



INTRATHECAL 1% 2 CHLOROPROCAINE V/S 0.5% HYPERBARIC BUPIVACAINE IN AMBULATORY SURGERY

Anaesthesiology

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ABSTRACT

Background- This study was designed to compare 2-CP with bupivacaine for spinal anesthesia in an elective ambulatory setting.

Methods- A total of 100 patients were enrolled in this randomized double-blind study. Spinal anesthesia was achieved with 0.5% hyperbaric bupivacaine 5 mg (n = 50) or 2% preservative-free 2-CP 40 mg (n = 50). The primary endpoint for the study was the time until reaching eligibility for discharge. Secondary outcomes included the duration of the sensory and motor blocks, the length of stay in the postanesthesia care unit, the time until ambulation, and the time until micturition.

Results - The average time to discharge readiness was 277.12 min in the 2-CP group and 353.11 min in the bupivacaine group, a difference of 76 min. The average time for complete regression of the sensory block was significantly lower in the 2-CP group as compared to bupivacaine group. Times to ambulation were also significantly lower in the 2-CP group.

Conclusion- 2-chloroprocaine provides adequate duration and depth of surgical anesthesia for short procedures with the advantages of faster block resolution and earlier hospital discharge compared with spinal bupivacaine

KEYWORDS

2-chloroprocaine, Bupivacaine, Ambulatory surgery.

INTRODUCTION

Subarachnoid block (SAB) is a popular and common anaesthetic procedure practices worldwide. It was first performed by August Bier more than a century ago by injecting cocaine into cerebrospinal fluid (CSF) of a patient. Spinal anaesthesia is a safe, economical, easy to perform and effective technique which provides rapid and reliable anaesthesia. It is anaesthesia of choice for lower abdominal and lower limb surgeries. Various local anaesthetic agents commonly used for spinal anaesthesia are lignocaine, bupivacaine, levobupivacaine, and ropivacaine^{1,2}.

An increasing number of day-care surgical patients are challenging the presently used methods of anaesthesia. Reliable surgical anaesthesia should be fast, with rapid recovery and minimal side effects. To produce reliable spinal anaesthesia with a reasonable recovery time it is essential to understand the factors affecting the spread of spinal block and to choose the optimal drug and adequate dose for specific surgical procedures³.

Lidocaine has an attractive pharmacokinetic profile as it shows a rapid onset and allows a fast recovery of both motor and sensory block (130-170minutes).⁴ However, when compared with other local anaesthetics, the use of lidocaine for spinal anaesthesia is associated with an increased risk of transient neurological symptoms (TNS) including back and leg pain.⁵⁻⁷

Bupivacaine may provide prolonged postoperative analgesia and has a lower incidence of TNS. However, the longer duration of action (240-380minutes) may delay the recovery of motor function, cause urinary retention, and therefore ultimately may lead to a delayed discharge from the hospital.⁸

Over the last few years, 2-chloroprocaine has regained popularity. While 2-chloroprocaine was withdrawn from the market in the 1980s because of concerns about neurotoxicity,⁹⁻¹⁰ a new formulation without preservatives that has no longer been associated with neurotoxicity¹¹⁻¹² was introduced into clinical routine in 2004. 2-chloroprocaine is characterized by both a very fast onset (5-10minutes) and a quick recovery time (70-150minutes)¹³⁻¹⁴.

It has not been systematically studied whether the differences in pharmacokinetics of two local anaesthetics can translate into an improvement of relevant outcomes after spinal anaesthesia in day-care

surgery. We want to compare 2-chloroprocaine with Bupivacaine 0.5% Heavy, which is still considered by several authors as criterion standard for spinal anesthesia¹⁸.

MATERIAL AND METHOD

Study area:-

The present study includes patients undergoing ambulatory surgery under subarachnoid block.

Study design:

Hospital based Randomized, Double Blind, Interventional study.

Randomization:

It is a statistical procedure by which the participants will be allocated into two different groups.

In this study randomization will be done by sealed envelope. A total of 100 sealed envelopes (50 per group) will be made, each sealed envelope mentioning a particular study group. One of my colleagues will ask the patient to pick up a sealed envelope from the box. Patient will be allocated to group mentioned on the sealed envelope. Study drug will be prepared by my colleague and will be administered by me to the patient.

Double blinding:

This trial is so planned that the doctor who would prepare and introduce anaesthetic agent will be different from the doctor who will observe the study participants and observe data. The syringe used will be wrapped with white paper.

The patient will be told that some anaesthetic agent would be given, but type of anaesthetic agent will not be disclosed to them.

Study Group:-

The study will be conducted in following two groups of patients. Each group will consist of 100 patients. (n=50)

- Group A – chloroprocaine group (n=50) 4ml of 1% chloroprocaine
- Group B – bupivacaine group (n=50) 4ml of 0.5% hyperbaric bupivacaine

INCLUSION CRITERIA:-

Patients aged 20-50yrs

Patient height >145 cm.

Patient's body weight 40-80 kg.
ASA grade I-II.
Undergoing infraumbilical surgery

EXCLUSION CRITERIA:-

- Patient Refusal
- Patients with history of bleeding disorders or patients on anticoagulants, Platelet<75,000.
- Chronic history of headache and backache or any Neurological disease.
- Severe hypovolemia, anemia, compromised renal, cardiac or respiratory status.
- Spinal deformity or infection at the local site.
- Patient allergic to Local Anaesthetic drug
- Failed spinal block
- Pregnant women.

RESULTS

Table 1. Demographics profile

Variable	Group-A	Group-B	P-Value
Age in Yrs	52.04±6.02	51.35±7.05	>0.05
Sex (M:F)	28:22	29:21	>0.05
ASA(I:II)	42:8	43:7	>0.05

Both groups were comparable.

Table 2. Outcome

Variable	Group-A	Group-B	P-Value
Time to eligibility for discharge from hospital (min)	277.12±84.23	353.11±93.12	0.001
Time for two-segment regression (min)	50.23±18.23	73.24±37.24	0.001
Time for complete regression to S2 (min)	144.32±38.41	329.56±82.35	0.001
Duration of the motor block (min)	76.23±25.14	129.24±94.12	0.001
Time to ambulation (min)	225.12±36.12	270.35±45.12	0.001

The incidences of complications recorded during the follow-up phone calls (postdural puncture headache, transient neurological symptoms, and back pain) were all similar between groups.

DISCUSSION

The purpose of this study was to compare 2-CP with bupivacaine for spinal anesthesia in an ambulatory surgery setting. Our principal finding was that spinal anesthesia with 2-CP can provide a satisfactory surgical block while permitting an earlier discharge from hospital than spinal bupivacaine. This advantage is due to a more rapid regression of the sensory and motor block, which helps patients ambulate and void faster.

The finding that shows the most significant advantage is the time for regression of the sensory block to S2, as 2-CP was 2.3 times faster than bupivacaine. In a volunteer study of eight patients comparing equivalent doses of spinal 2-CP and bupivacaine, Yoos et al. demonstrated a 1.¹⁹ times faster regression of the sensory block with 2-CP (a difference of 78 min). However, the data of Yoos et al. cannot be compared directly to ours as they used a different method to evaluate the sensory block. In our study, the level of sensory block was assessed using loss of cold sensation to ice, whereas Yoos et al. utilized loss of sensation to pinprick with a dermatome tester. Although the same nerve fibres transmit pain and cold information, there is a subtle distinction. Pinprick sensation is conducted by the A delta fibres, while cold sensation is transmitted by both the A delta fibres and the C fibres.²⁰

The primary outcome of this study i.e the time to eligibility for discharge from hospital, was measured from the time spinal anesthesia was performed to the moment the patient attained all of the discharge criteria. As to this outcome, a significant difference of 76 min was observed in favour of the 2-CP group due to faster regression of the block, resulting in earlier ambulation and earlier voiding. Delayed discharge due to urinary retention was particularly problematic in the bupivacaine group. Even with good block regression and successful ambulation, many patients who received bupivacaine experienced a longer delay between their first attempt and their eventual successful complete voiding. This delay may be explained by the need for a

regression of the sensory block to at least the S2 dermatome in order to obtain normal detrusor function. Breebaart et al. also demonstrated a longer interval to first voiding in patients having spinal anesthesia with longacting local anesthetics (levobupivacaine and ropivacaine) compared with those with shorter-acting agents (lidocaine).²¹

Although this study was not designed to measure health care costs, our results could be significant when considered from a cost savings perspective. As health care costs are determined, in part, by the length of hospital stay, achieving faster discharge from hospital through the utilization of 2-CP for spinal anesthesia could provide potential cost savings without compromising the quality of patient care.

CONCLUSION

2-chloroprocaine provides adequate duration and depth of surgical anesthesia for short procedures with the advantages of faster block resolution and earlier hospital discharge compared with spinal bupivacaine.

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