Original Research Paper

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COMPARISON OF EFFICACY OF INTRATHECAL DEXMEDETOMIDINE VERSUS FENTANYL AS ADJUVANT TO ISOBARIC ROPIVACAINE IN PARTURIENTS UNDERGOING ELECTIVE LSCS

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ABSTRACT **Introduction And Objectives:** Regional anaesthesia is the preferred technique for most of the lower segment caesarean section. Pregnancy is usually associated with difficult airway due to mucosal oedema, friable mucosa, large breasts and worsening of Mallampatti class which gives regional anaesthesia a distinct advantage over general anaesthesia. In 2009 Ropivacaine an aminoamide local anaesthetic was introduced in India, though it was being used in other parts of the world since early 1990s. The advantage of Ropivacaine is that it produces less motor blockade when used in lower doses and has reduced toxic potential when compared to commonly used drug like Bupivacaine. A study was required to compare the efficacy of intrathecal Dexmedetomidine versus Fentanyl as adjuvant to Isobaric Ropivacaine in parturients undergoing elective LSCS to determine the sensory and motor blocking effect of both the drugs. **Methods:** Sixty patients of ASA class II of age group 18 to 35 years posted for elective lower segment cesarean sections were randomized using computer generated numbers into two groups, group RD (n=30)and group RF(n=30). Group RD received 15 mg of 0.75 % Isobaric Ropivacaine (2ml) plus 5 mcg Dexmedetomidine (0.5ml) and Group RF received 15 mg of 0.75% Isobaric Ropivacaine (2ml) plus 25 mcg Fentanyl (0.5ml) The study design was a prospective randomized controlled double blind study. Subarachnoid block was given with patients in left lateral position and the study drug was administered intrathecally after confirmation of space by negative aspiration for CSF. Onset, duration of sensory and motor block, time for maximum sensory and motor block, time for 2 segment sensory regression and haemodynamic parameters were recorded. **Results:** There was no statistically significant difference in the onset of sensory block at T10[5.17+2.24 mins in group RD vs 6.17+2.32 mins in group RF] (p=0. 09), duration of analgesia [156.7+55.4 mins in group RD vs 134.8+51.3 mins in group RF](p=0.1), onset of motor block [3.43+1.38 in group RD versus 3.97+1.42 in group RF] (p=0.14). Time for maximum sensory block was [9.37+2.8 mins in RD group vs 15.5+3.8 mins in RF 0.75 group] (p=0.00). Time for 2 segment sensory regression was [72.2+11.3 in group RD vs 61.8 +10.07 in group RF] (p=0.00) . These had statistically significant differences between the groups . **Interpretation And Conclusion:** Group RD produced better and prolonged sensory blockade with motor blockade compared to group RF . Thus Ropivacaine 0.75 % with Dexmedetomidine 5 mcg is a good choice for intrathecal block for LSCS.

KEYWORDS : Ropivacaine; Dexmedetomidine; Fentanyl; Intrathecal; Lower segment cesarean section

INTRODUCTION

Pregnancy is usually associated with difficult airway due to mucosal oedema, friable mucosa, large breasts and worsening of Mallampatti class which gives regional anaesthesia a distinct advantage over general anaesthesia[1]. Regional anaesthesia has lot of other advantages compared to general anaesthesia . The advantages are[2]

1. Awake patient
2. Polypharmacy avoided
3. No airway manipulation
4. Good motor and sensory blockade
5. Early food intake by thepatient
6. Less incidence of post operative nausea and vomiting
7. Prolonged postoperative analgesia
8. Ideal operating conditions can be met
9. Post Anaesthetic Care Unit (PACU) and ward nurses particularly appreciate the use of regional anaesthesia

Hence in surgeries like LSCS, subarachnoid block is commonly performed.

With spinal anaesthesia, the onset of anaesthesia is more rapid; allowing the surgical incision to be made sooner and also provides post operative analgesia.

Spinal anaesthesia with cocaine was initially produced inadvertently by J Leonard Corningin in 1885,and first used deliberately by August Bier in 1898.[2]

For decades Lignocaine had been the local anaesthetic of choice for spinal anaesthesia . Its advantages are rapid onset of action and good motor block manifested as good muscle relaxation. Its use was limited by its short duration of action and has been implicated in transient neurologic symptoms and cauda equine syndrome following intrathecal injection.[3,4]Bupivacaine is three times more potent than Lignocaine[5] and has longer duration of action. Its disadvantages are slow onset of action, decreased motor block. Bupivacaine though long acting has increased incidence of fatal cardiac toxicity after accidental intravascular injection, because of narrow cardiovascular collapse/central nervous system toxicity ratio (cc/cns).[6] This led to discovery of newer local anaesthetics with similar sensory duration of action but less motor block and less cardiotoxicity like Ropivacaine and Levobupivacaine, both being S-enantiomers. Compared with Bupivacaine (the drug of choice for many years), Ropivacaine is equally effective for subcutaneous infiltration, epidural, intrathecal and peripheral nerve block ,obstetrics and postoperative analgesia.[6]

In 2009 Ropivacaine an aminoamide local anaesthetic was introduced in India, though it was being used in other parts of the world since early 1990s. The advantage of Ropivacaine is that it produces less motor blockade when used in lower doses and can be very useful for ambulatory surgeries.[7] As Ropivacaine has been recently introduced in India and not many studies have been done in India regarding use of Ropivacaine for spinal anaesthesia and Ropivacaine being available as isobaric drug in two concentrations of 0.5% and 0.75%, a study is required to compare the effectiveness between 15 mg of 0.75 % Isobaric Ropivacaine (2ml) plus 5 mcg Dexmedetomidine (0.5ml) and 15 mg of 0.75% Isobaric Ropivacaine (2ml) plus 25 mcg Fentanyl (0.5ml) keeping the volume of both the solutions constant at 2.5 ml.

OBJECTIVES

Comparison of 2.5ml of 0.75% of ropivacaine with 5 microgram dexmedetomidine and 2.5ml of 0.75% isobaric Ropivacaine with 25 micrograms of fentanyl for spinal anaesthesia in patients undergoing elective lower segment cesarean sections with respect to

- Onset and duration of sensory block.
- Maximum sensory blockade attained and time taken for the same.
- Time taken for 2 segment sensory regression.
- Onset and duration of motor blockade.
- Quality of motor blockade and time taken for the maximum motor blockade.
- Haemodynamic changes.
- Any adverse effects like severe hypotension, bradycardia and respiratory depression.

METHODOLOGY

Source Of Data

Patients admitted to hospitals attached to Bangalore Medical College and Research Institute, Bangalore undergoing elective lower segment caesarean section surgeries under subarachnoid block during the period November 2019 to May 2021.

METHOD OF COLLECTION OF DATA

A. Study Design: Randomised Control Study.

B. Duration of study: 1.5 years- From November 2019 to May 2021.
C. Place of study: Will be done in hospitals attached to Bangalore Medical College and Research Institute, Bangalore.

Inclusion criteria:
1. Parturients of age group 18-35 years undergoing elective lower segment caesarean section under subarachnoid block.
2. Parturients willing to give written informed consent
3. Parturients belonging to ASA II [Annexure 2]

Exclusion criteria:
1. Patients not willing to give consent.
2. Patients undergoing Emergency LSCS
3. Patients with medical and obstetric complications like anaemia , heart diseases , gestational hypertension, gestational diabetes , shock, septicaemia and hypertension
4. Patients with history of hypersensitivity to local anaesthetic, Dexmedetomidine, Fentanyl
5. Subjects having any absolute contraindications for spinal anaesthesia like increased ICP, severe hypovolemia , bleeding diathesis , local infection
6. Patients with height < 150cm and >170 cm and BMI >30

A routine pre-anaesthetic examination was conducted on the evening before surgery
- History and general condition of the patient
- Airway assessment by Mallampati grading.
- Nutritional status, height and weight of the patient
- A detailed examination of the Cardiovascular system, Respiratory system and Central nervous system
- Examination of the spine

The following routine pre-operative investigations was carried out for all patients after taking written and informed consent.
1. Complete blood count.
2. Blood sugars.
3. Renal function test.
4. HIV and HBsAg status testing
5. Bleeding time.
6. Clotting time.
7. Urine analysis.
8. ECG.
9. Other investigations deemed to be appropriate for the surgery

Sample Size Calculation
Sample size was calculated based on previous study, conducted by Ravipati et al[100] –'A Comparative study between Intrathecal Isobaric Ropivacaine 0.75% Plus Dexmedetomidine and Isobaric Ropivacaine 0.75% PlusFentanyl for Lower Limb Surgeries'.A difference of 30.12 min in the duration of motor block (modified Bromage score>1) was taken to be clinically significant.

$n = 2 x (Z\alpha + Z_{1-\beta})^2\sigma^2/(d^2)$
Where
$Z\alpha$ = standard table value for 95% CI = 1.96
$Z_{1-\beta}$ = Standard table value for 80% Power = 0.84
σ = standard deviation (34.475)
d= minimum expected difference b/w means of 2 groups (30.12)
n= Sample size
$n = 2 (1.96+0.84)^2 (34.475)^2/ (30.12)^2$
n=20.54
n □- 21

An estimated 21 parturients per group were necessary to detect a 30.12 min difference in the duration of motor block with an 80% power, based on a simple stratified two-sample 95%t-based confidence interval for group comparison. To compensate for the dropouts from the study and also to make sure that the sampling size is not inadequate, a total number of 60 patients were selected and divided randomly into two groups of 30 patients each by computer generated numbers.

60 parturients undergoing LSCS were randomly grouped by computer generated numbers and assigned to one of the two groups:

Group RD (n = 30): 15 mg of 0.75 % Isobaric Ropivacaine (2ml) plus 5 mcg Dexmedetomidine (0.5ml)
Group RF (n = 30): 15 mg of 0.75% Isobaric Ropivacaine (2ml) plus 25 mcg Fentanyl (0.5ml)

Data was collected in pretested proforma meeting the objectives of the study. Preoperative assessment was done for each patient and written informed consent was taken. All patients were premedicated on the night before surgery with Tablet Ranitidine 150mg, fasted 8 hours for solid food and 4 hours for clear fluids. Intravenous line was secured with 18 gauge cannula and was preloaded with Ringer lactate 500ml half an hour before anaesthesia. All patients received Inj. Ranitidine 50mg IV and Inj. Metoclopromide 10mg IV for aspiration prophylaxis before surgery. All patients were transported to OT in left lateral position.

Monitoring was done using multi- parameter monitor having electrocardiography (ECG), non-invasive blood pressure (NIBP) and arterial pulse saturation (SPO_2). Patients were placed in left lateral position. Under aseptic precautions lumbar puncture was performed at the level of L3-L4 interspace through a midline approach using 25 G Quincke's spinal needle and study drug was injected after confirmation of needle tip in the subarachnoid space by clear and free flow of cerebrospinal fluid.

The patient , the anesthetist performing the spinal and observing anesthetist were blinded to the patient group.

Group RD received 15 mg of 0.75 % Isobaric Ropivacaine (2ml) plus 5 mcg Dexmedetomidine (0.5ml) and Group RF received 15 mg of 0.75% Isobaric Ropivacaine (2ml) plus 25 mcg Fentanyl (0.5ml)

Intrathecal injection was given over approximately 10-15s. Patients were made to lie supine immediately. Patients were monitored with ECG, NIBP, SPO2 and respiratory rate at regular intervals of every 5 minutes and continued in the post-operative period. The VAS[Annexure 3] was monitored for 24 hours in the post operative period and the rescue analgesia (Injection Paracetamol 1 gm) was given when VAS Scale was of >4.

The following parameters were recorded
1. Onset of sensory blockade and motor blockade
2. Maximum level of sensory blockade attained and the time taken for the same
3. Maximum level of motor blockade attained and the time taken for the same
4. Sensory blockade was tested using pin prick method with a blunt 27 G hypodermic needle every 15 seconds till the onset of sensory blockade and thereafter at 2 mins intervals till the maximum level of sensory blockade was achieved and subsequently at 5 mins interval during first 30 mins intervals until complete recovery
5. Quality of motor blockade was assessed by modified Bromage scale
6. Time for two segments sensory regression
7. Total duration of sensory blockade and motor blockade
8. Total duration of analgesia was noted
9. Sedation was assessed every 15 mins intraoperatively and hourly in the post operative period for first 6 hours using Ramsay sedation score
10. Neonatal APGAR scores in 1 and 5 mins
11. Post operative pain was assessed using visual analogue scale[Annexure 2] (0-10) at 30 mins , hourly for next 6 hours and 2 hourly till 24 hours and time to first analgesic request was recorded
12. Duration of post operative analgesia- time from injection of local anaesthetic to demand for first rescue analgesia (Inj Paracetamol) post operatively was noted. (VAS≥3).
13. Paracetamol requirement for first 24 hours post operatively was noted.
14. Adverse effects if any was noted.

RESULTS

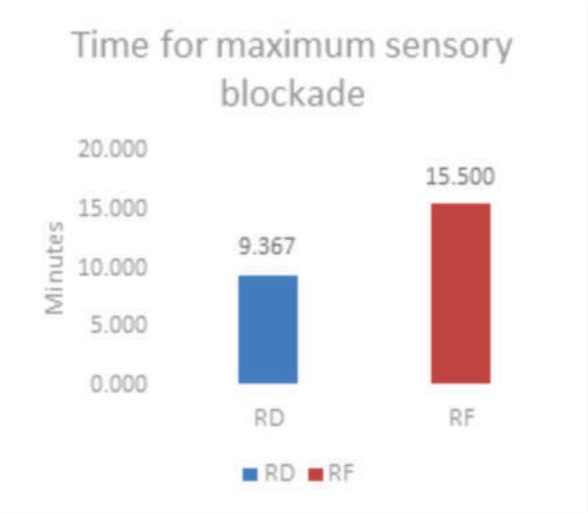
Age distribution
There is no statistical significant difference in the age wise distribution of patients between the groups (p= 0.972)

Duration of surgery
There is no significant difference in the duration of surgery among the two groups (p =0.300).

Time for Onset of sensory block (minutes)
The mean time of onset of sensory blockade at T 10 in group RD is 5.17±2.245mins and in group RF is 6.17±2.321 mins. There is no statistical significant difference between the two groups regarding the onset of sensory blockade (p= 0.095).

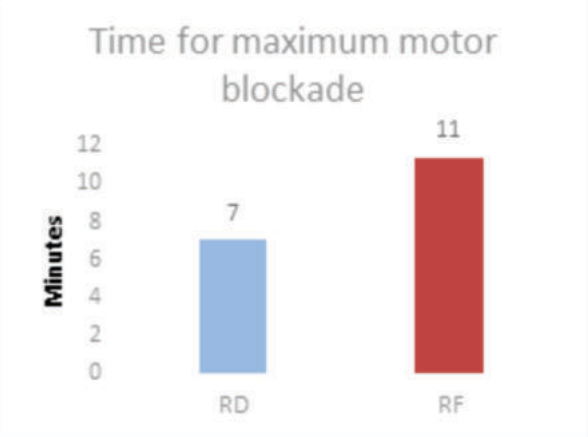
The time taken for the onset of motor blockade is 3.43 ± 1.38 mins in group RD and 3.79 ± 1.426 mins in group RF. There is no statistical significant difference between the groups (p=0.147).

Time For Maximum Sensory Blockade (minutes)



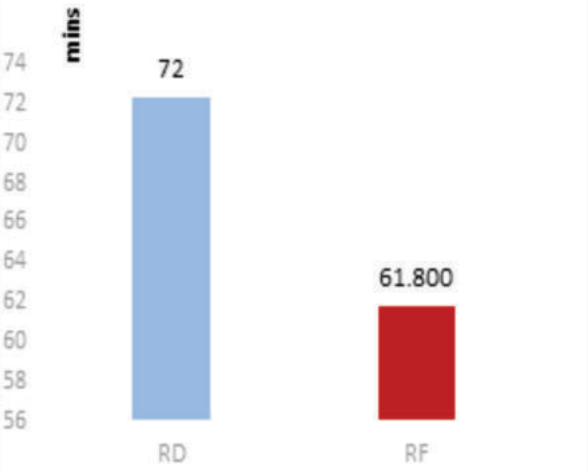
The time for attaining maximum sensory level was better in group RD than group RF (P=0.00) .

Time For Maximum Motor Blockade



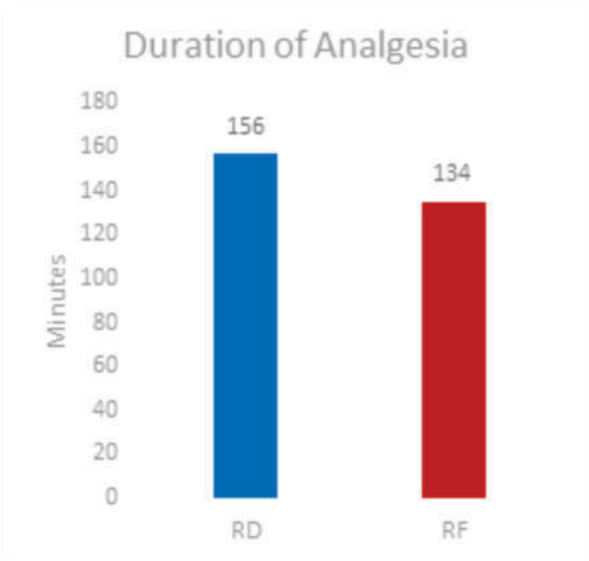
The mean time taken for attaining maximum motor blockade is 7.03 ± 2.65 mins in group RD and 11.37± 3.53 mins in group RF. There is a statistically highly significant difference between the groups (p=0.00).

Two Segment Sensory Regression



The time for attaining 2 segment sensory regression was better in group RD than group RF (p =0.00)

Duration Of Analgesia



The mean duration of analgesia is 156.73±55.429 mins in group RD and 134.83±51.386mins in group RF. There is a statistically highly significant difference between the groups (p=0.118).

Grade Of Motor Block

The Bromage scale attained by the patients in both the groups. Complete motor block(Bromage4)was attained in 28 patients[out of 30 patients] in group RD whereas it was attained only in 20 patients [out of 20 patients]in group RF which was statistically significant(p=0.009).

Duration Of Motor Block (minutes)

The duration of motor blockade in Group RD is better than Group RF with p value of 0.026

Neonatal Apgar Scores

It shows no difference in the APGAR score .Hence APGAR score is independent of type of intervention (group)

Duration Of Post Operative Analgesia

It shows that duration of post operative analgesia were comparable between the groups (p value = 0.270)

Post Operative Pct Consumption

It shows that post operative IV Paracetamol consumption between the groups were comparable (p value = 0.300)

Mean heart rate (bpm) at various time intervals

It shows mean HR at various intervals in mmHg in the two groups.

There was no statistically significant difference in the heart rate at various intervals between both the groups.

There was no statistically significant difference in systolic blood pressure at various intervals between both the groups.

Mean DBP at various time intervals in mm Hg

There was no statistically significant difference in diastolic blood pressure at various time intervals between both the groups.

Mean arterial pressure at various intervals in mm Hg

There is no statistically significant difference in diastolic blood pressure between both the groups except at 60 minutes (p value = 0.004).

DISCUSSION

A Study Entitled "Comparison Of Efficacy Of Intrathecal Dexmedetomidine Versus Fentanyl As Adjuvant To Isobaric Ropivacaine In Parturients Undergoing Elective Lscs " Was Undertaken In Vani Vilas Hospital And Ghousia Maternity Hospital , Bowring and Lady Curzon Hospital attached to Bangalore Medical College and Research Institute , Bangalore, to evaluate the sensory and motor blocking properties between 0.75% Isobaric Ropivacaine with

Dexmedetomidine and 0.75% Isobaric Ropivacaine with Fentanyl .

METHODOLOGY

After informed consent 60 parturients of ASA class II, posted for elective lower segment cesarean section were grouped randomly using computer generated numbers and assigned to one of the two groups, either 0.75% Isobaric Ropivacaine with Dexmedetomidine (Group RD) or 0.75% Isobaric Ropivacaine with Fentanyl (Group RF) . Subarachnoid block was given with 25 G Quinke's spinal needle at L3-4 interspace with patient in left lateral position. After continuous and free flow of CSF, 2.5 ml of study drug either 0.75% Isobaric Ropivacaine with Dexmedetomidine or 0.75% Isobaric Ropivacaine with Fentanyl was given. Immediately patient was made to lie on supine position on the operating table being flat. All the patients in our study weregivenspinal anesthesiainleft lateral position to avoid supine hypotension syndrome.

Hypothesis made before starting the study

Hypothesis made before the study was that 0.75% of Ropivacaine with Dexmedetomidine will produce better and prolonged subarachnoid block than that of 0.75% Ropivacaine with Fentanyl in lower segment cesarean section.ButRopivacaineof0.75% with Fentanyl can also be used for surgeries of shorter duration.

Drug selected for the study

In our study, the drug selected for Subarachnoid block was Ropivacaine,a newer amide local anaesthetic which was introduced in India in the year2009 [NeonlaboratoriesLtd.India].The potency of Ropivacaine relative to Bupivacaine is two third with regard to sensory block and half with regard to motor block[6,104]. Cardiotoxicity of Ropivacaine is less than Bupivacaine as it causes less depression of myocardial contractility[91]. Ropivacaine has been recently introduced in India and is available in two concentrations of Isobaric 0.5% and 0.75%.As not many studies have been done to know the efficacy of Ropivacaine with comparison of additives in lower segment cesarean section surgeries, a study was required to know the sensory and motor blocking properties of Ropivacaine for lower segment cesarean section surgeries.

Concentrations of the drug selected

Ropivacaine is available in two concentrations of 0.5% and 0.75% Isobaric preservative free in the market. Studies have been done to compare the efficacy of these two concentrations for Subarachnoid block for lower limb orthopaedic procedure[92]. As per Ravipati P et al[100] (2017) who compared the efficacy between intrathecal Dexmedetomidine and Fentanyl as an adjuvant to 2.0 ml of 0.75 % Isobaric Ropivacaine showed earlier sensory blockade and motor blockade in patients for lower limb surgeries with intrathecal Dexmedetomidine with Ropivacaine than with Fentanyl.However there are not many studies showing the use of Isobaric Ropivacaine 0.75% in lower segment cesarean section surgeries . Hence we selected Isobaric Ropivacaine for the same.

Dose and volume of the drug selected

Berrin Gunaydin et al (2010) studied the efficacy of plain or Hyperbaric solutions of intrathecal Bupivacaine and Ropivacaine on maternal block characteristics, complications, side effects and neonatal parameters to find out which is superior in a single study in elective LSCS. 103 term parturients were randomly assigned to receive intrathecal 10mg Hyperbaric Bupivacaine,10 mg plain Bupivacaine ,15 mg Hyperbaric Ropivacaine prepared with dextrose 30 % or 15mg plain Ropivacaine coadministered with Fentanyl 20 mcg. Intrathecal Hyperbaric Ropivacaine 15mg with Fentanyl 20 mcg was found to be more suitable as it provided early motor recovery leading to faster patient ambulation , rapid onset of sensory block with less incidence of hypotension [93].

Un Canan et al (2013) compared the anaesthetic efficacy and foetal and maternal effects of intrathecal Hyperbaric Ropivacaine + 25mcg Fentanyl versus intrathecal Hyperbaric Bupivacaine + 25 mcg Fentanyl in elective caesarean delivery .The study included 40 ASA 2 patients scheduled for caesarean delivery who were randomized into two groups of 20 each . The combinations of Bupivacaine + Fentanyl or Ropivacaine + Fentanyl exhibited similar anaesthetic efficacy and fetal and maternal effects.[96]

Gupta R et al (2013) studied to compare intrathecal Hyperbaric versus Isobaric Ropivacaine in patients undergoing lower abdominal surgery in a randomized controlled double blind study . Group A (n= 35) received 3 ml of Isobaric Ropivacaine 6 mg/ml (18mg). Group B (n=35) received 3 ml of Hyperbaric Ropivacaine 6 mg/ml (18 mg). Intrathecal Hyperbaric Ropivacaine provided more rapid, adequate and good quality sensory and motor block with rapid post – operative recovery as compared to Isobaric Ropivacaine.[97]

Therefore we used 2 ml of 0.75% Isobaric Ropivacaine with Dexmedetomidine 5 micrograms and Fentanyl 25 micrograms , both the adjuvants that equals 0.5 ml , therefore total volume of 2.5 ml was used.

Sensory blockade

Onset of sensory blockade

In our study onset of sensory block is considered as loss of sensation at T10. The mean time for sensory block onset was 5.17±2.245 mins in RD group vs. 6.17±2.231 mins in RF group with statistically insignificant p value of 0.095

Our study does not correlate with the study conducted by Ravipathi et al.[100] where there was statistically significant difference in the time taken for onset of sensory blockade between 0.75% of Isobaric Ropivacaine wih Dexmedetomidine and 0.75% Isobaric Ropivacaine with Fentanyl.

Our study correlates with Al-Ghanem et al [8] where group D had a sensory onset of 7.5± 7.4 and group F had 7.4± 3.3 with a p value of 0.95, hence the sensory onset between the groups were comparable. In this study conducted by Al-Ghanem S M et al[8], all the patients were given subarachnoid block in sitting posture and authors have not mentioned how much time was taken to bring the patients to supine position after completion of SAB. The dose of Bupivacaine used in their study was 10mg unlike our study where Isobaric Ropivacaine 15 mg was used . They have used isobaric Bupivacaine instead of isobaric Ropivacaine unlike our study.

In the study done by Mahendru V et al[12] , the sensory onset time has been defined as the time for onset of sensory block to T8 unlike our study where in we have taken onset time to T10 level. Hence the onset duration is more prolonged in their study .

Time for maximum sensory level

In our study the mean time for maximum sensory level is 9.37±2.822 mins in RD group vs.15.50±3.875 min RF group. There is statistically significant difference between the groups in the time taken for maximum sensory level

Our study agrees with the studies conducted by Abhinandan Mittal et al.[99] and where there was statistically significant difference in the time taken for maximum sensory blockade between 0.75% of Isobaric Ropivacaine with Dexmedetomidine and 0.75% Isobaric Ropivacaine with Fentanyl.

Our results do not correspond with the study conducted by Wahedi et al.[81] where the time for maximum sensory block with 0.75% was [32 mins] and with 0.5% was [24mins].This is probably because in our study the sensory level was assessed using pin prick method and in Wahedi et al[81]. study it was using loss of sensation to cold.

In the study conducted by Al Ghanem SM et al[8] , time to reach maximum sensory level in group D was 19.3±2.8 and group RF was 18.3±2.4 with p value of 0.126 where the results were again comparable

Hence our study compares with the studies conducted by Al Ghanem S M et al[8]Gupta R et al[94] and Mahendru V et al[12], who found no statistical significant difference in the mean-time taken for maximum sensory blockade between Dexmedetomidine group and Fentanyl group unlike our study.

Two segment sensory regression

The mean time taken for 2 segment sensory regression is 72.27±11.383 mins in Ropivacaine 0.75% group and 61.80±10.074 mins in Ropivacaine 0.5% group. There is statistically significant difference between the groups (p=0.000) with faster regression of sensory block in group RF .This correlates with the study conducted by Apura Abhinandan Mittal and et al.[99] who also found statistically significant difference between the two groups RD and RF.

Our study compares with the study conducted by Tarbeeh G A et al[11] ,

who also found statistically significant difference in the mean time taken for two segments sensory regression between Fentanyl group (114±35min) and Dexmedetomidine (150±42min) group when compared with Bupivacaine group (100±25min).

Our study compares with the studies conducted by Tarbeeh G A et al[11] , Gupta R et al[94] who found statistically significant difference in the mean time taken for two segments sensory regression between Fentanyl group and Dexmedetomidine group.

In the study conducted by Gupta R et al[94], the mean time taken for sensory regression by two segments in Dexmedetomidine group was 120±22.2 minutes which concurs with our study (72.2±11.38minutes). The duration for two segments sensory regression with Fentanyl was less (76±20.2min) compared to our study (61.8±10.07min).

In the study conducted by Kanazi et al[10], the mean time taken for sensory regression by two segments in Bupivacaine group was 80±28 minutes and in Dexmedetomidine group was 122±37min which compares with our study. In a study conducted by Singh H et al[80], there was significant increase in sensory regression by two segments in Fentanyl group (93±22 minutes) as compared to Bupivacaine group (74±18 minutes) which correlates with our study.

Duration of analgesia

In our study the duration of analgesia was 156.73±55.429 mins in RD compared to 134.83±51.386 mins in RF which was statistically insignificant (p=0.118).

Our study disagrees with the studies conducted by Ravipathi et al[100] and Apurva Abhinandan Mittal et al[99] where duration of analgesia was statistically significant between group RD and RF.

Our study compares with the study conducted by Tarbeeh G A et al[11], who have also found the statistically significant difference between the Dexmedetomidine and Fentanyl groups when compared with Bupivacaine group.

In our study the mean duration of analgesia in Group-D was higher and statistically significant compared with Fentanyl group. Our study correlates with the study conducted by Gupta R et al[94] (Dexmedetomidine group 251±30min and Fentanyl group 168±15min) and Tarbeeh GA et al [11] (Dexmedetomidine group 450±84min and Fentanyl group 280±61min).

Our study also has found a prolonged duration of analgesia with Dexmedetomidine group when compared with Bupivacaine group.

Motor blockade

Onset of motor blockade

The mean time taken for the onset of motor blockade is 3.43±1.382 mins in group RD and 3.97±1.426 mins in group RF . There is no statistically significant difference between the groups (p=0.147)

Our results agree with the results of Ravipathi et al[100] where they have found no statistical difference in the mean duration of motoronset.

Our study does not compare with the studies conducted by various authors [7,8,10,11,80]. This was probably due to the mean time taken for onset of motor block in their studies was Bromage 3 unlike our study which was Bromage 1. Hence the onset time of motor blockade was prolonged in their studies compared to our study.

Degree of motor blockade

In our study it was found that group RD produced more intense motor blockade than RF. In group RD number of patients with grade 4 motor blockade [absence of movement in the toes- complete motor blockade]were 28 compared with 20 patients in group RF . This is statistically significant (p=0.009)

In the study conducted by Farokhmehr et al.[101], Bromage score was higher in the 10 µg/kg Dexmedetomidine group (P = 0.0001) with lower pain score as compared with the 5 µg/kg Dexmedetomidine and placebo groups (P = 0.0001). This was statistically significant and similar to our study.

Time for maximum motor blockade

The mean time for maximum motor blockade is 7.03±2.659 mins in group RD and 11.37±3.538 mins in group RF which was statistically significant (p=0.00),

Similarly, in the study conducted by Apurva Abhinandan Mittal et al [99] time for complete motor block blockade was 25.42±3.36 mins in group RD vs 36.5±4.96 mins in group RF with p value of less than 0.05.

In the study conducted by Mahendru V et al[12], mean time taken for onset of motor blockade in Bupivacaine group was 9.2±2.9 min, Fentanyl group was 9±3min and Dexmedetomidine group was 9.7±3.2min. Statistically there was no significant difference in mean time taken for onset of motor block and hence does not correlate with our study.

Also in study conducted by Gupta R et al[94] , the mean time taken for maximum motor blockade was 11.6±1.8min in Group-D, 11.2±1.3min in Group-F who also did not find statistically significant difference which doesn't correlate with our study

Duration of motor blockade

The duration of motor blockade in group RD is 136.13 ±49.37 mins compared to 108.7 ± 43.59 mins in RF group with p value of 0.026 which is statistically significant .

Similarly in the study conducted by Mittal A A et al[99], the duration of motor block was (328.50±31.82)min. in Group 1, (235.0±21.84)min in Group 2 and (174.25±13.18)min. in Group 3 with p value of < 0.05 . And also in the study conducted by Ravipathi et al[100], the mean of total duration of motor block in Group RD was 136.7333 min while it was 94.8667 min in Group RF which was clinically and statistically significant (P - 0.000).

Our study also correlates with studies conducted by Al-Ghanem S Met al[8], Gupta R et al[94], Mahendru V et al[12] and Tarbeeh G A et al[11], who have found statistically significant difference when Dexmedetomidine group was compared with Fentanyl group

Heart rate

There was no statistically significant difference between the two groups except the basal heart rate . Our results does not concur with the results conducted by Ravipathi et al [100] where there was no significance between the two groups.

Blood pressure

There was no statistically significant difference in SBP, DBP, MAP monitored at various intervals between the two groups. This is probably due to all our patients were preloaded with 500 ml of ringer's lactate.Our results concur with results conducted by Apurva Abhinandan Mittal et al[99]

CONCLUSION

From the present study it can be concluded that

1. There was no statistically significant difference in the onset of sensory block and duration of analgesia.
2. There was statistically significant difference in the time for maximum sensory block (prolonged) in group RD compared to group RF.
3. Two segment regression was faster in group RF compared to group RD .
4. There was no statistically significant difference in the onset of motor block .
5. The time for attaining maximum motor block was faster in group RD compared to group RF.
6. Grade of motor block was better achieved in Group RD compared to Group RF.
7. Duration of motor blockade was prolonged with Group RD compared to Group RF.

Hence we can conclude that Group RD attained maximum level of sensory and motor block with slower two segment sensory regression. Thus Group RD proved to be better in our study conducted in lower segment cesarean section surgeries.

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