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A COMPARATIVE EVALUATION BETWEEN THREE DIFFERENT DOSES OF INTRATHECAL 1% CHLOROPROCAINE FOR PATIENTS UNDERGOING SHORT DURATION LOWER LIMB SURGERY-A CLINICAL STUDY

Dr. Anshu Priyanka Lakra MD Anesthesia, Senior Resident, Department Of Anaesthesiology, Gandhi Medical College, Bhopal

Dr. Rajkumar Ahirwal MD Anesthesia, Associate Professor, Department Of Anaesthesiology, Gandhi Medical College, Bhopal

Dr. Urmila Keshari* MD Anesthesia, Professor, Department Of Anaesthesiology, Gandhi Medical College, Bhopal *Corresponding Author

ABSTRACT Chloroprocaine is an amino ester local anesthetics with very short half life. Intrathecal 1% chloroprocaine represents an interesting alternative in patients undergoing short duration lower limb surgery when compared with spinal bupivacaine. This study evaluate the effect of 3 doses of chloroprocaine 1% 30,40 and 50mg for spinal anesthesia in adult patients undergoing short duration elective surgery of lower limb . Sixty ASA physical status I and II patients both male and female posted for various short duration lower limb surgeries under spinal anaesthesia were randomized into three group to receive one of the single doses of chloroprocaine 1% either 30mg,40mg or 50mg via intrathecal injection. The onset time of sensory and motor block, duration of sensory & motor block, maximum height of block, hemodynamic parameters was noted. Their hemodynamic parameters were stable and dermatomal level reached was T8-T10 in majority in the dose of 4ml&5ml of chlorprocaine . Serious side effect or neurological deficit associated with the drug did not occur in any patient in this study. We found 1% choloprocaine in the dose of 4ml and 5 ml to be effective spinal anaesthetic agent for short surgical procedure of lower limb.30 mg dose may not be suitable for lower limb procedure lasting ≤60 min. however correct patient and surgery selection allow a successful use also of the 30mg dose

KEYWORDS : chloroprocaine, spinal anaesthesia, short surgeries of lower limb

INTRODUCTION:

Spinal anesthesia is a reliable and safe technique for procedures of the lower extremities. Nevertheless, some of its characteristics may limit its use for ambulatory surgery, including delayed ambulation, risk of urinary retention and pain after block regression. current availability of short acting local anesthetics has renewed interest for this technique also in the context of short and ultrashort procedure. Chlorprocaine is an amino ester local anesthetic with a very short half life. It was introduces and has been successfully used for spinal anesthesia since 1952, sodium bisulfate was then added as a preservative after 1956 to commercially available preparation. The drug was then abandoned in the 1980's for several reports of neurological deficits in patients receiving accidentally high doses of intrathecal chloroprocaine during epidural labour analgesia were published. All preservatives and antioxidant have been removed from currently available preparation of chlorprocaine, preservative free chloropracaine is available as 10mg/ml which is recently approved by European medicine agency. In comparision with bupivacaine, chloroprocaine showed faster offset times to end of anesthesia, unassisted ambulation and discharge from hostpital. These finding suggest that chloroprocaine may be suitable alternative to low doses of long acting local anesthetics in ambulatory surgery. Its safety profile also suggest that chloroprocaine could be a valid substitute for intrathecal short and intermediate acting local anesthetics such as lidocaine and mepivacaine often cause transient neurological symptoms. Chloroprocaine has many advantages like quick onset, dense sensory and motor block of short duration hence this drug is considered as a preffered choice for patient undergoing short duration lower limb surgery.

AIMS AND OBJECTIVE:

- To study the onset of sensory and motor block.
- To study and compare intra operative quality and duration of anaesthesia and level of sub arachnoid block.
- To study perioperative hemodynamic effects by subarachnoid block
- To study the occurrence of side effects and complication if any.

MATERIAL AND METHODS:

This study was planned to evaluate the effect of 3ml, 4ml and 5ml of chlorprocaine in subarachnoid block in patient undergoing short duration lower limb surgery umder spinal anesthesia. The present study is a observational study of 60 patient between age group 18-45 years of either sex belonging to ASA grade I and II for elective short duration lower limb surgeries.

INCLUSION CRITERIA:

1) ASA grade I and II
2) Age group between 18-45 years of both sexes.
3) Elective short duration lower limb surgeries under spinal anesthesia.

EXCLUSION CRITERIA:

1) Patient refusal
2) ASA grade 3 and 4
3) Patient with coagulation abnormality
4) Patient with neurological deficit

All the patients were uniformly managed with regards to pre-anaesthetic evaluation, investigations and pre medication. Pre operatively a peripheral venous access is secured through the large bore iv cannula. On thev day of surgery , the patients will be given an injection of midazolam 1mg, ondensetron 4mg,ranitidine 50mg intravenously and preloading with ringer lactate(10ml per kg body weight) prior to induction of anesthesia. Pulse oximetry, noninvasive blood pressure ,ecg monitoring was instituted in all patients. A specially design performa was used to collect the data .patient allocated to either group A(3ml),group B(4ml),group C(5ml) of intrathecal chloroprocaine.

The sub arachnoid block will be performed in all patients in sitting position under strict aseptic precautions using 25G Quincky needle in the midline, after observing the free flow of csf, either 3ml,4ml or 5ml of the study drug chloroprocaine will be given and patient will immediately be moved to supine position. Parameters like heart rate, blood pressure, SPO2 will be monitored preoperatively, intraoperatively and post operative for two hours. Onset and duration of motor and sensory block is recorded.time of rescue analgesia is recorded postoperatively.

STATISTICAL ANALYSIS:

The SPSS software was used for statistical calculation. Data were

expressed as either mean & standard deviation or number and percentages. Demographic data were compared using ANOVA test. The monitored and calculated parameters were analysed using ANOVA test.

RESULT:

Demographic data of these 60 patients were revealed in table 1.

	GROUP A	GROUP B	GROUP C	P value
AGE (Years)	33±8.85	34±9.92	35±9.272	0.634
WEIGHT(kg)	56±4.31	57±4.96	55±5.44	0.335
HEIGHT (cm)	153±4.63	151±3.50	151±4.599	0.288

There is no significant difference in patient age, gender & ASA classification in three groups. There is no significant difference of systolic and diastolic blood pressure and heart rate between three groups.

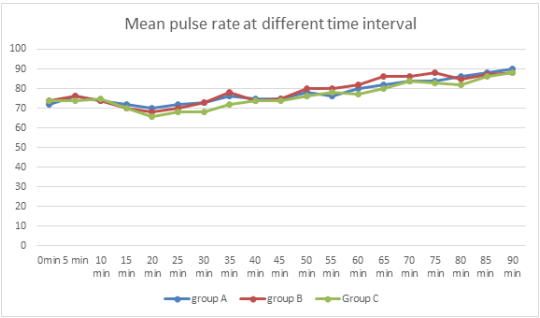

Figure 1:Mean pulse rate in three groups at different time intervals, there is no significant difference in mean pulse rate between three groups.

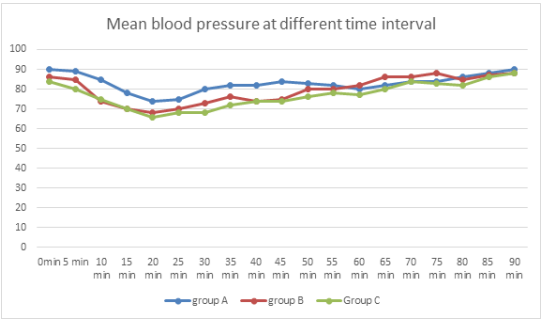

Figure 2: Mean blood pressure in three groups at different time intervals, there is no significant difference in mean pulse rate between three groups.

Characteristic of spinal block

Table 2: Onset and duration of sensory and motor block.

GROUP	CASE NO		ONSET OF BLOCK	DURATION OF BLOCK	
		Sensory	motor	sensory	motor
A	20	4.90±0.92	8.30±2.92	62.2±8.52	56.13±11.2
B	20	4.37±0.86	6.50±0.87	84.6±9.20	78.13±8.17
C	20	3.5±0.82	5.02±1.09	105±8.20	96.02±9.20

There is no significant difference in onset of sensory and motor block in these groups, but the duration of sensory block was shorter in group A(62.20±8.52) than group B (84.06±9.20) & group C (105±8.20). None of the patient reported any complaint suggestive of transient neurological symptoms. The post operative course was uneventful for all patients.

DISCUSSION:

Spinal anesthesia is a safe & reliable technique for short duration lower limb surgery[1,2].Some of its characteristics may limit its use for ambulatory surgery, including delayed ambulation, risk of urinary retention and pain after block regression[3]. The choice of the correct local anesthetic for spinal anesthesia is therefore crucial in the ambulatory setting. The ideal anesthetic for short duration surgery should have minimal effect on haemodynamic parameter & allow rapid onset and offset of its own effect for fast patient discharge with minimal side effect [4].Lidocaine has been the anesthetic of choice for years in the context of outpatient procedures. Nevertheless its use has been associated with a significant risk of transient neurological symptoms(TNS) & most anesthesiologist have therefore abandoned its use. The recent re-introduction of intrathecal articaine, chloroprocaine and prilocaine may offer a solution in the ambulatory setting, with a slightly faster profile for chlorprocaine.

The use of preservative free chlorprocaine for spinal anesthesia has been studied both in healthy volunteers and in patient. Many author investigated the correct spinal dose of chlorprocaine to assure adequate efficacy and fast resolution of block in the ambulatory setting. Sell 7 Pitkanen tested four different doses of spinal chlorprocaine (35,40, 45&50mg) in a cohort of 64 patients scheduled for elective lower extremity procedures. The regression of sensory block & time to discharge were faster in the lower dose groups(35&45mg) , although the higher level of block & time to complete block regression were comparable in all four groups. In an attempt to find the minimum effective dose for intrathecal injection, Kopacz tested 10 & 20 mg of plain chlorprocaine. The lower dose 10 mg should be considered the no effect dose for spinal anesthesia, though it provided some transient motor weakness. Similarly the 20 mg dose did not reliably produce dense motor block even though it was able to produce a cephalad level of sensory anesthesia of at least L1 in all subjects.

Our study stands unique by evaluating three different dose (30,40 & 50 mg) of intrathecal chlorprocaine in short duration lower limb surgery with an average duration of 45-60 min. Finding of the study suggest that the duration of sensory & motor block was shorter in group A(62.20±8.52)(56.13±11.27) compared to group B(84.6±9.20)(78.13±8.17) and Group C(105±8.20)(96.02±9.20). The 30 mg dose of chloroprocaine was associated with a significant increase in the number of patients requiring fentanyl supplementation before the end of surgery because of inadequate duration of surgical block as compared with the duration of surgery itself. This occurred more frequently with 30mg(35%) less frequently with 40mg(13%) & never with 50 mg(p=0.014). This finding is related to the duration of surgery, which in present study range between 30 to 60 min, rather than efficacy of the anesthetic drug itself. Hence 30 mg dose may not be suitable for lowerlimb procedure lasting ≤60 min. however correct patient and surgery selection allow a successful use also of the 30mg dose. Unless the surgeon is confident that the considered procedure will be completed within 20-30 min, the 30 mg dose should not be recommended [20]. The three doses(30,40 &50mg) of intrathecal chlorprocaine provided a high degree of cardiovascular stability with no incidence of transient neurological symptoms using totally preservative & antioxidant free 2-chloroprocaine.this finding is in agreement with findings reported in volunteer studies[18,21]which did not report any case of transient neurological symptoms after spinal chloroprocaine. Surgery lasted a mean time of 50±22min. The postoperative course was uneventful in all patients.

CONCLUSION:

Study of 30,40 &50mg of 1% chlorprocaine in 60 ASA I and II patients, the following conclusion was arrived:

- Intrathecal 1% is a safe short acting local anesthetics for short or ultra short surgical procedures.
- onset and duration of sensory and motor block & time of recovery of ambulation were dose related.
- There is no significant difference of systolic blood pressure, diastolic blood pressure and heart rate between these groups. The intraoperative haemodynamic parameter remained stable in all the three groups.
- 40 to 50 mg of plain chloroprocaine 1% provided adequate spinal anesthesia for lower limb outpatient procedures lasting 45 to 60 min. Reducing the dose of 2-chloroprocaine to 30 mg resulted in a spinal block of insufficient duration and had no

advantages in terms of home discharge.

- Adverse effect such as hypotention, bradycardia and neurological deficts does not occur in any of the patients.

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