

**Comparing the Bupivacaine Heavy and 2-Chloroprocaine for Saddle Block in Perianal Day Care Surgeries: Observational Interventional Study**Rishi Kant<sup>1</sup>, Nitin Kumar<sup>2</sup><sup>1</sup>Senior Resident, Department of Anaesthesiology, Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, Pawapuri, Bihar, India<sup>2</sup>Senior Resident, Department of Anaesthesiology, IGIMS, Patna, Bihar, India

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Conflict of interest: Nil

**Abstract****Aim:** The aim of the present study was to compare the bupivacaine heavy and 2-chloroprocaine for saddle block in perianal day care surgeries.**Methods:** This observational interventional study conducted in the Department of Anesthesiology for 12 months. We included 100 patients in each group.**Results:** There was a statistically significant difference in the mean time for eligibility to discharge from the hospital between the groups, as shown by a p-value of less than 0.001. Group A exhibited a lower mean time ( $238.52 \pm 22.78$  min) in comparison to group B ( $342.58 \pm 16.54$  min). The average duration of stay in the Post-Anesthesia Care Unit (PACU) was found to be shorter in group A ( $65.35 \pm 6.64$  min) compared to group B ( $77.23 \pm 8.52$  min), with a statistically significant p-value of less than 0.001. The mean duration of ambulation differed significantly between group A (mean time:  $184.36 \pm 20.38$  min) and group B (mean time:  $272.38 \pm 20.60$  min), as shown by a p-value of less than 0.001. There was a statistically significant difference in the time required to void between group A (mean time:  $222.38 \pm 20.48$  min) and group B (mean time:  $312.28 \pm 22.58$  min), with a p-value of less than 0.001. There were no discernible disparities between the two groups with regards to demographic characteristics. The incidences of complications seen in our research, including as bradycardia, hypotension, headache, postoperative nausea and vomiting (PONV), and backache, were found to be similar in both groups.**Conclusion:** The use of saddle block anesthesia with 2-Chloroprocaine demonstrates adequate efficacy in achieving surgical anesthetic for perianal procedures, in comparison to the administration of low dosage hyperbaric Bupivacaine. Moreover, the utilization of 2-Chloroprocaine is associated with favorable outcomes, including faster release from the hospital, shorter duration of stay in the post-anesthesia care unit, and quicker recovery in terms of ambulation and micturition.**Keywords:** bupivacaine, saddle block, 2-chloroprocaine.

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**Introduction**

An optimal anesthetic technique would provide excellent operating conditions, rapid recovery, early discharge, no postoperative side effects, and high patient satisfaction, in addition to the high quality and low costs of the anesthetic services. [1] Saddle block is advantageous in terms of usage of small dose of local anesthetic, simplicity to perform and offers rapid onset of action, reliable surgical analgesia with good muscle relaxation.

Ambulatory day care surgical procedures had increased worldwide. Spinal anaesthesia is safe and reliable technique for surgery of lower abdomen and limbs. [2] However, some of its characteristics like delayed ambulation, risk of urinary retention and pain after block regression may limit its use for

ambulatory surgeries. Saddle block provides a reliable but is a restricted block with good surgical conditions and hence is optimal for perianal surgeries. The ideal anesthetic should have minimal side effects with rapid onset and offset of its own effect for early patient discharge.[3,4] 2-Chloroprocaine is an amino-ester local anesthetic and has very short half-life. Bupivacaine heavy is a long acting amide local anaesthetic agent with comparatively slower onset of action and longer duration. Attempts have been made to tailor spinal anesthesia for specific surgical procedures. [5] Several studies targeting local anesthetic at specific nerve roots supplying the surgical field have demonstrated successful results. [6,7]

Saddle anesthesia is a selective spinal anesthesia that directs a small bolus of hyperbaric local anesthetic toward S4–S5 and coccygeal nerve roots [8] and is commonly utilized for perianal surgeries. [9-12] Hyperbaric bupivacaine has safely replaced hyperbaric lidocaine for saddle block. [9,10] Although saddle blocks at different low doses of hyperbaric bupivacaine (1.5–4 mg) have been used previously for minor perianal surgeries [9,11,12], the optimal effective dose is yet to be determined. Proctologic surgery is one of main indications of saddle block. The anaesthesia it provides is particularly suitable for this very painful surgery that additionally requires a fully relaxed sphincter. A slightly extended block decreases, as much as possible, the risk of acute retention of urine, a common complication after this surgery. Spinal puncture is performed in a monitored patient in the sitting position. The needle is inserted in the lower lumbar region, i.e. the interspinous space L4-15 or L5-S1. Using a Whitacre® type pencil needle of 25 or 27 Gauge reduces the incidence of headache after puncture of the dura mater. The distal eyelet of this needle needs to be directed downward or caudally. With clear CSF flow, the hyperbaric solution of LA is injected as slowly as possible, without air bubbles, to deliver as much local anaesthetic as possible to sacral territory. To “fix” the block without extension, the patient is kept in a sitting position for at least ten minutes. However, with lower the doses of LA, the patient should remain longer in the sitting position. The baricity of the LA solution and the position of the patient after the injection affect the caudal or cephalic diffusion of anaesthesia so hyperbaric anaesthesia is used to insure a caudad block. [13]

The aim of the present study was to compare the bupivacaine heavy and 2-chloroprocaine for saddle block in perianal day care surgeries.

### Materials and Methods

This observational study conducted in the Department of Anesthesiology, Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India for 12 months. We included 100 patients in each group.

### Methodology

Total 100 patients were divided randomly into two groups, Group A and Group B by computer generated random numbers at 1:1 ratio. Group A

received 2 ml of 1% 2- Chloroprocaine, group B received 2ml of 0.5% Bupivacaine heavy. Double blinding was done where neither the patient nor the investigator knew about the drug. The patients of ASA physical status grade I and II aged between 18 to 58 years undergoing elective perianal day care surgeries <60 mins duration was included in the study. The patients with bleeding/coagulation disorders, existing neurological disease, sepsis, pregnancy and obese patients (BMI> 30kg/m<sup>2</sup>) were excluded.

After pre-anaesthetic evaluation, all patients received tablet Ranitidine 150 mg orally in the night and were kept nil by mouth for 8 hours for solids and 2 hours for clear liquids. On the day of surgery, in the OT standard monitors like pulse oximetry, NIBP and ECG were connected, and baseline readings were recorded. IV line was secured with 20G iv cannula and coloaded with ringer lactate solution at the rate of 15ml / kg.

Under aseptic precautions, spinal anaesthesia was given at L3- L4 or L4-5 interspace using 25 G Quincke spinal needle with patient in sitting position. The patients were placed in supine after 6-10 minutes to achieve adequate saddle block. The sensory level of the block is assessed in a caudal to cephalad direction by using pin prick examination. The occurrence of clinically relevant hypotension (>20% from baseline values) was treated with ephedrine. Clinically relevant bradycardia was treated with atropine.

The patients were discharged from PACU after achieving modified Aldrete score of  $\geq 9$  and from hospital after achieving Post Anesthesia Discharge Score system of 9. [14] Time to ambulate and void urine was also noted. Patients were contacted over phone, 24 hr and 7 days following surgery for assessing potential complications. A standardized questionnaire was used to check for the presence of headache, nausea, vomiting and backache.

### Statistical Analysis

Data were entered in MS-Excel and analyzed in SPSS V 21.0. Descriptive statistics were represented with percentages, Mean with SD. Chi-square test, independent t-test were applied to find significance. P<0.05 was considered as statistically significant.

### Results

**Table 1: Clinical data**

	<b>Group A</b>	<b>Group B</b>	<b>P value</b>
Eligibility to discharge from the hospital	238.52± 22.78	342.58 ±16.54	<0.001
Length of stay in PACU (MIN)	65.35±6.64	77.23±8.52	<0.001
Time to ambulate(min)	184.36±20.38	272.38±20.60	<0.001
Time to void urine (min)	222.38±20.48	312.28±22.58	<0.001

The mean time for eligibility to discharge from hospital between groups were statistically

significant with p value <0. 001. Group A had less mean time (238.52± 22.78 min) compared to group

B ( $342.58 \pm 16.54$  min). The mean time for length of stay in PACU was less in group A ( $65.35 \pm 6.64$  min) as compared to group B ( $77.23 \pm 8.52$  min) with p value of  $< 0.001$ . Mean time taken to ambulate was statistically significant with group A having less mean time ( $184.36 \pm 20.38$  min)

compared to group B ( $272.38 \pm 20.60$  min), with p value of  $< 0.001$ . The time taken to void was statistically significant with group A having less mean time ( $222.38 \pm 20.48$  min) compared to group B ( $312.28 \pm 22.58$  min), with p value of  $< 0.001$ .

**Table 2: Demographic data**

Variables	Group A	Group B
Age	$33.57 \pm 10.25$	$35.65 \pm 12.28$
Height (cm)	$170.65 \pm 8.32$	$172.38 \pm 8.42$
Weight (kg)	$78.82 \pm 7.99$	$77.63 \pm 7.43$
BMI (kg/m <sup>2</sup> )	$26.84 \pm 1.2$	$25.55 \pm 1.2$
Duration of surgery (min)	$7.83 \pm 4.56$	$6.54 \pm 3.67$
Sex (female/male)	22/28	24/25

There was no difference between the two groups in terms of demographic criteria.

**Table 3: Complications**

Parameter	Group A	Group B
No complications	38	39
Bradycardia	3	0
Hypotension	0	3
Headache	2	5
PONV	4	0
Backache	3	3

The complications in our study like bradycardia, hypotension, headache, PONV and backache were comparable between the two groups.

### Discussion

The incidence of perianal surgery varies among institutions, accounting for up to 10% of general surgical procedures. The procedure is suitable to perform on a day-case basis with spinal anaesthesia. However, prolonged sensory and motor block and urinary retention can cause a delay in discharge. [15,16] It was widely used in Anglo-Saxon countries until the 1960s, especially in obstetrics, before being replaced by more flexible epidural anaesthesia. [17] Saddle block provides anaesthesia of the perineum, tip of the coccyx, medial and bottom of the buttocks and posteromedial part of the thighs covering an area that for a rider would correspond to that in contact with a saddle. Such anaesthesia is obtained by injecting a small dose of hyperbaric local anaesthetic (LA) in a patient maintained in sitting position for a few minutes to facilitate preferential impregnation of sacral roots (S1 to S5) responsible for innervation of perineum, external genitalia and anus. The saddle block causes a parasympathetic blockade at the bladder level which may result in bladder and rectal atony which is advantageous because of sphincteric relaxation for the operator.

Saddle block is advantageous in terms of usage of small dose of local anesthetic, simplicity to perform and offers rapid onset of action, reliable surgical analgesia with good muscle relaxation. In the study

conducted by Liu SS [18] et al showed that long-acting anesthetics such as bupivacaine can be administered for outpatient surgeries but optimum dose is needed. Bupivacaine heavy is a long acting amide local anaesthetic agent with comparatively slower onset of action and longer duration. 2-chloroprocaine is an amino-ester local anesthetic with a short half-life. Since 1952 it has been successfully used for spinal anaesthesia. [19] Many reports of neurotoxicity were reported following the use of large doses of 2-chloroprocaine and hence was withdrawn from commercial use. [20-22]

The mean time for eligibility to discharge from hospital between groups were statistically significant with p value  $< 0.001$ . Group A had less mean time ( $238.52 \pm 22.78$  min) compared to group B ( $342.58 \pm 16.54$  min). Mean time taken to ambulate was statistically significant with group A having less mean time ( $184.36 \pm 20.38$  min) compared to group B ( $272.38 \pm 20.60$  min), with p value of  $< 0.001$ . There was no difference between the two groups in terms of demographic criteria. The complications in our study like bradycardia, hypotension, headache, PONV and backache were comparable between the two groups. The mean time for eligibility to discharge from hospital between groups were statistically significant with p value  $< 0.001$ . Group A had less mean time compared to group B. Yoos JR and Kopacz DJ [23] conducted double blind, randomized crossover study on 8 healthy volunteers concluded time to simulated discharge (including time to complete

block regression, ambulation, and spontaneous voiding) was significantly longer with bupivacaine ( $191 \pm 30$  min) as compared to 2-Chloroprocaine ( $113 \pm 14$  min). In the study conducted by Lacasse MA et al [24] conducted on 106 patients undergoing outpatient surgery under spinal anesthesia, mean time to hospital discharge was  $277 \pm 87$  min for chloroprocaine group as compared to  $353 \pm 99$  for bupivacaine group.

The mean time for length of stay in PACU was less in group A ( $65.35 \pm 6.64$  min) as compared to group B ( $77.23 \pm 8.52$  min) with p value of  $< 0.001$ . However, in the study conducted by Lacasse MA et al<sup>24</sup> mean duration of stay in PACU was  $67 \pm 16$  min in chloroprocaine group and  $68 \pm 14$  which was statistically insignificant with  $p = 0.66$ . The time taken to void was statistically significant with group A having less mean time ( $222.38 \pm 20.48$  min) compared to group B ( $312.28 \pm 22.58$  min), with p value of  $< 0.001$ . Mathur V et al [25] conducted a study on 100 patients undergoing ambulatory urology surgery under spinal anesthesia. According to their study time to first void in chloroprocaine group was lesser ( $177.46 \pm 33.41$  min) than bupivacaine group ( $277.56 \pm 43.31$  min) which was similar to our study. Mean time taken to ambulate was statistically significant with group A having less mean time ( $180.40 \pm 20.32$  min) compared to group B ( $270.30 \pm 20.50$  min), with p value of  $< 0.001$ . In a review study by Ghisi D, Bonarelli S [26] concluded that 1% 2-chloroprocaine showed faster unassisted ambulation and discharge from hospital. In the study conducted by Lacasse MA et al [24] conducted on 106 patients undergoing outpatient surgery under spinal anesthesia, mean time to ambulate was lesser in chloroprocaine group ( $225 \pm 56$  min) as compared to bupivacaine group ( $265 \pm 65$  min), the results being similar to our study.

### Conclusion

In summary, the use of saddle block anesthesia with 2-Chloroprocaine demonstrates adequate efficacy in achieving surgical anesthetic for perianal procedures, in comparison to the administration of low dosage hyperbaric Bupivacaine. Moreover, the utilization of 2-Chloroprocaine is associated with favorable outcomes, including faster release from the hospital, shorter duration of stay in the post-anesthesia care unit, and quicker recovery in terms of ambulation and micturition.

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