



A COMPARISON OF ROPIVACAINE 0.125% VERSUS ROPIVACAINE 0.0625% WITH FENTANYL.

Anaesthesiology

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ABSTRACT

Background: To minimize the concentration of local anaesthetics by comparing the sensory and motor effects by two different concentrations with or without adjuvants.

Aim: To compare the efficacy of epidural analgesia using 0.125% Ropivacaine versus an 0.0625% Ropivacaine with 2µg/ml Fentanyl for labour analgesia.

Methods: A total of 60 parturients in active labour were randomly assigned into two groups (R and R+F) of 30 patients each, to receive an epidural injection of 15 ml of Ropivacaine 0.125% in R group and 15 ml Ropivacaine 0.0625% with Fentanyl (2 µg/ml) in group R+F as initial bolus dose. Same dose regimen were used as subsequent top-up dose on patients demand for pain relief. The duration and quality of analgesia, motor block, top-up doses required consumption of Ropivacaine and Fentanyl and feto-maternal outcome in both groups

Result: Epidural top-up technique using 0.125% Ropivacaine (group R) analgesia was similar to that using 0.0625% Ropivacaine (group R+F) with 50µg Fentanyl, but motor power was retained allowing women to mobilize. There also appear to be beneficial effects on the progress of labour, with a clinically important reduction in the length of the second stage.

Conclusion: Our study resulted that establishing epidural analgesia in labour with 15ml of 0.125% Ropivacaine (in group R) followed by top-ups of 10ml of 0.125% Ropivacaine, produced similar analgesia to that obtained from the same volume of 0.0625% Ropivacaine with 2µg Fentanyl (in group R+F), but motor block was minimized (termed as **Walking Epidural**). No significant neonatal depression was seen in our study.

So it would be better to give 0.0625% Ropivacaine with 2µg Fentanyl for better management of pain in obstetric patients without any effect on fetal respiration and better management of labour pain.

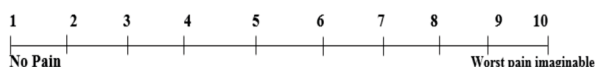
KEYWORDS

Epidural Labour Analgesia, Ropivacaine, Fentanyl, VAS scale, Bromage sco

INTRODUCTION

Analgesic adequacy during labour along with the avoidance of adverse effects is vital for obstetric conditions. The pains of labor result in a maternal stress response, which is neither beneficial for the fetus nor the mother.^[1] Evidences are suggestive that labor disorders including maternal hypertension, dystocia, meconium staining, and fetal distress are stress related.^[2] Hence, maternal pain relief not only benefits the parturient, but her neonate also. The description of peripheral pain pathways proposed by Cleland in 1993 has been modified by Bonica JJ^[3]. Revill in 1876 suggested VAS scale for evaluation of sensory pain.^[4]

VAS SCALE



Maternal and fetal effects of analgesia during labor remain central to discussions among patients, anesthesiologists, and an obstetrical caregiver^[5] with the controversies in obstetrical anesthesia including the effects of regional anesthesia on the progress and outcome of labor as well as effects on the neonate.

Ropivacaine, an amide local anesthetic is less cardiotoxic in animals^[6] as well as it may also be more selective for sensory fibers when compared to other local anesthetics, producing less motor block.^[7] This allows for increased maternal ambulation and also allows for normal progression of labor, which translates into fewer instrumental deliveries and more vaginal deliveries^[8] although this is controversial.^[9] These factors suggest that ropivacaine may be superior to bupivacaine in obstetric analgesia.

Fentanyl is a synthetic phenylpiperidine-derivative opiate agonist. Fentanyl citrate is N-(1-Phenethyl-4-piperidyl) propionanilide citrate (1:1). Fentanyl is a highly lipophilic compound that is freely soluble in organic solvents and sparingly soluble in water (1:40). The molecular

weight of the free base is 336.5 (the citrate salt is 528.6). The pKa of the tertiary nitrogens are 7.3 and 8.4.

Minimum local anesthetic concentration (MLAC) studies by up and down sequential allocation have found both 0.2% and 0.1% ropivacaine to be effective for labor analgesia.^[10] OPRMA118G gene has been reported to be present in a higher number of Asians as compared to their Western counterparts, which pre-disposes the Asian population to a higher degree of pain perception.^[11]

AIMS AND OBJECTIVES

To compare the efficacy of epidural analgesia using 0.125% Ropivacaine versus an 0.0625% Ropivacaine with 2mcg/ml Fentanyl for labour analgesia. In the present investigation following parameters were compared:

- Quality of analgesia (VAS)
- Duration of labour
- Motor block (Bromage score)
- Time from epidural to delivery.

MATERIAL AND METHODS

This study was carried out in Swaroop Rani Nehru Hospital associated with Moti Lal Nehru Medical College, Prayagraj (Formerly Allahabad) over a period of one year. After approval from ethical committee of Institution and obtaining written and informed consent from the patients.

PATIENTS SELECTION:

A total of 60 parturients in active labour of ASA Grade I and II without any complication of pregnancy, in vertex presentation were randomly assigned to two groups of 30 patients each, to receive an epidural injection of 15 ml of Ropivacaine 0.125% in R group and 15 ml Ropivacaine 0.125% with Fentanyl (2 µg/ml) in group R+F as initial bolus dose. Same dose regimen were used as subsequent top-up dose on patients demand for pain relief.

Inclusion Criteria

- Parturients in active labour
- Patients who request epidural analgesia for pain relief
- ASA Status I & II
- Patients have no contraindications for vaginal delivery
- Females in the age group from 18 to 40
- Primigravida
- Adequate gynaecoid pelvis
- Cervical dilatation less than 4 cm

Exclusion Criteria

- Patient refusal
- Patients with pregnancy induced hypertension, heart disease, anaemia and other complications of pregnancy
- Cervical dilatation greater than 4 cm
- Patients who received systemic opioids within 4 hours of epidural request
- Coagulopathy
- Patients with clinically significant renal, hepatic, cardiovascular, haematopoietic, pulmonary, gastrointestinal, nervous or endocrine disorder.
- Patients unwilling or unable to comply with the study procedures.

PARAMETERS TO BE OBSERVED

- Analgesia was measured using Visual Analogue Scores (VAS) on a 10cm line. Measurements were performed every 10 minutes until analgesia was established and at 30 min and 1 hr after the initial dose. Thereafter 2 hourly VAS were recorded until delivery.
- Motor blockade was assessed using a modified Bromage scale^[12] 30 mins after each top-up and at each request to get out of bed (score 0 = no weakness, able straight leg raise against resistance, 1 = not able to straight leg raise, able to flex knee, 2 = unable to flex knee, able to flex ankle, 3 = unable to move lower limb).
- Mode of delivery was recorded, as were time intervals between top-ups, duration of first and second stages of labour, and time from insertion of epidural until delivery.
- Tolerability was assessed by checking for complications like dural puncture, venous puncture, pruritus, nausea, vomiting, rigor, drowsiness, urinary retention, hypotension, respiratory depression.

Observations**Table 1. VAS Score.**

Time in mins	Group R		Group R+F		Student t test
	Mean	Std Deviation	Mean	Std Deviation	P value
0	92.00	7.67	94.00	7.37	1.000
5	47.60	11.62	56.80	11.68	0.794
15	12.70	8.49	15.40	8.90	1.000
30	0.18	1.08	5.80	5.55	0.000
45	10.17	6.21	13.00	6.75	0.102
60	12.34	8.8	13.60	8.43	0.847
120	10.40	10.26	12.80	8.68	0.787
180	9.00	3.79	11.80	4.74	0.707

The VAS score was assessed at 0, 5, 15, 30, 45, 60, 120 and 180 minutes. The initial VAS score ranged between 80 and 100 for all the patients. VAS score given by Revill^[4] for pain was comparable in both groups throughout labour. Haemodynamic status of parturients in both groups was comparable. None of the patients in any group required either ephedrine or atropine.

Table 2. Motor block- Bromage score

Bromage Scale	Group R		Group R+F	
	N	%	N	%
0	0	0	16	53.33
1	20	66.67	12	40
2	10	33.33	2	6.67
3	0	0	0	0
Chi-Square value	20.48718			
P value	0.00004 (Significant)			

Dr. Phillip Raikes Bromage, at his early years at McGill described Bromage score in 1965^[12].

Table 3. Maternal pulse rate

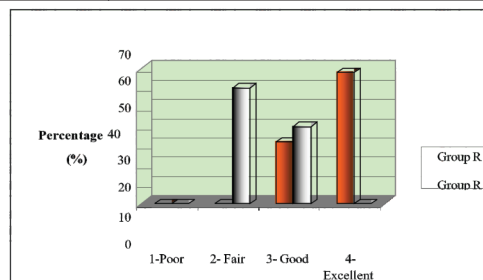
Time in mins	Group R		Group R+F	
	Mean	Std Deviation	Mean	Std Deviation
0	90.26	11.14	91.44	9.57
2	92.43	9.65	93.28	9.57
5	91.48	12.11	89.36	7.20
15	91.83	9.44	89.12	7.66
30	90.87	6.20	86.40	6.03
45	90.09	6.59	85.84	4.93
60	89.74	8.10	87.60	3.61
2 hours	88.35	6.23	89.52	6.12
3 hours	88.48	9.12	89.76	2.07

Table 4. Maternal systolic blood pressure

Time in mins	Group R		Group R+F	
	Systolic blood pressure Mean	Std Deviation	Systolic blood pressure Mean	Std Deviation
0	116	6.455	115.84	7.116
5	113.6	9.074	114.4	8.210
15	112.4	7.141	111.12	6.685
30	112.72	7.414	111.84	7.701
45	108.88	7.096	112.4	6.481
60	112.16	7.369	111.12	6.483
2 hours	112.56	9.028	107.24	7.674
3 hours	108.36	7.658	112.40	7.000

Table 5. Patient comfort level

Comfort level	Group – R		Group – R+F	
	N	%	N	%
1- Poor	0	0	0	0
2- Fair	18	60	0	0
3- Good	12	40	9	32
4- Excellent	0	0	21	68
Chi-Square value	32.2222			
P value	< 0.001 (Significant)			



Graph 1. Patient comfort level Patient comfort level was assessed by asking the patient how they felt at the end of the delivery. Majority of patients (68%) in group R had excellent pain relief. 32% of patients in group R1 had good pain relief. In group R+F, 60% of patients had fair pain relief and 40% of patients had good pain relief (Table 2).

APGAR score estimated at one and five minutes are tabulated below.

Table 6. One minute APGAR

APGAR	Group R		Group R+F	
	N	%	N	%
5	0	0	0	0
6	2	8	4	20
7	12	44	8	24
8	16	48	18	56
9	0	0	0	0
10	0	0	0	0

P value by Chi square test did not show statistical difference.

APGAR score was created by Dr.Verginia Apgar in 1952 an anaesthesiologist is a scoring system to assess newborn at one and five minute.^[13]

Table 7. Five minute APGAR

APGAR	Group R		Group R+F	
	N	%	N	%
5	0	0	0	0

6	0	0	0	0
7	0	0		8
8	20	66	18	60
9	5	17	8	27
10	5	1	4	13

P value by Chi square test did not show statistical difference.

RESULT

In our study, we have demonstrated that with an epidural top-up technique using 0.125% Ropivacaine (group R) analgesia was similar to that using 0.0625% Ropivacaine (group R+F) with 50µg Fentanyl, but motor power was retained allowing women to mobilize. There also appear to be beneficial effects on the progress of labour, with a clinically important reduction in the length of the second stage.

CONCLUSION-

This study with title “**Epidural labour analgesia :A comparison of 0.125% Ropivacaine vs 0.0625% Ropivacaine with Fentanyl**” was conducted at Swaroopprani Hospital associated with Motilal Nehru Medical College, Prayagraj. In our study, comparison of epidural bolus administration of 0.125% Ropivacaine(Group R) and 0.0625% Ropivacaine with 0.0002% Fentanyl for analgesia during labour was done. Patients were randomized to enter either group R and group . Group R received bolus doses of 0.125% Ropivacaine while group R+F received 0.0625% Ropivacaine with 0.0002% Fentanyl.

1. Analgesia provided by both techniques was found to be similar (Table 1).
2. Women in group R+F retained motor power in their legs. Motor Block was minimized in Group R+F (Table 2).
3. Maternal satisfaction with epidural analgesia was higher in group R+F.
4. Maternal pulse rate variation was similar in both the groups (Table 3).
5. Maternal systolic BP variation was almost similar in both groups (Table 4).
6. Patient comfort level was better in group R+ F (Table 5 and graph 1).
7. Apgar score at 1 and 5 minutes were better managed in both groups (Table 6 and 7).

So it was concluded that Ropivacaine with Fentanyl was better than Ropivacaine alone in epidural labour analgesia with added advantage of ambulation and maternal satisfaction .

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