Research Article

Epidural labor analgesia, a comparative study, ropivacaine 0.2% verses bupivacaine 0.125%

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Abstract

Background: Epidural labor analgesia is an attractive pain reliving technique in the labor. The parturients remain pain free, comfortable and mobile and can co-operate in labour in very good manner and enjoy the birth of their baby instead of suffering from agonizing pain of labor. We conducted a study at Jilla Hospital Aurangabad on the two different drugs i.e. Inj. Bupivacaine in concentration of 0.125% and Inj. Ropivacine in concentration of 0.2% with added Inj. Fentanyl 20 µg. **Objectives:** The purpose of present study is to compare analgesic potency and the level of motor blocked of the Ropivcaine 0.2% with Bupivacaine 0.125% in labor analgesia. **Material and Methods:** 70 parturients were included in study 35 each group. Epidural catheter (Portex) was placed in L3-4 to L5- S1 space with loss of resistance (LOR) to 0.9% saline was used to detect the space. Test dosing with Inj Lidocaine with Adrenaline 3 ml was given and a bolos dose of the study solution in volume of 8 to 10 ml with Inj fentanyl 20 µg given. The analgesia was noted on VAS (Visual Analogue Scale) as less than 3 as good pain relief and motor blocked measure on modified Bromage scale as 0 to 3. **Results:** In our study we found that the labor analgesia and motor blocked in both the groups were comparable, not clinically significant difference but the pain relief was better in single dose in Ropivacaine group than Bupivacaine group. Parturients were more comfortable with Ropivacaine group. the onset time after the dose was less in more number of parturients in Ropivacine group, where many patients need another dose of Inj Bupivcaine to achieve the required level of analgesia i.e. VAS < 3 Again it`s a observation of the obstetrician who conducted the deliveries that the time to delivery of baby was reduced in all the parturients who received the labor analgesia. The mode of delivery was not altered due labor analgesia. **Conclusion:** Overall we, the team, will say that though the data may not be significant in both the groups but we definitely are in more favor of Inj. Ropivacine for labor analgesia because of onset in significant number of parturients is far short, motor blocked is not a problem at all, less cardio toxicity and neuro toxicity, the concentration we had used for Ropovcaine i. e. 0.2% is commercially available so no problem in giving the exact concentration.

Keywords: Labor analgesia, Epidural, Ropivcaine, Bupivcaine.

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INTRODUCTION

Epidural analgesia is popular and effective method of pain control during labor. It is an attractive to parturient because she remains awake, pain free and comfortable, watch her delivery and immediately can interact her baby. Bupivacaine is well proven drug for labor analgesia but because of its cardio toxicity and the discomfort due to motor blocked imposes limitation for its usefulness. Motor blocked reduces her mobility and is associated with maternal dissatisfaction and has been shown to increase the assisted deliveries, i.e. forceps, vacuum application and surgical delivery. Ropivacaine, an amino acid local anaesthetic structurally related to bupivcaine but Ropivacaine is stereoisomer and bupivacaine is recimic mixture. It is less lipophylic and hence chance of motor block is less as compared to bupivacaine. This reduced lipophylicity makes it less likely to cause CNS and cardiotoxicity. Ropivacaine might be superior to bupivcaine for epidural labor analgesia because it appears to induce less lower extremity motor blockade due to its more selectivity towards the sensory fibers. The clinical relevance of this difference is not yet clear. In Ropivacaine, an amino-amide local anaesthetic that is

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structurally similar to bupivacaine has a lower potential for cardiovascular and central nervous system toxicity. A meta-analysis of studies comparing higher concentrations of Ropivacaine and bupivacaine (0.25%-0.5%) suggested that the use of Ropivacaine was associated with less instrumental deliveries and less motor blockade than bupivacaine. The purpose of present study is to compare analgesic potency and the level of motor blocked of the Ropivcaine 0.2% with Bupivacaine 0.125% in labor analgesia.

MATHODS

70 patients were included in study. Inclusion criteria were: written informed consent, ASA status I or II, nullipara or G2P1, singleton pregnancy, vertex presentation and cervical dilatation of 2 to 4 cm. Exclusion criteria were: absence of informed consent, contraindications for epidural anaesthesia, allergy to amide local anaesthetics, multi-parity, multi-fetal gestations, pre-term pregnancy, patients with associated cardiac or systemic illness and those who did not get pain relief at all in whom the catheter was replaced. <38th week of gestation and cervical dilation of > 5 cm at the time of epidural catheter placement. All the base line investigations including coagulation profile was noted and were within normal limits and After obtaining written informed valid consent, and confirmation of the cervical dilatation of 2 to 4 cm, the parturient was positioned in a left lateral position. The epidural space was identified at L4/5, L5-S1, or L3/4 with an 18-gauge Tuohy`s needle using the loss of resistance technique to 0.9% saline. A 20-gauge triple orifice epidural catheter (Portex) was inserted 2-4 cm into the epidural space. After a negative test dose of 60 mg Lidocaine 2%,with Adrenaline 1 in 2,00,000 the study solution i.e. Inj. Ropivcaine 0.2% vol. 8 to 10 ml with 20 µg Inj fentanyl in group A and Inj. Bupivacaine 0.125% 8 to 10 ml with Inj. Fentanyl 20 µg s a bolus dose depending on height of patient, was injected. Adequate analgesia (visual analogue scale [VAS] of □□3 was considered as an endpoint. Intermittent bolus doses given of 50 % of initial bolus dose on SOS basis which was on an average 1 to 1.5 hrs after initial dose. Initial dose and time required to reach VAS □□3 were noted. Vital parameters, VAS score, motor block (modified Bromage scale) i.e. 0 : Normal movement in hip, knee and foot ; 1 : Weakness in hip muscle ; 2 : Weakness of the knee muscles; 3 : Motor block of hip, knee and foot and sensory level of anaesthesia were recorded after 15, 30 and 60 min and then every 60 min. Inadequate analgesia was defined as VAS > 3 and treated with incremental interventions : a 5 ml bolus of the study solution, If insufficient analgesia persisted, the patient was excluded from the study and the catheter had to be resited.

RESULTS

The VAS score in Ropivacaine 0.2% group was excellent i.e. 0 to 3 in 29(83%), of which 10 patients were absolutely pain free after 15 mins of the bolus dose, VAS = 0, and 7 having VAS =1, 9 having VAS =2 and 3 having VAS =3. The remaining 6 (17%) patients need another 5 ml dose to reduce the VAS < 3, Among the Bupivacaine group excellent score AVS < 3 was found in 15 (43%) patients and VAS was > 4 in 20 (57%) patients after 15 mins of first bolus dose of 8 to 10 ml of Inj Bupivacaine 0.125% with Fentanyl 20 µg. Which reduced to < 3 after giving additional 5 ml dose of the Inj Bupivacaine 0.125% in 14 patients and the remaining need third dose of 5 ml in next 15 min to achieve VAS < 3? There was no need to give local anaesthesia for the incision for episiotomy in more number of patients in Ropivacaine group than in bupivacaine group. The VAS score was < 3 in significant number of patient in Ropivacaine group than in Bupivacaine group.

VAS scale at 15 mins	Ropivacaine 0.2% (n=35)	Bupivqacaine 0.125% (n=35)
Less than 3 i.e. Satisfactory analgesia	29(83%),	15 (43%)
More than 3 i.e. Unsatisfactory analgesia	6 (17%)	20 (57%)

Table below shows that 19 parturients (54%) in the Bupivacaine group and 25 (71%) in the Ropivacaine group did not show any motor block (Bromage = 0) throughout labour; there were no differences in motor block between the two drugs (Chi-Square and p < 0.5). As parturients with epidural analgesia were not commonly mobilized at the time the study was performed, mobilization was not attempted in 48 parturients (69%). Rest of the patients were moved to waiting room. The 3 patents in Bupivacaine group feel severe tingling and numbness in foot and not able to move at their own, but other 19 were comfortable.

Maximal motor block		
	Bupivacaine n = 35	Ropivacaine n = 35
Bromage 0	19(54%)	25(71%)
Bromage 1	13(37%)	10(29%)
Bromage 2	03(9%)	00
Bromage 3	00	00

Obstetrical outcomes for parturients receiving either Bupivacaine Or Ropivacaine for epidural labour analgesia. Values are in number (proportion).

	Bupivacaine n = 35	Ropivacaine n = 35
Spontaneous vaginal delivery	16(46%)	19(54%)
Instrumental vaginal delivery	14(40%)	10(29%)
Caesarean section	5(14%)	6(17%)

These values show no significant difference in the outcome or the mode of delivery in both the groups. The APGAR score in both groups was comparable, though the fetal heart rate was dropped in Bupivacaine group in more number of patients as compared with Ropivacaine group after giving the first bolus dose of epidural analgesia, it not seem to be clinically significant neither it was one of the evaluation criteria in this study, it's just a writer`s observation. Again the delivery time is shortened in both the groups as was expected if no labour analgesia was given to the patient as per obstetrician's or a person`s(conducting the labor) observation. Whether its clinically significant or not was not the evaluation criteria in this study.

DISCUSSION

We did not find any difference in the incidence of motor block between parturients receiving either Ropivacaine 0.2% or Bupivacaine at 0.125% with 20µg Fentanyl for epidural labor analgesia. Moreover, there were no differences in obstetrical or neonatal outcomes. This study was designed to compare the analgesic effect and the motor blocked by the Inj Ropivacaine 0.2% and Inj Bupivqacaine 0.125% in epidural labor analgesia. Significant reduction in motor block incidence during labor epidural analgesia at the same time provision of good relief from labor pain and comfort to the parturient in delivery room because such a reduction was thought to be clinically relevant. Indeed, there were more parturients without motor block in the Ropivacaine group and the pain control was also better than in the Bupivacaine group (25 vs. 19 patients out of 35 each group) and (83 % Vs 43%). However, this difference was not statistically significant as the second dose of Bupivacaine repeated after 15 mins give comparable pain relief in both the groups. Several studies have compared Bupivacaine and Ropivacaine for labor analgesia. They were recently summarized in a meta-analysis by Halpern *et al*. In 19 of 23 studies analyzed, motor block was more frequent in the Bupivacaine group than in the Ropivacaine group (Bupivacaine in percentage of 0.2% and more will increase the chances of motor blocked). These results are consistent with the trend towards less motor block with Ropivacaine, also observed in our study. By several studies which did not reveal any difference in the amount of local anaesthetics required by parturient controlled epidural analgesia when identical concentrations of Bupivacaine and Ropivacaine were used Writer *et al*., which suggested that the use of Ropivacaine for labor analgesia was associated with more spontaneous vaginal deliveries than the use of Bupivacaine, a more recent meta-analysis did not confirm these results. The incidence of spontaneous vaginal delivery as primary outcome was not different between both groups. In accordance with these results and other studies, we also did not detect any differences concerning mode of delivery nor neonatal outcome.

CONCLUSION

In spite of the above limitations, we have arrived at the conclusion that both the concentrations are effective in producing labor analgesia. Group R2 (0.2% ropivacaine) parturients; however, had a faster onset and significantly longer duration of analgesia with a single dose and required lesser top-ups, resulting in a significantly reduced consumption of opioids. Hence, our study favors, the use of 15 ml of 0.2% ropivacaine with 2 mcg/ml fentanyl over 0.125% ropivacaine for labor analgesia.

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