



Original Article

A Comparative Study of the Efficacy of 0.2% Ropivacaine and 0.125% Bupivacaine in Pain Relief Normal Labour

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Abstract

Background: Most of the women do not require pain relief during labour. There are many methods which help the women to relax and make manage the pain. Non-medical methods such as water immersion, relaxation methods and acupuncture relief pain. There are many medical and pharmaceutical methods are available to relief labour pain, out of these epidural analgesia is commonly used.

Material & Methods: The present study was conducted in the department anaesthesia, Darbhanga Medical College and Hospital, Bihar between June 2013 to September 2014 after approval from ethical committee.

Results: Mean time of onset of analgesia in Ropivacaine and Bupivacaine were 4.9 ± 1.4 and 8.1 ± 1.2 min, while time of onset of peak analgesia were 9.8 ± 1.8 and 14.1 ± 1.5 min respectively. Mode of delivery in ropivacaine and Bupivacaine were instrumental, operational & normal in 20%, 3.3%, 76.3% and 10%, 10%, 80% cases respectively.

Conclusion: Both ropivacaine and bupivacaine provide excellent labor analgesia for most obstetrical patients. There is no significant difference between the two drugs in the incidence of spontaneous vaginal delivery or any other obstetrical outcome.

Introduction

Most women do not require pain relief during early labour, but seek it once the active phase of first-stage labour begins. Nondrug techniques can be learnt as part of antenatal care, however as pain increases with advancing labour, the woman should be aware that drugs are available and should not be made to feel that she has failed if she uses them. Epidural analgesia is achieved by injection of a local anaesthetic close to the nerves

that transmit pain. Epidural analgesia used as a form of pain relief in labour.

Transcutaneous electrical nerve stimulation (TENS)-

Randomised controlled trials provide no compelling evidence for TENS having any analgesic effect during labour^(1,2). However, papers show a high degree of patient satisfaction with this method⁽³⁾.

Acupuncture Aromatherapy

Acupuncture and hypnosis may be beneficial for the management of labour pain, however number of women studied has been small.

Water/birthing pool

Immersion in water during labour increases maternal relaxation and reduce analgesic requirements. It is supported by the Royal College of Obstetricians and Gynaecologists for healthy women with uncomplicated pregnancies⁽⁴⁾. A Cochrane review found that water immersion during the first stage of labour reduces the use of analgesia and reported maternal pain, without adverse effects on labour duration, operative delivery or neonatal outcome⁽⁵⁾.

Nitrous oxide and oxygen

It is generally considered safe, but there has been a case report of severe hypoxaemic episodes associated with its use in labour, in an otherwise healthy woman⁽⁶⁾.

Intramuscular opiate**Pethidine**

This is widely used and effective within 15 minutes and lasts for 2-3 hours. One study found that systemic pethidine was more effective at relieving labour pain than placebo, but its analgesic effect was modest⁽⁷⁾. A recent Swedish study showed that opioids did not relieve labour pain, but did reduce anxiety and discomfort⁽⁸⁾. Other intramuscular opiates include diamorphine, meptazinol and pentazocine, however there is little evidence to show superiority of one over another⁽⁹⁾.

Remifenta

This is given as patient-controlled analgesia (PCA). A recent double-blind, randomised, controlled clinical trial showed that an intermittent, incremental regime with repeated small-dose PCA boluses of remifentanil, provided effective and reliable analgesia during labour and delivery⁽¹⁰⁾. There is the potential for adverse effects on the foetus who may be floppy at birth and with respiratory depression. This effect is temporary and responds to gentle stimulation.

Epidural analgesia**Advantages**

It is the most effective way of relieving labour pain complete relief in 95% of cases. It also has the benefit of avoiding need for greater analgesia/general anaesthetic if forceps, vacuum extraction or Caesarean sections are required. It is not associated with increase in symptoms related to perineal trauma and pelvic floor muscle weakness⁽¹¹⁾.

Disadvantages

- Dizziness or shivering may occur.
- It increases the length of the second stage⁽¹²⁾.
- There is an increased rate of operative vaginal delivery⁽¹³⁾. Many delivery units discontinue epidural to reduce operative delivery rate. However, there is insufficient evidence to support this practice⁽¹⁴⁾. There is evidence that it increases the rate of inadequate pain relief in the second stage of labour.
- Transient hypotension occurs in 20% women.
- Dural tap occurs in 1% women and this causes severe headache in 50%.

Aim & Objectives

1. To evaluate the efficacy of epidural 0.2% ropivacaine for pain relief in labor.
2. To compare and evaluate with 0.125% bupivacaine for pain relief in labor.
3. To study the complication and side effect if any.

Material & Methods

After the approval from the hospital ethical committee, our study was conducted in the Department of Anesthesia Darbhanga Medical College & Hospital, Laheriasarai, between June 2013 to September 2014.

a) Inclusion criteria

- Cephalic singlating pregnancy.
- Undergoing normal labour.
- ASA grade 1 and 2.
- 60 primi pregnant women selected.

b) Exclusion criteria.

- Received parenteral opioid analgesic in the preceding 2nd hour
- Women had preeclampsia.
- Insulin dependent diabetes mellitus.
- Previous cesarean section.
- Any contraindication to epidural analgesia.

The pregnant women randomly divided into 2 groups with 30 women each & randomization was done by computer generated code.

- Group A = 30 pregnant in this group receive 0.2% ropivacaine through epidural catheter.
- Group B = 30 pregnant in this group receive 0.125% bupivacaine through epidural catheter.

Results

Table 1: Age distribution

Age Group (yrs)	Group R	Group B
< 20	12 (40%)	12 (40%)
21 – 25	17 (56.7%)	14 (46.7%)
26 – 30	1 (3.3%)	4 (13.3%)
Total	30	30
Mean Age	21.5 + 2.4	23.3 + 2.9
Range	19 – 30	18 – 29

Table 2: Shows distribution of Parturient based on the fetal positions

Fetal portion	Group R	Group B
LOA	16 (53.3%)	21 (70%)
ROP	1 (3.3%)	5 (16.7%)
ROA	8 (26.7%)	3 (10%)
LOP	5 (16.7%)	1 (3.3%)

Table3: Shows distribution of Parturient according to cervical dilatation

Cervical Dilatation	Group R	Group B
< 3 cm	-	-
3 – 4 cm	23 (76.7%)	25 (83.3%)
> 5 cm	7 (23.3%)	5 (16.7%)
Mean	4.1 + 0.6	3.9 + 0.6
Range	3-5	3-5

Table 4: Shows the time of onset & peak analgesia in two groups

Time Interval	Group R		Group B		R vs B	
	Range	Mean + SD	Range	Mean + SD	T	P
Onset (min)	3-10	4.9 + 1.4	5-11	8.1 + 1.2	9.57	< 0.001 HS
Peak (min)	7-15	9.8 + 1.8	10-18	14.1 + 1.5	8.86	<0.001 HS

Table 5: Shows the variations in the No. of top up between the two groups

Top – ups	Group R		Group B	
	No.	%	No.	%
0	-	-	1	3.3
1-2	3	10.0	24	80.0
3-4	13	43.3	5	16.7
5-6	14	46.7	-	-
Total	30	100	30	100

Table 6: Shows distribution of sensory block in the parturient

	Group R		Group B		R vs B	
	No.	%	No.	%	χ^2	P
Tingling	11	36.7	8	26.7	0.69	0.41 ns
Sensory Loss	30	100	30	100	-	-
Aware of Contraction	19	63.3	22	73.3	0.69	0.41 ns

Table 7: Shows distribution of motor block in the parturient

	Group R		Group B		R vs B	
	No.	%	No.	%	χ^2	P
Paresis	5	16.7	3	10.0	0.58	0.45 ns
Bearing down	25	83.3	27	90	0.58	0.44 ns

Table 8: Shows the mode of delivery in 2 groups

Mode	Group R		Group B	
	No.	%	No.	%
Instrumental	6	20.0	3	10.0
Operational(LSCS)	1	3.3	3	10.0
SVD (Normal)	23	76.7	24	80.0
Total	30	100	30	100

Table 9: Shows distribution of parturient based on fetal apgar score at 1 and 5 minutes

APGAR	SCORE	Group R		Group B	
		No.	%	No.	%
At 1 Min.	< 6	17	56.7	16	53.3
	7-8	12	40	14	46.7
	> 9	1	3.3	-	-
At 5 Min	< 8	3	10	-	-
	8-9	26	86.7	24	80.0
	> 9	1	3.3	6	20.0

Table 10: Shows distribution of complications in the parturient

Mode	Group R		Group B	
	No.	%	No.	%
Hypotension	5	16.7	3	10.0
Total	5	16.7	3	10.0

Table 11: Shows the distribution of the total dose of Ropivacaine & Bupivacaine employed

Drug Given	Group R	
	Range	Mean + SD
Ropivacaine (mg)	20 – 40	31.2 + 6.3

Drug Given	Group B	
	Range	Mean + SD
Bupivacaine (mg)	10-25	19.5 + 3.6

Table 12: Shows distribution of parturient based on vas

	Group R	Group B
Mean + SD	4.3 + 1.1	3.7 + 1.0
Range	2.25 – 6.0	2.25 – 5.5

Table 13: Shows pain relief based on verbal scoring system

	Group R	Group B
Aware of contraction but not painful (1)	12 (40.0%)	16 (53.3%)
Aware of pressure or tolerable discomfort (2)	17 (56.7%)	14 (46.7%)
Distressing pain or pressure (3)	1 (3.3%)	-

Table 14: Shows pain relief during episiotomy

	Group R		Group B	
	No.	%	No.	%
Pain Relief	24	80.0	20	66.7

Table 15: Distribution based on willingness for labor analgesia

	Group R		Group B	
	No.	%	No.	%
Willing for LA	27	90	26	86.7
Not willing	3	10	4	13.3

Discussion

Labour is a very painful process and child birth can be the most amazing event experienced by majority of women. This distress serves no useful purpose and instead harm the mother and fetus. Painful labour often results in excessive maternal stress and mechanical workload, increase oxygen demand and hyperventilation. These result in increase in catecholamine secretion leading to uterine vasoconstriction, increased uterine contractility, hypoperfusion of the fetoplacental unit, foetal hypoxia and acidosis. These response can easily be obtunded by the providing analgesia during labour. Various have been experimented upon to provide pain relief to the labouring mother and minimum detriment on progress of labour and wellbeing of foetus. Obstetricians and anaesthetist have always feared the incidence of instrumental deliveries in women receiving labour analgesia could be higher than in those who donot receive it. Ideally pain relief with epidural techniques should be produced with the minimum disturbance to the progress of labour or to sympathetic functions, sensory functions (proprioception) and motor functions of the CNS. Thus it is intriguing to the obstetric anaesthetist to strike a balance between patient satisfaction by providing good analgesia, reduce motor block thus making the parturient participate in labour and decrease the instrumental deliveries due to prolonged second stage.

Factors contributing to instrumental delivery include

- a) Diminished pain and sensation from uterine contraction leading to diminished Ferguson's reflex and of the perception of the need to push at full dilatation.
- b) Reduced motor force due to weakened abdominal musculature.
- c) Inadequate rotation of the presenting part due to weakened pelvic floor musculature.

Studies have revealed that the threshold of the obstetrician to perform assisted delivery is definitely lower when epidural analgesia is already present.

All these factors have generated intense in epidural analgesia in 3 forms.

- i. decreased local anaesthetic concentration
- ii. combining with opioids
- iii. combined spinal epidural technique

Bupivacaine has stood the test of time as bedrock of labour analgesia because of its longer duration of action and lesser degree of motor block for a comparable degree of sensory analgesia. The newer local anaesthetic Ropivacaine has advantages over Bupivacaine because of its motor-sparing properties and its lower systemic toxicity. Clinical comparisons shows there is no much advantage between ropivacaine and bupivacaine.

Conclusion

This study shows that both ropivacaine and bupivacaine provide excellent labor analgesia for most obstetrical patients. There is no significant difference between the two drugs in the incidence of spontaneous vaginal delivery or any other obstetrical outcome. Similarly, there is no difference in neonatal outcomes. Although more studies reported a reduced incidence of motor block in the ropivacaine group, this result must be interpreted with caution because of the heterogeneity in the results. There was no difference in measures of the quality of analgesia or maternal satisfaction with analgesia. We conclude that more study is needed to compare the potencies of ropivacaine and bupivacaine in the doses normally used for clinical analgesia, to resolve this issue.

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