Lignocaine Versus Ropivacaine Infiltration for Postpartum Perineal Pain

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Abstract

Background: Millions of women worldwide undergo postpartum perineal repair under local infiltration. Inadequate postpartum pain management can negatively impact a mother’s physical and psychological recovery. Aims: To study and compare the analgesic effect and maternal satisfaction with lignocaine versus ropivacaine infiltration for postpartum perineal pain relief. Materials and Methods: After clearance from the Institutional Ethics Committee, a double-blind prospective randomized study carried out on 100 parturients of aged 18–40 years who had spontaneous vaginal delivery, comparing 1% lignocaine and 0.75% ropivacaine infiltration for the repair of selective episiotomy or perineal injury. Time of the first analgesic (TFA) demand, maternal satisfaction at 24 h, and visual analog scale (VAS) pain score were studied. Statistical Analysis: Chi-square test and Student’s t-test were used and P < 0.05 was considered as significant. Results: VAS pain score was significantly lower at 2 and 4 h in ropivacaine group versus lignocaine group (P < 0.0001). Significantly, longer TFA (10.2 ± 1.54 vs. 2.20 ± 0.44 h, P < 0.0001) and higher percentage of maternal satisfaction (86% vs. 44%) were observed in ropivacaine as compared to lignocaine group (P < 0.0001). Conclusions: Prolonged analgesia and higher rate of maternal satisfaction were found when ropivacaine infiltration was used for perineal repair as compared to lignocaine.

Keywords: Perineal pain, postpartum, ropivacaine

Introduction

Episiotomy is the most frequent obstetric procedure[1] done to increase the introitus to enhance safe vaginal delivery. Because of distressing perineal pain, mother finds difficulty in sitting, walking, and also breastfeeding. This may become as chronic pain and affects either physical or mental function negatively.[2-4] Traditionally, lignocaine infiltration has been used before performing episiotomy, but its shorter duration of action may lead to early analgesic intervention.[5] Ropivacaine has been widely used for local infiltration but less for postpartum perineal infiltration.[6-9] Hence, we decided to compare the lignocaine and ropivacaine for postpartum perineal repair to observe maternal analgesia and satisfaction.

Materials and Methods

After the Ethics Committee approval and written informed consent, a double-blind randomized prospective clinical study was carried out on 100 primiparous women who had spontaneous vaginal delivery, comparing 1% lignocaine and 0.75% ropivacaine for the repair of selective episiotomy or perineal injury. Consecutive primiparous women who had given birth vaginally and had an episiotomy or a perineal tear were included in the study. Exclusion criteria included patients refusal, allergy to study drug, chronic analgesic user before and during pregnancy, drug dependence, and major postpartum complications.

After explaining the procedure and the nature of safety of the procedure, a written informed consent was obtained before established labor. A 20-gauge intravenous access was established for all the patients included in the study.

Patients selected for the study were randomly allocated into two groups using a slip in box technique to receive the drugs.
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either as a lignocaine or ropivacaine. Following aseptic procedure, Group L (control group) received 10 ml of 1% lignocaine and Group R received 10 ml of ropivacaine 0.75%. After negative aspiration concealed local anesthetic agent was used to infiltrate vaginal skin and perineum for repair. The patients were familiarized with the concept of visual analog scale (VAS) for pain assessment (0 = no pain and 10 = worst possible pain). During injection and postprocedure, the patient was monitored for pulse, blood pressure, and pain score (VAS) until 24 h.

Postprocedure, patients were shifted to the postnatal ward for observation. Duration of effective analgesia was defined as the time of first analgesic (TFA) demand and time of rescue analgesic (tablet ibuprofen 400 mg) was noted in both the groups. Maternal satisfaction was noted as poor, very poor, good, and very good satisfaction with ability to carry out their basic daily activities at 24 h.[9] All patients were observed and treated for any side effects and complications.

Statistical analysis
Numerical data were analyzed using Student’s t-test. Categorical data were analyzed by Chi-square test. Results were expressed as mean ± standard deviation (SD), number or percentage (%). Results were considered significant if \( P < 0.05 \).

RESULTS
During the study period, 450 of 1250 women with a vaginal delivery had episiotomies (36%), and 25 patient had various degrees of perineal tears (2%). Only 100 patients fulfilling the inclusion criteria were randomly assigned to one of the two groups (Group L = 50; Group R = 50). Exclusions from the study were either due to maternal exhaustion, severe postpartum hemorrhage, or lack of nursing staff at night. Demographically, both the groups were comparable [Table 1]. In both groups, all the patients had selective episiotomy except those who sustained perineal tears during delivery. Instrumental (forceps/vacuum) deliveries occurred in 18 (36%) patients in both groups. There was no significant difference between the groups in severity of perineal pain during 1st h. During this period, the median VAS score was between zero and one in both groups. At 2 and 4 h, lignocaine group had significantly higher VAS score than ropivacaine group (4 vs. 2) and (6 vs. 3), respectively [Table 2]. At the 8th h, the mean VAS was below 4 in ropivacaine group while the lignocaine group had already received rescue analgesic following severe pain. There was no significant difference statistically in VAS score at the time of analgesic demand in both groups [Table 2]. TFA for the Group (R) was 10.2 ± 1.54 h as compared to Group (L) was 2.20 ± 0.44 h [Table 3]. The difference was statistically significant \( (P < 0.0001) \). We observed significantly higher percentage of maternal satisfaction in Group R (86% vs. 15%) as compared to Group L with \( P < 0.0001 \) [Table 4]. No complication or adverse effects observed.

DISCUSSION
We studied and compared lignocaine and ropivacaine infiltration for postpartum perineal repair. From our study, it can be elicited that ropivacaine provides prolonged analgesia with higher maternal satisfaction as compared to lignocaine. Local anesthetics have been increasingly popular for management of postoperative pain for their good analgesic effects and simple, safe, and inexpensive properties.\(^{[10]}\)

Lignocaine is the most commonly used anesthetic agent for local infiltration. However, shorter duration of analgesia is the major problem associated with lignocaine which may lead to larger consumption of oral analgesic by mother.\(^{[5,9]}\) Until date, bupivacaine is also being used for local infiltration, but it has toxic potential for higher plasma concentration on accidental intravascular injection. Thereafter ropivacaine, the pure S(-) enantiomer of propivacaine emerged as safer alternative for bupivacaine.\(^{[6,7]}\) Ropivacaine has been shown to be superior to lignocaine for various reasons.\(^{[8,9,11]}\) It reduces postoperative opioid consumption after hysteroscopy, thyroidectomy, hysteroscopy, and laparoscopic surgeries.\(^{[12-15]}\) In addition, it also useful in suppression of inflammation, and the prevention

| Table 1: Patient’s characteristics |
|----------------------------------|
| Parameters                      | Mean±SD \( (n=50) \) | \( P \) |
|----------------------------------|
| Age (years)                     | Group L                  | 25.8±4.6 | Group R                  | 24.8±4.4 | NS |
| Weight (kg)                     | Group L                  | 62.6±4.8 | Group R                  | 60.4±4.2 | NS |

NS=Nonsignificant, SD=Standard deviation

| Table 2: Mean pain score on visual analogue scale |
|-----------------------------------------------|
| Time                                          | Mean±SD \( (n=50) \) | \( P \) |
|-----------------------------------------------|
| During repair                                 | Group L                  | 0      | Group R                  | 0       | 0   |
| 1 h postrepair                                | 0                        | 0      | 0                        | 0       | 0   |
| 2 h postrepair                                | 4.0±0.44                 | 2.0±0.52 | <0.0001                   |
| 4 h postrepair                                | 6.0±0.76                 | 3.0±0.82 | <0.0001                   |
| At demand for analgesic                       | 5.3±0.58                 | 5.5±0.58 | 0.088                     |

Data represented in mean±SD. SD=Standard deviation

| Table 3: Mean time for analgesic demand |
|----------------------------------------|
| Time interval (h)                      | Group L \( (n=50) \)    | Group R \( (n=50) \) | \( P \) |
|----------------------------------------|
| Time interval (h)                      | 2.2 (0.44)               | 10.2 (1.54)           | <0.0001                      |

| Table 4: Maternal satisfaction at 24 h |
|--------------------------------------|
| Grade                                | Group L \( (n=50) \) (%) | Group R \( (n=50) \) (%) | \( P \) |
|--------------------------------------|
| Good or very good                    | 22 (44)                  | 43 (86)                | <0.001                      |
| Poor or very poor                    | 28 (55)                  | 7 (15)                 | <0.001                      |

Data in numbers and (percentages)
of secondary hyperalgesia.\textsuperscript{[11,16,17]} It can be easily administered by staff nurse, obstetrician, or anesthetist.

Numerous studies have been carried out to evaluate the analgesic efficiency of ropivacaine in wound infiltration.\textsuperscript{[16-22]} The usefulness of ropivacaine (0.75\%) infiltration has been reported for postepisiotomy pain relief in the study by Bolandard et al., and found prolonged analgesia and TFA demand was 10 h which is concordant with this study.\textsuperscript{[18]} Another study by Schinkel et al., who did not demonstrate any significant difference in analgesia with ropivacaine, lignocaine, or saline.\textsuperscript{[19]} Patients in that study received epidural analgesia which may be the possible explanation. However, they found nonsignificant reduction in oral analgesic consumption during 24 h following delivery.

Moffitt et al. observed prolonged analgesic effect with ropivacaine (12 h) given by subcutaneous infiltration as compared to lignocaine (2 h).\textsuperscript{[20]} We also found significantly prolonged analgesia with ropivacaine as compared to lignocaine (10 vs. 2 h). Gutton et al. compared lignocaine (10 mg/ml) with ropivacaine (7.5 mg/ml) for postepisiotomy infiltration and observed prolonged analgesia and improved maternal satisfaction with ropivacaine as opposed to lignocaine.\textsuperscript{[10]} We also observed that a significantly higher proportion of mother experienced satisfaction with ropivacaine infiltration as compared to lignocaine ($P < 0.0001$).

Various mechanisms are explained for prolonged duration of ropivacaine. Ropivacaine displays biphasic vasomotor response with early vasoconstriction followed by vasodilation which explains prolonged local action.\textsuperscript{[21]} Cederholm et al. also demonstrated prolonged dermal analgesia with ropivacaine as compared to bupivacaine.\textsuperscript{[22]} In addition, ropivacaine exerts antioxidant, early anti-inflammatory effect with reduction in pain sensitization peripherally.\textsuperscript{[16,17]} Other interesting factor about ropivacaine is that lesser dermal injection pain as compared to lignocaine, this may be beneficial for patients cooperation while infiltrating.\textsuperscript{[20]}

Higher rate of maternal satisfaction with their ability to carry out basic daily activities in ropivacaine group was sustained over prolonged period. Early discharge due to better pain relief helps the mother and child bonding.\textsuperscript{[23]}

The limitation of this study is that we did not assess pain characteristics and VAS after 24 h due to limited manpower. However, the higher maternal satisfaction rate in ropivacaine group can explain the better quality of analgesia with this drug. Another limitation of our study is that we did not measure the total analgesic supplements taken postoperatively by the groups. It was hypothesized that the total analgesic requirements would have been lower in Group R because of the prolonged analgesic demand. To obtain the definite result, we suggest that the total postoperative analgesic requirements be measured between the groups.

**Conclusions**

Due to combination of interesting local anesthetic properties including prolonged analgesia with higher maternal satisfaction, ropivacaine appears to be a better option for lignocaine in postpartum perineal repair.

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**Conflicts of interest**

There are no conflicts of interest.

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