsayed	2022	Egypt	Randomised Controlled Trial	50	Mastectomy	TE			Epidural ketamine provided a better analgesia and less need to rescue analgesia, less incidence of nausea and vomiting, but more sedation when compared with epidural tramadol at a dose of 1 mg/kg

A Comparative Study of Morphine and Clonidine as an Adjunct to Ropivacaine in Paravertebral Block for Modified Radical Mastectomy.	Mukesh Kumar, Rajni Gupta, Prateek Kumar Dinkar, Haider Abbas	2023	India	Comparative Analysis	90	Modified Radical Mastectomy	TPVB			Morphine in the PVB provides better postoperative analgesia. The consumption of rescue analgesia was significantly reduced in the morphine group as compared to the clonidine group. The procedure also proved to be safe as no complication was encountered in the PVB in our study.
Effects of fentanyl and dexmedetom	Nibedita Pani, Padmalaya Sahu, Deepti Swain,	2022	India	Randomised Controlled Trial	60	Modified Radical Mastectomy	TPVB			Dexmedetomidine provides prolonged postoperative analgesia compared with

idine as adjuvants to bupivacaine in paravertebral block for postoperative analgesia in patients undergoing modified radical mastectomy: A prospective randomised double-blind study	Chetna Biswal, Amit Pradhan, Sidharth Sraban Routray									fentanyl when used as an adjuvant to bupivacaine in PVB after MRM.

Rhomboid Intercostal Block for Postoperative Analgesia in Mastectomy: A Prospective, Randomized Controlled Trial	Paulus Gunawan, I Gusti Ngurah Mahaalit Aribawa, Made Septyana Parama Adi	2025	Indonesia	Randomised Controlled Trial	28	Unilateral Mastectomy	RIB			RIB significantly reduces postoperative opioid requirements and pain intensity in mastectomy patients and may serve as a valuable adjunct in enhanced recovery pathways for breast surgery.
Multimodal analgesia with thoracic paravertebral block decrease	Pei-Chin Liu, Fu-Wei Sub, Yi-Fang Tsaid, Yen-Shu Lind, Chun-Sung Sung, Ling-Ming Tseng,	2025	Taiwan	Comparative Analysis	60	Total Mastectomy; Unilateral Modified Radical Mastectomy; Sentinel Lymph Node Biopsy	TPVB			Nonintubated GA with total intravenous anesthesia (TIVA) and MMA using TPVB is a viable and safe alternative for breast cancer surgery. It results in reduced pain scores and

pain and side effects in mastectomy patients	Wei-Nung Teng									analgesic needs compared with conventional GA, with PONV outcomes comparable to those managed with standard intravenous medications.
Comparative Analgesic Efficacy of Adding Magnesium Sulphate to Bupivacaine in Serratus Anterior Plane Block Tt	Prashant Kumar Gupta, Deepak Kumar, Prem Shankar Tiwari	2025	India	Comparative Analysis	100	Unilateral Mastectomy	SAPB			The addition of magnesium sulphate to bupivacaine in SAPB significantly improves postoperative pain control in mastectomy patients, reduces opioid consumption, and does not increase adverse effects.

Reduce Pain After Mastectomy										
A Comparative Study of Epidural 0.5% Levobupivacaine and 0.75% Ropivacaine Analgesia for Modified Radical Mastectomies	R. Brindha, B.K. Jayalakshmi, P.D. Subha, Sendilmurukan	2023	Not reported	Comparative Analysis	66	Modified Radical Mastectomy	TE			Thoracic epidural anesthesia is more reliable and safer over the general anesthesia. The post operative pain and complications such as vomiting, GI tract complications can be reduced by TEA. 0.75% ropivacaine showed faster onset of action than the levobupivacaine. Both groups show similar effects on heart rate, respiratory rate etc.

Comparison Between Preemptive Erector Spinae Plane Block Versus Serratus Anterior Plane Block on Postoperative Analgesia for Patients Undergoing Modified Radical Maste	Ramy Mousa Saleh, Tamer M. Allam and Mahmoud M. Elnady	2025	Egypt	Randomised Controlled Trial	70	Modified Radical Mastectomy; Axillary Lymph Node Dissection	SAPB; ESPB			Our analysis demonstrated that USG-ESPB offers prolonged analgesia, lower total dose of postoperative rescue analgesia, , reduced pain scores and diminished postoperative analgesic needs in patients undergoing unilateral MRM with axillary lymph nodes clearance surgery as opposed to USG-SAPB.

ctomy: A Randomized Clinical Trial										
Interpectoral nerve blocks may lower postoperative narcotic use after mastectomy	Ricardo J. Bello, Benjamin A. Palleiko, Kara Kennedy, Lauren Cournoyer, Anne C. Larkin, Kate H. Dinh, Jennifer LaFemina	2024	United States	Cohort Study	105	Mastectomy	PECS I			IPNB may be an effective strategy to decrease postoperative opioid use in mastectomy patients. Larger, prospective studies are needed to further investigate the effectiveness of IPNB.
Comparison between ultrasound guided erector spinae plane	Samy Abdelrahman Amr, Ahmed Hassan Othman, Eman Hassan Ahmed, Romany Gergis	2024	Egypt	Randomised Controlled Trial	105	Modified Radical Mastectomy	TPVB; ESPB			ESP and TPV blocks provided superior early postoperative analgesia and reduced stress response compared to the control group in female patients undergoing

block and paravertebral block on acute and chronic post mastectomy pain after modified radical mastectomy: randomized controlled trial.	Naeem, and Shereen Mamdouh Kamal									modified radical mastectomy. PVB is better than ESB in acute postoperative pain management (the total morphine consumption VAS score and time of first analgesic request). Both techniques showed better long-term outcomes compared to the control group regarding LANSS score in the 6-month follow-up.
A Prospective Randomized Study to	Sarvesh Basavarajaiah, Bhavyashree, Prajwal	2024	India	Randomised Controlled Trial	60	Modified Radical Mastectomy	PECS I; PECS II			Dexmedetomidine 0.5 µ/kg added as an adjuvant to 0.5% ropivacaine for ultrasound gui Conclusion: ded

Know the Efficacy of Dexmedetomidine as an Adjuvant to Ropivacaine in the Ultrasound-guided Pectoral Nerve Block for Post Modified Radical Mastectomy Analgesia.	Patel, Soumya									Pecs block prolongs the duration of analgesia and reduces postoperative morphine consumption.

Comparison of Postoperative Analgesic Efficacy of USG Guided PECS Block Versus Erector Spinae Plane Block using Levobupivacaine in Patients Undergoing Surgery for Breast Cancer	Sowmya Shanmugam, B.S. Thamilselvi, N.Nivedha, A.Amala Savio	2025	India	Randomised Controlled Trial	60	Modified Radical Mastectomy	PECS II; ESPB			The PECS block significantly reduced postoperative pain and opioid use and provided longer pain relief than the ESP block. Given its efficacy and safety, it is preferable for pain management after breast cancer surgery.

Magnesium Sulfate As An Adjuvant In Serratus Anterior Plane Block For Postoperative Pain Management In Modified Radical Mastectomy	Sudha Singh, Richa Singh, Jyoti Mala, Akhileshwar	2025	India	Randomised Controlled Trial	70	Modified Radical Mastectomy	SAPB			Magnesium sulfate as an adjuvant in SAP block provides superior postoperative analgesia in MRM without increasing adverse effects.
Comparison of the Postoperative Analgesic	Taje Lusi, Shobha Ujwal, Nidhi Jain	2026	India	Randomised Controlled Trial	62	Unilateral Modified Radical Mastectomy	PECS II			Addition of dexamethasone to levobupivacaine in PECS II block significantly prolongs

Effect of Levobupivacaine and Its Combination with Dexamethasone under Ultrasound-Guided Modified Pectoralis II Block in Patients Undergoing Modified Radical										analgesia, lowers pain scores, and reduces rescue analgesic requirement, making it an effective adjuvant for postoperative pain management in MRM patients.

Mastectomy										
Ultrasound-Guided Erector Spinae Block Versus Serratus Anterior Block for Perioperative Analgesia In Patients Undergoing Modified Radical Mastectomy	Tenzin Nyima, Sanjeev Palta, Richa Saroa, Robin Kaushik, Satinder Gombar	2023	India	Randomised Controlled Trial	80	Modified Radical Mastectomy	SAPB; EPSB			ESP block provides better analgesia as compared to SAM block after MRM.

Surgery										
Comparison of Efficacy and Safety of Superficial and Deep Serratus Plane Block for Post-Mastectomy Analgesia: A Randomized Controlled Study	V. Dinesh Kumar, (Major) Kanagaraj M, B. Anbarasan	2024	India	Randomised Controlled Trial	60	Total Mastectomy; Partial Mastectomy; Modified Radical Mastectomy	SAPB			Deep serratus plane block provides longer duration of analgesia and better patient satisfaction compared to superficial block for post-mastectomy pain, with similar safety profile. Larger prospective studies are needed to validate these findings.
Role of tramadol as an	Vaishali Singla, Sanjeev Palta,	2024	India	Randomised Contr	70	Modified Radical Mastectomy	SAPB			Tramadol, when used as an adjuvant to ropivacaine for

adjuvant in ultrasound-guided serratus anterior muscle block for modified radical mastectomy - A randomized control trial	Richa Saroa, Robin Kaushik, Avneet Singh			olled Trial						SAM block reduces post-operative pain scores in the first 24 h and prolongs the time of first morphine requirement.
A Study of Efficacy of IITV-Guided Erector	Vrinda Oza, Parthkumar D. Vadgama, Vandana S. Parmar,	2024	India	Randomised Controlled Trial	60	Unilateral Modified Radical Mastectomy	ESPB			IITV-guided ESP block before administering general anaesthesia have less postoperative rescue analgesic requirement,

Spinae Plane (ESP) Block as Novel Multimodal Analgesia Technique for Postoperative Analgesia in Modified Radical Mastectomy (MRM)	Kalrav K. Rawal									longer duration of analgesia, lower pain scores and also provides significant intraoperative haemodynamic stability with no significant adverse effects compared to the control group.
The Effectiveness of PECS II Block on	Waldemar P Siahaan, Barry Imanuel Kambey, Garry	2026	Indonesia	Randomised Controlled Trial	32	Modified Radical Mastectomy	PECS II			Adding PECS II block to GA in MRM substantially improves postoperative pain control and

PONV and Rescue Opioid Dose in Post-Modified Radical Mastectomy Patients.	Dietmar Chrysogonus Kumaat, Venesa Laurent Ngantung									eliminates PONV, with minimal opioid rescue. Larger multicenter studies are warranted to confirm these findings.
Comparison Between 0.25% Bupivacaine and 0.2% Ropivacaine in Transversus Thoracic	Yashvanth R, Rachan Amin, Suchet Sharath, Gauri S Kene, Akhil Rao U K, Soujan Chowta	2024	India	Randomised Controlled Trial	60	Unilateral Mastectomy; Axillary Lymph Node Dissection	PECS I; PECS II; TTP			The results of our study is supportive in proving that 0.2% Ropivacaine is superior to 0.25% Bupivacaine for post-operative analgesia using PECS block and TTP block for breast cancer surgery. It should be considered as

Muscle Plane and Pectoral Nerve Block in Breast Cancer Surgery-A Randomized Prospective Study										an adjuvant therapy multimodal analgesic technique to general anaesthesia.
Effects of ultrasound-guided erector spinae plane block on the immune functi	Yunxia Hu, Meiting Li, Jiacen Li, Qiang Lyu, Rong Jiang, Yu Du	2021	China	Randomised Controlled Trial	104	Radical Mastectomy	ESPB			The analgesic effect of ultrasound-guided ESP block is significant after radical mastectomy. There are few adverse reactions and few effects on immune function, and it can promote the

on and postoperative recovery of patients under going radical mastectomy.										postoperative recovery of patients.
Comparison of Postoperative Pain with and Without Pectoral Block in Patients Undergoing Modified	Zenab Noorain, Shahzad Hussain Waqar, Saad Ali Shah, Shahabul Huddah, Sajid Ali Shah	2024	Pakistan	Randomised Controlled Trial	60	Unilateral Modified Radical Mastectomy	PECS I; PECS II			Post-operative pain with PEC block showed significantly better control as compared to the patients without PEC block group in females undergoing modified radical mastectomy under general anaesthesia.

Radical Mastectomy										