Indian Journal of Clinical Anaesthesia 2021;8(4):507–510

Content available at: https://www.ipinnovative.com/open-access-journals

Indian Journal of Clinical Anaesthesia

Journal homepage: www.ijca.in

Original Research Article

Assessment of post-operative analgesia in modified radical mastectomy patients using surgical wound irrigation with 0.25% bupivacaine

Muhammed Shafi C[1], Brejesh Ravi Varma[2,*], Mangesh Shenoy[2], Salman Mohammed Kutty[2]

[1]*Dept. of Anesthesiology, Malabar Hospital, Calicut, Kerala, India*
[2]*Dept. of Anesthesiology, MES Academy of Medical Sciences, Malappuram, Kerala, India*

ARTICLE INFO

Article history:
Received 09-04-2021
Accepted 22-04-2021
Available online 11-11-2021

Keywords:
Bupivacaine
Modified radical mastectomy
Rescue analgesia
Post-operative pain

ABSTRACT

Background: Modified Radical Mastectomy is the widely followed treatment for operable breast cancers. Among the methods used to alleviate pain, irrigation of wound with 0.25% Bupivacaine is one of the under-utilized methods with good efficiency compared to other drugs.
Objectives: To evaluate the role of local irrigation of 0.25% bupivacaine in alleviating the post-operative pain.
Materials and Methods: This observational study was conducted among 60 female patients who underwent Modified Radical Mastectomy in a tertiary care teaching hospital between January 2017 and July 2018. Thirty (30) patients were randomly allotted to control group, where the routine post-operative pain management was followed. Another 30 were randomly allotted to study group where, before closure of the wound, a 20G scalp vein set was used along the length of the incision with multiple punctures in it for continuous irrigation with 0.25% Bupivacaine. Post operatively Visual analogue scale was used to measure the pain sensation at every six hours for 24 hours. The adverse effects like pain, hematoma, wound dehiscence, infection was noted on all the post-operative days.
Results: Both the groups were similar with respect to basic parameters measured. There was a significant reduction in need for rescue analgesia in the study group. There was a significant difference in mean VAS score between both groups from 6^{th} hour of surgery. Post-operative nausea and vomiting was significantly less in the study group.
Conclusion: Irrigation of wound with 0.25% Bupivacaine is found to reduce the pain sensation with minimal side effects without systemic compromise.

1. Introduction

Modified Radical Mastectomy (MRM) is the primary and popular mode of treatment for operable breast cancers.[1] In India among all the cancers, breast cancer accounts for 37.7% among females in 25-49 years of age and 46.5% among females of 50-69 years of age.[2] There is not only physical suffering that needs to be managed but also the emotional suffering. Hence the pain sensation will be felt higher. Post-operative pain is one of the main reasons for prolonged hospital stay. Painless postoperative period is essential to make the patient comfortable. Postoperative analgesia can be offered by different modalities like peripheral nerve blocks, administering opioids, local anesthetic drugs, NSAIDS (non-steroidal anti-inflammatory drugs). But evidence is there to confirm, that effective postoperative analgesia is not achieved completely. As a routine procedure, the local anesthetic drug is used

* *Corresponding author*.
E-mail address: brejeshvarma@rediffmail.com (B. R. Varma).

https://doi.org/10.18231/j.ijca.2021.110

in the breast reconstructive plastic surgeries to improve the clinical outcome.[3–5] MRM necessitates more breast tissue removal sparing the pectoralis major.[6] Epidural analgesia/perineural catheters provides superior analgesia. But they are expensive, time consuming, needs more medical supervision and labor intensive.[7,8] The irrigation of local anesthetic is a relatively simple and cost effective technique and portable pumps can be utilized for the same.[9] The efficacy of this technique reported by various studies ranges between 30 to 86%.[10,11] As there is a chance for spread of the cancerous cells and the risk of needle track seedlings, the local anesthetic drug infiltration along the line of incision is not followed routinely.[6]

As the breast tissue is dissected beyond the surgical incision, effective analgesia may not be provided by the drug along the line of surgical incision. The current study intends to evaluate the role of local irrigation of 0.25% bupivacaine in alleviating the post-operative pain.

2. Materials and Methods

This is an observational study conducted on 60 patients who had undergone MRM in a tertiary care medical college hospital, between January 2017 and July 2018. All those who fulfilled the inclusion and exclusion criteria and those who were willing to participate were included as study participants. Written informed consent was obtained from all the participants. Patients with history of routine analgesic usage, adverse drug reaction to local anesthetics; clinically significant hepatic, neurologic and psychiatric disease were excluded from the study. All patients underwent a prescribed standard anesthetic protocol. Fentanyl was infused at the rate of 0.5mcg/hour to all the patients from the commencement of surgery till closure of the wound. Patients underwent general anesthesia with balanced anesthesia technique. Patients were randomly allotted to control group, where the routine post-operative pain management was followed. Another 30 were randomly allotted to study group where, before closure of the wound, a 20G scalp vein set was used to prepare for continuous irrigation catheter. Using sterile technique, length of the incision was measured, and multiple punctures were given starting from distal end of scalp vein set; length of which will be equal to the incision length. Distal end of the set along with the needle was cut, removed and that end tightly closed with suture. This catheter was placed subcutaneously, and the wound was closed. The proximal end of this irrigation catheter was kept outside the wound through which 10ml of 0.25% bupivacaine was given before the patient was reversed from muscle relaxant before extubation. Later patient was shifted to postoperative unit. Continuous wound irrigation was given using 0.25% bupivacaine at a rate of 0.04ml/kg/hour for 24 hours. Pain scores were noted sixth hourly in a visual analogue scale (VAS) for 24 hours post-operatively. Intra venous tramadol (1 mg/kg) was given for patients whose visual analogue scale was more than four. The total requirement of cumulative analgesia was also recorded for twenty-four hours. Other adverse effects like nausea & vomiting, hematoma, wound dehiscence and infection were also noted during post-operative stay in the hospital.

2.1. Statistical analysis

Data was coded and entered in MS excel and analysis was done using SPSS 17. Descriptive analysis was done. Percentage and frequency were used to denote the discrete variables. Continuous variables were expressed as Mean ± standard deviation. Chi- square / Fischer exact test was done to look for associations between categorical variables. T- test was done to measure the association between need for rescue analgesia and various parameters. ANOVA was computed to see if there is any difference between in mean VAS score at different time intervals in the study group.

3. Results

The mean age (56.3 ± 7.68 vs 54.17 ± 6.32, P=0.246) and weight (52.32 ± 6.31 vs 53.18 ± 7.01, p=0.619) of the study population were comparable between both the groups before the start of the study. There was no significant difference in means between both the groups (Table 1). Both the groups were similar with respect to ASA status (Table 2).

The duration of surgery and dose of fentanyl given was more or less similar in both the groups. (Table 1).

The number of rescue analgesia needed was 0.43 ± 0.12 in study group while it was 2.33 ± 0.68 in control group. The result was statistically significant. The mean VAS Score immediately after surgery was similar between both the groups. The pain sensation increased with time. But there was a significant difference between study and control group at all the times. When compared within the study group (ANOVA), there was no significant increase in pain sensation with time. (Table 1) Post-operative nausea and vomiting was present in 3.33 in study population and 20% in control group. The result was statistically significant.

4. Discussion

This observational study was conducted in a tertiary care set up of Northern Kerala to assess the efficacy of local irrigation of 0.25% bupivacaine in patients who underwent MRM. There was no significant difference between both groups with respect to age, weight, ASÁ Grade, Mallampatti classification and pre-operative fentanyl given. This clearly shows us that both the groups are comparable.

Even from earlier times, many methods have been tried for the management of postoperative pain. Since a large amount of tissue is removed, the pain sensation in breast surgery will be usually more and opioid analgesics improved the pain tolerance of the patients. But usage

Table 1: Comparison of mean values of various parameters between study and control group

	Study Group		Control group		Mean difference	t value	P value
	Mean	SD	Mean	SD			
AGE (years)	56.30	7.68	54.17	6.32	2.130	1.173	0.246
Weight (Kg)	52.32	6.31	53.18	7.01	0.860	-0.499	0.619
Duration of surgery (min)	159.09	16.05	166.01	19.25	6.92	-1.512	0.136
Fentanyl dose infused(μg)	117.87	11.04	115.36	12.23	2.51	0.834	0.407
Number of rescue analgesia doses needed in 24 hours	0.43	0.12	2.33	0.68	1.9	-15.07	<0.001
VAS 0	0.40	0.932	0.61	1.36	-0.210	-0.698	<0.488
VAS 6	0.47	0.973	2.32	0.98	1.850	-0.733	<0.001
VAS 12	0.67	1.583	4.17	0.89	3.5	-10.55	<0.001
VAS 18	0.73	1.596	3.26	0.65	2.53	-8.041	<0.001
VAS 24	0.40	1.303	1.95	0.68	1.55	-5.776	<0.001

Table 2: Bi variate analysis of ASA grade, Mallampatti score and side effects between both groups

		Study Group		Control group		Chi square value	P value
		No	%	No	%		
ASA classification	I	5	16.67	7	23.33	1.643	0.44
	II	20	66.66	21	70		
	III	5	16.67	2	6.67		
Mallampatti Score	1	9	30	6	20	0.801	0.669
	2	13	43.33	15	50		
	3	8	26.67	9	30		
Post-operative nausea and vomiting	Present	1	3.33	6	20	4.043	0.044
	Absent	29	96.67	24	80		

of opioids is related to vomiting, nausea, episodes of respiratory depression, ileus and pruritis. Hence there was a need for finding out a better non opioid analgesic technique for a better patient care. Local anesthetics (LA) were found to have a better control in management of post-operative pain in breast surgeries. [12,13] The LA also found to reduce the pain signals and also the inflammatory reaction. Regional anesthesia techniques though not regularly used, is regarded as one of the better methods for post-operative pain relief. [14]

Various authors worked with different local anesthetic agents for different type of surgeries and found that local anesthetics were equally competent to systemic drugs in alleviating post-operative pain. [15–19]

There was no difference between VAS score immediately after surgery between both groups because of the anesthetic drug effect. After four hours, the VAS score was higher in the control group and the need for Rescue analgesia increased. The Pain sensation was higher for the control group in 6,12, 18 and 24 hours compared to study group. The VAS score was more or less same through the period of observation in the study group signifying that the local irrigation of bupivacaine has a profound effect in minimizing the pain after surgery.

Legeby et al[20] observed that levobupivacaine had better pain reduction when injected locally compared to oral paracetamol/systemic morphine. Similar results were observed by studies done by other authors too. [15,21–26]

Talbot et al[9] andFredman et al[27] in their respective studies found that there was no significant difference in pain reduction between local administration of levobupivacaine.

The occurrence of nausea and vomiting was less in study group which implies that local administration of the drug reduces the occurrence of post-operative nausea and vomiting.

Fredman et al[27] observed that the adverse effects like vomiting and nausea decreased with the administration of local anesthetics compared to systemic use of analgesic drugs.

The need for rescue analgesia was less in the study group compared to control group. Ferreira et al[24] and Mathur et al[28] in their respective studies observed similar results.

5. Conclusion

The irrigation of surgical wound with local anesthetics is a simple, effective method which can be incorporated in the therapeutic armamentarium of multimodal analgesia postoperatively. This cost effective procedure reduces

opioid consumption, lessen postoperative sedation and the requirement for antiemetic drugs. Hence we conclude by saying Irrigation of wound with 0.25% Bupivacaine is found to reduce the pain sensation with minimal side effects without systemic compromise.

6. Source of Funding

None.

7. Conflict of Interest

None.

References

1. Howlader N, Noone AM, Krapcho M, Garshell J, Neyman N, Altekruse SF, et al.. Cancer Statistics Review, 1975-2010. Bethesda, MD: National Cancer Institute; 2112.
2. Latest statistics of breast cancer in India 2020. [Online]. 2020 [Cited on 2021 Jan 10]. Available from: https://www.breastcancerindia.net/statistics/latest_statistics_breast_cancer_india.html.
3. Fayman M, Beeton A, Potgieter E, Becker PJ. Comparative analysis of bupivacaine and ropivacaine for infiltration analgesia for bilateral breast surgery. *Aesthetic Plast Surg*. 2003;27:100–3.
4. Lu L, Fine NA. The efficacy of continuous local anesthetic infiltration in breast surgery: Reduction mammaplasty and reconstruction. *Plast Reconstr Surg*. 2005;115:1927–34.
5. Wu CL, Hurley RW, Anderson GF, Herbert R, Rowlingson AJ, Fleisher LA. Effect of postoperative epidural analgesia on morbidity and mortality following surgery in medicare patients. *Reg Anesth Pain Med*. 2004;29(6):525–33.
6. Uematsu T, Kasami M. Risk of needle tract seeding of breast cancer: Cytological results derived from core wash material. *Breast Cancer Res Treat*. 2008;110:51–5.
7. Block BM, Liu SS, Rowlingson AJ, Cowan AR, Cowan JA, Wu CL, et al. Efficacy of postoperative epidural analgesia: a meta-analysis. *JAMA*. 2003;290:2455–63.
8. Richman JM, Liu SS, Courpas G, Wong R, Rowlingson AJ, Mcgready J. Does continuous peripheral nerve block provide superior pain control to opioids? A meta-analysis. *Anesth Analg*. 2006;102:248–57.
9. Talbot H, Hutchinson SP, Edbrooke DL, Wrench I, Kohlhardt SR. Evaluation of a local anaesthesia regimen following mastectomy. *Anaesthesia*. 2004;59(7):664–7.
10. Apfelbaum JL, Chen C, Mehta SS. Postoperative pain experience: results from a national survey suggest postoperative pain continues to be undermanaged. *Anesth Analg*. 2003;97:534–40.
11. Mcgrath B, Elgendy H, Chung F. Thirty percent of patients have moderate to severe pain 24 hr after ambulatory surgery: a survey of 5,703 patients. *Can J Anaesth*. 2004;51:886–91.
12. White PF. The role of non-opioid analgesic techniques in the management of pain after ambulatory surgery. *Anesth Analg*. 2002;94:577–85.
13. White PF. The changing role of non-opioid analgesic techniques in the management of postoperative pain. *Anesth Analg*. 2005;101:5–22.
14. Fassoulaki A, Triga A, Melemeni A. Multimodal analgesia with gabapentin and local anesthetics prevents acute and chronic pain after breast surgery for cancer. *Anesth Analg*. 2005;10:1427–32.
15. Jacobs VR, Morrison JE. Application of a locally placed anesthesia catheter for reduction of postoperative pain after mastectomy for breast cancer. *Int J Fertil Womens Med*. 2006;51(5):225–9.
16. Liu SS. Clinical approach to the patient with postoperative pain. ACS surgery: principles and practice. Hamilt BC Decker Inc; 2009.
17. Rawal N. Wound catheter techniques for postoperative analgesia. *Periodicum Biologorum*. 2009;111(2):227–30.
18. White PF, Rawal S, Latham P, Markowitz S, Issioui T, Chi L. Use of a continuous local anesthetic infusion for pain management after median sternotomy. *Anaesthesiology*. 2003;99(4):918–23.
19. Sakuragi T, Ishino HDK. Bacatericidal activity of clinically usedlocal anesthetics on Staphylocossus aureus. *Reg*. 1996;21:239–42.
20. Legeby M, Jurell G, Beausang-Linder M, Olofsson C. Placebo-controlled trial of local anaesthesia for treatment of pain after breast reconstruction. *Scand J PlastReconstr Surg Hand Surg*. 2009;43(6):315–9.
21. Lu L, Fine NA. The efficacy of continuous local anesthetic infiltration in breast surgery: reduction mammaplasty and reconstruction. *Plast Reconstr Surg*. 2005;115(7):1927–34.
22. Fayman M, Beeton A, Potgieter E, Becker PJ. Comparative analysis of bupivacaine and ropivacaine for infiltration analgesia for bilateral breast surgery. *Aesthetic Plast Surg*. 2003;27(2):100–3.
23. Dumlu EG, Tokaç M, Öcal H, Durak D, Kara H, Kılıç M. Local bupivacaine for postoperative pain management in thyroidectomized patients: A prospective and controlled clinical study. *Ulus Cerrahi Derg*. 2015;32(3):173–7.
24. Laso LF, Lopez-Picado A, Lamata L, Garcia MC, López IC, Ruilope LP, et al. Postoperative analgesia by infusion of local anesthetic into the surgical wound after modified radical mastectomy: a randomized clinical trial. *Plast Reconstr Surg*. 2014;134(6):862–70.
25. Gottschalk AG. Continuous wound infusion of local anesthetics: importance in postoperative pain therapy. *Anaesthesist*. 2010;59(12):1076–82.
26. Strazisar B, Besic N. Comparison of continuous local anaesthetic and systemic pain treatment after axillary lymphadenectomy in breast carcinoma patients - a prospective randomized study. *Radiol Oncol*. 2013;47(2):145–53.
27. Fredman B, Zohar E, Tarabykin A, Shapiro A, Mayo A, Klein E, et al. Bupivacaine wound instillation via an electronic patient-controlled analgesia device and a double-catheter system does not decrease postoperative pain or opioid requirements after major abdominal surgery. *Anesth Analg*. 2001;92(1):189–93.
28. Mathur S, Gehlot R, Bedi V, Raiger LK. A prospective randomized controlled trial to compare the efficacy of wound instillation with 0.25% bupivacaine, 0.2% ropivacaine and normal saline for postoperative analgesia in breast surgery. *Indian J Clin Anaesth*. 2021;8(1):49–54.

Author biography

Muhammed Shafi C, Consultant Anaesthesiologist

Brejesh Ravi Varma, Assistant Professor

Mangesh Shenoy, Professor & HOD

Salman Mohammed Kutty, Assistant Professor

Cite this article: Shafi C M, Varma BR, Shenoy M, Kutty SM. Assessment of post-operative analgesia in modified radical mastectomy patients using surgical wound irrigation with 0.25% bupivacaine. *Indian J Clin Anaesth* 2021;8(4):507-510.