

# Comparison of efficacy of isobaric ropivacaine and bupivacaine with morphine in spinal anaesthesia for perineal surgeries

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## Abstract

**Introduction:** In the present study we compared ropivacaine and bupivacaine with adjuvant morphine for perineal surgeries. **Aims:** The aim of this study is to compare isobaric 3ml of 0.5% Ropivacaine and 3ml of isobaric 0.5% Bupivacaine with 100 $\mu$  morphine in both the group sintrathetically for elective Perineal surgeries. Onset and duration of sensory block, onset and duration of motor block, maximum height of sensory block, quality of anaesthesia, time of request for analgesia, time for ambulation, time for urination, sedation score, VAS score, hemodynamic parameters and adverse effects if any were studied. **Methods:** This study was conducted in 120 patients scheduled for elective Perineal surgeries were randomly divided into two groups of 60 each. Group B received isobaric 3ml of 0.5% Bupivacaine and Group R received 3ml of 0.5% Ropivacaine with 100 $\mu$  morphine intrathecally in both groups. Onset and duration of sensory block, onset and duration of motor block, maximum height of sensory block, quality of anaesthesia, time of request for analgesia, time for ambulation, time for urination, sedation score, VAS score, hemodynamic parameters and adverse effects if any were studied **Results:** There was significant difference between the two groups in mean time to onset of sensory block, duration of sensory block, duration of motor block and time to walk in mins. Total duration of sensory block was 155.50 $\pm$ 4.19 min in group R and 199.83 $\pm$ 11.12 min in group B, which is significant. (P <0.001). Duration of motor block was 159.83 min in group R and 182.83min in group B which is clinically and statistically significant (P<0.001). **Conclusion:** Ropivacaine 3 ml of 0.5% with 100 $\mu$  morphine provides comparable quality of sensory block but has slower onset and significantly shorter duration of motor block compared to Bupivacaine. **Keywords:** Ropivacaine, Bupivacaine, morphine, intrathecal, Perineal surgeries.

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## INTRODUCTION

Spinal anaesthesia is a technique of choice for anorectal surgeries. There is more interest in medications that produce shorter duration of anaesthesia while limiting side effects for ambulatory surgeries. Spinal anaesthesia with Lidocaine is useful choice for anorectal procedure in ambulatory surgery setting, because of fast onset, short duration characteristics. Neurotoxic effects have been

associated with intrathecallidocaine, prompting the research of alternatives to it.<sup>1</sup> Low dose Bupivacaine is being used successfully for the surgeries. However, duration of analgesia is a limiting factor when low doses of local anaesthetics are used prompting the use of adjuvants like opioids for prolonging analgesia. The newer drug Ropivacaine being comparatively less cardiotoxic, producing minimal motor blockade of shorter duration which relieves the psychological distress of being immobile for a longer period of time after Perinealsurgeries. Ropivacaine is a relatively new amino amide long acting enantiomerically pure(s enantiomer) local anesthetic with high pka and low lipid solubility. It is considered to block sensory nerves to greater degree than motor nerves and having similar local anesthetic properties and chemical structure to that of bupivacaine. Hence the purpose of this study is to assess the duration of sensory and motor blockade of intrathecal isobaric Ropivacaine with 100 $\mu$  morphine and side effects if any

compared to intrathecal isobaric Bupivacaine with 100µ morphine during Perineal surgeries

**MATERIALS AND METHODS**

**Source of data**

A randomized study was conducted on 120 patients admitted at Vani Vilas and Bowring and Lady Curzon hospital and Victoria hospital attached to BMC and RI, undergoing elective Perineal surgeries from 2010 to 2012. Inclusion Criteria was,ASA physical status I and II, patients giving valid informed/explained consent and **IN THE AGE GROUP OF 18-60 YEARS. EXCLUSION CRITERIA WAS** patients who are allergic to amide local anaesthetic drug, Patient refusal, Patients with Chronic low backache, Patients who have any contra indication for spinal anaesthesia such as infection at the site of injection, bleeding or coagulation abnormalities, increased intracranial pressure, spinal deformities. Patients with cardiovascular, renal, liver diseases. The study protocol was approved by Hospital Ethics committee and Ethical clearance was obtained from the institution for the study. Preanaesthetic check up was done one day prior to the surgery. Patients were evaluated for any systemic diseases and laboratory investigations recorded. The procedure of spinal anaesthesia was explained to the patients and written consent was obtained. Patients advised overnight fasting. **ORAL PRE-MEDICATION WITH DIAZEPAM 10 MG, RANITIDINE 150 MG AND ONDANSETRON 4 MG GIVEN.** 120 patients were randomly divided into two groups of sixty each. **Group I:** 60 patients received 3ml of injection 0.5% isobaric Ropivacaine with 100µ morphine intrathecally **Group II:** 60 patients received 3ml of injection 0.5% isobaric Bupivacaine with 100µ morphine intra the cally IV access was obtained with 18 Gauge IV cannula and IV infusion started with Ringer Lactate. Patients were monitored for heart rate (HR), non invasive blood pressure (NIBP)

peripheral oxygen saturation (SpO<sub>2</sub>). respiratory rate (RR) electrocardiogram(ECG). Spinal anaesthesia was performed with the patient in the lateral position using a 25-gauge Quincke. needle at the L3-4 or L4-5 interspaces. The study solution 3ml was administered over 30sec. The following data were recorded: demographic data, onset and duration of sensory block, onset and duration of motor block, maximum height of sensory block, quality of anaesthesia, time of request for analgesia, time for ambulation, time for urination, sedation score, VAS score, hemodynamic parameters and adverse effects if any were studied. After the spinal block, HR, RR, SpO<sub>2</sub> and NIBP were measured every 2min until first 20 mins then every 5mins till the end of the surgery and then every 15 min in post operative period. Time to motor block was assessed every 5 min using the Bromage scale (0=no motor block, 3=complete motor block of lower limbs) until complete motor block and then every 15 min until the return of normal motor function. Time to first complaint of pain and request for rescue analgesia was recorded. The quality of anaesthesia, the quality of muscle relaxation (judged by the surgeon) and the degree of intraoperative patient comfort (judged by the patient) were recorded as excellent, good, fair or poor. Any other side effects was recorded and properly treated e.g. bradycardia, hypotension, nausea, vomiting.

**STATISTICAL ANALYSIS**

Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis). Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups. \* Moderately significant (P value: 0.01 < P < 0.05), \*\* Strongly significant (P value < 0.01).

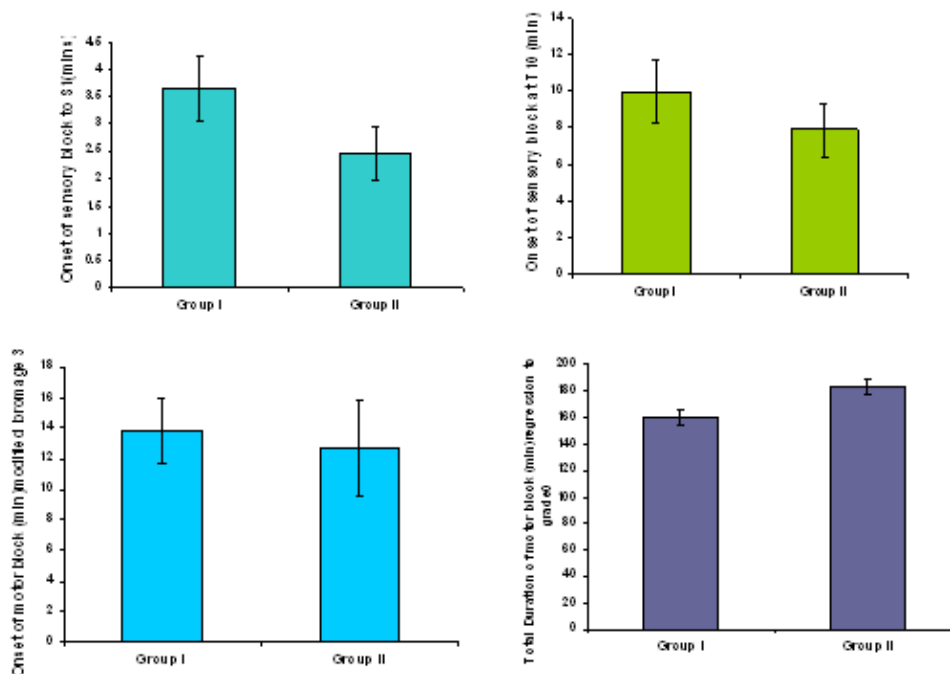
**RESULTS**

**Table 1: Demographic Data**

Parameter	Group I	Group II	P Value
Age (yrs) (Mean ± SD)	35.22±11.29	32.98±8.42	0.222
Weight(kgs) (Mean ± SD)	58.65±6.16	55.98±6.89	0.027*
Height (cm)	157.43±5.78	157.20±6.79	0.840
M:F (60)	38:22	43:17	0.436

**Table 20: Comparison of study variables in two groups of patients studied**

Study variables	Group I	Group II	P value
Onset of sensory block to S1(mins)	3.65±0.58	2.47±0.50	<0.001**
Onset of sensory block at T10 (min)	9.97±1.71	7.87±1.47	<0.001**
2 segment regression	107.08±5.39	120.00±11.05	<0.001**
Total duration of sensory block	155.50±4.19	199.83±11.12	<0.001**
Onset of motor block (min)modified bromage 2	9.33±1.71	7.35±2.82	<0.001**
Onset of motor block (min)modified bromage 3	13.83±2.13	12.67±3.12	0.018*
Total Duration of motor block (min)regression to grade 0	159.83±5.29	182.83±5.55	<0.001**
Time to request for resqueanalgesia (HRS) analgesia (HRS)	6.92.00±0.77	6.90±0.77	0.906



1. In both the groups, haemodynamic parameters like HR, SPO2, SBP, DBP, RR were studied and recorded with no significant p value.
2. Onset of sensory block to S1(min) in ropivacaine group was  $3.65 \pm 0.58$  vs  $2.47 \pm 0.50$  in bupivacaine group with p value  $< 0.001^{**}$
3. Onset of sensory block at T10 (min) in ropivacaine group was  $9.97 \pm 1.71$  vs  $7.87 \pm 1.47$  in bupivacaine group with p value  $< 0.001^{**}$
4. 2 segment regression of sensory block in ropivacaine group was  $107.08 \pm 5.39$  mins vs  $120.00 \pm 11.05$  in bupivacaine group which was significant with a p value of.  $< 0.001^{**}$
5. Distribution of side effects like nausea, vomiting, pruritus are statistically similar in two groups with  $P = 1.000$ . Mean time for urination in minutes is significantly more associated with bupivacaine group ( $278.50 \pm 4.44$  mins) vs ( $246.50 \pm 4.89$  mins) in ropivacaine group with  $P = < 0.001^{**}$
6. Quality of sensory block is statistically similar with  $P = 1.000$  where 35 patients in both the groups had excellent quality of sensory block.
7. Time to walk in minutes is significantly more in bupivacaine group  $287.42 \pm 7.99$  vs  $269.75 \pm 6.53$  in ropivacaine group with  $P = < 0.001^{**}$

## DISCUSSION

Subarachnoid block is a commonly employed anaesthetic technique for performing Perineal surgeries. It is safe, inexpensive and easy to administer which also offers a high level of post-operative analgesia for patients. The technique is simple, has rapid onset and is reliable.

Lidocaine has been the most widely used local anaesthetic for spinal anaesthesia because of its faster onset, short duration characteristics. It is also associated with a very high incidence of transient neurologic symptoms. For this reason, small doses of longer acting drugs have been suggested as possible alternatives to lidocaine for outpatient spinal anaesthesia. Ropivacaine, amide local anaesthetic agent with similar local properties to bupivacaine but with a reduced potential for both neurotoxicity and cardiotoxicity (Neval Boztug<sup>2</sup> *et al*). Ropivacaine is being increasingly used for spinal anaesthesia in caesarean section, lower abdominal and perineal surgeries including lower limb surgeries. Advantages claimed are shorter duration of sensory and motor block<sup>3</sup> properties compared to Bupivacaine (McDonald SB)<sup>47</sup> Thus it minimizes the psychological discomfort of being immobile for long time. Hence this study was conducted to assess the sensory and motor characteristic of Ropivacaine for spinal anaesthesia in patients undergoing elective perineal surgeries. The equipotent ratio between ropivacaine and bupivacaine is considered to be 3:2 (Gautier<sup>3</sup> *et al*). Ph.E. Gautier<sup>3</sup> *et al*, conducted a study to evaluate intrathecal ropivacaine for ambulatory surgery and noted that intrathecal ropivacaine 10mg produced shorter sensory and motor blockade than bupivacaine 8mg [ $152 \pm$  and  $135 \pm 41$  min vs  $181 \pm 44$  min and  $169 \pm 52$  min mean  $\pm$  SD;  $P < 0.05$ ] and concluded intrathecal ropivacaine 12mg is approximately equivalent to bupivacaine 8mg. In our study equivalent dose of 15mg of Ropivacaine with  $100\mu\text{g}$  morphine and 15mg bupivacaine with  $100\mu\text{g}$  morphine is used. Prolonging

effective post operative analgesia by adding opioids like morphine is considered to be the advantage in spinal anaesthesia (C. O. Ogun<sup>8</sup> *et al*)(Chung and colleagues<sup>14</sup>) All patients receiving either drug achieved adequate level of anaesthesia. Various authors have considered a block up to T10 for onset of sensory blockade (D.A.Mc.Namee<sup>5</sup> *et al*), however we considered S1 for onset as it was appropriate for perineal surgery. Also, onset of sensory block at T10 dermatome in ropivacaine group was (9.97±1.71min) and in Bupivacaine group was (7.87±1.47min) Maximum height of sensory block achieved is similar in both the groups. 63% patients in isobaric Ropivacaine 0.5% and 60% patients in isobaric Bupivacaine 0.5% group had a sensory block at T6 level respectively. We also observed in our study that the time for two segment regression was faster in Ropivacaine group when compared with Bupivacaine group in comparison with the study conducted by Jean – Marc Malinovsky<sup>1</sup> Ph.E.Gautier<sup>3</sup> *et al*, studied duration of motor blockade was 135min with 10mg ropivacaine when compared with 8mg bupivacaine which produced motor blockade for 169min and concluded Ropivacaine produces motor blockage of shorter duration. This was comparable with our study results where the duration of motor block was 159.83min in Ropivacaine group vs 182.83min in Bupivacaine group. Our findings are in affirmation with that of Chan Jong Chung<sup>13</sup> *et al* and Helena Kallio<sup>4</sup> and others who also found shorter duration of motor blockade (120min) with Ropivacaine when compared with Bupivacaine. Ph.E.Gautier<sup>3</sup> and other noted that the time for ambulation (walk) in min was 192±48 with 8mg Bupivacaine when compared with 169±38min with 12mg Ropivacaine and concluded Ropivacaine produces a motor blockade of shorter duration and patients are able to walk easily when compared with Bupivacaine group. In our study we also observed that time for ambulation in min is significantly more in Bupivacaine group (287.42min vs 269.75min in Ropivacaine group). The mean duration for urination in min is significantly more associated with Bupivacaine. None of the patients in both the drug groups had retention of urine. Haemodynamic parameters like heart rate, SBP, DBP, MAP, RR, SpO<sub>2</sub> were comparable with no significant difference between the groups.

## CONCLUSION

Our study reveals that 3ml (15mg) of isobaric 0.5% Ropivacaine with 100µg morphine administered intrathecally provides shorter duration of motor block and early ambulation with adequate anaesthesia for Perineal surgeries when compared to isobaric Bupivacaine with same dose.

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