INTERNATIONAL JOURNAL OF CURRENT MEDICAL AND PHARMACEUTICAL RESEARCH
ISSN: 2395-6429, Impact Factor: 4.656
Available Online at www.journalcmpr.com
Volume 8; Issue 06(A); June 2022; Page No.267-270
DOI: http://dx.doi.org/10.24327/23956429.ijcmpr20220063

Case Report

A RANDOMIZED PROSPECTIVE STUDY OF INTRATHECAL 1% CHLORPROCAINE AND 0.5% ROPIVACAINE IN PERIANAL SURGERIES

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ARTICLE INFO

Article History:
Received 06th March, 2022
Received in revised form 14th April, 2022
Accepted 23rd May, 2022
Published online 28th June, 2022

Key words:
chlorprocaine, ambulatory surgeries, ropivacine

ABSTRACT

A Comparative study of intrathecal 1% Chlorprocaine and 0.5% Ropivacaine in perianal surgeries. To compare the time of onset, height of block, intensity of sensory and motor blockade, duration of analgesia, time to ambulation, time to discharge as well as the incidence of side effects between the two groups. Patients who are scheduled for elective peri anal surgery are included after the pre anaesthetic assessment if they meet the inclusion criteria Group C – intrathecal 4.0 mL of 1% Chlorprocaine Group R – intrathecal 4.0 mL of 0.5% Ropivacaine There was no significant hemodynamic changes & com plicationsin the both groups. Average discharge time was significantly lower with chlorprocaine as compared to ropivacaine. Intrathecal administration of 40 mg of local anaesthetic 1% Chloroprocaine for surgeries of short duration, when compared with 0.5%,ropivacaine resulted in rapid onset with quicker recovery from anaesthesia and a shorter time for first rescue analgesia and unassisted ambulation.

INTRODUCTION

General anaesthesia is the most often used anaesthetic approach for different surgical procedures, according to both patients and doctors. Local anaesthesia has numerous benefits over general anaesthesia in case of immediate recovery and airway management. Aside from confining the anaesthetized region to the surgical site, frequent post-operative adverse effects of general anaesthesia such as nausea, vomiting, dizziness, and lethargy can be reduced. Because it delivers a stable anaesthetic effect with a speedy beginning of action, spinal anaesthesia is an appropriate anaesthetic alternative for surgical procedures of the lower abdomen and lower extremities.

Spinal anaesthesia is perhaps the very commonly utilised approach for lower abdominal procedures. A Perianal surgery delivers a modest quantity of local anaesthetic to the S4–S5 and coccygeal nerve rootsUnfortunately, its disadvantages, such as the possibility of urine retention, prolonged mobility, and prolonged hospitalization, may restrict its usage for day care surgery. [(3)] As the popularity of ambulatory surgery grows, so does the need for anaesthetic medications for outpatient regional anaesthesia. The ideal anaesthetic approach would indeed offer good operating circumstances, but it would also allow for speedy recovery, no postoperative adverse effects, and maximum patient satisfaction. Aside from improving the quality and lowering the cost of anaesthetic services, the ideal anaesthetic approach would also increase operative room efficiency and allow for quick patient departure.

Ropivacaine, a newer medication, has developed and is frequently used for epidural blocks and nerve plexus blocks. Ropivacaine has a better safety profile than bupivacaine in terms of central nervous system and cardiotoxicity. Although ropivacaine is often employed in nerve and epidural blocks, the information on its usage in the intrathecal route is limited. This study was designed to compare effects of two local anesthetics 1% Chloroprocaine and 0.5% Ropivacaine in perianal surgery.

Aim of the Study

To compare the time of onset, the height of block, intensity of sensory and motor blockade, duration of analgesia, time to ambulation, as well as the incidence of side effects between the two groups.

MATERIALS AND METHODS

Design of Study: Prospective comparative study

Place of Study: Department of Anesthesiology, Thoothukudi Medical College, Thoothukudi

Period of Study: 18 Months (November 2019- October 2021)

Sample Size: 60. Periodic sample

Study Population: Elective perianal surgeries

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Inclusion Criteria

1. ASA PS I & II.
2. Age between 18 to 65 years of either sex.
3. Elective perianal surgeries.

Exclusion Criteria

- Patient refusal.
- Coagulation disorder.
- Current treatment with Antiplatelet
- Sepsis.
- Dehydration.
- Spinal cord anamalies.

METHODOLOGY

Preanesthetic assessment

All patients will undergo a pre-anaesthetic checkup one day prior to surgery.A test dose of local anaesthetic is given one day prior to surgery.All patients had given alprazolam 0.25mg and ranitidine 150mg orally on the night before surgery and kept nil per oral for 8 hours.

Conduct of Anaesthesia

1. Boyles machine will be checked.
2. An emergency drug tray will be kept ready.
3. After shifting patients to OT and standard multi parameters monitors will be connected.
4. After securing IV access, premedication with inj. Glycopyrrolate 0.2mg + inj. Midazolam 1mg.
5. Patient positioned in the right lateral position, under SAP, the subarachnoid block was performed with 25G quinckes needle at L3L4 or L4L5 interspace, on clear tap of CSF, the drug will be injected after reconfirmation of CSF aspiration.

Study Procedure

1. GROUP C - block was given with inj. Chloroprocaine 1% 4ml.
2. GROUP R - block was given with inj. Ropivacaine 0.5% 4ml.
3. The time at which injection is completed is considered zero time of the study, and all the measurements are recorded from this point.
4. Pain is assessed by loss of pinprick sensation.
5. The motor block is assessed by modified Bromage Score.
6. Hemodynamics variables are recorded every minute for the first 5min, at 5min for the next half an hour after the administration of SAB and every 10min thereafter up to 120min after the block; postoperatively, patients were monitored every hour for the first 4h.
7. Any hypersensitivity reaction for the drugs and other adverse events are also monitored.
8. To evaluate the duration of sensory and motor block, patients are asked to inform the time of pain began and also the time when full power returned to the lower limb, in the post-operative period when the patient complained of pain at the operative site, rescue analgesics are given accordingly.

Statistical Analysis

Data are presented as percentages and the number of cases. Continuous variables were compared using the Independent sample t-test. Categorical data were analyzed with Pearson chi-square tests. Significance was defined by P values less than 0.05 using a two-tailed test. Data analysis was performed using IBM-SPSS version 21.0 (IBM-SPSS Science Inc., Chicago, IL).

RESULTS

Table 1 Cross-tabulation of gender and groups

			GENDER		Total
			F	M	
GROUP	GROUP C	Count	15	15	30
		% within GROUP	50.0%	50.0%	100.0%
	GROUP R	Count	15	15	30
		% within GROUP	50.0%	50.0%	100.0%
Total		Count	30	30	60
		% within GROUP	50.0%	50.0%	100.0%

In this study, 60 patients who underwent elective perianal surgery were divided into 2 groups. Group C - Intrathecal 4.0ml of 1% chloroprocaine (30 patients) and Group R - Intrathecal 4.0ml of 0.5% Ropivacaine (30 patients). There is no statistically significant difference in gender between groups.

Table 2 Comparison of time taken for sensory block peak level between groups

Group		N	Mean	Std. Deviation	P-value
Time Taken For Sensory Block Peak Level	Group C	30	4.13	0.78	<0.0001
	Group R	30	5.63	0.67	

The time taken for sensory block peak level in group C is 4.13±0.78 mins and in the group, R is 5.63±0.67 mins, which is statistically significant p<0.0001.

In group C, no complications were seen and in group R, 2 cases of bradycardia and 1 case of hypotension were noted. There is no statistically significant difference in complications between groups p=0.206. In this study, 60 patients who underwent elective perianal surgery were divided into 2 groups. Group C received intrathecal 4.0 ml of 1% chloroprocaine (30 patients) and Group R received intrathecal 4.0 ml of 0.5% Ropivacaine (30 patients).The demographic profile, including mean age, weight and height, was compared in both groups. There is no statistically significant difference in gender between the two groups. The mean time for onset of sensory block in Group C and Group R was 3.44±0.25 min and 4.32±0.13 min, respectively. The time taken for sensory block peak level in group C is 4.13±0.78 mins and in the group R is 5.63±0.67 mins The time taken for motor block peak level in group C is 3.23±0.57 min and in the group R is 4.47±0.51 mins The highest sensory block peak in group C was found in T8 (60%), followed by T6 (20.0%), T10 (16.7%) and T4 (3.3%). At the same time, the highest sensory block peak in group R was also found in T8 (46.7%), followed by T6 (30.0%), T4 (13.3%) and T10 (10.0%).There is no statistically significant difference in systolic blood pressure between groups. There is no statistically significant difference in diastolic blood pressure between two groups. There is a statistically significant difference in heart rate at 3 mins between groups The duration of sensory block in group C is 66.90±3.35 mins and in the group, R is 128.90±3.84 mins The duration of motor block in group C is 54.87±4.28 mins and in the group, R is 109.73±4.70 mins The duration of analgesia in group C is 81.53±5.79 mins and in the group, R is 154.30±6.20 mins The time taken for ambulation in group C is 120.47±7.10 mins and in the group, R is 250.33±6.38 minsIn group C, no

complications were seen and in group R, 2 cases of bradycardia and 1 case of hypotension were noted

DISCUSSION

Chloroprocaine is a quick-acting amino-ester local anaesthetic with few adverse effects and a short action time. Ropivacaine is the pure S enantiomer of propivacaine, a long-acting amide local anaesthetic medication. Ropivacaine has a lower lipid solubility than bupivacaine, which explains why it penetrates less deeply into myelinated motor neurons, resulting in less motor blockade and higher sensory-motor differentiation.

The hunt for the perfect anaesthetic agent is still ongoing, and we currently have a wide range of drugs with different qualities. Because none of the local anaesthetic agents can be used in all operations, the time necessitates a longer-acting medicine that covers all aspects of the surgery while staying within the parameters. The patient's features, as well as the drug's distribution, define the central neuraxial obstruction. The age, height, posture, spinal column anatomy, and CSF volume of a patient must all be taken into account. The drug's distribution is influenced by the quantity, volume, specific gravity, density, baricity of solution, and potency of the medicine used. The concentration lowers after drug administration due to CSF dilution and mixing, diffusion and distribution to neural tissues, uptake and fixing by neural tissues, and vascular absorption and elimination via arachnoid villi and directly from the capillary bed of parenchyma. These parameters govern the start of the sensory blockade, the start of the motor blockade, the peak height of the sensory block, the length of the sensory block, and the duration of the motor block. A greater sensory and motor blockade is accomplished when a higher dosage of spinal anaesthetic is used, for example. If the medicine concentration and dose are higher, the block will be deeper. The block is bigger when a medicine is given at a faster rate than when it is given at a slower rate.

Our study was conducted to compare the effects of intrathecal administration of 1% chloroprocaine and 0.5% Ropivacaine in perianal surgeries. A total of 60 patients were enrolled, of which 60 patients were randomly allocated into two groups, namely Group C and Group R, which were administered with 1% chloroprocaine and 0.5% Ropivacaine respectively. The demographic profile, including mean age, gender, weight and height, were compared in both groups. When the demographic parameters such as age, gender, weight and height were compared, it was found to be statistically non-significant to either of the local anaesthetics used. The onset of sensory block was substantially faster in group C than in group R in our investigation ($p<0.0001$). Khare *et al*. compared intrathecal 1% 2CP 30 mg (Group A) with 0.5% hyperbaric bupivacaine 15 mg (Group B) in infraumbilical procedures and found similar outcomes. They discovered that the onset of sensory block in Group A (1.8 ± 0.3 min) was much faster than in Group B (3.2 ± 0.4 min) ($P < 0.001$). The pKa of the medication, which is the unprotonated form that penetrates the neuron plasma membrane, is commonly used to identify the commencement of the action. Due to the high concentrations (1%) employed, CP has a rapid onset even with a relatively high pKa. Furthermore, the onset is dosage-dependent, which may account for the considerably earlier start of sensory block in our investigation.

In our study, the meantime to achieve the highest level of sensory block was significantly shorter in group C than group R ($p<0.0001$). According to Camponovo *et al*., the time to attain the greatest dermatomal degree of sensory block in Group A and Group B was 8.5 min and 14 min, respectively. As a result, with CP (Group A), it was substantially shorter ($P < 0.05$). [40] The mean time to achieve the highest level of motor block was significantly early in Group C compared with Group R, and the difference was statistically significant ($p<0.0001$). Group C and group R shows equal distribution of sensory block peak at T8, which was found to be 60% and 46.7%, respectively, and these values were statistically non-significant ($p=0.334$). When the systolic blood pressure was compared in both groups, it was found that there was no significant change in mean SBP ($P > 0.05$). This finding was in accordance with the findings of Jain *et al*. Jain *et al*. compared 1% chloroprocaine versus 0.5% bupivacaine intrathecally. It was also stated that there was no significant change in mean systolic blood pressure when administered intraperitoneally. [41] When the diastolic blood pressure was compared in the two groups, there was no significant change in mean diastolic blood pressure ($P >0.05$). This finding was in accordance with the findings of Jain *et al*. It was stated that there was no significant change in mean diastolic pressure when chloroprocaine and bupivacaine were administered intraperitoneally. Our study also suggests that there was a significant difference ($p=0.041$) found on heart rate at 3 min in group C, which was administered with 1% chloroprocaine. These findings were in accordance with the findings of Sinha R *et al*. In their investigation. The mean heart rate increased after spinal anaesthesia was administered in both groups, with Group B receiving more bupivacaine but not statistically significant. The heart rate began to fall after 21 min of anaesthesia, although it was more statistically significant in group B after 30 min than in group A, which was given chloroprocaine. Similarly, the duration of sensory block was significantly shorter in group C than group R ($p<0.0001$). In LSCS, Ashwini and Kumara compared 25 mg 2CP and 10 mg bupivacaine. The sensory blockage with 2CP (61.83 min) was much shorter than that with bupivacaine (174.67 min). In terms of sensory blockade duration, the findings of this study are consistent with our findings. discovered that Group A had a shorter sensory block (74.64 ± 10.42 min) than Group B (198.92 ± 11.95 min) ($P = 0.001$). The fast breakdown of 2CP by plasma pseudocholinesterase may account for its shorter lifetime. The duration of motor block was found to be significantly shorter in group C (54.87±4.28 min) when compared to group R (109.73±4.70min). Our results coincide with those They found that the duration of motor block was significantly shorter in Group A (76 min) than in Group B (119 min) ($P < 0.05$). Similarly, Camponovo *et al*. discovered that the length of the motor block in Group A (100 min) was considerably shorter than in Group B (210 min) ($P < 0.005$). [40] The duration of motor block was similarly shorter in Group A (59.86 ± 7.17 min) than in Group B (168.33 ± 13.62 min) ($P < 0.05$), according to The biggest beneficial impact of 2CP was the shorter length of the motor block, which allows for earlier ambulation and thereby reduces the negative consequences of protracted motor blockade. The mean duration of analgesia was significantly shorter in group C (81.53± 5.79 min) when compared to Group R (154.30 ± 6.20 min). Our findings are similar to those of who discovered that the duration of analgesia in Group A (120 min) was substantially shorter than in Group B (180 min) (293.5 min) ($P< 0.005$).[40] The findings of Ashwini and Kumara, who compared the duration of analgesia in LSCS patients, were

identical to ours. According to the researchers, analgesia lasted 60 minutes in the CP group and 174 minutes in the bupivacaine group. (P< 0.05).PDPH, urine retention, Transient Neurologic Symptoms, or other neurological deficits were not reported by any of our patients. Short-acting intrathecal local anaesthetics, particularly lignocaine, mepivacaine, and earlier preparations of CP, were associated with a high rate of Transient Neurologic Symptoms. [46,47] In the CP and bupivacaine groups, Ashwini and Kumara found hypotension in 9 and 16 patients, respectively, bradycardia in 1 CP patient and none in the bupivacaine group, and nausea in 2 CP patients and none in the other group. discovered that each group included one (4%) patient who vomited, but none of the patients had Transient Neurologic Symptoms or other neurologic symptoms. Hypotension and bradycardia were seen more frequently in Group B than in Group A in our investigation, although these side effects were below tolerable limits and were not clinically significant

CONCLUSION

Intrathecal administration of 40 mg of local anaesthetic 1% Chloroprocaine for perianal surgeries of short duration, when compared with0.5%,ropivacaine resulted in rapid onset with quicker recovery from anaesthesia and a shorter time for first rescue analgesia and unassisted ambulation. Hence in a dose of 40mg, 1% 2- Chloroprocaine can be used effectively for perianal surgeries of short duration

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How to cite this article:

Palaramakrishnan Devarpiran and Arun Kumar Thangaraju (2022) 'A Randomized Prospective Study Of Intrathecal 1% Chlorprocaine And 0.5% Ropivacaine In Perianal Surgeries', *International Journal of Current Medical and Pharmaceutical Research,* 08(06), pp 267-270.

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