

Research Article

A Comparative Study of Epidural Labour Analgesia and Programmed Labour Analgesia in Controlling Labour Pain

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Abstract: Background and Aim: Comparison of the efficacy of epidural labour analgesia and programmed labour analgesia in controlling labour pain. **Objectives:** Primary objectives are VAS score, vitals and any untoward effects. Effect on ambulation, APGAR score and incidence of intervention as secondary objectives. **Methods:** A total of 80 parturients in active labour were allocated into two equal groups by using random allocation software. Group (G1) was given epidural injection of 15 ml of ropivacaine 0.2% with 2mcg/ml fentanyl. Top up was given with same dose regimen in graded manner. Group (G2) was given programmed labour analgesia with Inj. Pentazocine 6mg IV+Inj. Diazepam 2mg IV+Inj. Tramadol 1mg/kg deep i.m and thereafter Inj. Drotaverine 40mg IV half hourly (maximum of 3 doses). Inj. Ketamine 0.25-0.5 mg/kg IV was given as rescue analgesia. Quality of pain relief was assessed with VAS score. **Results:** Labour analgesia was better in epidural group (G1) with VAS decreased significantly at 5 min ($p < .00001$). It was <3 till end of delivery in group (G1). In Group (G2) VAS was mostly >3 and they required rescue analgesia with ketamine. There were no significant changes in hemodynamics. Side effects were mild without needing any intervention. There was no effect on ambulation in group (G1). Local anaesthetics were needed for episiotomy in all cases in group (G2). No adverse effects were seen on neonate in either group. **Conclusion:** Epidural labour analgesia with 0.2% ropivacaine plus fentanyl 2mcg/ml is better for labour analgesia in terms of VAS score, safety profile and side effects. There was no increase in duration of labour with epidural labour analgesia.

Keywords: Labour pains, epidural labour analgesia, ropivacaine 0.2% with fentanyl versus programmed labour.

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INTRODUCTION

Labour pains are the most severe pain a woman will have to bear in her lifetime. Maternal pain relief benefits both the mother and her neonate. Maternal and fetal effects of analgesia during labour remain central to discussions among patients, anaesthesiologists and obstetricians [1]. The aim should be maternal safety and pain relief without any adverse effects on progress of labour or on fetus.

Central neuraxial analgesia is the gold standard technique for pain relief in labour. Epidural analgesia with less concentration of local anaesthetics combined with opioids, provides good analgesia with little motor blockade known as "walking epidural" [3]. Pain relief starts sooner and lasts longer than either drug alone. Ropivacaine has advantage of more sensory blockade,

less motor blockade than bupivacaine and decreased risk of systemic toxicity.

Campbell *et al.*, [3] concluded that incidence of forceps delivery was higher in parturients receiving bupivacaine/fentanyl as compared to ropivacaine/fentanyl, 35% versus 10%. Writer D *et al.*, [4] in a meta analysis concluded that ropivacaine use leads to more spontaneous vaginal deliveries and less instrumentation than bupivacaine.

Yagkov Beilin *et al.*, [5] determined the lowest concentration i.e. 0.2% Ropivacaine that offers pain relief in labour.

Programmed labour is a method of providing labour analgesia which is easily available and the obstetrician can give it to the parturient. Savita Konin

[2] has concluded that programmed labour leads to significant reduction in duration of active phase of labour.

To resolve various controversies we conducted this study to compare epidural labour analgesia and programmed labour analgesia.

MATERIAL AND METHODS

After taking approval from the institutional ethics committee, this randomized interventional clinical trial was conducted in the department of Anaesthesia at Kamla Nehru State Hospital for Mother and Child, Indira Gandhi Medical College Shimla in collaboration with the department of obstetrics. Study participants included 80 parturients of ASA1 and ASA2 with uncomplicated pregnancy with vertex presentation.

A sample size of 72 was calculated anticipating a minimum of 20% decrease in VAS score at the time of delivery considering significance level of 96% ($\alpha=0.05$) and 80% power of the study ($\beta=0.2$). Randomization was done to allocate 80 parturients fulfilling the inclusion criteria. They were allocated into two equal groups of 40 each using random allocation software. Various independent variables (eg. age, study group, drugs, dosing, baseline vitals) and dependent variables (vitals, VAS score, ambulation, APGAR, side effects) of interest were recorded on proforma for further analysis.

Study Period: August 2018 through July 2019.

PATIENT SELECTION

Inclusion Criteria

- Parturients requesting labour analgesia, in active labour, singleton pregnancy with vertex with spontaneous or induced labour, cervical dilatation 4-6 cm, 20-50% effaced, reactive NST, preruptured membranes less than 6 hrs, pre-eclampsia with non severe features.

Exclusion Criteria

- Hypersensitivity to study drugs, bleeding disorders, decreased platelet count, spine surgery or deformity, mal presentations, cephalo-pelvic disproportion, previous LSCS, placenta previa, height < 150 cm.

Thorough preanaesthetic evaluation was done on parturients. After taking informed consent, IV line was secured with 18 G cannula and Ringer lactate started. Monitors were attached and baseline vitals and VAS Score recorded.

STUDY GROUP(G1): 40 parturients were subjected to epidural labour analgesia. Under all aseptic conditions (sitting/lateral position) 0.2% lignocaine local anaesthesia was infiltrated. With 18 G TOUHY

needle epidural space was approached through L3-4/L4-5 intervertebral space using loss of resistance technique and hanging drop technique and 18G catheter was threaded and fixed at 5 cm from the epidural space. 3ml of study drug was given as test dose after negative aspiration for blood and cerebrospinal fluid. The catheter was secured and woman was placed in supine position. Feeling dizzy, tinnitus or metallic taste gave indication of intravascular injection. Five minute after test dose if she is able to move her legs and absence of hypotension, additional 12 ml of study solution was given. This dose was initial bolus and its time noted. If catheter was intravascular, it was removed and reinserted at another interspace. Intradural placement of catheter was removed from the study.

STUDY DRUG: 15 ml of Ropivacaine 0.2% with 2 mcg/ml fentanyl (using 6 parts from a tuberculin syringe containing 50 mcg in 10 parts).

Adequacy of analgesia checked after 5 min. If VAS score < 3 analgesia was considered adequate. Onset of analgesia was from 1st bolus to time of achieving VAS < 3. If analgesia was not adequate after 15 min, 2nd graded dose of 15 ml of study drug was given. If still analgesia was not attained, case was withdrawn and classified as epidural failure. An assisted trial of walk was given to assess ambulation. An additional graded dose of Ropivacaine (5ml+5ml+5ml) was given as top-up on patient request. Hypotension was defined as systolic blood pressure < 90mmHg and treated with 6mg ephedrine. Bradycardia was defined as heart rate < 60 bpm and was treated by inj. Atropine.

STUDY GROUP (G2): After complete physical examination by obstetrician, conventional programmed labour analgesia was given as practiced in Kamla Nehru State Hospital, at cervical dilatation 4-6 cm. Parturient received Inj. Pentazocine 6mg i.v.+Inj. Diazepam 2mg i.v.+Inj. Tramadol 1mg/kg deep i.m and thereafter Inj. Drotaverine 40 mg i.v half hourly (maximum of 3 doses). Inj. Ketamine 0.25 mg-0.5mg/kg was given as rescue analgesia if required at cervical dilatation of 7-8 cm. Time of inj. was noted and VAS score checked. Partographic monitoring of fetal heart rate was done throughout the labour.

Following data were recorded at 0, 5, 15 minute and then every 15 minute till 1 hour and then every 30 minute until deliver. Heart rate, blood pressure, oxygen saturation, VAS score, fetal heart rate.

At delivery following were noted:

Time of delivery, duration of 1st and 2nd stage of labour, type of delivery, local anaesthesia requirement for episiotomy, instrumentation requirement, APGAR score, side effects.

RESULTS

Demographic and obstetric data were comparable in both the groups.

Demographic and obstetric data:

Table-1

	G1	G2	P value
Mean Age (years)	26.72±4.26	25.17±4.17	.104
Parity			
<i>Primi</i>	23	21	.653
<i>Multi</i>	17	19	
Mean Cervical dilatation (cm)	4.95±1.01	5±0.78	.805
Mean POG(weeks)	37.97±1.14	38.25±1.25	.30

Visual analogue scale (VAS): Baseline mean VAS was 6.12±1.01 in Group (G1), At 5 minute it was 2.8±.68, which is highly significant (p value <.00001) and remained < 3 till the end of delivery. In Group (G2), mean VAS was 6.22±.91 at 0 minute, at 5 minute it decreased significantly(p value<00001) and was 3.62±.49. It remained low till only 270 minutes and that too was mostly > 3.

Mean Maternal VAS:

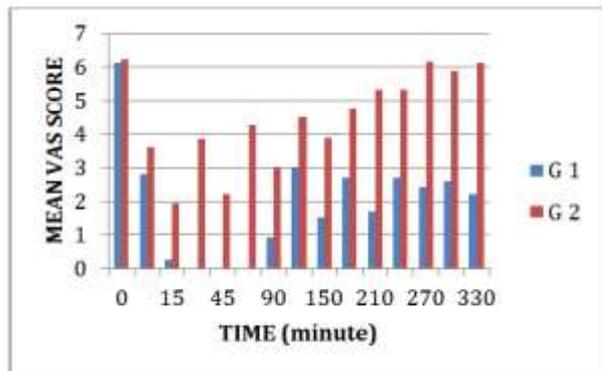


Fig-1

The mean SBP significantly decreased (p value=.0002) at 5 min in Group (G1) and remained decreased till 180 min. After that it started increasing. In Group2 mean SBP started decreasing after 5 min and was significantly less than baseline (p value=.03) at 15 min and it remained decreased, significantly till 150 min (p value <.001). Then it started increasing. But if we compare mean systolic BP between the two groups, it was not significant.

Mean maternal systolic blood pressure:

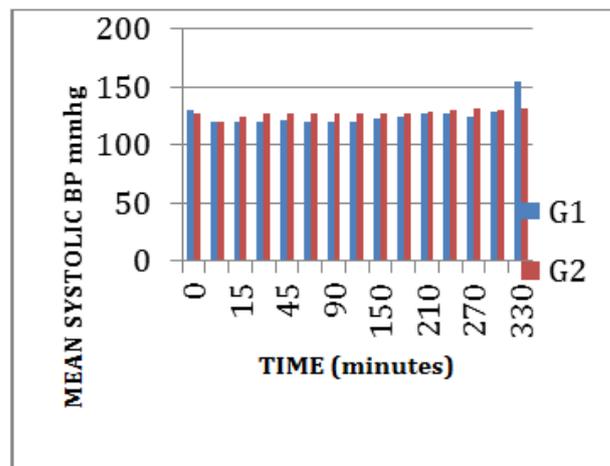


Fig-2

Mean maternal heart rates in Group (G1) decreased significantly from baseline (p value<.006) from 5 min till 60 min duration. Then it increased. In Group (G2) maternal heart rate decreased significantly from baseline at 5 min (p value=.004) and remained significantly low till 45 min, there after started increasing. But in between the Group(G1) and G2 decrease in maternal heart rates was comparable.

Mean maternal heart rate:

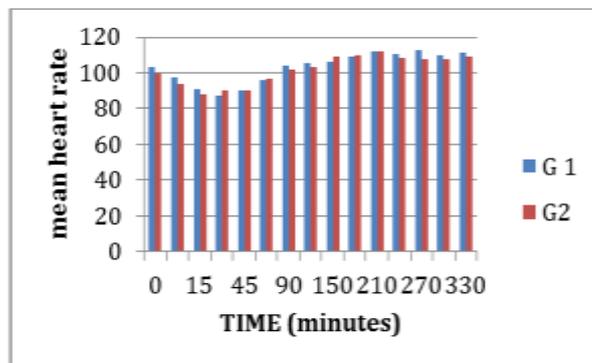


Fig-3

The mean oxyhemoglobin saturation was comparable (p value>.05) in both the groups.

APGAR score at 1 min and 5 min were comparable in 2 groups.

Duration of labour since starting of labour analgesia was 289.02±28.3min in Group (G1) and 295.02±24 min in Group(G2), which was comparable(p value>.05).

Duration of labour:

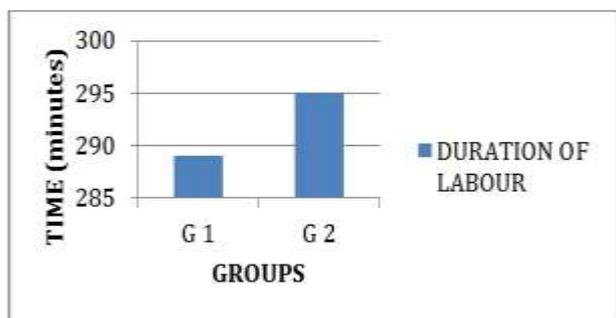
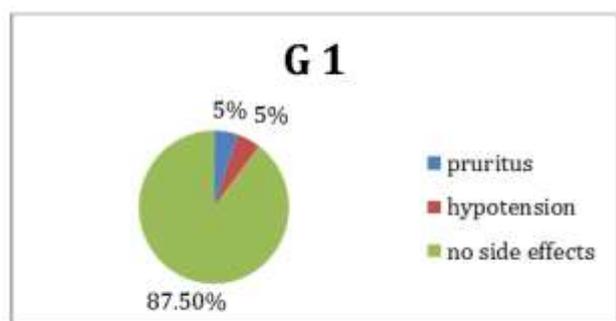
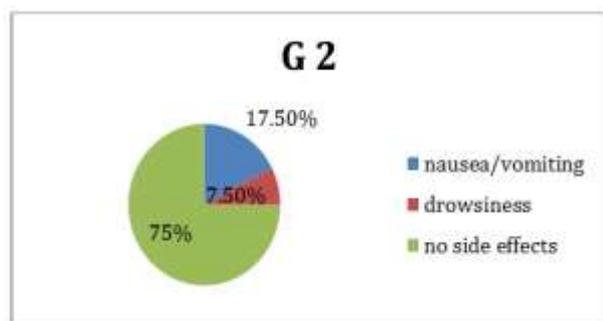


Fig-4

Side effects: Out of 40 parturients in Group(G1), two subjects (5%) had pruritus and two (5%) had hypotension. In Group (G2), seven (17.5) had nausea /vomiting and three (7.5%) had drowsiness.



In Group(G2) all parturients needed local anesthetic for episiotomy whereas in Group (G1) none needed local anesthetic. There was no effect on ambulation in either group.



Mode of delivery: In Group(G1), 38(95%) parturients delivered by normal vaginal delivery, 2(5%) delivered by Caesarean section for non progress of labour and deep transverse arrest. In Group(G2), 39(97.5%) delivered by normal vaginal delivery and 1(2.5%) delivered by caesarean section for foetal distress.

Mode of delivery:

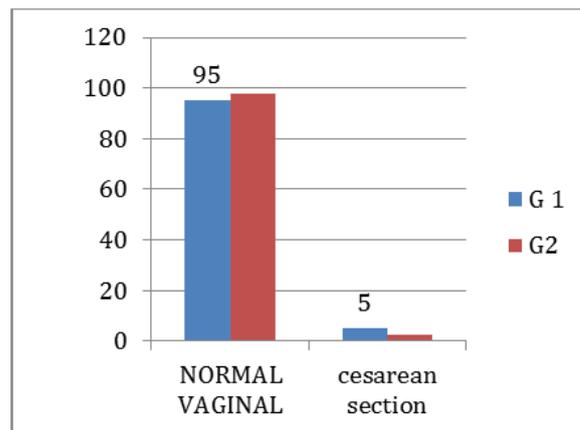


Fig-5

DISCUSSION

Availability of Ropivacaine revolutionised the labour analgesia in terms of its reduced systemic toxicity and less motor blockade. Lipid soluble fentanyl exerts its effect only in 5 min and lasts for 60 to 90 min. Synergy between Ropivacaine and Fentanyl enhances duration of analgesia from 2.5 to 3 hours. There are misconceptions among obstetricians that epidural labour analgesia prolongs the labour and leads to more instrumentation in comparison to programmed labour.

In our study VAS was <3 in all cases who were given epidural labour analgesia which were in accordance with study done by Chetty *et al.*, [6] who found VAS <3 in all 80 parturients who were given Ropivacaine 0.2% with Fentanyl 2 mcg/ml. VAS was >3 in programmed labour group. VAS was highly significant in two groups in our study (p<.00001). G. Sravani *et al.*, [7] in a study on programmed labour found no pain relief in 5 patients, mild relief in 33 patients, moderate pain relief in 12 patients and no patient had complete pain relief. S. N. Daftary [8] and Veronica Irene *et al.*, [9] concluded that only 70% patients get pain relief by programmed labour.

There was 10% decrease in mean SBP from baseline and 12% decrease in heart rate in Group (G1) but no parturient had bradycardia. Dr Tushar Majumder *et al.*, [10] did not find hypotension with different concentrations of Ropivacaine and Fentanyl in 60 parturients. In Group (G2) no parturient developed hypotension or bradycardia in concordance with study by Priyanka Kadakia *et al.*, [11] and Chauhan *et al.*, [12].

No rescue was required in group(G1) but all parturients needed Ketamine as rescue analgesic in Group (G2).

No adverse effect on APGAR in both the groups, in consistence with study done by Millicent Anim-Somuah *et al.*, [13].

There was no increase in caesarean rate with epidural labour analgesia group(G1), it was only 5% and in programmed labour group(G2) it was 2.5%. Chetty *et al.*, [6] had 95% vaginal deliveries and 2.5% caesarean rate and 2.5% had forceps delivery. Agarwal *et al.*, [14] in their study observed that instrumental delivery does not relate to epidural analgesia.

There was no effect on ambulation in both groups, similar to study done by Chetty *et al.*, [6].

Duration of labour was slightly less in Group (G1) but statistical significance was not seen in duration of labour between the two groups. Halpern and Leighton [15] found no increase in duration of labour in epidural group versus systemic opioids.

Side effects were not significant in group (G1). Out of 40 parturients 2 developed pruritus and 2 had hypotension. No intervention was required by them. Incidence of hypotension is known in 10% cases of neuraxial analgesia during labour and pruritus in 30 - 100% cases after neuraxial opioids. In programmed labour nausea/vomiting occurred in 17.5% and drowsiness in 7.5 % cases. In study by Veronica *et al.*, [10] nausea /vomiting was seen in 10 % cases. We observed failure in one case and it was excluded from the study.

CONCLUSION

Epidural labour analgesia with 0.2% Ropivacaine is very effective and safe and has no adverse effects on haemodynamics. It does not affect mode of delivery and neonatal outcome. In programmed labour pain relief is not satisfactory, remains for shorter duration and requires rescue analgesia.

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Conflicts of interest: There are no conflicts of interest.

REFERENCES

1. Melzack, R. (1984). The myth of painless childbirth. *Pain*. 321-337.
2. Konin, S., & Mhabalshetti, N. A. (2014). Programmed Labor-Protocol. *Journal of Evolution of Medical and Dental Sciences*. 3(69):14770-6.
3. Campbell, D. C., Zwack, R. M., Crone, L. A. L., & Yip, R. W. (2000). Ambulatory labor epidural analgesia: bupivacaine versus ropivacaine, *Anesth*

4. 4. Writer WD, Stienstra R, Eddleston JM ,Gatt SP. Neonatal outcome and mode of delivery after epidural analgesia for labour with ropivacaine and bupivacaine :a prospective meta-analysis. *Br J Anaesth*.1998 Nov;81(5):713-7.
5. Beilin, Y., Guinn, N. R., Bernstein, H. H., Zahn, J., Hossain, S., & Bodian, C. A. (2007). Local anesthetics and mode of delivery: bupivacaine versus ropivacaine versus levobupivacaine. *Anesthesia & Analgesia*, 105(3), 756-763.
6. Chhetty, Y. K., Naithani, U., Gupta, S., Bedi, V., Agrawal, I., & Swain, L. (2013). Epidural labor analgesia: A comparison of ropivacaine 0.125% versus 0.2% with fentanyl. *Journal of Obstetric Anaesthesia and Critical Care*, 3(1), 16-22.
7. Sravani, G. G., & Rao, K. S. (2014). A Clinical Study of Programmed Labour and its Maternal and Fetal Outcome. *JMSCR*, 2, 672-681.
8. Daftary, S. N., Desai, S. V., Thanawala, U., Bhide, A., Levi, J., Patki, A., ... & Obstetrics, F. (2009). Programmed Labor—Indegenous Protocol to Optimize Labor Outcome. *South Asian Federation of Obstetrics and Gynecology*. 1(1):61-64.
9. Yuel, V. I., Kaur, V., & Kaur, D. (2008). Programmed labour for optimizing labor and delivery. *JK Science*, 10(2), 62-64.
10. Tushar, M., Ranjit, R., & Shanti Singh, H. (2019). Comparison of different concentrations of epidural ropivacaine for labour analgesia: A prospective randomized and double blind study. *Journal of medical science and clinical research*. 7:30-34
11. Kadakia, P. H., & Verma, R. Labor analgesia-A personal communication.
12. Chauhan, R., & Gupta, R. (2003). A clinical study of programmed labour and its outcome. *J Obstet Gynaecol \$ Family Welfare*, 5, 8-9.
13. Anim-Somuah, M., Smyth, R. M. D., & Howell, C. J. (2005). Epidural versus non epidural or no analgesia in labour. *Cochrane Database of Systemic Reviews*. (4):CD000331.
14. Agrawal, D., Makhija, B., Arora, M., Haritwal, A., & Gurha, P. (2014). The effect of epidural analgesia on labour, mode of delivery and neonatal outcome in nullipara of India, 2011-2014. *Journal of clinical and diagnostic research: JCDR*, 8(10), OC03.
15. Halpern, S. H., & Leighton, B. L. (2005). Epidural analgesia and the progress of labour. In: Halpern, S. H., & Douglas, M. J., eds. Evidence based obstetric anaesthesia. Oxford, UK: Blackwell: 10-22.

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