ORIGINAL ARTICLE

CUMMULATIVE EFFECT OF INCISIONAL INFILTRATION IN ADDITION TO WOUND INSTILLATION, AMONG TWO SESSIONS OF TUMESCENT ANALGESIA IN POSTOPERATIVE MODIFIED RADICAL MASTECTOMY (MRM) PATIENTS

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ABSTRACT: AIMS: This study was conducted to evaluate and compare the efficacy of two sequential sessions of tumescent analgesia in modified radical mastectomy patients for immediate postoperative pain relief. **MATERIALS AND METHODS:** In this prospective randomized controlled study 100 patients treated by MRM for operable breast carcinoma in S.V.R.R.G.G. Hospital and Sri Venkateswara Medical College, Tirupati, were included in the study. They were evaluated for two consecutive sessions of tumescent analgesia. Session I involved infiltration of 20 cc of 0.25% bupivacaine subcutaneously in to the incisional area plus wound instillation of 100 CC of 0.4% xylocaine with adrenaline with 1 mg of butorphanol through the axillary drains. Pain was assessed every 30 minutes by using visual analogue scale (VAS). Pain of VAS-3 was taken as cut off point and session II of wound instillation (100 CC of 0.4% xylocaine with adrenaline with 1 mg of butorphanol through the axillary drains) alone was executed. The efficacy of these two methods of tumescent analgesia was assessed and compared. Statistical analysis was performed using SPSS version. **RESULTS:** Session I tumescent analgesia conferred 9 to 10 hours of pain relief and session II for 7 to 8 hours. **CONCLUSION:** Incisional infiltration of bupivacaine showed cumulative effect and imporved the quality and duration of analgesia in MRM patients in the immediate postoperative period. Tumescent analgesia is a simple and effective means of providing good postoperative pain relief without any major side-effects.

KEYWORDS: Tumescent analgesia, Modified Radical Mastectomy, Bupivicaine, Xylocaine, Butorphanol.

INTRODUCTION: Modified Radical Mastectomy (MRM) is the most common surgical procedure for operable breast malignancies. Based on current incidence rates, 12.4% of women born in the United States at present will develop breast cancer at some time during their lifetime.[1] Postoperative pain has been severe in MRM cases and demands for pain relief are high. Various strategies like non-steroidal anti-inflammatory drugs, opioids, peripheral nerve blocks, wound infiltration with local anaesthetics, offered significant improvement in this aspect. Despite these improvements, several studies reported limited success in providing effective postoperative pain control. The technique of infiltration and irrigation of surgical wound with local anaesthetics has been widely used as a part of multimodal analgesia in plastic reconstructive breast surgery, with remarkable efficacy and without adverse effects.[2],[3]

"Tumescent" – meaning abnormally distended especially by fluids or gas. Tumescent anesthesia (TA) is a distinct form of local anesthesia that employs a large volume of diluents (usually normal saline) containing a very dilute concentration of anesthetic (primarily lidocaine) and vasoconstrictor (epinephrine), as well as other additives (sodium bicarbonate, opioids etc).

The present study was conducted to evaluate the additive effect of infiltration of 20 cc of 0.25% bupivacaine subcutaneously in to the incisional area in the first, among two consecutive sessions of tumescent analgesia, commonly involving wound instillation of 100 CC of 0.4% xylocaine with adrenaline with 1 mg of butorphanol through the axillary drains. Assessment of duration of analgesia, number of analgesic demands and cumulative analgesic requirement for pain relief were done.

MATERIALS AND METHODS: This prospective randomized controlled study was conducted in S.V.R.R. Govt. General Hospital attached to Sri Venkateswara Medical College, Tirupati. Institutional ethics committee approval was obtained. Written informed consent was obtained from the patients.

Inclusion Criteria: Elective MRM patients, American Society of Anesthesiologists' physical status of I and II patients, age between 45 and 60 years.

Exclusion Criteria: Clinically significant cardiovascular, pulmonary, hepatic, renal, neurologic, and psychiatric disease; chronic analgesic drug usage (on oral analgesics for more than a month); major blood loss and unpredictable action of the drug such as continued excessive blood collection into the drains.

Preoperatively, all patients were educated in rating the visual analogue score for pain. Pre-anaesthetic medication consisted of tablet pantoprazole 40 mg and alprazolam 0.5 mg administered orally on the morning of surgery.

A standard general anaesthesia was induced with propofol 2 mg/kg and the opioid used was fentanyl at 2 µg/kg. Trachea was intubated with appropriate sized endotracheal tube, which was facilitated with vecuronium 0.08 mg/kg. Oxygen in nitrous oxide mixture in a ratio of 30: 70, and end tidal concentrations of sevoflurane of 1-2% were maintained throughout the operative period.

At the end of the surgical procedure, two drains, one in the axilla near the axillary vessels and the second in the chest wall below the skin flap (over the pectoral muscles) were placed by the surgeon before closing the surgical incision. After 10 minutes of placement, both drains were connected to the drain bag, so that collected fluid will be removed. Remaining fluid was removed by aspiration, so that the total area of the wound should be filled by the drug.

Session I Tumescent analgesia: After closure of the incision, all patients were subjected to infiltration of 20 cc of 0.25% bupivacaine subcutaneously in to the incisional area. At the same time wound instillation of 100 CC of 0.4% xylocaine with adrenaline with 1 mg of butorphanol was given through the axillary drains and they were blocked for one hour. Pain score at "0" h was noted after extubation and subsequently every 30 min. Pain scores both static visual analog scale (VAS) and dynamic (DVAS, pain on moving the ipsilateral arm) were assessed.

Session II Tumescent analgesia: At a point of time when the patient complains of pain of VAS-3 indicates the termination Session I and onset of Session II. Wound instillation of 100 CC of 0.4% xylocaine with adrenaline with 1 mg of butorphanol alone was given through the axillary drains in this session. The drains were blocked for one hour.

Termination from the study: If patient complains of pain after Session II, patient will be given 100mg of Diclofenac sodium aqueous form through intravenous route. The duration of analgesia was defined from the time of instillation of the drug to the time for the first demand of analgesia.

The efficacy of these two methods of tumescent analgesia was assessed and compared. The number of demands and the total cumulative analgesic requirement were also noted for 24 hrs.

Statistical analysis was performed using SPSS version 13 Chicago IL. Data were expressed as mean values ± SD Normality of distribution was assessed using the Kolmogorov-Smirnov test. Depending on the results, either parametric or nonparametric tests were performed. Normally distributed continuous data were analyzed and compared using the ANOVA. Post-hoc analysis was performed using Bonferroni test. Number of patients receiving "rescue" analgesia, number of analgesic demands was analyzed by using χ^2 test or Fisher's exact test as appropriate.

Fig. 1

RESULTS: The observations made were given in the following tables – 1, diagrams 2 and 3.

Total number of patients 100		
Sl. No.	**Parameter**	**Value (mean±sd)**
1.	Weight in kg	65.68±4.90
2.	Age in years	47±2.17
3.	Session I Duration of blockade (in hours)	9.79±0.81

4.	Session II Duration of blockade (in hours)	7.88±0.56
5.	Length of incission in centimetres	7.5±1.6

Table 1: Demographic data

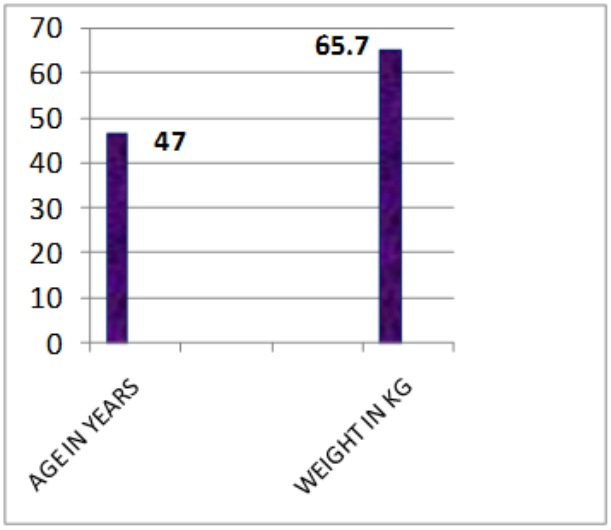

Diagram 1: Mean age & weight

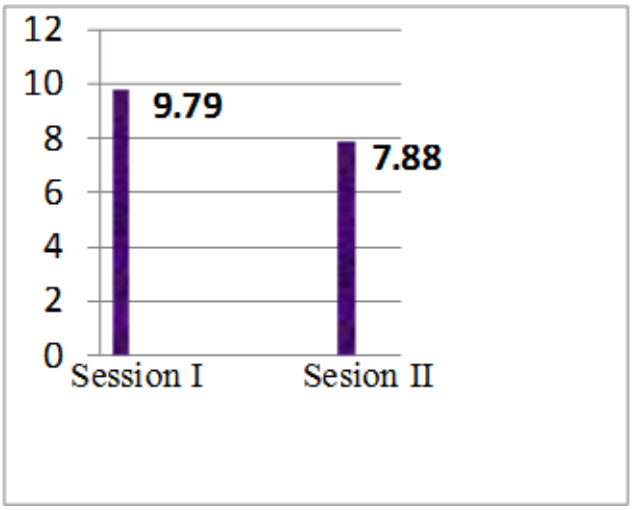

Diagram 2: Mean duration of analgesia in hours

DISCUSSION: Local anaesthetic drugs have become increasingly popular because of their analgesic properties, and lack of opioid-induced adverse effects for treating immediate post-surgical pain. In many of the plastic reconstructive breast procedures, irrigation of the pocket

created for the insertion of the prosthesis with local anesthetics is reported with high levels of satisfaction regarding postoperative pain relief.[4],[5]

The techniques like paravertebral block, brachial plexus block by infraclavicular approach have been tried for postoperative analgesia following mastectomy.[6],[7],[8] Arunakul and Ruksa[9] found that single injection of paravertebral block (PVB) reduced pain scores and obviated opioid consumption in MRM. However, these procedures are laborious and technically challenging. Infiltration of local anaesthetic along the suture line also provides good analgesia.[10],[11],[12] Sidiropoulou and his colleagues[13] in their study found that early postoperative analgesia (4 h) was good with PVB and late postoperative analgesia was good with continuous irrigation and concluded that continuous wound irrigation is as effective as PVB with low pain scores and good patient satisfaction.

The technique of instillation of the drug through drains is well established method of operative analgesia in surgical procedures such as laparoscopic cholecystectomy,[14],[15] abdominal hysterectomy.[16],[17] This is well accepted by the patient and the surgeons.

In a study by Fredman et al.[18] it was seen that after major abdominal surgery repeated wound instillation of 0.25% bupivacaine solution via an electronic patient-controlled analgesia (PCA) device and a double-catheter system did not decrease postoperative pain or opioid requirements. However, there is limited number of studies regarding its use in the MRM procedure.

In a study by Legeby et al.[19] following breast reconstruction surgery, levobupivacaine injected locally every 3 rd hr as a supplement to paracetamol orally, and morphine given by PCA resulted in improved pain relief at rest and during mobilization compared with placebo.

Talbot et al.[20] in their study to determine the effect of local anaesthetic irrigation of axillary drains on postoperative pain following a modified Patey mastectomy felt it did not appear to offer any contribution for postoperative analgesia in some of their patients.

CONCLUSION: Wound instillation with local anaesthetics is a simple, effective and inexpensive means of providing good analgesia for patients following the MRM procedure without any major side effects. Infiltration of 20 cc of 0.25% bupivacaine subcutaneously in to the incisional area in addition to wound instillation of 100 CC of 0.4% xylocaine with adrenaline with 1mg of butorphanol through the axillary drains gives the additive effect in terms of quality and duration of pain relief. This technique of providing postoperative analgesia can be included in the armamentarium of multimodal analgesia.

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