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"COMPARISON BETWEEN INTRATHECAL 1% 2-CHLORPROCAINE AND 0.5%BUPIVACAINE IN AMBULATORY LOWER LIMB SURGERIES"

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ABSTRACT

Background: At present more procedures are performed in an outpatient setting, and many of them are conducted under spinal anesthesia. Attempts have been made to adapt hyperbaric bupivacaine to the ambulatory setting by using smaller doses. 2-Chloroprocaine is characterized by both fast onset and a quick recovery time . The present study aimed therefore at determining the non-inferiority of 1% 2-chloroprocaine compared to low dose of 0.5% hyperbaric bupivacaine for spinal anaesthesia in terms of block characteristics.

Material and methods: The study was observational, hospital based analytical study conducted on 20 patients scheduled for lower limb surgery under spinal anesthesia.Patients in either sex between 18 to 60 years of age belonging to ASA class 1 and class II, divided in to two groups of 10 patients each.Group C received 50mg of 1% chlorprocaine and Group B received 10mg of 0.5% hyperbaric bupivacaine for spinal anaesthesia.

Results: Time to attain sensory block at T 10 was 4.9 min in Group C and 6 min in Group B which is statistically significant.Though Group C attained peak sensory block in 12 min and Group B in 13.9 min,it was not statistically significant.Two segment regression of sensory block was attained by Group C in 60 min while Group B in 83.9 min which shows statistical significance.Motor blockade with a modified bromage scale ≥ 2 was achieved by Group C in 3.9 min and Group B in 5.2 min which is statistically significant.

Conclusion: Spinal anaesthesia with 50mg of 1% chlorprocaine provides faster onset and regression of block compared to 10 mg of 0.5% bupivacaine which is desirable in ambulatory lowerlimb surgeries.

KEYWORDS : 1% 2-chlorprocaine,0.5% bupivacaine,spinal anaesthesia,ambulatory surgery

INTRODUCTION

Nowadays more procedures are performed in an outpatient setting, and many of them are conducted under spinal anesthesia. Unfortunately,no local anesthetic can provide a block with rapid onset, predictable duration, good effectiveness, reliability and fast recovery, without side effects. For many years, spinal lidocaine has been the local anesthetic of choice for outpatient surgery because of its profile of fast onset and short duration. However, transient neurological symptoms (TNS), described as back pain with irradiation to the lower extremities, have been reported[1].

As an alternative, attempts have been made to adapt hyperbaric bupivacaine to the ambulatory setting by using smaller doses. However, the duration of the block remains prolonged with these smaller doses, and they may provide insufficient anesthesia[1].

Over the last few years, 2-chloroprocaine has regained popularity[2]. 2-Chloroprocaine is characterized by both a very fast onset and a quick recovery time[2] . Clinical studies in volunteers demonstrated that its use at doses ranging between 30 and 60 mg provides a spinal block profile similar to that of lidocaine,with a lower incidence of TNS[3].The present study aimed therefore at determining the non-inferiority of 1% 2-chloroprocaine compared to low dose of 0.5% hyperbaric bupivacaine for spinal anaesthesia in terms of sensory block characteristics.

METHODS AND MATERIALS

After obtaining institutional ethics committee approval and informed consent,an observational analytic study was conducted for 1 year on 20 patients in either sex between 18 to 60 years of age belonging to ASA class 1 and 2 scheduled for lower limb surgeries of duration less than 1 hour under spinal anesthesia. Patients with contraindication to spinal anesthesia,patients with known allergy to local anesthetic, patients with history of neuromuscular diseases of lower limbs were excluded from the study.

All the patients for study was seen before the day of surgery for preanesthetic assessment and preperation for anesthesia and surgery. Informed consent from each patient was obtained after explaining the procedure. Routine blood investigations like complete blood count,prothrombin time,activated partial thromboplastin time and random blood sugar were sent.Patients were premedicated with tablet diazepam 5 mg and tablet pantop 40 mg on the night before the day of surgery.

On the day of surgery patients were shifted to operation theatre where monitors such as pulse oximeter,electrocardiogram and noninvasive blood pressure(NIBP) was connected and preoperative blood pressure,heart rate and oxygen saturation was recorded as baseline. Venous access was secured with 20G IV canula and preloaded with Ringer's lactate or normal saline 10ml/kg over 10 minutes.

All patients were given intravenous sedation with 0.02mg/kg of midazolam.Patients were positioned in lateral position and under strict asepsis using 25G QBSN sub arachnoid block was given in L3-L4 level. 10 patients received 50mg of 1% 2-chlorprocaine(Group C) and the other 10 received 10mg of 0.5% hyperbaric bupivacaine(Group B) for neuraxial blockade as decided by the anaesthesiologist.After the completion of spinal injection,patients were immediately placed in supine position.The evolution of both sensory and motor block was evaluated every minute until readiness to surgery,then sensory block was evaluated every 5 minutes till maximum level of sensory block was acheived and then every 10 minutes until 2 segment regression of sensory block .Non invasive blood pressure and heart rate was recorded every minute for 10 minutes, then every 5 minutes till the end of surgery.

Readiness to surgery is defined as the presence of motor blockade with bromage scale ≥2 and loss of pinprick sensation at T10.Bilateral sensory block to pinprick was tested in a cephalad to caudal direction.The right C5-6 dermatome was used as an unblocked reference point.

Sensory block was verified by bilateral pinprick test using a 20-G hypodermic needle. The motor block was assessed using the modified Bromage scale

0 = no block, full straight leg raise possible
1 = unable to straight leg raise, able to flex knee
2 = unable to flex knee, able to flex ankle
3 = no motor movement, complete motor block.

Completion of injection of the spinal anaesthetic drug was considered as the 0 minute for the onset of anaesthesia.

Time to attain T10 sensory block,time to attain a bromage scale ≥ 2, time to achieve the maximum level of sensory block and time for two segment regression was recorded. Data was completed after two segment regression of maximum block height is obtained.

STATISTICALANALYSIS

Data was entered in Microsoft Excel 2007 & analyzed using SPSS version 22. A sample size of 20 with 10 in each group was included in the study with 95% confidence interval & 80% power.

Collected data was analyzed by Mean, standard deviation, independent t test for comparison of the two groups. Significance was assessed using ANOVA for repeated measures, chi-square test. The results were considered significant statistically, if *P* value was less than 0.05.

RESULTS

The study population consisted of 20 patients,10 were given spinal anaesthesia with 10mg of 0.5% bupivacaine heavy(Group B) and remaining 10 with 50mg of 1% chlorprocaine(Group C).

The age, weight, height and BMI of the patients were comparable in both the groups without any statistical significance(Table no.1).

Table Number 1. Demographic data

Group	N	Mean	Std. Deviation	t test		p value
AGE	Group B	10	35.00	6.90	0.721	NS
	Group C	10	36.20	7.89		
WEIGHT	Group B	10	69.30	10.01	0.907	NS
	Group C	10	69.80	8.90		
HEIGHT	Group B	10	171.80	7.47	0.295	NS
	Group C	10	168.80	4.66		
BMI	Group B	10	23.61	2.67	0.395	NS
	Group C	10	24.77	3.27		

Group C attained readiness to surgery earlier than Group B with a statistical significance(Table no.2).Mean time to attain sensory block at T 10 level was 4.9±0.88 minutes in group C and 6 ±1.05 minutes in group B (p = 0.021) .Group C achieved motor block with a modified bromage scale ≥ 2 in 3.9±0.88 minutes while group B in 5.2±1.14 minutes(p =0.010).

Table number 2. Time to attain readiness to surgery

Time to readiness to surgery		N	Mean	Std. Deviation	95% Confidence Interval for Mean		t test	p value
					Lower Bound	Upper Bound		
TIME TO SENSORY BLOCK AT T10	Group B	10	6.00	1.05	5.25	6.75	0.021	Sig
	Group C	10	4.90	0.88	4.27	5.53		
	Total	20	5.45	1.10	4.94	5.96		
TIME TO MOTOR BLOCK (bromage ≥ 2)	Group B	10	5.20	1.14	4.39	6.01	0.010	sig
	Group C	10	3.90	0.88	3.27	4.53		
	Total	20	4.55	1.19	3.99	5.11		

Time to attain peak sensory block height did not show any statistical significance between both the groups .Group C attained peak height in 12 ± 2.9 minutes and group B in 13.9 ± 3.07 minutes(p = 0.175). Group C showed 2 segment regression of sensory blockade in 60 ± 7.4 minutes and group B in 83 ± 5.9 minutes which shows a high statistical significance with p = 0.000 (Table no.3).

Table Number 3. Sensory block characteristics

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		t test p value	
					Lower Bound	Upper Bound		
SENSORY BLOCK-TIME TO MAXIMUM TWO SEGMENT REGRESSION TIME	Group B	10	13.90	3.07	11.70	16.10	0.175	NS
	Group C	10	12.00	2.94	9.89	14.11		
	Total	20	12.95	3.09	11.51	14.39		
REGRESSION-TIME TO TWO SEGMENT	Group B	10	83.90	5.99	79.62	88.18	0.000	HS
	Group C	10	60.00	7.45	54.67	65.33		
	Total	20	71.95	13.92	65.44	78.46		

DISCUSSION

The purpose of this study was to compare 50mg of 1% 2-Chlorprocaine with 10 mg of 0.5% bupivacaine for spinal anaesthesia in ambulatory lower limb surgeries in terms of onset of block and regression of sensory blockade.This study demonstrated that spinal anaesthesia with chlorprocaine provides adequate and faster onset of surgical block in terms of both sensory and motor blockade with faster recovery from anaesthesia.

On comparing the time to attain readiness for surgery,it was observed that Group C attained sensory block at T 10 dermatome 1.1 minutes earlier than group B which is statistically significant. In a study conducted by C.Camponovo et al[3] comparing 50 mg of 1% chlorprocaine and 10 mg of 0.5% bupivacaine for spinal anaesthesia,they observed a faster onset of sensory blockade at T 10 dermatome in the chlorprocaine group by 1 minute which is consistent with our study.

Motor block with a modified bromage scale ≥ 2 was attained by group C 1.3 minutes earlier than group B. Ankit Agarwal et al[4] in their study comparing 40 mg of 1% chlorprocaine with 12.5 mg of hyperbaric bupivacaine for spinal anaesthesia observed a faster onset of motor blockade in the chlorprocaine group by 1 minute.

Time to attain peak sensory block was less in group C as compared to group B but was not statistically significant.Ankit Agarwal et al compared 40 mg of 1% chlorprocaine with 12.5 mg of 0.5% hyperbaric bupivacaine for spinal anaesthesia and observed that chlorprocaine group attained peak sensory block at 14 minutes and bupivacaine group at 17 minutes.

For analyzing the resolution of spinal anaesthesia, two segment regression of sensory blockade was compared between both the groups.Group C showed a two segment regression of sensory block 20 minutes earlier than group B.Jessica R Yoos et al[5] conducted a study for comparing 40 mg of 1% chlorprocaine and 7.5 mg of 0.5% bupivacaine in spinal anaesthesia and observed that chlorprocaine group had a two segment regression of sensory blockade 30 minutes faster than bupivacaine group.

CONCLUSION

In conclusion,intrathecal 50 mg of 1% chlorprocaine produces a satisfactory surgical block for lower limb procedure lasting less than 60 minutes and provides faster onset and regression of block compared to 10 mg of 0.5% bupivacaine which is desirable in ambulatory surgeries .

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