



## A Study to Compare the Effectiveness of 0.2% Ropivacaine and 2mcgs/ml Fentanyl with 0.125% Bupivacaine and 2mcg/ml Fentanyl for Epidural Labour Analgesia

Authors

**Dr Sangeetha. A G<sup>\*1</sup>, Prof. Dr N.K.Sekaran, M.D.<sup>2</sup>**

<sup>\*1</sup>Final year Post Graduate, Dept of Anaesthesiology, RMMCH, Chidambaram-608002, Tamil Nadu, India

<sup>2</sup>Professor, Dept of Anaesthesiology, RMMCH, Chidambaram-608002, Tamil Nadu, India

### Abstract

**Introduction:** Most consistent effective method to alleviate labour pain is lumbar epidural analgesia. Bupivacaine and Ropivacaine in lower concentrations are the most commonly used local anaesthetics. Opioids like Fentanyl are usually combined with local anaesthetics to improve its potency.

**Materials and Methods:** This study was conducted on 60 parturients of Rajah Muthiah Medical College. The study population was divided into 2 groups of 30 each randomly. Group 1 received Ropivacaine with fentanyl and Group 2 received Bupivacaine with fentanyl. Sensory and motor parameters are monitored along with maternal and foetal outcome.

**Results & Conclusion:** Ropivacaine group showed earlier onset of sensory blockade and shorter duration of labour than Bupivacaine group.

**Keywords:** Bupivacaine, Ropivacaine, fentanyl, epidural analgesia.

### Introduction

Various methods have been made to alleviate labour pain. It is now well recognized that nearly consistent effective method to alleviate pain in labour is lumbar epidural analgesia.

Epidural bupivacaine in very low concentrations provides excellent analgesia for labour and delivery and it remains the most widely used anaesthetic in obstetric analgesia<sup>1</sup>. However disadvantages include potential for motor blockade and cardiovascular toxicity. Several studies suggest that Ropivacaine produced less motor blockade and less cardiac side effects than bupivacaine. However relative potency studies show Ropivacaine is significantly less effective than bupivacaine with potency ratio of 0.6<sup>2</sup>.

Fentanyl a high potent opioid is a suitable analgesic drug combined with local anaesthetics and used in labour since many decades to improve its potency and to minimise side effects.

### Materials and Methods

This study of epidural labour analgesia was conducted on 60 full term labouring women of Rajah Muthiah Medical College & Hospital, Chidambaram. The study population was divided into two groups of 30 each randomly.

Group 1 received 0.2% Ropivacaine with 2mcgs/ml fentanyl.

Group 2 received 0.125% Bupivacaine with 2mcgs/ml fentanyl.

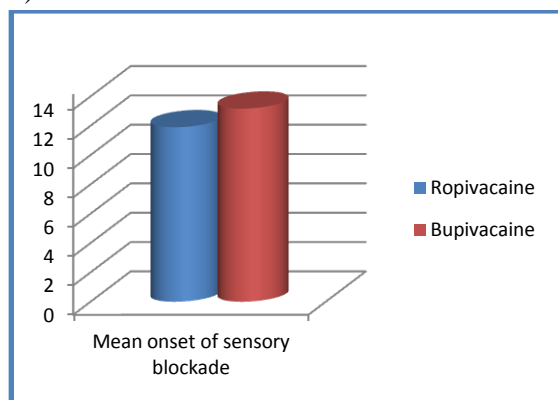
- With the patient in left lateral position, under aseptic precautions L<sub>2</sub>-L<sub>3</sub> interspace was identified and skin infiltration was done with 1ml of 2% lignocaine. Using a 18 G Tuohy needle and 'loss of resistance to air technique' the epidural space was identified.
- After confirmation by negative aspiration test 18G epidural catheter was inserted and 5cms kept inside the epidural space. The catheter was tapped firmly to the back. The patient was turned to supine position. After negative aspiration of blood and CSF the initial dose of 10ml of LA solution was given in divided doses.
- Intermittent epidural boluses started after 1 hr. 5ml of drug solution every 30mins. The following observations were monitored.

- ✓ Time of onset of analgesia.
- ✓ Level of sensory blockade.
- ✓ Assessment of motor blockade (by modified Bromage scale).
- ✓ Level of sedation (Michigan sedation scale).
- ✓ Effectiveness of pain relief (visual analog score).
- ✓ Duration of labour & outcome (labour natural, instrumental, caesarean section).
- ✓ Maternal parameters (pulse rate, BP) & Neonatal outcome (Apgar score).
- ✓ Complications/side effects if any.

## Results

### Onset of Sensory Blockade

**Graph 1** Mean onset of sensory blockade (in mins)



P value 0.002 – statistically significant

The anova analysis between two groups showed statistically significant early onset of sensory blockade in Ropivacaine group compared to Bupivacaine group.

### Level of Motor Blockade

There is no statistical difference in motor blockade between two groups based on chi square analysis.

**Table 1** Level of Motor Blockade

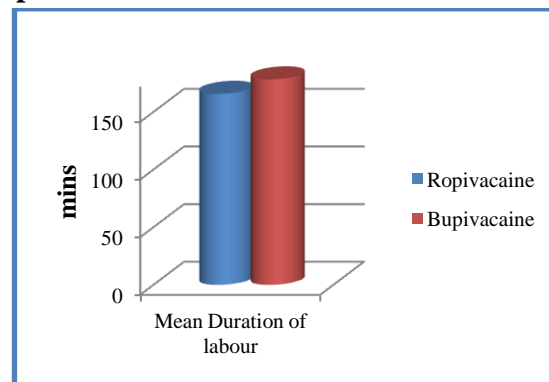
Modified Bromage scale	Group 1(Ropivacaine) (n)	Group 2(Bupivacaine) (n)
0	5	11
1	21	15
2	4	4

P value 0.19 – not significant

### Duration of Labour

Based on anova analysis duration of labour is significantly reduced in Ropivacaine group compared to Bupivacaine group.(p-0.05)

**Graph 2** Mean Duration of Labour



## Discussion

Lumbar epidural analgesia is an effective method for pain relief in labour<sup>11</sup>. Bupivacaine and Ropivacaine in lower concentrations are the most commonly used local anaesthetics for epidural labour analgesia. Opioids like fentanyl are usually combined with local anaesthetics to improve its potency<sup>1</sup>.

Polley et al<sup>2</sup>, in 1999 conducted a study to find the relative potencies of Bupivacaine and Ropivacaine for epidural labour analgesia. Up-down sequential allocation technique was used for drug

concentration. They concluded that Ropivacaine is 0.6% less potent than Bupivacaine.

Parpaglioni R et al<sup>3</sup>, in 2000 conducted a study comparing 0.1% Ropivacaine with 0.0625% Bupivacaine both combined with sufentanyl 10 mcgs/ml for epidural labour analgesia on 190 full term labouring women. They concluded that Ropivacaine group produced prolonged analgesia. No significant changes seen in onset & quality of analgesia, maternal outcome and ability to ambulate between two groups. However in our study onset of sensory blockade is significantly earlier in Ropivacaine group (p-0.002.)

There are many studies showing that Ropivacaine produces significantly lesser blockade than Bupivacaine<sup>4,5</sup>. Grey C et al<sup>6</sup>, in 2000 conducted a study in 50 labouring women for patient controlled epidural analgesia comparing 0.125% Ropivacaine and 0.125% Bupivacaine. They concluded that Ropivacaine produced significantly less motor blockade than Bupivacaine. However several studies are there supporting that there is no difference in level of motor blockade. Dresner et al<sup>47</sup>, and Parpaglioni et al studies concluded that at equi analgesic concentrations there is no significant difference in level of motor blockade. Our study too concludes the same.

Lee BB et al<sup>7</sup>, conducted a study in 2004 on 350 labouring women comparing 0.125% Ropivacaine and 0.125% Bupivacaine combined with fentanyl 2mcgs/ml. and concluded that Ropivacaine shortens first stage of labour. Neha et al<sup>8</sup>, meta-analysis study conducted in 2012 comparing 0.125% of both drugs infer that no difference is seen on duration of labour (first and second stage). In our study the duration of labour is significantly less in Ropivacaine group (p-0.05).

In our study we infer that epidural analgesia has no effect on maternal and foetal outcome. Many studies infer the same<sup>7,8</sup>.

### Conclusion

We conclude that at equi analgesic concentrations Ropivacaine is superior to Bupivacaine with regards to onset of sensory blockade and duration

of labour, with no significant significant difference in motor blockade.

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