



PARASTERNAL INTERCOSTAL BLOCK WITH TWO DIFFERENT CONCENTRATIONS OF ROPIVACAINE FOR POST OPERATIVE ANALGESIA IN PATIENTS UNDERGOING CARDIAC SURGERY

Anaesthesiology

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ABSTRACT

In the current era of early tracheal extubation, achieving optimal pain relief after cardiac surgery can be challenging. Adequate post-operative analgesia prevents unnecessary patient discomfort, may decrease morbidity and may decrease ICU/hospital length of stay, which may be attained via a variety of techniques. Traditionally, analgesia after cardiac surgery has been obtained with intravenous opioids. The intercostal nerves innervating the sternum are easily identified during surgery. Parasternal intercostal blocks reduces opioid use and reduces pain scores. In this study, we will evaluate the efficacy of ropivacaine in post-operative pain, effect on hemodynamic parameters, in patients undergoing cardiac surgeries.

KEYWORDS

Parasternal Block, ropivacaine, Cardiac Surgery

INTRODUCTION

In the current era of early tracheal extubation, achieving optimal pain relief after cardiac surgery can be challenging.

Patients with coronary artery disease (CAD) and left ventricular dysfunction presenting for coronary artery bypass graft surgery (CABG) represent a high-risk group among the cardiac surgical population^(1,2).

General Anesthesia is the most commonly used anesthetic technique for cardiac surgery. Two third of patient undergoing CABG report moderate to severe pain⁽³⁾, particularly on ambulatory and respiratory effort⁽⁴⁾. Prospect of moderate or severe pain is a common concern of patient when contemplating cardiac operation.

Cardiac surgical procedure is done usually through median sternotomy incision and for this; impairment of pulmonary function is one of the most significant post-operative complication of CABG⁽⁵⁾ and other cardiac surgery.

Basal atelectasis develops early during anesthesia and may persist in the postoperative period. After surgery both respiratory muscles weakness and reduced, uncoordinated rib cage expansion contribute to the restrictive ventilatory defect following median sternotomy and is characterized by increased ventilation perfusion (V/Q) mismatch⁽⁶⁾. Post-operative pain may cause hypo-ventilation and insufficient cough, leading to retention of airway secretions and aggravation of the impaired lung function⁽⁷⁾.

Adequate post operative analgesia prevents unnecessary patient discomfort may decrease morbidity, decrease ICU/hospital length of stay. Adequate post operative analgesia after cardiac surgery may be attained via a wide variety of techniques.

Traditionally, it has been obtained with intravenous agent. Use of intravenous opioids for pain relief during post operative period may delay tracheal extubation and fast tracking in addition to producing nausea, vomiting and ileus.⁽⁸⁾ Excess doses of non-steroidal anti-inflammatory analgesics have their own potential side-effects.

Regional anesthesia for post-operative pain relief has additional benefits like attenuation of altered circulatory, metabolic, immunological, hemostatic response^(9,10)

Epidural analgesia⁽¹¹⁾ may provide better analgesia with reduced opioid use ,earlier extubation and improved respiratory function. However concern related to systemic hypotension and resulting decreasing coronary perfusion and also the possibility of devastating epidural hematoma after aspirin therapy and full heparinization have resulted in regional analgesia not being widely used in cardiac surgical patients.^(12,13)

The sternum and parasternal area is innervated by anterior and

posterior branches of intercostal nerve. Blockage of these nerve by parasternal injection of local anesthetics is safe even in anti coagulated patients.

There is paucity of literature pertinent to the use of parasternal intercostal block for post operative pain relief in patient undergoing elective cardiac surgeries.

Studies using parasternal infiltration with local anesthetics as a continuous infusion have shown conflicting results in a reducing sternal wound pain and opioids use^(14,15).

Barr et al⁽¹⁶⁾ in their study on parasternal block with ropivacaine used 0.75% of the drug with a fixed dose of 300mg for all patients. They studied that administration of a parasternal intercostal block using ropivacaine 0.75% had improved analgesia in postoperative cardiac surgical patients.

Choudhary et al⁽¹⁷⁾ assessed the effectiveness of 0.5% ropivacaine used for parasternal intercostal blocks for postoperative analgesia in pediatric patients undergoing cardiac surgery.

With this background This study was performed to compare the efficacy of two doses of ropivacaine(0.5% and 0.75%) used in parasternal intercostals block for postoperative pain, their effect on hemodynamic parameters, vas score in postoperative period in patients undergoing cardiac surgery.

METHODOLOGY

Study Location :

- The study was conducted in cardio thoracic operation theater under the Department of Anesthesiology, S.M.S. Hospital and attached group of hospitals, Jaipur with due permission from the institutional ethical committee and a written informed consent.

Study Period:

- After the approval of plan by institutional ethical committee no.821/MC/EC/2019 and research review board from july 2018 to december 2018.

Study Design :

- Hospital based, prospective, randomized, double blind, interventional study.

Sample Size:

- Sample size was calculated to be 5 subjects in each of the two group at alpha error 0.05 and study power 90% to detect expected minimum difference of 1.67 ± 0.65 in VAS score after extubation (as per reference article) hence for study purpose sample size was increased and rounded off to 25 in each group.

Randomization:

- Randomization was done by sealed envelope method.

GROUPS:

Patients were randomly allocated to 2 groups (in each group).

Group "A"- received parasternal block with ropivacaine 0.75%.

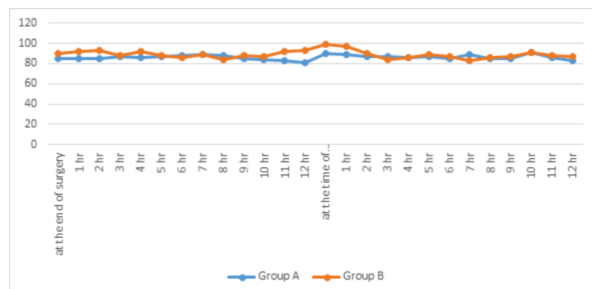
Group "B" received parasternal block with ropivacaine 0.5%.

4 MI Volume Was Injected In 2nd To 6th Intercostal Space, total 20 MI On Each Side Of Sternum In Both The Group.

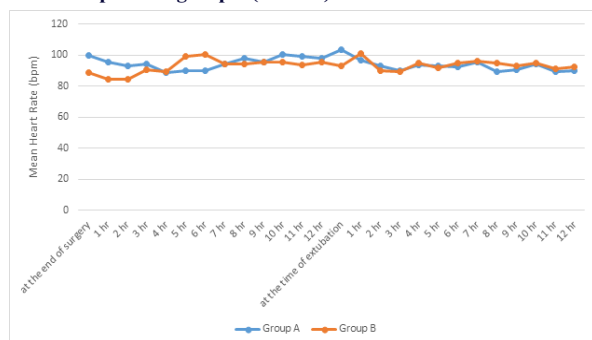
RESULT

In our study there was no statistically significant difference was observed in both the group in term of age ($p=0.428$).

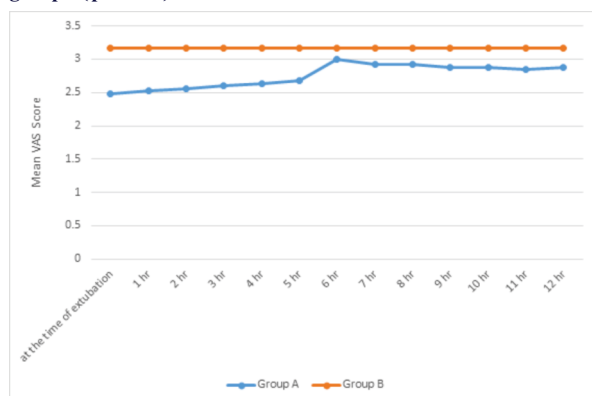
Male female difference was also not statistically significant ($p=1.000$)



Statistically significant difference was observed in MAP 1, 2, 4, 11, 12 hr post-operatively, at the time of extubation and 1hr post-extubation. MAP at extubation was significantly lower in group A when compared to group B ($P<.001$)



Statistically significant difference was observed in heart rate 1, 2, 5, 6 hr post-operatively and at the time of extubation. Heart rate at extubation was significantly lower in group A when compared to group B ($p<0.001$).



Statistically significant difference was observed in VAS score at the time of extubation and 1, 2, 4, 5 hour post extubation in both the group. Mean VAS score at extubation was significantly lower in group A when compared to group B. ($p=0.0004$)

CONCLUSION

Parasternal intercostals block for postoperative pain relief for adult cardiac surgical patients is a simple technique, which is easy to perform and appears to be a useful adjunct to postoperative pain relief during the postoperative period. Unlike neuroaxial blocks, it can be

used in patients who are anticoagulated perioperatively and have deranged coagulation parameters. 0.75 % ropivacaine is more efficacious than that of 0.5% when used in the same route.

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