

## Comparative evaluation of efficacy of 0.1% levobupivacaine with fentanyl and 0.1% Ropivacaine with fentanyl during Labour epidural analgesia

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### Abstract

**Background:** Epidural bupivacaine is the most widely used local anaesthetic agent for labour analgesia. The present study compared 0.1% levobupivacaine with fentanyl vs 0.1% ropivacaine with fentanyl in labour epidural analgesia. **Materials & Methods:** Group I patients received 0.1% levobupivacaine with 2 µg/ml fentanyl and group II patients received 0.1% ropivacaine with 2 µg/ml fentanyl. Each group had 20 patients. **Results:** The mode of delivery found was instrument-assisted vaginal delivery seen in 8 in group I and 6 in group II, caesarean seen 7 in group I and 8 in group II and normal vaginal delivery seen 5 in group I and 6 in group II. The mean total number of manual rescue boluses was 0.68 in group I and 1.05 in group II and first requirement of manual rescue bolus was 2.65 in group I and 3.14 in group II and demand boluses per hour was 0.36 in group I and 0.08 in group II. The difference was significant ( $P < 0.05$ ). **Conclusion:** Levobupivacaine and ropivacaine with fentanyl were equally effective in labour epidural analgesia.

**Keywords:** Epidural analgesia, Levobupivacaine, Ropivacaine

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### Introduction

Epidural bupivacaine is the most widely used local anaesthetic agent for labour analgesia.

Fentanyl is frequently used in combination with bupivacaine, as its use permits effective analgesia using concentrations of bupivacaine that would otherwise be sub-therapeutic. This approach is associated with a lower incidence of motor blockade and instrumental delivery compared with more concentrated bupivacaine-only solutions. Ropivacaine and levo-bupivacaine have challenged the position of bupivacaine as the drug of choice for labour analgesia. These agents, which exist purely in the L-isomeric form, may be suitable alternatives to bupivacaine for labour analgesia, as they exhibit a lower threshold for cardiac and neurological toxicity compared with bupivacaine. In addition, when compared in equal concentrations in labour, ropivacaine produces less motor block than bupivacaine, whether combined with fentanyl or sufentanil. An ideal labor analgesic technique should provide adequate and satisfactory analgesia without any motor blockade or adverse maternal and fetal effects. Among the variety of labor analgesia techniques, epidural analgesia remains gold standard for providing pain relief during labor. Even though combined spinal epidural analgesia (CSEA) is

considered as a safe technique with greater maternal satisfaction, there were no differences in maternal satisfaction, mode of delivery, and ability to ambulate between CSEA and epidural techniques[1-4]. Long-acting local anaesthetics like levobupivacaine and ropivacaine have been increasingly used along with adjuvants such as opioids to provide safe, effective and adequate pain relief during labour. The present study compared 0.1% levobupivacaine with fentanyl vs 0.1% ropivacaine with fentanyl in labour epidural analgesia.

### Materials & methods

The present study was conducted among 40 labouring parturients. All enrolled patients were informed regarding the study and their written consent was obtained. Data such as name, age, etc. was recorded. Patients were divided into 2 groups. Each group had 20 patients. Group I patients received 0.1% levobupivacaine with 2 µg/ml fentanyl and group II patients received 0.1% ropivacaine with 2 µg/ml fentanyl. Total number of manual rescue boluses, first requirement of manual rescue bolus, demand boluses per hour and type of delivery was recorded. Results thus obtained were subjected to statistical analysis. P value  $< 0.05$  was considered significant[5-7]

### Results

**Table 1: Distribution of patients**

Groups	Group I	Group II
Agent	0.1% levobupivacaine+ fentanyl	0.1% ropivacaine+ fentanyl
Number	20	20

Table 1 shows distribution of patients into group I and II

**Table 2: Comparison of mode of delivery**

Mode	Group I	Group II	P value
Instrument-assisted vaginal delivery	8	6	0.15
Caesarean	7	8	
Normal vaginal delivery	5	6	

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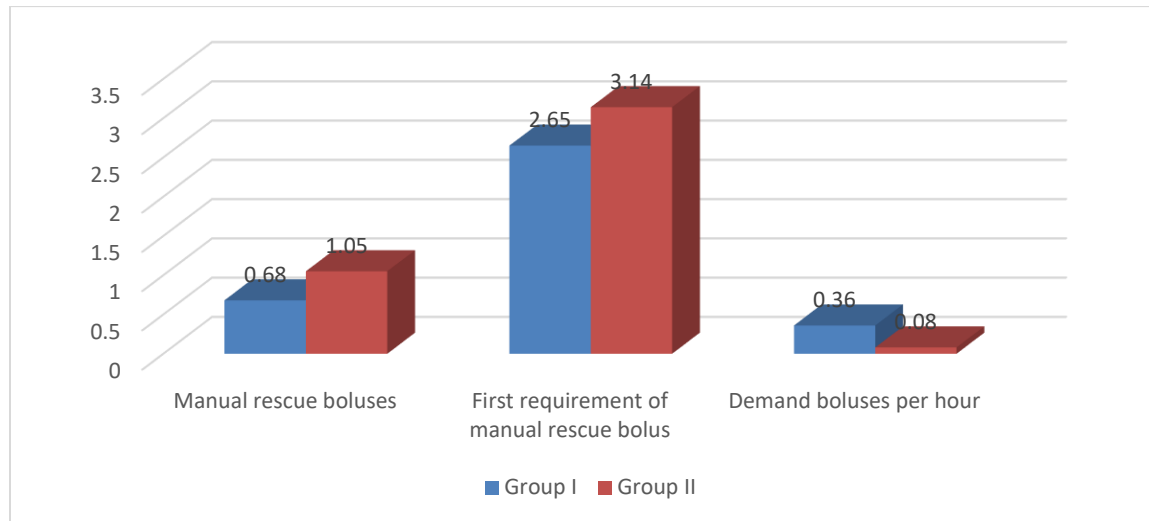
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Table 2 shows that mode of delivery found was instrument-assisted vaginal delivery seen in 8 in group I and 6 in group II, caesarean seen 7 in group I and 8 in group II and normal vaginal delivery seen 5 in group I and 6 in group II. The difference was non-significant ( $P > 0.05$ ).

**Table 3: Comparison of parameters**

Parameters	Group I	Group II	P value
Manual rescue boluses	0.68	1.05	0.01
First requirement of manual rescue bolus	2.65	3.14	0.05
Demand boluses per hour	0.36	0.08	0.02

Table 3, Fig 1 shows that mean total number of manual rescue boluses was 0.68 in group I and 1.05 in group II and first requirement of manual rescue bolus was 2.65 in group I and 3.14 in group II and demand boluses per hour was 0.36 in group I and 0.08 in group II. The difference was significant ( $P < 0.05$ ).



**Fig 1: Comparison of parameters**

## Discussion

Epidural bupivacaine provides excellent sensory block and has been used for labor analgesia for many years [8]. However, concern about its cardiac toxicity and the intensity of motor block has led to the investigation of other agents. Ropivacaine has been associated with reduced incidence of operative vaginal delivery and less motor block when compared to bupivacaine. Recently, it has been shown that ropivacaine appears equipotent to bupivacaine, less cardiotoxic and neurotoxic and seem to be more suitable agent for pain relief in laboring women. Lee et al [1] found no significant differences in the mode of delivery, duration of labour and foetal outcomes in the study comparing low concentration of ropivacaine (0.08%) and levobupivacaine (0.06%) with fentanyl (2 mcg/ml) for labour epidural analgesia. However, the study was besieged with the disadvantages of more frequent top ups in the levobupivacaine group and significantly increased total amount of local anaesthetic consumption in the ropivacaine group. The present study compared 0.1% levobupivacaine with fentanyl vs 0.1% ropivacaine with fentanyl in labour epidural analgesia. In present study, group I patients received 0.1% ropivacaine with 2 µg/ml fentanyl and group II patients received 0.1% ropivacaine with 2 µg/ml fentanyl. Each group had 20 patients. Purdie et al [10] compared the relative potencies and clinical characteristics of epidural ropivacaine and levobupivacaine in labour using patient-controlled epidural analgesia (PCEA). In a randomised double-blinded study, 60 ASA I or II primigravidae requesting epidural analgesia in early labour were allocated to receive either 0.1% ropivacaine with fentanyl 0.0002% or 0.1% levobupivacaine with 0.0002% fentanyl via a patient-controlled analgesia pump. Analgesia was established with 15 ml of study solution and maintained using 5-ml boluses of study solution

with a 5-min lockout interval. There were no significant differences in onset time, duration and quality of analgesia, motor and sensory blockade, local anaesthetic consumption, mode of delivery, neonatal outcome or maternal satisfaction between the groups. They concluded that 0.1% ropivacaine with 0.0002% fentanyl and 0.1% levobupivacaine with 0.0002% fentanyl are clinically indistinguishable for labour analgesia and appear pharmacologically equipotent when using PCEA. We found that mode of delivery found was instrument-assisted vaginal delivery seen in 8 in group I and 6 in group II, caesarean seen 7 in group I and 8 in group II and normal vaginal delivery seen 5 in group I and 6 in group II. Chethanananda et al [11] in their study sixty parturients requesting for labor analgesia were divided into two groups. Group B ( $n = 30$ ) received racemic bupivacaine (0.0625%) and fentanyl 2 µg/ml of 10 ml and Group R ( $n = 30$ ) received ropivacaine (0.1%) and fentanyl 2 µg/ml. In both groups, the drug was given in 5 ml fractionated doses at 5 min interval. Parturients not experiencing analgesia within 15 min of initial bolus were supplemented with additional 5 ml of the same concentration of the solution. Epidural analgesia was maintained by timed top ups at the end of 90 min with the dosage equal to the initial dose of the drug. Duration of labor analgesia, motor block, visual analog scale, maternal hemodynamic parameters, mode of delivery, and maternal satisfaction was assessed. Both drugs were equally effective clinically. Maternal demographic characteristics were comparable. There were no statistically significant differences in visual analog pain score, highest sensory block, maternal satisfaction, mode of delivery, total dose of LAs during labor and motor block at delivery between the groups. We found that mean total number of manual rescue boluses was 0.68 in group I and 1.05 in group II and first requirement of manual rescue bolus was 2.65 in group I and 3.14

in group II and demand boluses per hour was 0.36 in group I and 0.08 in group II. Owen et al [12] studies showed that motor block was similar in bupivacaine and ropivacaine groups. In contrary, other studies shows that ropivacaine produces less motor blockade with shorter duration of action as compared to bupivacaine at higher concentrations.

#### Conclusion

Authors found that levobupivacaine and ropivacaine with fentanyl were equally effective in labour epidural analgesia.

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**Conflict of Interest:** Nil

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