



## TO COMPARE THE EFFICACY AND PERIOPERATIVE ANALGESIA OF A PECTORAL NERVE BLOCK AND LOCAL INFILTRATION WITH SEDATION FOR PERMANENT PACEMAKER IMPLANTATION

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### ABSTRACT

**Aim:** Permanent pacemaker implantation (PPI) is a procedure in which a pacemaker is implanted surgically in the deltopectoral pouch when the conduction defect is irreversible. These patients are high-risk patients with poor cardiac reserve. Usually, PPI is done under local infiltration with sedation. We designed this prospective, randomised, controlled study to compare pectoralis block with local infiltration and sedation for PPI. **Methods:** Forty patients posted for PPI were randomly allocated to two groups, group A, which received an ultrasound-guided pectoralis (PEC) block and group B received local infiltration with sedation. Injection Paracetamol was used as a rescue analgesic perioperatively. Vitals like HR, SBP, DBP, MAP, SPO<sub>2</sub>, and patient and surgeon satisfaction were assessed every 2 min after anaesthesia. Visual analogue scale (VAS) was evaluated at 2, 4, 6, 8, 10 and 12 hours postoperatively. **Result:** Analysis of our study showed that group A patients had significantly low VAS scores perioperatively with a p-value of < 0.005. Also, analgesic and sedation requirements were significantly low for group A. Haemodynamic stability was significantly better in group A. **Conclusion:** From our study, we conclude that PPI can be done under pectoralis block without the need for sedation or analgesics with maintaining haemodynamic stability which facilitates early discharge.

**KEYWORDS :** Pectoralis block, Ropivacaine, Permanent pacemaker

### Introduction:

Pacemakers are electronic devices that stimulate the heart with electrical impulses to maintain or restore a functional heartbeat. Pacemakers were initially external and involved the placement of subcutaneous electrodes for patients with inappropriate intrinsic cardiac pacemaker activity and/or abnormal conducting tissue. The complete heart block was treated using electrodes directly attached to the heart. Ultimately, the pacemaker evolved and an entirely implantable pacemaker was developed. Since then, there have been several advancements in pacemakers, and the modern-day permanent pacemaker is placed subcutaneously.

Different indications for PPI are chronic bifascicular and trifascicular block, atrioventricular block associated with acute myocardial Infarction, sinus node dysfunction, prevention and termination of tachyarrhythmias, pacing in the hypersensitive carotid sinus and neurally mediated syndromes. These patients are sick and have poor cardiac reserve. Implantation of PPI is done under local anaesthesia with sedation which can cause pain and discomfort leading to sympathetic stimulation leading to haemodynamic instability in already poor cardiac reserve patients. Different regional blocks have been tried with good results by Marin R 6 et al for PPI. Nevertheless, an augmented embracement of the modern safer regional analgesic techniques increasingly motivates anaesthesiologists to formulate effective regional-centric opioid-sparing anaesthesia.

**Methods:** This prospective, single-blind, randomised comparative trial was conducted at a tertiary care and was duly approved by the institutional ethical committee. This study included a total of 34 patients who were posted for PPI for various indications. All patients were included in the study except patients with deranged coagulation profiles. Written informed consent was obtained from all the study participants. Using computer-generated randomization techniques patients were randomized into two groups. Patients were explained the visual analogue scale [VAS] before the scheduled elective surgery. Standard fasting guidelines were followed. Monitors were attached and vascular access was secured. Group A (n=17) received a USG-guided PEC block with 20 ml of 0.5 % Ropivacaine. Pec block was performed in a supine position with the ultrasound probe oriented inferolateral in the mid-clavicular region<sup>7,8</sup>. The pectoralis major and minor muscles were outlined. The needle was introduced at the level corresponding to the 4th rib, heading from medial to lateral direction toward the anterior axillary line. Thereby the needle was advanced until the rib and then it was withdrawn so as to position the tip in the

plane between the serratus anterior and pectoralis minor muscle. A total of 1.25 mg/kg of 0.5% ropivacaine (half the total dose) was injected after confirming a negative aspiration. Following the initial drug injection, the needle was meticulously withdrawn so that the tip lay between the two pectoral muscles, and 1.25 mg/kg of 0.5% ropivacaine (rest of the dose) was injected after careful aspiration. Group B received local infiltration of 20 ml of 0.5 % ropivacaine and injection fentanyl 2 mcg per Kg BW. If patients complained of pain, an injection of paracetamol 2ml per kg BW was given. The primary endpoints of this study were to assess the adequacy of surgical anaesthesia, analgesia and duration of postoperative analgesia, whereas the secondary endpoints included the assessment of patients' haemodynamic profile perioperatively and comparing the incidence of adverse events associated with the two techniques. For all patients electrocardiography, heart rate (HR), mean arterial pressure (MAP), respiratory rate and pulse oximetry were monitored. Data were recorded at 5-min intervals till the end of surgery. Postoperative pain was assessed immediately at the end of surgery and then till the first rescue analgesic (FRA) was administered. VAS score was monitored at 0, 3, 6, and 12 hr post-procedure.



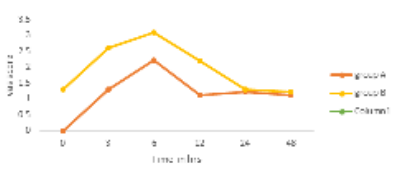
### Statistical analysis

SPSS version 20.0 was used for analysis. Frequency, mean distribution, standard deviation, Chi-Square test and student t-Test were calculated to value.  $P < 0.05$  was considered statistically significant. Categorical variables were expressed as absolute numbers and percentages. Intergroup data were compared by the Chi-square test. The sample size was decided as per the previous literature review. Patient information was collected through a structured proforma, tabulated in a master chart, and analysed using Statistical Package for the Social Sciences.

Results: The demographic parameters (age, BMI, and ASA-class), duration of surgery, and baseline haemodynamics were statistically comparable in both groups. VAS scores were significantly lower in

Group A compared to that of Group B (fig 1), with the duration of postoperative analgesia being highly significant ( $P < 0.000$ ) in Group A ( $724.00 \pm 103.2914$  min) compared to that of Group B ( $256.643 \pm 73.4218$  min)

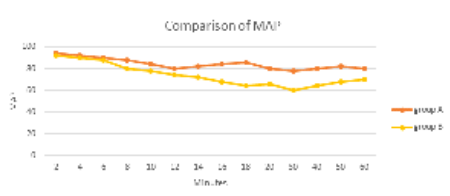
**Figure 1.**



Doses of sedation and analgesics were statistically significant. The number of rescue analgesics in two groups, Group A and Group B was  $0.171 \pm 0.3212$  versus  $0.212 \pm 0.2456$  ( $P = 0.128$ ).

The trend of intraoperative heart rate (HR), and mean arterial pressure (MAP) was more stable in group A than in group B as shown in figure 1.

**Figure 2.**



### Discussion:

The study demonstrates a satisfactory efficacy of the pectoralis block in permanent pacemaker implantation procedures. The patients requiring PPI due to various indications are high-risk patients with poor cardiac reserve. Administration of combinations of sedation can cause haemodynamic instability and there may be limitations on doses of these drugs. Also, lack of sympathetic stimulation due to PEC block, vitals were maintained to baseline values. Patients who received PEC block were comfortable throughout the procedure with lesser need of analgesics or sedations compared to patients who received local infiltration with sedation. This finding was similar to studies done by Kumar v1 et al who delineated the analgesic and opioid-sparing benefits of pectoralis block in their case series of 10 patients undergoing video-assisted thoracoscopic surgery. The prolonged analgesic duration of pectoralis blocks explains the much lower, almost one-third post-operative rescue analgesics requirement as studied by Khemka r3et al and Kumar s2 et al.

Due to prolonged analgesia postoperatively, patients could be mobilised and discharged early. This improved patient satisfaction.

### Conclusion:

Pectoralis blocks are simple single-shot effective alternatives to local infiltration with sedation, it also provides effective perioperative analgesia and haemodynamic stability following anterior chest wall procedures like permanent pacemaker implantation.

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**Conflicts of interest:** There are no conflicts of interest.

### REFERENCES:

- Kumar V, Gaber M, Moore F, Castresana MR. Pectoral blocks as an alternative for pain management after video assisted thoracoscopic surgeries and its potential role in enhancing postoperative recovery. *Anesth Analg* 2016;122(Suppl 3):S325
- Kumar S, Goel D, Sharma SK, Ahmad S, Dwivedi P, Deo N, et al. A randomised controlled study of the postoperative analgesic efficacy of ultrasound-guided pectoral nerve block in the first 24 h after modified radical mastectomy. *Indian J Anaesth* 2018;62:436-42
- Khemka R, Chakraborty A. Ultrasound-guided modified serratus anterior plane block for perioperative analgesia in breast oncological surgery: A case series. *Indian J Anaesth* 2019;63:231-4
- IsidraVeve et al. *Anesthesia for Pacemaker Insertion, seminars in cardiothoracic and vascular anaesthesia* Volume4, Issue3
- Hayes D., Barold S., Camm J.; Evolving indications for permanent cardiac pacing: An appraisal of the 1998 American College of Cardiology/American Heart Association guidelines. *Am J Cardiol* 82:1082-1086, 1999
- Martin R, Dupuis JY, Tetrault JP. Regional anesthesia for pacemaker insertion. *Reg Anesth*. 1989 Mar-Apr;14(2):81-4. PMID: 2487668
- Blanco R. The 'pecc block': a novel technique for providing analgesia after breast surgery. *Anaesthesia*. 2011 Sep;66(9):847-8.
- Blanco R, Fajardo M, Parras Maldonado T. Ultrasound description of Pecs II (modified Pecs I): a novel approach to breast surgery. *Rev Esp Anestesiol Reanim*. 2012 Nov;59(9):470-5. - [PubMed](#)

- Hussain N, Brull R, McCartney CJL, Wong P, Kumar N, Essandoh M, Sawyer T, Sullivan T, Abdallah FW. Pectoralis-II Myofascial Block and Analgesia in Breast Cancer Surgery: A Systematic Review and Meta-analysis. *Anesthesiology*. 2019 Sep;131(3):630-648.
- Bashandy GM, Abbas DN. Pectoral nerves I and II blocks in multimodal analgesia for breast cancer surgery: a randomized clinical trial. *Reg Anesth Pain Med*. 2015 Jan-Feb;40(1):68-74. - [PubMed](#)
- Kulhari S, Bharti N, Bala I, Arora S, Singh G. Efficacy of pectoral nerve block versus thoracic paravertebral block for postoperative analgesia after radical mastectomy: a randomized controlled trial. *Br J Anaesth*. 2016 Sep;117(3):382-6
- Kuthiala G, Chaudhary G. Ropivacaine: A review of its pharmacology and clinical use. *Indian J Anaesth* 2011;55:104-10