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A randomized comparative study of 0.1% levobupivacaine with fentanyl vs 0.1% ropivacaine with fentanyl

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Abstract

Background: Pregnant women experience severe labor pain which is the leading cause of stress and anxiety. The present study compared 0.1% ropivacaine and 0.1% levobupivacaine with 2 µg/ml fentanyl as a patient controlled epidural analgesia.

Materials and Methods: 30 labouring parturients were divided into 2 groups of 15 each. Group I patients received 0.1% ropivacaine with 2 µg/ml fentanyl and group II patients received 0.1% levobupivacaine with 2 µg/ml fentanyl as epidural solutions via PCEA pump infusions.

Results: Mode of delivery found to be caesarean seen in 5 in group I and 7 in group II, instrument-assisted vaginal delivery seen 8 in group I and 6 in group II and normal vaginal delivery seen 7 in group I and 7 in group II. The difference was non-significant ($P > 0.05$). Demand boluses per hour was 0.08 in group I and 0.36 in group II, mean total number of manual rescue boluses was 1.02 in group I and 0.61 in group II and first requirement of manual rescue bolus was 3.10 in group I and 2.60 in group II. The difference was significant ($P < 0.05$).

Conclusion: Both bupivacaine and ropivacaine produced equivalent analgesia with fentanyl for labor.

Keywords: Fentanyl, ropivacaine, levobupivacaine

Introduction

In pregnancy stress and anxiety is linked with labor pain [1]. The cause of fetal and mother hypoxemia is the result of hyperventilation and subsequently enhanced release of adrenaline usually causing painful uterine contractions. Labor analgesia is responsible for reducing labor pain and increasing fetal as well as maternal outcome [2]. Labor analgesia should be able to deliver sufficient and suitable analgesia without any motor blockade [3]. There should be no complication in baby and in mother. There are lots of techniques for labor analgesia. Epidural analgesia is widely and extensively used among all in labor pain. It is evident that combined spinal epidural analgesia (CSEA) is regarded as a safe technique but is comparable with epidural analgesia in terms of maternal satisfaction and mode of delivery [4].

Both levobupivacaine and ropivacaine are long-acting local anaesthetics and are widely used with adjuvants such as opioids. Its function is to provide safe, effective and adequate pain relief during labour [5]. Lee *et al.* [6] 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% ropivacaine and 0.1% levobupivacaine with 2 µg/ml fentanyl as a patient controlled epidural analgesia.

Materials and Methods

The present study was conducted among 30 labouring parturients. All enrolment of subjects in the study was done after they agreed to participate.

All relevant information of patients were recorded in case history proforma following which all were classified randomly into 2 groups containing 15 each. Group I patients received 0.1% ropivacaine with 2 µg/ml fentanyl and group II patients received 0.1% levobupivacaine with 2 µg/ml fentanyl as epidural solutions via PCEA pump infusions. Parameters such as incidence of instrumental AVD, VAS score, degree of motor blockade and total epidural drug consumption was noted.

Data of the study was entered in MS excel sheet for statistical analysis, where suitable tests were applied to obtained significant p value.

Results

Table 1: Distribution of patients

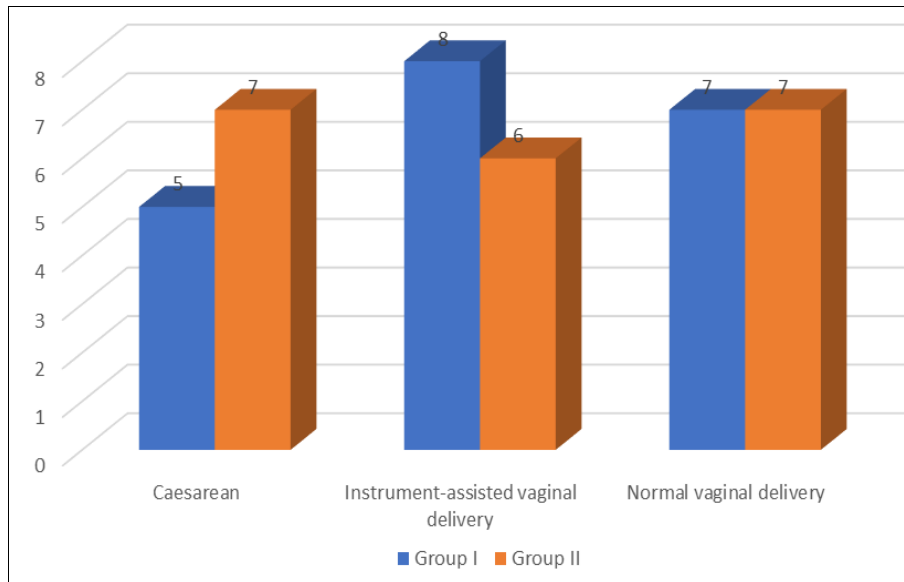
Groups	Group I	Group II
Agent	0.1% ropivacaine +2 µg/ml fentanyl	0.1% levobupivacaine + 2 µg/ml fentanyl

Table 1 shows distribution of patients into group I and II based on agent used.

Table 2: Mode of delivery in all groups

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

Table 2, graph 1 shows that mode of delivery found to be caesarean seen in 5 in group I and 7 in group II, instrument-assisted vaginal delivery seen 8 in group I and 6 in group II and normal vaginal delivery seen 7 in group I and 7 in group II. The difference was non-significant ($P > 0.05$).



Graph 1: Mode of delivery in all groups

Table 3: Comparison of parameters

Parameters	Group I	Group II	P value
Demand boluses per hour	0.08	0.36	0.01
Mean total number of manual rescue boluses	1.02	0.61	0.02
First requirement of manual rescue bolus	3.10	2.60	0.05

Table 3 shows that demand boluses per hour was 0.08 in group I and 0.36 in group II, mean total number of manual rescue boluses was 1.02 in group I and 0.61 in group II and first requirement of manual rescue bolus was 3.10 in group I and 2.60 in group II. The difference was significant ($P < 0.05$).

Discussion

Neuraxial techniques have been considered as the gold standard modality for labour analgesia.⁷ In spite of the superior analgesia and improved safety of epidural labour analgesia, it has been associated with maternal and foetal adversative effects including extension of labour, higher incidence of instrumental assisted vaginal delivery (AVD), reduced ambulation mainly due to varying degrees of motor block especially with the use of higher concentrations of local anaesthetics. Research found that with epidural bupivacaine, a superior sensory block is achieved. Thus, it is extensively used for labor analgesia^[8]. However, concern about its cardiac toxicity & the intensity of motor block has lead to the investigation of other agents. Ropivacaine has been associated with less incidence of operative vaginal

delivery and less motor block when compared to bupivacaine^[9]. Of late, it has been shown that ropivacaine appears equipotent to bupivacaine, less cardiotoxic and neurotoxic & appear to be more appropriate agent for pain relief in laboring women^[10]. The present study compared 0.1% ropivacaine and 0.1% levobupivacaine with 2 µg/ml fentanyl as a patient controlled epidural analgesia.

In present study, mode of delivery found to be caesarean seen in 5 in group I and 7 in group II, instrument-assisted vaginal delivery seen 8 in group I and 6 in group II and normal vaginal delivery seen 7 in group I and 7 in group II. Chuttani *et al.*^[11] involved 60 laboring parturients in their study which were divided into groups receiving 0.1% ropivacaine with 2 µg/ml fentanyl or 0.1% levobupivacaine with 2 µg/ml fentanyl. Data showed that there was 43.3% and 30% incidence of instrumental AVD in levobupivacaine group and in ropivacaine group respectively which was found to be non-significant. It was found that maternal pain score (VAS), total epidural drug consumption and foetal APGAR scores were comparable in both groups.

We found that demand boluses per hour was 0.08 in group I and 0.36 in group II, mean total number of manual rescue

boluses was 1.02 in group I and 0.61 in group II and first requirement of manual rescue bolus was 3.10 in group I and 2.60 in group II. Chethanananda *et al.* [12] conducted a study on 60 parturients classified into group B which received 0.0625% racemic bupivacaine and fentanyl 2 µg/ml of 10 ml and group R received 0.1% ropivacaine 0.1% and fentanyl 2 µg/ml. Results of the study showed that duration of labor analgesia, motor block, VAS, mode of delivery, maternal parameters and maternal satisfaction was assessed both groups were equally effective. No difference in any parameter was observed.

The limitation of the study is short sample size.

Conclusion

Authors found that both bupivacaine and ropivacaine produced equivalent analgesia with fentanyl for labor.

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