



TO STUDY OPIOID SPARING EFFECT OF PECTORALIS PLANE BLOCK WHEN USED WITH GENERAL ANAESTHESIA IN PATIENTS UNDERGOING ELECTIVE MODIFIED RADICAL MASTECTOMY

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ABSTRACT **Introduction:** Breast carcinoma is one the most common carcinoma in our country. MRM is thus one of the most commonly performed surgery. Adequate pain relief is of utmost importance for patient's wellbeing and early recovery. Various methods are used to provide analgesia like drugs, blocks, regional anaesthesia etc. Most commonly used drugs for this purpose are opioids but they have their own related side effects mainly post-operative. To come over those side effects, we have used PEC blocks in our study for pain relief.

Materials and Methods: This prospective randomised controlled study was conducted in 60, ASA 1, 2 patients, planned for Modified Radical Mastectomy (MRM) under general anaesthesia. After approval from institution scientific and research committee, and obtaining written informed consent, the patients were randomly divided into two groups (A and B). Group A (N=30), received general anaesthesia with i.v. fentanyl at the dose of 2microgram/kg BW. Group B (N=30) received general anaesthesia with PEC block and i.v. paracetamol at dose of 15mg/kg. The intraoperative hemodynamics, total amount of opioids used intraoperatively, time of first rescue analgesia, total consumption of analgesics in 24 hours after completion of surgery and side effects were noted and compared between the two groups.

Results: time of first rescue analgesic was significantly more in B than group A. total consumption of opioids was significantly more in group B when compared with group A. Opioids related side effects were spared in group B when compared with group A.

Conclusion: PEC blocks can be used effectively for intra-operative and post-operative pain relief in patients undergoing MRM under general anaesthesia thereby decreasing the incidence of opioids related side-effects.

KEYWORDS :

INTRODUCTION:

Modified radical mastectomy is one of the most frequently performed procedure^{1,2} as one in every eight women in our country suffers from breast carcinoma during her life span.

Every surgery demands proper pain relief for intraoperative hemodynamic stability and post-operative patient's comfort and early recovery.

Pain could be relieved via pharmacological agents or via regional anaesthesia. Later have advantages like opioid sparing, prolonged and superior analgesia, less opioids related side effects like PONV, gastric irritation etc., early mobilization speeds up the recovery and thus reduces hospital stay^{3,4}.

Different blocks/regional anaesthesia like thoracic epidural, pectoralis plane blocks, paravertebral blocks, erector spinae plane block etc can be given for analgesia in MRM surgery along with general anaesthesia^{4,5}. PEC blocks because of their ease to perform when compared with paravertebral blocks and better effectiveness when compared to erector spinae blocks on the basis of previous studies was chosen in our study.

PEC blocks are interfascial plane blocks. In PEC 1 block, local anaesthetic is infiltrated in the plane between pectoralis major and pectoralis minor muscles while in PEC 2 block, local anaesthetic is infiltrated above the serratus anterior muscle in anterior axillary line at third rib. These blocks results in blocking of pectoralis, intercostobrachial, intercostals 3rd, 4th, 5th, 6th along with long thoracic nerves resulting in anaesthesia and analgesia of the concerned area⁶.

In our study, we have compared PEC blocks and i.v. Paracetamol, 15mg/kg in one group with i.v.fentanyl, 2micrograms/kg BW in other group to see opioid sparing effects of the former in patients undergoing MRM under general anaesthesia.

MATERIALS AND METHODS:

This is a type of randomised double-blind comparative study conducted over a period of one year span in MGM medical College and

M.Y. hospital. This study involved, 60 female patients aged 18-65 years, ASA grade 1 and 2 posted for elective MRM under general anaesthesia. Those who refused for the study, history of anaphylaxis with local anaesthetics, with history of significant co-existing systemic disease, patients with coagulopathy, psychiatric disorders and neuropathy and patients with opioids addiction were excluded from the study. All the patients included in the study were well explained about the purpose of study and procedure involved in their local vernacular languages and then their well informed and written consent was taken.

After obtaining approval from institutional ethical committee (IEC), patients were randomly divided using envelope method into two groups with n=30 in both the groups. Double blinding was used as the anaesthesiologist involved during surgery and patient were kept blind about the groups they were allocated into.

Group A, received general anaesthesia using intravenous fentanyl, 2microgms/kg BW.

Group B, received general anaesthesia using PEC blocks with intravenous paracetamol infusion at the dose of 15mg/kg BW.

All the patients included in the study were assessed preoperatively and necessary advice was given. Day before surgery, purpose of study, procedure involved, benefits and hazards, VAS scoring were explained to the patients and they were counselled about the anaesthesia and related side effects. Patients were advised to be Nil per mouth as per criteria. As the patient came in operation theatre, 18G intravenous line was secured and after confirming patency, ringer lactate fluid was started, multipara monitor were connected and baseline values of blood pressure, heart rate, SP02 were recorded along with ECG pattern. Preoxygenation with 100% oxygen for 5 minutes was done after premedication with midazolam 0.1mg/kg BW and glycopyrrolate 0.02mg/kg BW. In group A, Inj Fentanyl i.v. 2microgm/kg BW while in Group B, inj. Paracetamol i.v. 15mg/kg BW was given and then after 3 minutes propofol 2mg/kg BW was given. Endotracheal intubation was facilitated with succinylcholine 2mg/kg BW. After ET intubation, bilateral equal air entry was checked along with

capnograph and tube was secured. Anaesthesia was maintained with mixture of oxygen, nitrous oxide and isoflurane in 33:66:1 ratio and muscle relaxation with inj atracurium 0.1mg/kg BW. Before surgical incision, patients in group B, were given PEC block via landmark guided approach using 20 ml of 0.5% ropivacaine. Vitals were monitored throughout the procedure. In group B, i.v. fentanyl at the dose of 1 microgram/kg BW was given if signs of inadequate pain relief like tachycardia, hypertension, limb movements were observed.

At the end of surgery, anaesthesia was reversed after attainment of required reversal criteria using myopryrolate 0.04-0.08mg/kg BW and patient was extubated and oxygenated via facemask for 15 minutes. patients were assessed for VAS score at an interval of 30 minutes, 1, 2, 4, 8, 12, 16, 20 and 24 hours. Inj. Tramadol, 2mg/kg in 100ml normal saline was used as rescue analgesic in post-operative period when VAS score was found to be more than 4. Time of first rescue analgesic and total consumption of opioids in 24 hours were recorded.

Patients were also assessed for PONV, bowel movements and residual sedation.

Statistics:

The data was entered in Microsoft excel sheet and checked for co-investigator for any missing entry. The variables were coded and SPSS version 21 was used for analysis. The data thus obtained was analysed using paired student t Test and other suitable statistical tests as applicable were applied. P value >0.05 was considered to be insignificant, p-value <0.05 was considered statistically significant.

OBSERVATION AND RESULTS

Table-1- Demographic Variables

VARIABLES	GROUP A	GROUP B
AGE	47.06±18.87	49.12±08.67
WEIGHT	52.24±10.03	51.07±7.90
SEX	100%(female)	100%(female)
DURATION OF SURGERY	74.08±10.22	71.18±7.23
DURATION OF ANAESTHESIA	90.16±0.56	92.48±0.43

Table-2 - Time Of First Rescue Analgesic (tra) Requirements

TRA	GROUP A(min)	GROUP B
Mean ± SD (in minutes)	121.12±9.8	216.90±26.54

Table-3 -total Fentanyl Consumption Intraoperatively

Fentanyl used intraoperatively (in mg/kg)	GROUP A	GROUP B
Mean ± SD	3.06±2.88	0.611±10.41

Table-4- Total Consumption Of Analgesic (tca) In 24 Hours After Completion Of Surgery

TCA	GROUP A	GROUP B
Mean ± SD	402.2±44.87	221.08±0.39

Table-4 - Side Effects

SIDE EFFECTS	GROUP A	GROUP B
PONV	18 patients	03 patient
IRREGULAR BOWEL MOVEMENTS/CONSTIPATION	12 patients	02 patient
RESIDUAL SEDATION	09 patients	00 patients

In our study, demographic variables like weight, age, ASA physical status, duration of anaesthesia and duration of surgery were comparable in two groups with p>0.05 i.e. statistically insignificant. When compared to group A, VAS score value was less in group B with p<0.05 i.e. statistically significant. Total intra-operative opioids requirement was more in group A when compared with group B with p<0.001, i.e. statistically significant. Total consumption of analgesic drugs in 24 hours after completion of surgery was less in group B when compared to group A with p<0.05 i.e. statistically significant. Time of rescue analgesia (TRA) was significantly more in group B when compared with group A, p<0.05 showing prolonged analgesic effect of PEC blocks. Opioid related side effects like PONV, irregular bowel movements and residual sedation were more in group A than group B.

DISCUSSION

Breast carcinoma is one of the most common carcinoma seen in female patients demanding early treatment and timely surgery⁷. Proper pain management is one of the most important component of anaesthesia, if not managed properly could result in acute and chronic

complications. Various methods are used for pain control like pharmacological agents, regional anaesthesia, local anaesthetic infiltration etc. regional anaesthesia when used with general anaesthesia have added advantages and proved to be effective for postoperative pain control and reduced opioid related side effects^{8,9}.

In our study, we have divided 60 female patients aged 18-65 years, belonging to ASA physical status 1 and 2, undergoing elective modified radical mastectomy under general anaesthesia into two groups:

Group A, patients were given general anaesthesia with inj. Fentanyl i.v. 2micrograms/kg BW.

Group B, patients were given general anaesthesia with PEC blocks and i.v. Paracetamol but i.v. fentanyl at the dose of 1 microgram/kg BW was given if signs of inadequate pain relief like tachycardia, hypertension, limb movements were observed.

According to the data collected and statistical methods applied, we found that demographic variables like age, weight, ASA physical status, duration of surgery and duration of anaesthesia were comparable in two groups with p value>0.05 i.e. statistically insignificant. Vital monitoring parameters during intraoperative period like mean arterial pressure (MAP), heart rate were comparable in two groups showing similar pattern of rise and fall at 0 (just after time of intubation), 5,10,15,30,60,90,120 minutes of surgery and just after extubation. VAS score was less in group B when compared with group A (p<0.05) at 1, 2, 4 and 6 hours after extubation. Also time of rescue analgesia was significantly more in group B (216.90±26.54) when compared with group A (121.12±9.8). Total opioid consumption during surgery was more in group A than group B. intraoperative i.v.fentanyl consumption was significantly more in group A (3.06±2.88) when compared with group B (0.611±10.41) with p value <0.001. Total amount of analgesic consumption in 24 hours after completion of surgery was more in group A (402.2±44.87) when compared to group B (221.08±0.39). Opioids related side effects like PONV, gastric irritation, residual sedation were more in group A than group B.

Yamada et al¹⁰ and Taha et al¹¹ demonstrated that ropivacaine had a concentration-dependent analgesic effect when used in PEC blocks and provided adequate effect.

Yinglan¹² and colleagues showed that increasing the ropivacaine concentration under the same volume in ultrasound-guided PEC block anaesthesia resulted in a progressive increase in the analgesic effect showing results in concurrence with our study.

Among studies which have used opioids perioperatively, Bashandy et al. have compared GA alone with PECS blocks and reported better results with the latter.¹³

Mirkeshi et al.¹⁴ found that PECS block in combination with general anaesthesia for BC surgery significantly increased time to the first request to analgesia and was effective for reducing PP in the recovery room. PECS block combined with general anaesthesia did not reduce the intraoperative use of fentanyl and propofol compared with the control group injected with normal saline.

CONCLUSION

On the basis of results obtained, we concluded that general anaesthesia added with PEC blocks and i.v. paracetamol when used in patients undergoing elective modified radical mastectomy provide intraoperative hemodynamic stability, reduces total amount of analgesia required in 24 hours of post-operative period, spares opioid related side effects and provide prolonged and dense analgesia.

REFERENCES

1. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2018. *CA Cancer J Clin.* 2018;68(1):7–30. doi:10.3322/caac.21442 Chen W, Zheng R, Baade PD.
2. Cancer statistics in China, 2015. *CA Cancer J Clin.* 2016;66(2):115–132. doi:10.3322/caac.21338.
3. Hickey OT, Burke SM, Hafeez P, Mudrakouski AL, Hayes ID, Shorten GD. Severity of acute pain after breast surgery is associated with the likelihood of subsequently developing persistent pain. *Clin J Pain.* 2010;26(7):556–560. doi:10.1097/AJP.0b013e3181dee988
4. Versyck B, van Geffen G-J, Van Houwe P. Prospective double blind randomized placebo-controlled clinical trial of the pectoral nerves (pecs) block type II. *J Clin Anesth.* 2017;40:46–50. doi:10.1016/j.jclinane.2017.03.054
5. Karaca O, Pinar HU, Arpacı E, Dogan R, Cok OY, Ahikalioglu A. The efficacy of ultrasound-guided type-I and type-II pectoral nerve blocks for postoperative analgesia

- after breast augmentation: a prospective, randomised study. *Anaesth Crit Care Pain Med.* 2019;38(1):47–52. doi:10.1016/j.accpm.2018.03.009
6. Gaurav K, Geeta C. Ropivacaine: a review of its pharmacology and clinical use. *Indian J Anaesth.* 2011;55(2):104–110. doi:10.4103/0019-5049.79875
 7. Blanco R. The 'pecs block': a novel technique for providing analgesia after breast surgery. *Anaesthesia* 2011; 66: 847–8
 8. 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; 40: 68–74
 9. Walder B, Schafer M, Henzi I, Tramer MR. Efficacy and safety of patient-controlled opioid analgesia for acute postoperative pain. A quantitative systematic review. *Acta Anaesthesiol Scand* 2001; 45: 795–804
 10. Versyck B, van Geffen G-J, Chin K-J. Analgesic efficacy of the peccs II block: a systematic review and meta-analysis. *Anaesthesia.* 2019;74(5):663–673. doi:10.1111/anae.14607
 11. Blanco R, Fajardo M, Parras Maldonado T. Ultrasound description of peccs II (modified peccs I): a novel approach to breast surgery. *Rev Esp Anesthesiol Reanim.* 2012;59 (9): 470–475. doi:10.1016/j.redar.2012.07.003
 12. Wahba SS, Sahar MK. Thoracic paravertebral block versus pectoral nerve block for analgesia after breast surgery. *Egypt J Anaesth.* 2014;30(2):129–135. doi:10.1016/j.egja.2013.10.006
 13. 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.*
 14. Mirkheshti A, Memary E, Sayyadi S, Samsami M, Motevalli S H. The Effect of Pectoral Nerves Blocks on Narcotic Consumption and Pain Intensity in the Patients Undergoing Breast Cancer Surgery, *Int J Cancer Manag.* 2020 ; 13(5):e98879. doi: 10.5812/ijcm.98879.