

To Evaluate the Efficacy of Ultrasonography Guided Pectoral Nerve Block for Postoperative Analgesia in Breast Surgeries

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Abstract:- Present study aim was to study the potential advantages of pectoralis nerve block for providing analgesia in postoperative mastectomy surgery period by assessing reduction in pain, improved analgesia in the axilla and upper limb and for reduced morphine consumption, besides being less invasive, easier and safer to perform as it is done under ultrasound guidance. Total 30 ASA I, II and III patients of age between 18 to 80 years were included in this study. All patient received 10ml inj. Bupivacaine 0.25% for pectoral nerve block under USG guidance, under all aseptic precautions. The results of my study by using 0.25% of 10ml injection of bupivacaine is supportive, in proving, the two-level PECS block is safe, effective, reliable, easy to perform, decreases opioid consumption, improves postoperative pain, provides patient satisfaction and psychological relief in breast cancer related surgery.

Keywords:- Ultrasonography, Pectoral Nerve Block, Breast Surgeries.

I. INTRODUCTION

Breast cancer is the most common cancer among women and its incidence is on the rise. According to GLOBOCAN statistics, there are 1.7 million women diagnosed with breast cancer and 522,000 related deaths. American cancer society reports that one in eight women will develop breast cancer in her lifetime.¹ India along with United States of America and China account for one-third of

the global breast cancer burden. Among the Indian population, it has surpassed that of cervical cancer and has become the most common cancer with 25.8 per 100,000 and mortality of 12.7 per 100,000. Despite the improved efficiency in surgical treatment of breast cancer, peri mastectomy pain syndrome remains a persistent challenging concern.

The standard of anaesthetic care for patients undergoing mastectomy or breast surgery is general anaesthesia or with a multimodal approach for analgesia, such as opioids, paracetamol and, NSAIDs.² Excessive morphine consumption is an additional concern in the management, as there is growing evidence of an increase in recurrence with the use of morphine.³ Advances in anaesthesia in the previous two decades have given rise to regional anesthesia techniques, such as thoracic epidural and paravertebral block which are now considered as 'gold standard' regional anaesthetic techniques for these patients. Although evidence shows that they are effective, associated significant complications have been reported with these procedures.⁴

Blanco R in 2011, illustrated the procedure of Pectoral Nerve (PECS) block and its effectiveness in reducing pain locally over the serratus anterior area during breast reconstruction surgeries.⁵ With limited studies showing positive results of PECS, this study was initiated to provide further evidence to the efficacy and safety of this recently introduced technique towards pain management in

Mastectomy surgeries. Our aim was to study the potential advantages of pectoralis nerve block for providing analgesia in postoperative mastectomy surgery period by assessing reduction in pain, improved analgesia in the axilla and upper limb and for reduced morphine consumption, besides being less invasive, easier and safer to perform as it is done under ultrasound guidance.

II. MATERIALS AND METHODS

- **Source of data:** Patients admitted for breast surgeries in our hospital
- **Study Period :** December 2019 to July 2021
- **Study Design :** A Prospective Observation Study
- **Study Sample :** 30 patients

A. Inclusion Criteria :

- Patient undergoing breast surgeries
- Patient of age between 18 to 80 yrs. of female
- Patient with ASA grade 1,2,3

B. Exclusion Criteria:

- Non-consenting patients
- ASA GRADE 4 physical status
- Allergy to local and general anaesthetic drugs
- Chest wall anatomical abnormality
- Presence of infection
- Patients on anti-coagulants or anti-platelet drugs /coagulopathy

The study included patients who fulfilled the inclusion criteria. Before proceeding with the study, a written and informed consent was taken from these patients. The same was explained to their bystanders. The confidentiality of the patient was maintained. Patients underwent routine pre-anesthetic evaluation and all patients recruited were either ASA 1 or 2 or 3. Fasting protocols were followed. All patients were kept nil per oral (NPO) for 6 hours for solids and milk; 2 hours for clear fluids like coconut water, or water. On the morning of surgery, patients were reassessed and taken in. The anaesthesia machine, emergency oxygen source, pipeline oxygen supply, working laryngoscope were checked. Working suction apparatus with suction catheter, airway equipment, intravenous fluids and all emergency drugs were kept ready for emergency resuscitation.

All patients received general anaesthesia. After establishing intravenous access in the operation theatre, routine monitors were established (ECG, pulse oximetry, noninvasive BP). Intraoperative vitals were monitored on an interval of 5, 15, 30, 60, 90, 120min. Systolic and Diastolic blood pressure along with heart rate ETCO₂ and saturation was recorded. Total morphine and fentanyl consumption was also recorded.

The block was performed with the patient in supine position and the arm abducted 90 degrees. The landmarks under US was identified that is the Pectoralis major, Pectoralis minor and the pectoral branch of the thoracoacromial artery. The transducer was rotated slightly

to allow in-plane needle trajectory from medial to lateral side. The proper fascial plane was confirmed by hydrodissection with saline to open the space between the pectoral muscles. First the plane between serratus anterior and pectoralis minor, was identified and 0.2ml/kg, 10ml of bupivacaine was instilled, followed by the plane and between pectoralis major and minor 0.2ml/kg of 10ml drug was instilled as the needle was withdrawn.

After surgery, patients were transferred to post-anaesthesia care unit (PACU), Pain score was documented against Numeric Rating Scale every 2 hours for the initial 8hrs at PACU then continued at the ward. The Numerical Rating Scale has shown a high correlation as compared to other pain-assessment tools. The patients were asked to circle the number between 0 and 10, zero representing “no pain at all” whereas the upper limit represents “the worst pain possible”

III. OBSERVATIONS AND RESULTS

This Prospective study of 30 patients was performed to evaluate the effects of the recently introduced, regional anaesthesia technique, the two-level PECS block, in the management of breast surgery at our hospital.

The following intra operative and post-operative parameters were measured as outcome variables: The primary outcome was the safety and efficacy of PECS block. This was supported with the following variables.

- a) Intra-operative heart rate and blood pressure
- b) Intra and post-operative opioid consumption
- c) Post-operative pain assessment and management
- d) Post-operative heart rate and blood pressure

Total 30 ASA I, II and III patients of age between 18 to 80 years were included in this study. All patient received 10ml inj. Bupivacaine 0.25% for pectoral nerve block under USG guidance, under all aseptic precautions. Mean age includes in the study was 36.03±14.60 years.

Intra operatively there was no significant changes noted in systolic and diastolic blood pressure, pulse rate and respiratory rate in any of the patients.

Time taken for procedure is time taken from the insertion of block needle to the end of local Anesthetic injection and needle withdrawal in minutes. The mean time taken for the procedure to administer a block is 10.45± 3.32 min.

Completeness of block was considered when block provided solid analgesia with no need of supplemental analgesia. Out of 30 patients no one required of supplement analgesia.

No complications were noted following block. Hence in our study there was 100% success rate with average 7hrs and 31 min of preoperative analgesia with no incidence of complications such as vessel puncture, nerve injury,

hematoma which reflects the safety of ultrasound guided pectoral nerve block.

IV. DISCUSSION

Effective control of the postoperative pain can prevent the negative physiological and psychological consequences that can occur if it is badly managed. Furthermore, this control can protect immunity by suppressing the stress response to surgery and reducing the need for opioid. Chronic postmastectomy pain can be developed from poorly managed acute postmastectomy pain. The severity of acute pain can be modified by the use of regional anesthesia techniques, like PECS block and this leads to less chronic pain. The time for performing the block varied from 5 min to 20 min. The mean time taken for the procedure to administer a block is 10.45 ± 3.32 min.

Present study shows that average duration of postoperative analgesia was 7 hrs and 31 min which is comparable with Blanc's study. PECS I and PECS II blocks were initially introduced by Blanco et al in 2011⁵ claiming its advantages in pain management during perioperative of reconstructive breast surgery. Their study was performed in 50 patients undergoing mastectomy surgery and reported good post operative analgesia for 8 hours. Since then, there have been multiple studies showing mixed results of the block.

Present study shows that there was considerable difference as regards to HR and BP during operation after giving block, on arrival to PACU and at 1,2,3,4,6,8 hrs postoperatively.

In agreement with our study, Fujiwara *et al.* found that PECS produces hemodynamic stability in his research on the effect of intercostal nerve block and PECS block for cardiac resynchronization therapy device. This can be explained by the fact that PECS is a nerve block without sympathetic affection and hemodynamic changes.⁶

In agreement with our results, Sopena - Zubiria *et al.* in their study on the reconstructive breast surgery found that the PECS has a good hemodynamic stability when added to the paravertebral block compared to the TPVB alone. Moreover, they considered it as a good, simple, and safe anesthetic and analgesic technique block; further, they consider it better than PVB and the thoracic spinal anesthesia where it provided satisfactory surgical anesthesia with prolonged duration of postoperative analgesia.⁷

Present study shows that there were highly significant changes in the pain score on arrival to PACU, and at 2, 4, 6, 8 h postoperatively. In agreement with our study, Hala in their study on the anesthesia for conservative breast surgery in breast found that in PECS groups, VAS throughout surgery and during the first 24 h postoperative was better than that in the thoracic spinal anesthesia.⁸

Present study showed that post operative rescue analgesia required in our study was minimal. In agreement with our results, Bashandy et al. during their study on the effect of PECS on breast cancer excision found that the total morphine consumption dose during the first 24 h

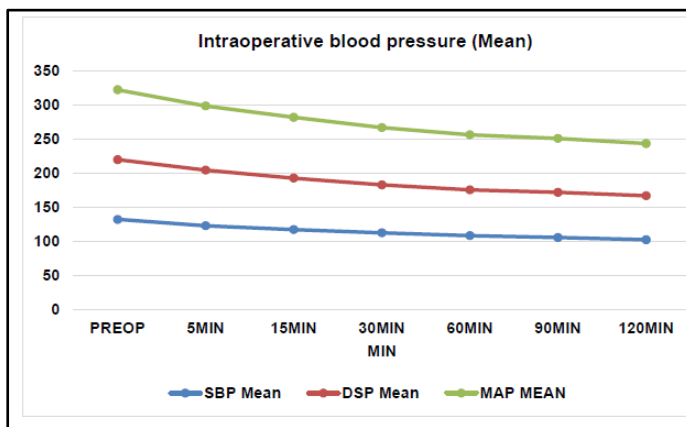


Fig 1 Intra-operative heart rate and blood pressure

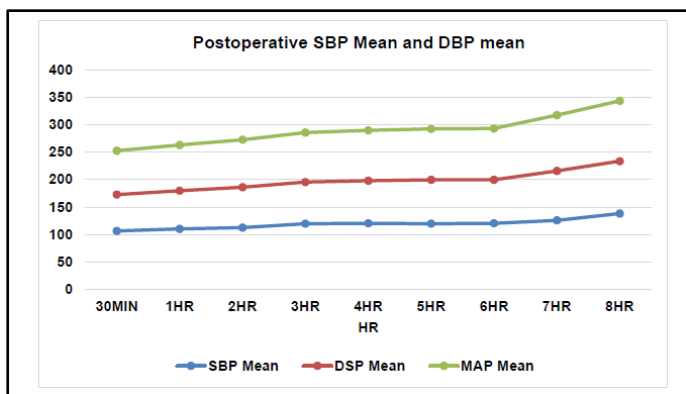


Fig 2 Intra and post-operative opioid consumption

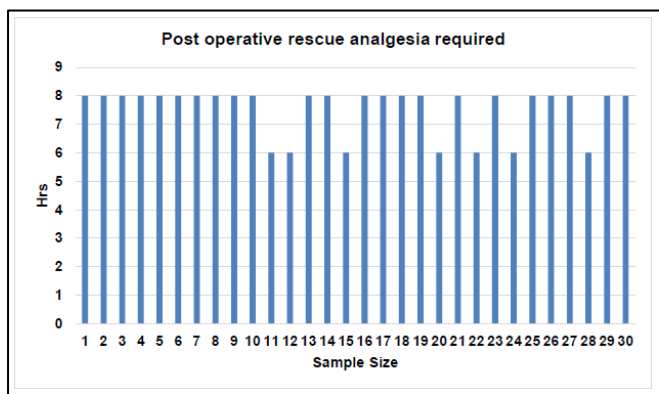


Fig 3 Post-operative pain assessment and management

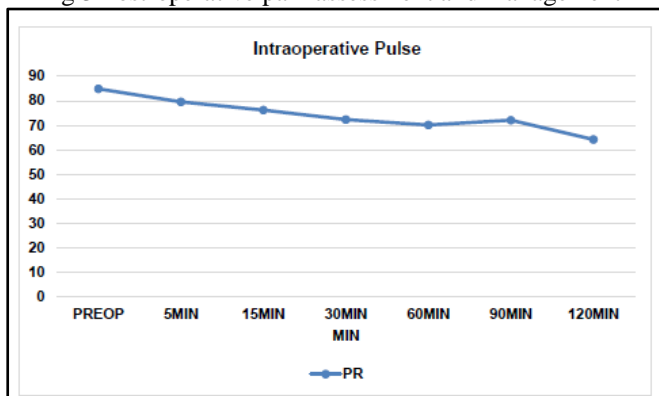


Fig 4 Post-operative heart rate and blood pressure

postoperatively was considerably lower in the PECS group than that in the PVB group.⁹

Kulhari *et al.*, during their study on the effect of PECS block versus TPVB using ropivacaine 0.5% for postoperative analgesia after radical mastectomy, found that the 24 h morphine consumption was also less in the PECS-II block group (3.90 ± 0.79 vs. 5.30 ± 0.98 mg in PECS-II and TPVB group, respectively; $P < 0.0001$) and found that the duration of analgesia was significantly longer in patients who received the PECS versus those who received TPVB (197.5 ± 31.35 vs. 294.5 ± 52.76 min in the TPVB group and the PECS-II, respectively; $P < 0.0001$).¹⁰

Furthermore, Chakraborty *et al.* in their study on a single injection of PECS block showed that the pain-free duration extended to 24 h after PECS injection.¹¹ Pedrosa in his study showed that the PECS block is an effective analgesic technique for breast reconstructive surgery and allows reduction of opioid (tramadol) consumption and its undesirable effects and he mentioned that it should be considered as an alternative to conventional analgesia.¹²

V. CONCLUSION

USG guided PEC-I and PEC-II block together provided good analgesia post operatively in all ca breast patients and it also decreases need of analgesic drugs like opioids and NSAIDS postoperatively. Because of good analgesia all patients were satisfied and definitely there was psychological relief in breast cancer related surgery. Inj. Bupivacain 0.25% of 10ml for PEC I and 10 ml for PEC II was sufficient without any toxicity.

Thus, we conclude that USG guided PEC-I and PEC - II block together with total 0.25% Bupivacain 20cc is safe, supportive, effective, reliable technique for post operative pain relief in patients of Carcinoma breast. It should be considered as an adjuvant therapy in multimodal analgesic technique to General Anaesthesia for Carcinoma breast.

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