

Multimodal analgesia with Pectoral Nerves Block (PECS) in breast conservative surgeries: A retrospective clinical audit.

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Abstract

Background and Aims: Multimodal pain management with regional nerve blocks helps improve patient recovery and care. Our objective was to assess the adequacy of multimodal analgesia with PECS block in breast conservative surgeries with number of patients needing rescue analgesics and to compare the effect of pectoral nerve block (PECS) on intra operative opioid requirement.

Method: The study was a retrospective data collection of 58 patients who underwent breast cancer surgeries. Standard management with general anaesthesia and PECS block was undertaken for all patients. Paracetamol was prescribed round the clock as part of multimodal analgesia. Data related to intraoperative opioid requirement, post operative rescue analgesia, side effects was collected. Categorical variables are expressed as number of patients and percentage of patients, these were then compared across the groups using Fisher's Exact Test, p value of less than 0.05 was considered as significant.

Results: PECS block was given in 66% of the patients. Intraoperative fentanyl requirement was less than 2mcg/kg in 46.15% of patients, when the opioid requirement was compared to patients who did not receive the block the p value was 0.135. Seventy seven percent of patients who received PECS block did not require any rescue analgesia. This was compared to patients who did not receive the block, the p value 0.077. Side effect profile among patients was unremarkable.

Conclusion: PECS block as a part of multimodal analgesia with paracetamol was effective in decreasing the need for rescue analgesics in the post operative period. It was however not effective in reducing the intraoperative opioid requirement

Keywords: Breast conservative surgery, Multimodal analgesia, Pain, PECS block.

Introduction

Breast surgery has become increasingly common due to increased awareness and early screening among patients, breast conservation is becoming actively a part of routine practice.

Providing a good postoperative pain relief will aid in improving patient outcomes. Management of acute pain forms an integral part of anaesthetic practice. Pain scores are high especially in the first 24 hours of surgery, the pain scores during this time are dependent on effective management of pain during intraoperative and also in recovery (post anaesthesia care unit).

Post operative pain is linked with adverse outcomes such as long-term chronic pain, phantom limb pain^[1,2].

Ineffective postoperative pain management is linked with increased inflammatory markers and length of hospital stays^[3,4].

Pain management is effective when multimodal analgesia is used, this involves concurrently using regional nerve blocks with intravenous (IV) analgesics. In breast surgery, as a part of multimodal analgesia and opioid sparing strategy we can use peripheral nerve blocks such as erector spinae block, pectoral nerve blocks (PECS) and paravertebral nerve block.

PECS block, first described by R Blanco is an ultrasound guided nerve block technique. It has been modified and classified as PECS I and II. The first part drug is given in the interfascial plane between pectoralis major and minor muscles. The second part is administered

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between pectoralis minor and serratus muscles. PECS I blocks the lateral and medial pectoral nerve and PECS II takes care of long thoracic nerve, thoracodorsal nerve and thoracic intercostal nerves from T2-T6^[5]. The nerves arising from the brachial plexus which cover the area above the breast are blocked by PECS block, this aspect of the block is speculated to make PECS block superior to erector spinae block^[6]. Ease of administration and better side effect profile favors usage of PECS over erector spinae block and paravertebral block.

Management of the patient after discharge from post anaesthesia recovery unit is done by the parent team. The feedback and data from this period will allow us anaesthetists to improve our perioperative care.

In this study, our objective was to assess the adequacy of multimodal analgesia with PECS block in breast conservative surgery with number of patients needing rescue analgesics in the first 24 hours of post operative period and secondarily to compare the effect of PECS block on intra operative opioid requirement.

Materials and methods

This was a retrospective study done on patients undergoing breast conservative surgery in our institute. Data of 58 patients were collected in the study period of six months between October 2021 to April 2022.

Study population included all female patients undergoing elective breast conservative surgery, aged between 18 to 80 years and ASA grading I to III.

Non cancer surgeries, Cosmetic surgeries, major flap reconstructions, emergency surgeries, bilateral breast surgeries were excluded from the study.

Preoperative data on demographics, chronic opioid medications, post chemotherapy status was collected.

In our institute General anaesthesia with PECS block consent is taken on the previous day of surgery. In the operating room, standard monitors pulse oximeter, non-invasive blood pressure and five electrode ECG are used. A broad-gauge IV access is secured on the non-surgical side, the patient is preoxygenated and general anaesthesia is induced with fentanyl 2mcg/kg, propofol 2-3 mg/kg and rocuronium 0.6-0.8 mg/kg. Airway is secured with appropriately sized endotracheal tube and confirmed by end tidal carbon-di-oxide monitoring. Standard monitoring according to guidelines are continued throughout the surgery.

PECS block is planned and given by a trained anaesthetist only. The procedure is done under aseptic precautions. It is performed in supine position with the arm abducted. 22G echogenic needle is used with ultrasound machine (Samsung WS80A™, Samsung™).

A linear array probe (5-13Mhz frequency) is used and the infraclavicular region is scanned to locate the axillary artery and vein. The probe is thereafter moved laterally until pectoralis minor and serratus anterior muscles are identified at the level of third rib (Figure-1).

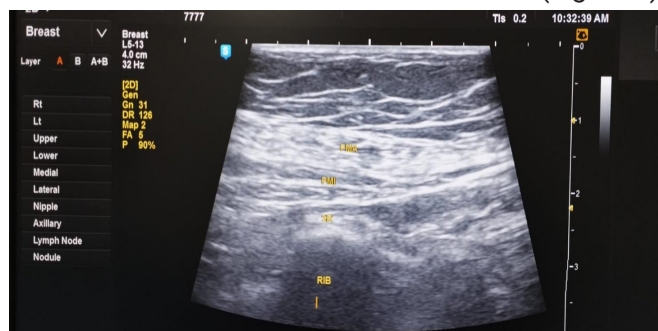


Figure 1: (Original) ultrasound image of pectoral region. PMA= pectoralis major, PMI = pectoralis minor, SR = serratus anterior and RIB= 3rd rib.

An in-plane method is used and the needle advanced obliquely to reach the space between serratus anterior and pectoralis minor muscles. Twenty ml of 0.25% bupivacaine is given as standard in this space and the needle is withdrawn to then lie in between the pectoralis minor and major muscles. Ten ml 0.25% bupivacaine is given in this space.

Intraoperatively, fentanyl is used when there is tachycardia/hypertension more than 20% from baseline. Intraoperatively, IV paracetamol was given half an hour prior to extubation as a part of multimodal analgesia. Data on total intraoperative fentanyl dose (<2mcg/kg, >2mcg/kg), duration of surgery (<2hours, 2-4 hours, > 4hours) was collected.

Post operatively, the patients are closely monitored in the post anaesthesia care unit for the first 4 hours. They are then shifted to the ward after being reviewed by the anaesthetist.

The patients as a routine are monitored every 1 to 2 hourly thereafter in the ward. The rescue analgesics IV diclofenac 75mg in 100ml normal saline or IV tramadol 50mg in 100ml normal saline are prescribed by the anaesthetist based on the risk profile and comorbidities.

The nurses are advised to give rescue analgesics if the patients have moderate to severe pain which corresponds to visual analogue scale of 4 and above.

The data on round the clock paracetamol prescription for multimodal analgesia was collected, number and type of rescue analgesics was collected. Adverse effects related to haematoma formation, local anaesthetic systemic toxicity and postoperative nausea vomiting was collected.

Data collection was done on Microsoft excel sheet. Analysis was done by using SPSS version 22.

Categorical variables are expressed as number of patients and percentage of patients, these were then compared across the groups using Fisher's Exact Test. Continuous variables are expressed as Mean, Median and Standard Deviation. An alpha level of 5% has been taken, i.e., a p value of less than 0.05 has been considered significant.

Results

A total of 58 patients were operated under breast surgery department, out of which 14 were non cancer and 5 surgeries involved major procedures like a local flap. A total of 39 patients were analysed in this study (figure 2. consort flow chart).

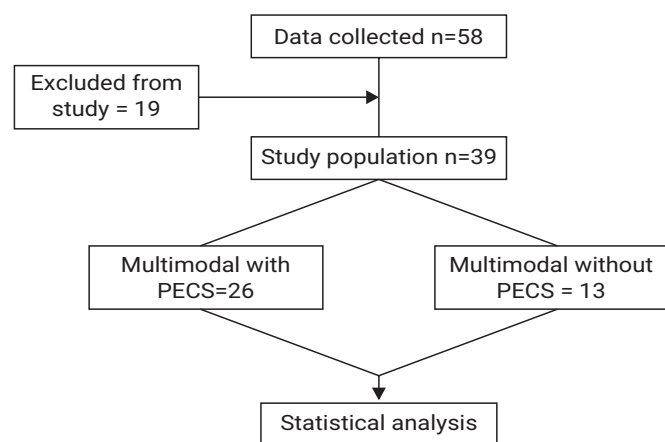


Figure 2 Consort flow chart

The average age among the study group was 55.5. ASA status was collected and 89.7% of patients were of ASA status II and above (table 1).

Table 1: Demographic data

Demographic Data	
AGE (Mean+/-SD)	55.54+/-11
ASA	
I	10.3%
II	61.5%
III	28.2%
Breast Surgeries	
Cancerous	44
Non-cancerous	14

Chronic pain medications were not taken by any patient in the study group. More than two thirds of the surgeries took between 2-4 hours, hence we presumed this would not affect the outcome and was not analysed. Patients who received chemotherapy did not show any correlation to rescue analgesics administered (P=0.756).

IV paracetamol was given intraoperatively in 35 out of 39 patients (89.7%) and postoperatively in all patients.

Rescue medications were given in 13/39 (33%) of the patients, none of them required more than 2 rescue medications in the first 24hours of surgery. Out of these 13 patients 9 were given IV tramadol, 3 were given IV diclofenac and only 1 received both.

Table 2: Intraoperative fentanyl dose

Fentanyl dose	Frequency	Percentage
< 2mcg/kg	18	46.15
>2mcg/kg	21	53.83%
Total	39	100.0

Intraoperatively PECS block was given to 26 (66.7%) patients, this was compared to intraoperative requirement of fentanyl. Fentanyl requirements did not show any significance when PECS block was administered, with a p value of 0.135.

PECS block as part of multimodal analgesia was given in 26 patients, out of them 77% of them did not need a rescue analgesic (Table 3).

Table 3: PECS block and rescue analgesics

		PECS Block		Total
		NO	YES	
RESCUE	NO	6 (46.15)	20 (76.92)	26 (66.67)
	YES	7 (53.85)	6 (23.08)	13 (33.33)
Total		13 (100)	26 (100)	39 (100)

Rescue analgesics were then compared across patients who did and did not receive PECS block, but the p value calculated was 0.077.

None of the patients had any allergic reaction or toxicity, 2 patients had a minor haematoma formation which was notified by surgeon intraoperatively. Post operative nausea vomiting data was not analysed as the parent team had prescribed antiemetics round the clock for all patients, this would have confounded the study.

Discussion

The study showed the importance of multimodal analgesia wherein we found that, PECS block with paracetamol significantly decreased the need for rescue analgesia in the post operative period.

The incidence of invasive female breast cancer rates has been increasing by 0.5% every year^[7]. Increasing age is one of the risk factors for development of breast cancers. In our study we had females presenting to us at an average age of 55.5 and most cases belonged to ASA grade II and above. Pain management in elderly patients with comorbidities becomes a challenge. Breast cancer surgeries are superficial and do not justify a long hospital stay, hence early recovery protocols need to be in place for these patients.

The study collected data on duration of surgery and post chemotherapy status of the patient, this however did not influence our postop analgesic requirements. A study done by Karamarie Fecho et al^[6] showed that duration of surgery and chemotherapy did not influence postop pain. Interestingly, they also showed that nearly 60% of patients experience severe postoperative pain. Hence, having round the clock analgesia with rescue medications prescribed becomes imperative.

Paracetamol was prescribed as round the clock analgesia. Intravenous paracetamol was preferred due to nil by mouth status and is also known to marginally decrease pain scores when compared to oral paracetamol^[9]. Post-surgical patients often have break through pain which needs rescue analgesics. We used tramadol an opioid and diclofenac an NSAID as rescue drugs, these were given to patients based on their risk profile. One third of our patients required rescue medications and only one patient required both the drugs.

PECS block was administered in 66% of patients. We could not administer block in all patients either due to lack of consent, unavailability of experienced regional anaesthetist or in cases where the drug could obscure the surgical field. Patients who received PECS block behaved well in the postoperative period with 77% of them not requiring any rescue medications. We compared rescue medications across patients who did and did not receive PECS block, but we could not find any statistical significance as we were limited by sample size. We also did not find any significance in intraoperative opioid requirements when PECS block was given.

Our finding was concurrent with studies done by Versyck et al^[10], Bashandy et al^[11] and the meta-analysis by Jin et al^[12], all these studies showed better postoperative pain scores and less postop analgesic requirement when PECS block alone was used. The analgesia used by the former two were morphine or its equivalents, we used paracetamol/diclofenac/tramadol which are commonly used and easy to administer drugs. The study compares commonly used practices prevalent in our setup.

Study done by Bashandy et al showed less intraoperative opioid requirement but the other two studies did not show any change in intraoperative opioid requirement when the block was not given.

Analgesia for breast surgeries can also be achieved by erector spinae block and paravertebral blocks^[13,14]. But PECS block when compared to erector spinae and paravertebral nerve block has shown to have better postoperative pain scores, lesser opioid and analgesic requirement in the postop period^[6,15,16]. PECS block

has lesser complications, lesser learning curve and is easier to administer. The nerves arising from brachial plexus contribute to pain, these are not blocked by the other two blocks. Hence, it can form an important part of our standard pain pathway.

We plan to formulate a pathway for breast surgeries involving PECS block with paracetamol as standard for all patients with a general anaesthetic technique. Ultrasound guided block training will be given to all responsible anaesthetist at the institute, round the clock analgesia will be continued for all patients as before. Pain scores, patient satisfaction scores which were a part of our limitations in this study will be included in a prospective audit of the pathway.

Conclusion

PECS block as a part of multimodal analgesia with paracetamol was effective in decreasing the need for rescue analgesics in the post operative period. It was however not effective in reducing the intraoperative opioid requirement.

Limitations

It was a retrospective study with lack of data pertaining to pain scores, patient satisfaction scores. Sample size was small for statistical yield.

Future scope

Multimodal analgesia and opioid sparing strategies are the cornerstone of pain management, a prospective study with this combination of methods can give better statistical values.

Recommendation

We recommend using multimodal analgesia as a standard of care for all breast cancer surgeries. Regional anaesthesia with intravenous analgesics helps reduce rescue analgesics and pain.

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Conflict of interest: Nil

Source of funding: Nil

Date received: Sep 07, 2022

Date accepted: Dec 22, 2022