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A comparative study - 0.25% bupivacaine versus 0.25% ropivacaine for ilioinguinal and ilio hypogastric nerve block by loss of resistance technique for post-operative analgesia in lscs cases.

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Abstract

Cesarean sectionis one of the most frequently performed major surgical interventions, causing severe postoperative pain. The postoperative analgesic regimen should provide safe, effective analgesia, with minimal side effects for the mother and her child. Different analgesic effect modalities have been used for the treatment of pain after cesarean delivery.We aim to compare 0.25% ropivacaine and 0.25% bupivacaine for bilateral ilioinguinal and illiohypogastric nerve block with regards to theadequacy, duration of analgesia, and hemodynamic stability. Here, 60 patients satisfying the inclusion and exclusion criteria were included. The pre-operative evaluation was done and routine investigations were sought. The pprocedure was explained to the patient and written consent was taken. LSCS was done under standard spinal anesthesia technique using 10 mg of 0.5% heavy bupivacaine. At the end of the surgery, the bilateral ilioinguinal and illiohypogastric nerve block was given with 15 ml of the study drug, 2cm medial and superior to the anterosuperior iliac spine using a 22 gauge needle. The severity of pain was assessed at1 hour, 2 hours, 4 hours, 6 hours, 8 hours, 10 hours, 12 hours, and 24 hours by Visual Analogue Scale. Hemodynamic parameters were monitored as well. The study ended at the time of 1st rescue analgesia. We found that the group receiving bupivacaine had alower VAS score, with delayed requirement for rescue analgesia.Hence, this technique can be imbibed as an effective modality in regular clinical practice.

Keywords: Ropivacaine, bupivacaine, post-operative analgesia, post lscs.

Introduction

Cesarean section (CS) has been one of the most regularly achieved major surgical interventions and causes severe postoperative pain. Childbirth is an emotion-filled event and the mother needs to bond with her newborn as early as feasible. Any intervention that leads to improve Ment in ache remedyis worthyof investigation. Optimum analgesia in post cesarean section patients is vital to provide better care for the mother, facilitate early ambulation, enhance bonding between mother – neonate, and save postoperative morbidity. The analgesic regimen needs to satisfy the goals of providing safe, effective analgesia, with minimal side effects for the mother and her child. Different analgesic effect modalities have been used for the remedy of pain after cesarean delivery.

Opioid drugs are effective in reducing post-cesarean pain but side effects such as nausea, vomiting, sedation of newborn, and secretion in breast milk limit their use. Bilateral Ilioinguinal and illiohy Po gastric nerve block is an effective method to provide analgesia in them. Bupivacaine and Ropi vacaine have been used in various concentrations in many peripheral nerve blocks. Bupivacaine and Ropi vacaine are synthetic amide local anesthetic drugs commonly used drug for anesthesia, analgesia, infiltration, and nerve blocks. Normal safe dose for bupivacaineis 2 mg/kg and for ropivacaine is 3-4 mg/kg.Ropivacaine is a newer drug with slow nerve penetrating power, produces differential blockade, and has a cardio-stable profile. It provides effective anesthesia at a concentration of 0.5% and adequate analgesia at 0.25%.

This studyaims at comparing 0.25% ropivacaine and 0.25% bupivacaine in post cesarean section patients for bilateral ilioinguinal and illiohy Po gastric nerve block with regards to the adequacy of pain relief (visual analogue scale) and duration of analgesia, hemodynamic parameters, and any adverse effect.

Materials and methods

This prospective, randomized clinical study was carried out at the Kempe Gowda Institute of Medical Sciences and Research Centre, Bangalore, Karnataka, India, betweenMarch 2022 and September 2022. The study was approved by the institutional ethics committee on 11 February 2022.

60 female patients aged between 18- 40yrss of American Society of Anesthesiologists (ASA) physical status 1 and 2, scheduled to undergo caesarean section with Pfannensteil incision under spinal anesthesia wereenrolled in this prospective randomized study. Patients with known sensitivity to the used drugs, infection at the nerve block area, incision other than Pfannensteil incision, and patients with major hepatic/ renal/ cardiovascular dysfunction/ respiratory disease/ preeclampsia or eclampsia were excluded from the study.

All patients were visited pre-operatively, the procedure was explained andwritten informed consent was taken. A detailed history and a thorough general and systemic examination and all routine investigations required for preoperative evaluation and the proposed surgery were done.

On arrival in the operating room, intravenous access using an 18G cannula was secured. Patient's basal parameters- Non-invasive blood pressure, heart rate, respiratory rate, and SpO2 were monitored.

Blinding was done by using pre-filled syringes of the study drug as both bupivacaine as well as ropivacaine are clear colorless drugs. To make 0.25% bupivacaine, or ropivacaine dilution with distilled water was done and

labelled as "DRUG B and R" the contents of which were known only to a third party anaesthesio logist not participating in the study. The observer or patients were not aware of the drug contents in the syringes. Lower segmental cesarean section was done under standard spinal anesthesia technique using 10 mg of 0.5% heavy bupivacaine. Level of sensory block was noted.

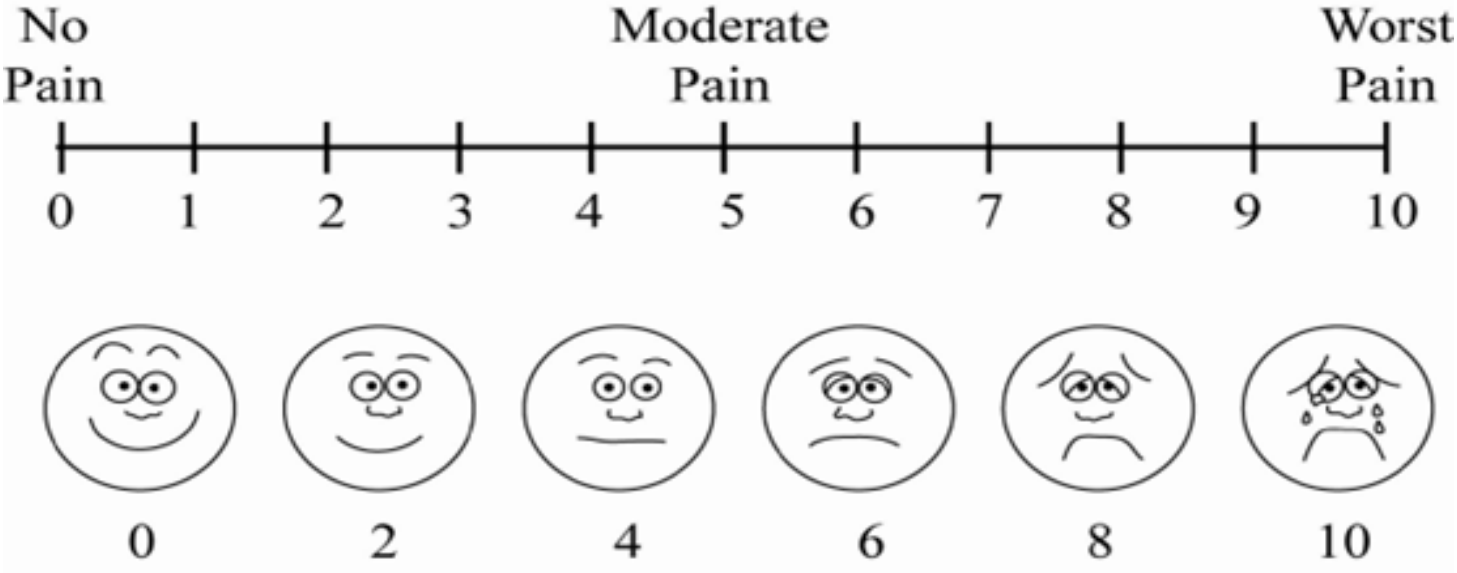
At the end of the surgery after regression of two segment levels of subarachnoid block, the bilateral ilioinguinal and illiohypogastric nerve block was given by landmark technique. Under all aseptic precautions at a point 2cm medial and superior to the anterosuperior iliac spine using 22 gauge needles a total of 15ml of the study drug was injected in a fan-like distribution between external and internal oblique and transversesabdomen are muscles on each side. To prevent entering the abdomen after piercing the external oblique muscle, the depth was limited to 1.5 cm, continuous aspiration was done while injecting the drug.

The severity of pain was assessed systematically by an investigator blinded to group allocation. These assessments were performed at1 hour, 2 hours, 4 hours, 6 hours, 8 hours, 10 hours, 12 hours, and 24 hours by Visual Analogue Scale.Hemodynamic parameters such as Heart rate, Systolic blood pressure, Diastolic blood pressure, SpO2, and respiratory rate were monitored as well.The sstudy ended at the time of rescue analgesia with IV Paracetamol 1gm. Time to complete regression of spinal anesthesia was noted by using the pinprick method and Brom age scale.

Visual analog scale (VAS)

Since the perception of pain is highly subjective, this variable was standardized by using data from VAS. It consists of a 10cm line anchored at one end by a label such as no pain and at the other end by a label such as worst pain imaginable. The patients simply mark the line to indicate the pain intensity.

If the patient complained of pain in between, then VAS score was reassessed, if it was more than 5, the patient received the injection of Paracetamol 1gmIV as rescue analgesia.



Results

After collecting the data, all the variables are examined for outliers and non-normal distributions. The Categorical variables are expressed as Frequency and Percentage. The Quantity variables are expressed as mean and standard deviation.

Descriptive statistics are used to evaluate baseline characteristics. Student's t-test was used to calculate the p-value. Discrete variables were analyzed using Chi-Square test and Mann Whitney U test with a $P < 0.05$ considered statistically significant. The statistical analysis was performed using the statistical software package SPSS 20.0.

Table 1: Comparison of mean age (in years) among 2 groups using Mann Whitney Test

Variable	Category	Group B		Group R		P-Value
		Mean	SD	Mean	SD	
Age	Mean	25.43	2.73	26.37	3.66	0.27
	Range	19 - 29		20 – 32		

The mean age in Group B is 25.43years, and in Group R, it is 26.37 years.

Table 2: Comparison of mean values of Vital Parameters between 2 groups using Independent Student t Test.

Parameter	Group	N	Mean	SD	Mean Diff	p-value
HR	Group B	30	73.90	5.93	-0.63	0.70
	Group R	30	74.53	6.78		
Systolic BP	Group B	30	121.53	5.77	-0.37	0.81
	Group R	30	121.90	5.92		
Diastolic BP	Group B	30	79.00	13.57	-3.53	0.17
	Group R	30	82.53	2.57		
RR	Group B	30	15.63	1.33	-0.40	0.27
	Group R	30	16.03	1.43		
SPO2	Group B	30	100.00	0.00	0.00	..
	Group R	30	100.00	0.00		

The test results demonstrated, heart rate of 73.90 +/- 5.93 in group B and 74.53 +/- 6.78 in group R with a p value of 0.70. Therefore, the results are statistically insignificant.

The test results demonstrated, Systolic BP of 121.53 +/- 5.77 in group B and 121.90 +/- 5.92 in group R with a p value of 0.81. Therefore, the results are statistically insignificant.

The test results demonstrated, Diastolic BP of 79.00 +/- 13.57 in group B and 82.53 +/- 2.57 in group R with a p value of 0.17. Therefore, the results are statistically insignificant.

The test results demonstrated no difference in mean SpO2 between the two groups.

Table 3: Comparison of mean VAS Scores between 2 groups at different time intervals using Independent Student t Test

Time	Group	N	Mean	SD	Mean Diff	p-value
1 hour	Group B	30	1.03	0.88	0.25	0.36
	Group R	30	1.08	0.09		

2 hours	Group B	30	1.00	0.00	0.07	0.16
	Group R	30	1.07	0.25		
4 hours	Group B	30	1.20	0.41	0.83	<0.001*
	Group R	30	2.03	0.18		
6 hours	Group B	30	3.13	0.35	1.00	<0.001*
	Group R	30	4.13	0.90		
8 hours	Group B	30	3.72	0.43	0.84	<0.001*
	Group R	30	4.49	0.57		
10 hours	Group B	30	4.12	0.29	0.61	<0.001*
	Group R	30	4.86	0.68		
12 hours	Group B	30	4.47	0.51	0.63	<0.001*
	Group R	30	5.10	0.31		
24 hours	Group B	30	5.50	0.57	0.57	<0.001*
	Group R	30	6.07	0.25		

The test results demonstrated that on comparison of VAS scores at 1 hour, 2 hours, 4 hours, 6 hours, 8 hours, 10 hours, 12 hours and 24 hours in group B was 1.03 +/- 0.88, 1.00, 1.20 +/- 0.41, 3.13 +/- 0.35, 3.72 +/- 0.43, 4.12 +/- 0.29, 4.47 +/- 0.51, 5.50 +/- 0.57 respectively which was lower at all intervals as compared to those shown by group R patients (1.08 +/- 0.09, 1.07 +/- 0.25, 2.03 +/- 0.18, 4.13 +/- 0.90, 4.49 +/- 0.57, 4.86 +/- 0.68, 5.10 +/- 0.31, 6.07 +/- 0.25 respectively).

The results were Statistically Significant at 4 hrs, 6 hrs, 8 hrs, 10 hrs, 12 hrs and 24 hrs with p value of < 0.001.

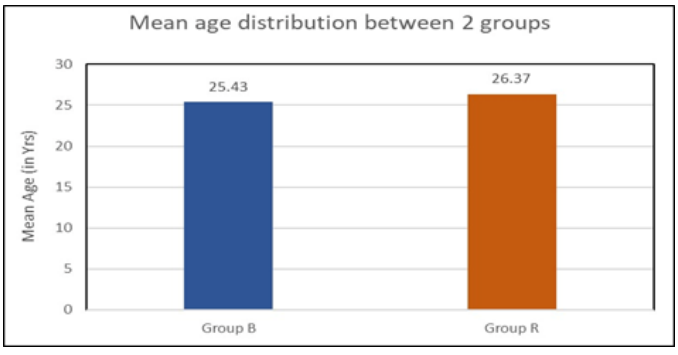
Table 4: Comparison of administration of first Rescue Analgesic between 2 groups using Chi-Square Test.

Variable	Category	Group B		Group R		P-Value
		n	%	n	%	
First rescue Analgesic	6^{th} Hour	0	0%	30	100%	<0.001*
	12^{th} Hour	30	100%	0	0%	

* - Statistically Significant

The results demonstrate that the time of 1^{st} rescue analgesia in group B was at the 12^{th} post-operative hour in all patients (100%) as opposed to the first rescue analgesia at 6^{th} hour in all patients of group R (100%) and the results were statistically significant p value < 0.001.

Graph 1:



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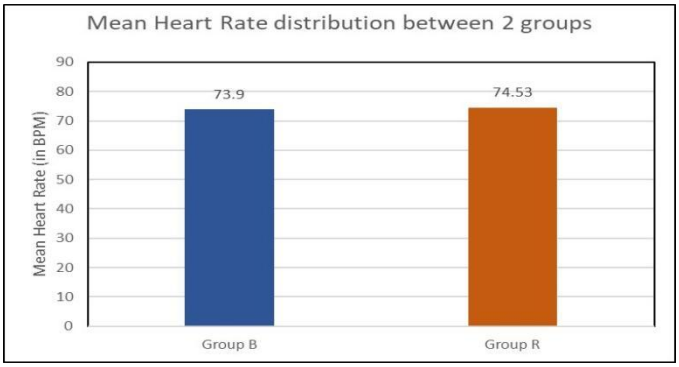

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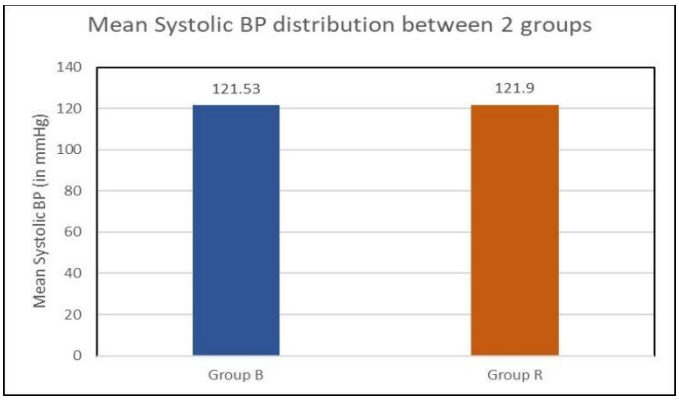

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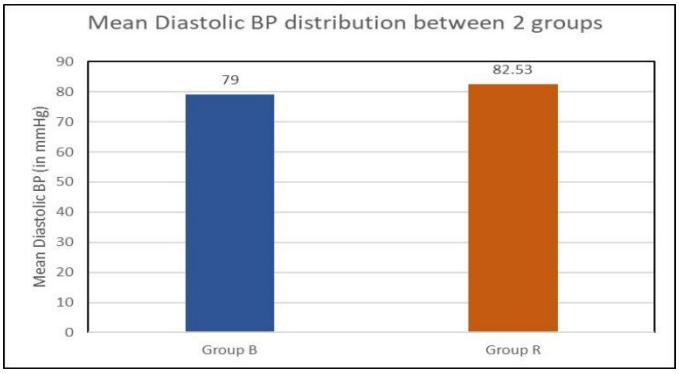

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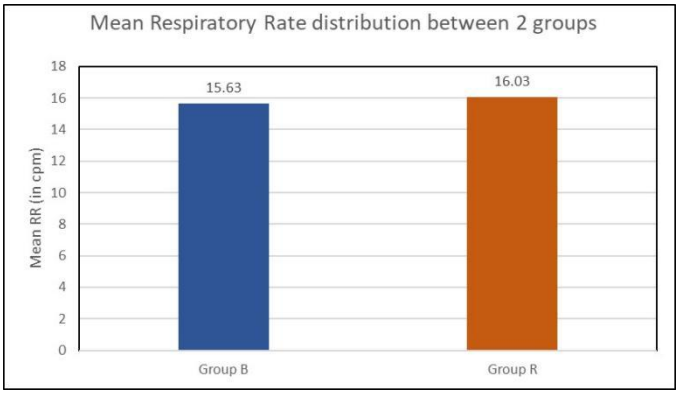

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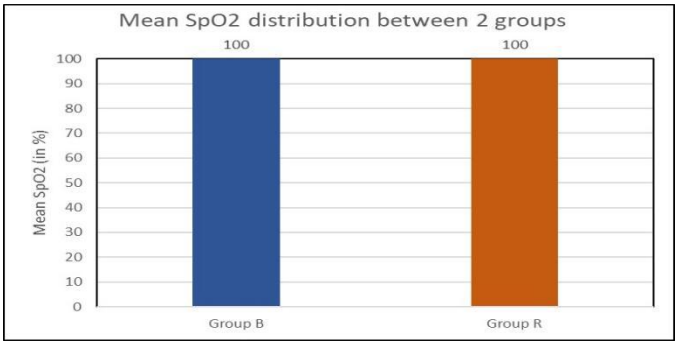

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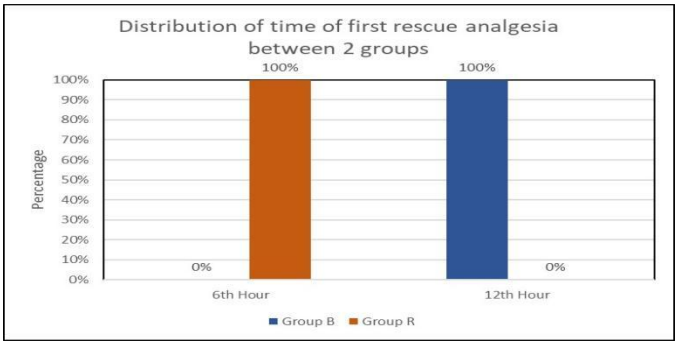

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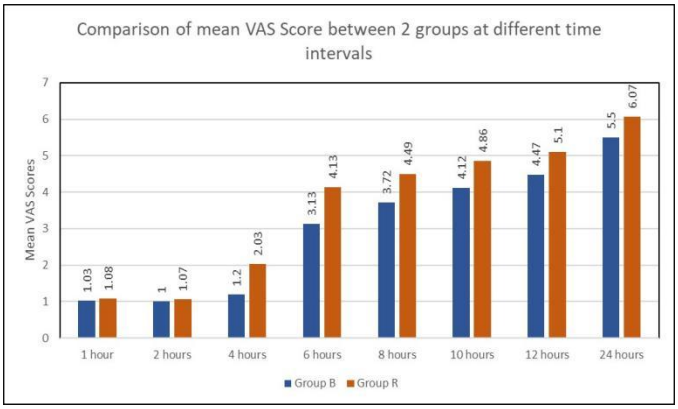

Discussion

The relief of pain has been the basic aspect of the practice of anesthesiology.

Postoperative pain is one of the most undesirable experiences for a patient undergoing cesarean delivery. A reduction in the postoperative stress response, a decrease in postoperative morbidity, and certain cases, a better surgical result is only a few of the benefits of postoperative analgesia. High-quality analgesia is important after cesarean delivery to promote early

recovery and optimize the mother's ability to care for her newborn.

Several modalities have been used to alleviate pain after surgery – like nonsteroidal anti-inflammatory drugs (NSAIDs) (including parecoxib/valdecoxib, ketoprofen, and paracetamol), opioids (both intravenous and patient-controlled analgesia), infiltration of local anesthetic (both before and after creation of pneumoperitoneum), thoracic epidural block, multimodal analgesia (using opioids, NSAID and infiltration of local anesthetic) and ultrasound-guided TAP block.

Lower segment cesarean section performed by Pfannenstiel incision lies at L1-L2 dermatomes. Sensory innervation of L1-L2 dermatomes is accomplished by ilioinguinal and iliohypogastric nerves. In the current study, both Group B and Group R patients received spinal anesthesia for the surgery.

This study aimed to determine the efficacy of injection of local anesthetic 0.25% Bupivacaine and 0.25% Ropi vacaine to block ilioinguinal and iliohypogastric nerves bilaterally to reduce postoperative pain after cesarean section and found the mean age distribution

Demographic Data

In our study, the age of patients in group B ranged between 19-29 years with a mean age of 25.43years, and in Group R, it was 20-32 years with the mean age of 26.37 years.

The age distribution profile in our study was comparable to the study conducted by Naghshineh E et al for the Preventive effect of ilioinguinal nerve block on postoperative pain after cesarean section where the mean age of patients in two groups was 27.8 ± 2.7 and 27.2 ± 4.9 years [1]

Hemodynamic parameters

In our study, hemodynamic parameters were maintained throughout the observation interval for both study groups.

VAS Pain Score

In our study VAS scores recorded at 1 hour, 2 hours, 4 hours, 6 hours, 8 hours, 10 hours, 12 hours, and 24 hours in group R patients were higher as compared to the scores recorded in group B PATIENTS. That is, the effect of analgesia in group B was found to be better as compared to the effect seen in group R group. Also, in group R patients, all of them required rescue analgesia within 6 hours post-operatively whereas the group B patients tolerated pain better and required the first rescue analgesia within 12 hours post-operatively.

These results are in complete tandem with the study done by Buntinget al [2], where he performed ilioinguinal and iliohypogastric nerve block techniques on post-LSCS cases patients with0.5% bupivacaine and found out that both the block group had lower pain scores and lower analgesic requirements compared to no- block group.

Neha Sharma et al [3] conducted a studyon 60 adult patients undergoing elective abdominal surgery. They compared 0.25% Bupivacaine with 0.5% Ropivacaine in the TAP block.

The comparison of mean pain scores at 8 h and 12h post-operatively showed significant differences in both the groups with Ropivacaine having significantly higher VAS scores than the Bupivacaine group.

Conclusion

Thus, from our study, it can be concluded that 0.25% bupivacaine for bilateral ilioinguinal and iliohypogastric nerve block provides better post-operative analgesia in post-LSCS patients as compared to ropivacaine. We also

inferred that bupivacaine group patients had delayed requirement of first rescue analgesia

Thus, it can be imbibed as an effective modality into regular clinical practice.

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