DEPARTMENT OF ANAESTHESIOLOGY

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Ref.No. ANAES/157/2006
Dated: 27.4.2006

TO WHOM IT MAY CONCERN

This is to certify that Dr. Atul Kumar Agarwal MBBS, MD has worked in the Department of Anaesthesiology, King George's Medical University, Lucknow in the following capacities:

Junior Resident I Year	From 19.5.1994 to 18.5.1995
Junior Resident II Year	From 19.5.1995 to 18.5.1996
Junior Resident III Year	From 19.5.1996 to 18.5.1997

During the above-mentioned period he has worked besides general surgery, in various sub and super specialties as Neuro Surgery, Plastic Surgery, Cardiothoracic Surgery, Obst. & Gynaecology, Orthopaedic Surgery, Ophthalmic Surgery, E.N.T., Psychiatry, Pediatric Surgery, Oncology Surgery, Urology & Maxillofacial Surgery and has shown good skill and competence in managing these cases. He has been working both for elective and emergency cases.

During his stay in the department he has passed M.D. (Anaesthesiology) examination. He has been involved in various academic, teaching, clinical and research activities of the department and has shown a keen aptitude for learning.

His behavior with the senior colleagues, juniors and towards patients has been always cordial. He has proved himself a dependable and trustworthy person.

I wish him all success in life.

(Vaishri Bogra)
Professor & Head

Dean/Principal
Varun Arjun Medical College
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IN DAY COMPARISON OF TWO ANESTHETIC TECHNIQUES WITH OUTCOME CARE SURGERY

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Conflicts of Interest: Nil

Abstract:

Introduction: There are many anesthetic techniques such as general, regional, spinal, epidural, caudal, hypotensive, inhalation, nerve blocks, total intravenous and regional intravenous used for multiple surgical procedures. There is controversial in effect of anesthetic technique on perioperative outcomes. Central neuraxial blocks including epidural, spinal and caudal anesthesia are regional anesthesia techniques. Other use of regional anesthesia techniques including reduced side effects, pain control, improved cardiac and pulmonary function, decreased blood loss and shortened stay in the post anesthesia care unit. In this growing world, day care surgery in the patient being discharged from the hospital on the same day has become popular modality of treatment. In this fast speed of life, adoption of nuclear family need of early return to work, and resumption of daily routine chores to maintain social which have propelled this treatment modality to newer heights. Anesthesia for day-care surgeries may require administration of general, local and regional anesthesia or monitored anesthesia care supplemented with sedation. Availability of newer drugs has contributed in advancements in anesthesia techniques largely to the progress of day-care surgery.

Aim: The aim is to compare two anaesthesia techniques for obese patients in day care surgery.

Material and Method: This is prospective study which is carried out in Dept. of Anesthesiology at Rohilkhand Medical College and Hospital, Bareilly (UP), during the period of 1 year. All paediatric patients which undergoing circumcisions were included in this study. Patient's queries regarding anesthesia and surgery were sought. Detail history of patients with lab routinely investigation like CBC, Creatine urine R/M etc. 60 Patients in each group with 30 patients not having any responsible adult at their homes were including in this study. Standard monitors SPO2, NIBP, ECG and Respiratory rate were attached. Every patient received 500 ml Ringer Lactate IV before surgery. inj. Ondansetron 4 mg, inj. Ranitidine 50 mg i.v. Fentanyl 2 mcg/kg i.v and inj Midazolam 1 mg i.v. 3 minutes prior to induction.

Results: All the data were recorded and each of those variables was summarized by mean and standard deviation. Paired t test was applied for comparing the two main groups. p value less than 0.05($p < 0.05$) have been considered as statistically significant. As p value is not significant in Mean surgical time and mean anaesthesia time were compared. Induction of anesthesia with Propofol produced a fall in B.P in this study.

Conclusion: Nowadays Ambulatory surgery for obese patients is an upcoming field. New technology and methods are developed to improve early recovery and complication free anaesthesia and it also help to developed decrease patient load in hospitals.

Corresponding author: Dr. Atul Kumar Agrawal

Keywords: Ambulatory Surgery, Anaesthesia Techniques, Day-care anesthesia, Day-care surgery

Introduction

There are many anesthetic techniques such as general, regional, spinal, epidural, caudal, hypotensive, inhalation, nerve blocks, total intravenous and regional intravenous used for multiple surgical procedures. There is controversial in effect of anesthetic technique on perioperative outcomes. Central neuraxial blocks including epidural, spinal and caudal anesthesia are regional anesthesia techniques. Other use of regional anesthesia techniques including reduced side effects, pain control, improved cardiac and pulmonary function, decreased blood loss and shortened stay in the post anesthesia care unit[iiiiiiiv].

Throughout the world in anesthetic and surgical practices recent advances have facilitated the rapid rise in ambulatory surgery. Due to availability of rapid, short acting anesthetic, sympatholytic, analgesic and muscle relaxant drugs as well as improved monitoring device which become possible to minimize the adverse effects of anesthesia and recovery process. In the perioperative care allowed surgeons to perform an increasing array of more invasive surgical procedures on an ambulatory basis[v].

In this growing world, day care surgery in the patient being discharged from the hospital on the same day has become popular modality of treatment. In this fast speed of life, adoption of nuclear family need of early return to work, and resumption of daily routine chores to maintain social which have propelled this treatment modality to newer heights[vi], [vii].

Anesthesia for day-care surgeries may require administration of general, local and regional anesthesia or monitored anesthesia care supplemented with sedation. Availability of newer drugs has contributed in advancements in anesthesia techniques largely to the progress of day-care surgery[viii]. Nowadays Food habits and sedentary life styles have created a pandemic of obesity. World health statistics 2012 shows that one in six adults is obese. Every hospital is facing a major obese patient load[ix]. Patients' separation from their homes and family environment and loss of man hours is reduced ambulatory surgery does not depend upon the availability of a hospital bed[x]. The aim is to compare two anaesthesia techniques for obese patients in day care surgery.

Material and Methods:

This is prospective study which is carried out in *Dept.* of Anesthesiology at Rohilkhand Medical College and Hospital, Bareilly (UP), during the period of 1 year. All paediatric patients which undergoing circumcisions were included in this study. Patient's queries regarding anesthesia and surgery were sought. Detail history of patients with lab routinely investigation like CBC, Creatine urine R/M etc. patients with alcohol/drug abuse, H/O allergic reactions to any of the drug being used, motion sickness and last 24 hours of surgery use of antiemetic drugs were excluded in this study. 60 Patients in each group with 30 patients not having any responsible adult at their homes were including in this study.

Standard monitors SPO2, NIBP, ECG and Respiratory rate were attached. Every patient received 500 ml Ringer Lactate IV before surgery. inj. Ondansetron 4 mg, inj. Ranitidine 50 mg i.v. Fentanyl 2 mcg/kg i.v and inj Midazolam 1 mg i.v. 3 minutes prior to induction. After induction BIS was attached and Continuous capnography was used during the procedure. After the surgery, Propofol infusion was stopped and Sevoflurane was stopped. Total anaesthesia time was recorded from induction to discontinuation of anaesthetics as well as Total surgical time from incision to placement of dressing was also noted.

Observations and Results:

All the data were recorded and each of those variables was summarized by mean and standard deviation. Paired t test was applied for comparing the two main groups. p value less than 0.05($p < 0.05$) have been considered as statistically significant.

Table 1: Demographic Data with two groups according to age, weight, height and BMI

Groups	GROUP A	GROUP B	P value
AGE[in years]	43.6±17.1	42.5±15.2	0.05
HEIGHT[in cm]	167±2.8	162±5.7	0.626
WEIGHT[in kg]	93±4.2	89.5±3.6	0.639
BMI[kg/m]	33.7±0.35	34.1±1.06	0.57

Table 2: Duration of Anaesthesia and Surgical Time

Groups	GROUP A	GROUP B	P value
Mean Anaesthesia time [in minutes]	20.3±6.4	22.02±5.4	0.472
Mean Surgical time [in minutes]	18.3±6.4	18.6±6.4	1

As p value is not significant in Mean surgical time and mean anaesthesia time were compared. Induction of anesthesia with Propofol produced a fall in B.P in this study. Mostly patients were of young age group of age 18 to 55yrs. Subsequently Ringer lactates 500ml were pre loading of every patient before induction.

There was no statistically significant difference in oxygen saturation between these two subgroups at any stage during the study p> 0.05. Patients in Propofol infusion, group had apnea transiently, which was corrected by controlled although ventilation through LMA.

Table 3: Data Related To Recovery

Groups	GROUP A	GROUP B	P value
Response to commands	8.5±1.2	8.3±0.5	0.093
Eye opening time	6.5±0.5	7.3±0.6	0.827
Time to sit up	19.1±0.5	17.5±0.9	0.255
Time to stand up	40.7±1.7	47.0±4.7	0.043
Recovery foll. MASS	62±15.0	56.2±4.8	0.478

Both groups show similar in Recovery profile. In groups A and B were 62±15.0 and 56.2±4.8 minutes respectively when patients for 6 hours in recovery area.

Discussion:

From the past 40 years in India also ambulatory anesthesia is being practiced. Problems occur in the first 3-4 hour postoperative period, can be easily resolved and are discharged. According to the study done by Joshi et al patients are at a high risk of perioperative complications, after surgery which may last for several days[xi]. As studied of Janet et al GA with newer anesthetic drugs allowed an earlier discharge as compared with spinal or epidural anesthesia in newer practice. Anesthetic agents like Propofol, Isoflurane and Sevoflurane and Fentanyl introduction of rapid ultra short acting anesthetic agents facilitates fact tracking for achieve recovery after GA[xii]. Similar study were done by Bharti et al in which compared induction with Propofol group 2-3 mg/kg and maintained with Propofol infusion50-200mcg/hr. and Sevoflurane group induction with 5-8% and maintenance with Sevoflurane 4% which suggest that rapid recovery can be achieved with both the techniques[xiii]. Bajwa and Bajwa et al study also shows that Propofol does not have any analgesic property[xiv]. Anderson et

al. study also shows that obese patients present specific challenges to both surgeons and anesthesiologists who show that obese patients present specific challenges to both surgeons and anesthesiologists[xv]. According to O. Ibraheim et al BIS allows reduction in total amount of anesthetic that patients are exposed to and appears to decrease time for emergence and recovery[xvi].

In this study achieved MASS recovery score in group A 62±15.0 minutes and group B 56.2±4.8 minutes respectively. Ambulatory surgery resulted in improved patient satisfaction and significant cost savings without compromising patient care. Motsch et al studied in urological and ophthalmic day surgeries early recovery and the return of mental function and psychomotor in the first 60 min after anaesthesia is faster following Sevoflurane than after Propofo[xvii]. Other studied from Tramer et al showed Propofol is not the sole antiemetic and can be used as induction agent alone, because it has short duration of action[xviii].

Conclusion:

Nowadays Ambulatory surgery for obese patients is an upcoming field. New technology and methods are developed to improve early recovery and complication free anaesthesia and it also help to developed decrease patient load in hospitals. In this study, Group A having more stable with haemodynamics. In both groups showed recovery profile are almost similar in this study.

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PHENYLEPHRINE DOSES FOR THE PREVENTION OF OXYTOCIN-INDUCED HYPOTENSION IN CAESAREAN SECTION: EFFECT OF PRELOAD

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Conflicts of Interest: Nil

ABSTRACT:

INTRODUCTION: Approximately 80% of the patients suffers Spinal-induced hypotension (SIH) for cesarean delivery (CD) and is a frequently encountered problem. Phenylephrine is a short-acting alpha agonist, can be administered by bolus as well as by infusion to treat oxytocin induced hypotension. Phenylephrine has been associated with a decreased incidence of hypotension and maternal nausea and vomiting and improved umbilical artery pH.

MATERIAL AND METHODS: Via computer-generated blocked randomization patients were randomized to be in the colloid or crystalloid infusion groups. 18-gauge intravenous (IV) catheter was inserted into a forearm vein, and vein patency was maintained with Lactated Ringer's solution (LR) at a rate of 5 ml/h before administering the preload. Colloid preload was 500 ml hydroxyethyl starch in 0.9% normal saline and crystalloid preload was LR (1500 ml). Volume of crystalloid and colloid preload was 1:3 colloid to crystalloid ratio to achieve a similar degree of volume expansion. Spinal anaesthesia was given with a 25-gauge pencil point needle at the L2-L3 or L3-L4 vertebral interspace. A mixture of hyperbaric bupivacaine 0.75%, 12 mg with morphine, 200 mcg was injected intrathecally. All patients were given a phenylephrine infusion (10 mg phenylephrine in 100 ml 0.9% NS). Just after intrathecal injection at a rate of 100 mcg/min. Phenylephrine infusion protocol was continued until the time of uterine incision. The infusion was stopped if the HR decreased below 60 beats per minute (bpm), or if the SBP increased to >20% above baseline, and was again restarted when the BP decreased to <20% below baseline (defined as hypotension). The total dose of phenylephrine used during the study period was recorded.

RESULTS: A total of 92 patients were included in the study, 56 in each group. 2 patients from crystalloid preload group were excluded because of the high sensory levels and 2 patients from colloid group was excluded because of significant hypertension prior to starting the phenylephrine infusion. Finally 54 patients in each group were included in the study. Mean age in lacteted ringer solution group was 27.21±6.24 years while in hydroxyethyl starch group it was 28.14±5.49. Mean Spinal uterine incision time was 16.58±4.21 and 18.28±3.39 in lacteted ringer solution group and hydroxyethyl starch group respectively. Estimated blood loss in ml(mean±SD) was 446±60.89 and 498±59.45 in lacteted ringer solution group and hydroxyethyl starch group respectively. Systolic blood pressure baseline (mean±SD) 128.88±10.28 and 131.31±9.54 in lacteted ringer solution group and hydroxyethyl starch group respectively. Heart rate (mean±SD) was 90.87±10.25 and 88.56±11.56 in lacteted ringer solution group and hydroxyethyl starch group respectively. Significantly less phenylephrine was used in the colloid group (1068 ± 554 mcg) compared to the crystalloid group (1401 ± 527 mcg) (P = 0.003) . There was no significant difference in the incidence of maternal nausea and vomiting, as well as APGAR scores at 1 and 5 min. Emergency rescue medications were administered to a total of 4 patients. 3 in crystalloid group and 1 in colloid group for supraventricular tachycardia.

CONCLUSION: In prevention of SIH and treatment Phenylephrine with colloids are shown to be superior to crystalloids because of the phenylephrine sparing effect.

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Introduction

Approximately 80% of the patients suffers Spinal-induced hypotension (SIH) for cesarean delivery (CD) and is a frequently encountered problem[i].Postpartum haemorrhage (PPH) is one of the leading causes of maternal mortality with uterine atony in about 50% cases[ii]. Prophylactic use of oxytocin has been shown to reduce the PPH by up to 40%[iii].as oxytocin receptors found in the heart and large vessels it causes hypotension and reflex tachycardia as an adverse effect[iv]. If hypotension is prolonged, impairment in placental blood flow and fetal acidosis can occur[v].to prevent this prophylactic phenylephrine infusion can be given. There are many approaches to prevent hypotension but no single approach has been shown as the gold standard, and each prophylactic treatment comes with accompanying risks. Crystalloid preload can prevent hypotension has a poor efficacy in preventing hypotension, due to rapid redistribution into the extracellular space[vi].

To prevent oxytocin induced hypotension , many approaches have been recommended, commonly used, synthetic colloids such as hydroxyethyl starch are more expensive than crystalloid and side effects include pruritis, anaphylactoid reactions, association with kidney injury, and coagulopathy[vii, viii].

Phenylephrine is a short-acting alpha agonist, can be administered by bolus as well as by infusion to treat oxytocin induced hypotension[ix]. Phenylephrine obtunds oxytocin-induced decrease in systemic vascular resistance (SVR) and increase in heart rate and cardiac output[x]. Phenylephrine has been associated with a decreased incidence of hypotension and maternal nausea and vomiting and improved umbilical artery pH[xi, xii]. In *ex vivo* studies, phenylephrine has been shown to improve fetal arterial perfusion than ephedrine[xiii].

In this prospective, comparative study, we formulated two groups of patients receiving prophylactic phenylephrine infusions which was combined with either a colloid or crystalloid preload. We assume that patients receiving prophylaxis with a phenylephrine infusion and colloid preload would show a reduced incidence of hypotension i.e. <20% below baseline as compared to patients receiving a phenylephrine infusion with crystalloid preload. We selected our secondary outcomes to reflect the clinical evidence of reduced cardiac output; these included the total dose of phenylephrine, incidence of bradycardia, nausea, and vomiting, as well as APGAR scores at 1 and 5 min.

MATERIAL AND METHODS

Via computer-generated blocked randomization patients were randomized to be in the colloid or crystalloid infusion groups. Normal singleton pregnancy, beyond 36 weeks gestation, between 18 and 35 years of age, , weight between 50 and 120 kg, and height ranging from 150-180 cm. Exclusion criteria were: Contraindications to spinal anesthesia, pregnancy-induced hypertension, preeclampsia, known uteroplacental insufficiency, multiple gestation, fetal abnormalities, congenital heart abnormalities, prematurity, or clinical evidence of fetal distress, signs of onset of labor, or history of adverse reactions to hydroxyethyl starch.

Pre-anaesthetic evaluation of all the parturients was done and an informed written consent was taken. 18-gauge intravenous (IV) catheter was inserted into a forearm vein, and vein patency was maintained with Lactated Ringer's solution (LR) at a rate of 5 ml/h before administering the preload. Colloid preload was 500 ml hydroxyethyl starch in 0.9% normal saline and crystalloid preload was LR (1500 ml). Volume of crystalloid and colloid preload was 1:3 colloid to crystalloid ratio to achieve a similar degree of volume expansion[xiv]. Intravenous administration of preload was delivered for 30 min, prior to spinal anaesthesia and when the fluid load was complete, IV patency was maintained at a rate of 5 ml/hour and medications were flushed with LR. Standard monitoring for all patients was done through use of non-invasive blood pressure (NIBP) measurement, electrocardiography, and pulse oximetry. Oxygen (2 l/min) was administered via nasal cannula. The average

Systolic BP and accompanying heart rate (HR) of these 3 measurements were recorded as mean baseline values.

Spinal anaesthesia was given with a 25-gauge pencil point needle at the L2-L3 or L3-L4 vertebral interspace. A mixture of hyperbaric bupivacaine 0.75%, 12 mg with morphine, 200 mcg was injected intrathecally. Patients were then kept in supine position with 15° left lateral tilt. BP and HR were measured and recorded at 1-min intervals starting 1-min after intrathecal injection until uterine incision. BP measurements were then taken as per instructions of anaesthesia team.

All patients were given a phenylephrine infusion (10 mg phenylephrine in 100 ml 0.9% NS). Just after intrathecal injection at a rate of 100 mcg/min. Phenylephrine infusion protocol was continued until the time of uterine incision. The infusion was stopped if the HR decreased below 60 beats per minute (bpm), or if the SBP increased to >20% above baseline , and was againrestarted when the BP decreased to <20% below baseline (defined as hypotension). The total dose of phenylephrine used during the study period was recorded.

After baby extraction, test drug solutions (10 mL) were administered based on group allocation over a period of 5 min using a syringe infusion pump. Patients idea about nauseating feeling was recorded from start of anaesthesia at every 5 minutes interval.

All normally distributed data were expressed as mean ± standard deviation. The data for the incidence of hypotension and occurrence of nausea and/or vomiting were compared using the Chi-squared test or Fisher's exact test as appropriate.

RESULTS OF STUDY

A total of 92 patients were included in the study, 56 in each group. 2 patients from crystalloid preload group were excluded because of the high sensory levels and 2 patients from colloid group was excluded because of significant hypertension prior to starting the phenylephrine infusion. Finally 54 patients in each group were included in the study.

TABLE 1: Patients characteristics in each group

Characteristics	Lacteted ringer solution group (n=54)	Hydroxyethyl starch group (n=54)	P value
Age (mean±SD)	27.21±6.24	28.14±5.49	P = 0.4128
Height(mean±SD)	160.27±6.44	161±5.22	P = 0.519
Spinal uterine incision time(mean±SD)	16.58±4.21	18.28±3.39	P = 0.023
Estimated blood loss in ml(mean±SD)	446±60.89	498±59.45	P <o.oo1
Systolic blood pressure baseline (mean±SD)	128.88±10.28	131.31±9.54	P = 0.206
Heart rate (mean±SD)	90.87±10.25	88.56±11.56	P = 0.274

Mean age in lacteted ringer solution group was 27.21±6.24 years while in hydroxyethyl starch group it was 28.14±5.49. Mean Spinal uterine incision time was 16.58±4.21 and 18.28±3.39 in lacteted ringer solution group and hydroxyethyl starch group respectively. Estimated blood loss in ml (mean±SD) was 446±60.89 and 498±59.45 in lacteted ringer solution group and hydroxyethyl starch group respectively. Systolic blood pressure baseline (mean±SD) 128.88±10.28 and 131.31±9.54 in lacteted ringer solution group and hydroxyethyl starch group respectively. Heart rate (mean±SD) was 90.87±10.25 and 88.56±11.56in lacteted ringer solution group and hydroxyethyl starch group respectively.

Significantly less phenylephrine was used in the colloid group (1068 ± 554 mcg) compared to the crystalloid group (1401 ± 527 mcg) (P = 0.003) . There was no significant difference in the

incidence of maternal nausea and vomiting, as well as APGAR scores at 1 and 5 min.

Emergency rescue medications were administered to a total of 4 patients. 3 in crystalloid group and 1 in colloid group for supraventricular tachycardia.

DISCUSSION AND CONCLUSION

The benefits of prophylactic phenylephrine infusion are still controversial. However, it has been associated with a decreased incidence of hypotension and maternal nausea and vomiting and improved umbilical artery pHxv,xvi. In our study there was lower incidence of hypotension with colloid preload when compared with the crystalloid group this results were comparable with the study by Bottiger BA et al[xvii] observed that here was a lower incidence of hypotension with colloid preload (10.8%) when compared with the crystalloid group (27.0%).in a study by Gangadharaiah R [xviii]et al it has been observed that co-administration of 75 µg phenylephrine with oxytocin reduced the incidence and the number of episodes of oxytocin-induced hypotension whereas 50 µg of phenylephrine did not reduce the incidence of hypotension but reduced the number of episodes of hypotension and rescue vasopressor requirement compared to control. Some studies have compared the efficacy of different doses of phenylephrine i.e. 100 µg, 125 µg and 150 µg to treat post-spinal hypotension in elective caesarean section and concluded that there was no significant difference in all groups[xix].

There was a gradual decrease in HR in both groups, despite the different dose required, may be attributed to the effect of the spinal anesthetic as well as the phenylephrine infusion. Phenylephrine has been associated with decreased cardiac output and dysrhythmias, including ventricular tachycardia, supraventricular tachycardia, coronary artery spasm, and myocardial infarction, although these side effects seem to be reduced when compared with ephedrine[xx].in our study 3 in crystalloid group and 1 in colloid group experienced supraventricular tachycardia. In our study no significant difference was observed in relation to clinical evidence of reduced cardiac output; nausea, and vomiting, as well as APGAR scores at 1 and 5 min.

In prevention of SIH and treatment Phenylephrine with collids are shown to be superior than crystelloids because of the phenylephrine sparing effect associated with preloading colloids. Further studies are required to confirm the results.

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Original Research Article

A Comparison of the Effects of Port Site Infiltration and Ultrasound-Guided Oblique Sub-Costal Transversus Abdominis Plane Block on Analgesic and Respiratory Performance in Patients Undergoing Laparoscopic Chole-Cystectomy

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Conflict of interest: Nil

Abstract

Background: Perioperative analgesic techniques that are reliable and efficient are crucial for improving postoperative healing.

Aims & objectives: For patients undergoing laparoscopic chole-cystectomy, the current research compared the effectiveness of sub-costal TAP block vs. port site infiltration with regard to pain and post-operative respiratory functioning.

Material and Methods: The current investigation was a single-center, hospital-based, randomized, observer-blinded, interventional trial that involved patients undergoing laparoscopic chole-cystectomy under general anesthesia who were between the ages of 18 and 60 and had an ASA Grade I or II. Category 1 (Oblique sub-costal TAP block category) and Category 2 were randomly assigned to each of 120 patients undergoing laparoscopic chole-cystectomy (Port site infiltration)

Results: The average length of the procedure and the average length of the analgesia were comparable between the categories and statistically insignificant. Peak Expiratory Flow Rate (PEFR) was not significantly different between the two categories at baseline (372.70 55.42 vs. 373.50 56.25 l/min; p>0.05), however Category 2's PEFR was significantly lower than Category 1's at 24 hours after surgery (329.42 17.72 vs. 266.42 39.16 l/min; p0.05). Both categories' VAS scores were equivalent during the shift, however Category 1's VAS score at the post-operative time intervals (2, 4, 8, 12, and 24 hours) was considerably lower than Category 2. 22 (18.3%) and 4 (3.3%) of the patients in Categories 1 and 2, respectively, needed rescue analgesics. It was shown that substantially fewer patients in Category 1 than in Category 2 required rescue analgesics. In Category 1 and Category 2, respectively, 4 (5%) and 10 (8.3%) patients experienced nausea and vomiting.

Conclusion: When compared to the port site infiltration Category, the TAP Categories pain and post-operative respiratory functions, as measured by PEFR following laparoscopic chole-cystectomy and VAS score at post-operative time intervals of 2, 4, 8, 12, and 24 hours, were considerably reduced.

Keywords: sub-costal TAP block, port site infiltration, analgesia, laparoscopic chole-cystectomy.

Introduction

Minimally invasive surgery, which encompasses endoscopy and laparoscopy, is one of the significant breakthroughs in the evolution of surgical techniques [1]. The advantages of laparoscopic surgery include lower post-operative discomfort, shorter hospital stays, better cosmetic outcomes, and patient satisfaction. Perioperative analgesic techniques that are reliable and efficient are crucial for improving postoperative healing [2]. The goal of the best analgesic regimens is to increase patient comfort and mobility while reducing the chance of problems that could hinder postoperative recovery. For the comfort of the patient, early mobilization, and a quicker recovery, postoperative pain must be controlled. As opposed to the traditional posterior technique, which gives sensory block from T10 to L1 spinal segment levels, sub-costal transversus abdominis plane (TAP) block can provide sensory block of the T7 to T12 nerves [3]. The use of ultrasound guidance can improve the precision and quality of nerve blockage. After a laparoscopic chole-cystectomy, port-site infiltration with local anesthetics is another efficient way to relieve pain [4]. The present research was conducted at our tertiary care center with that goal in mind because there is a dearth of literature comparing the effectiveness of sub-costal TAP block vs. port site infiltration with respect to pain and post-operative respiratory functions in patients undergoing laparoscopic chole-cystectomy [5].

Material and Methods

The current investigation was an interventional, single-center, hospital-based, randomized, and observer-blinded research that was carried out in central India's anesthesia department with assistance from the surgery department. The research lasted for 18 months. The institutional ethical committee approved the research.

Inclusion criteria: Under general anesthesia, a patient between the ages of 18 and 60 who is an ASA Grade I or II is having a laparoscopic chole-cystectomy.

Exclusion criteria: those undergoing an open chole-cystectomy conversion. ASA Ill and IV grades. infection at the local location. patient with cardiac and pulmonary problems before surgery. local anesthetic allergy (local anesthetic sensitivity test will be performed in all patients preoperatively).

Once the patients were included in the research, a proper informed consent was obtained from them, and a full history and physical examination were performed in accordance with the proforma. 240 patients undergoing laparoscopic chole-cystectomy were randomized into the two categories below at random (via sealed envelope):

Category 1: (Oblique sub-costal TAP block category, by anesthesiologists with expertise in ultrasound-guided truncal blocks, under ultrasound guidance)

Category 2: Infiltration at the port (by the operating surgeon at the end of the surgery.)

Bupivacaine and lignocaine were deposited in the aircraft after aspiration (dosage as per body weight). 10 ml on either side of the oblique sub-costal transversus abdominis plane block were infiltrated. Following surgery, port site infiltration was carried out as normal using the same amount of local anesthetic and split equally across the port sites.

A standardized general anesthesia protocol was used, including preoperative (before induction) non-opioid analgesia with injections of paracetamol (15 mg/kg), baseline vitals after attachment of non-invasive

monitors (ECG, non-invasive blood pressure, pulse oximetry, and end-tidal CO_2), and patient induction after pre-oxygenation with injections of fentanyl (1 mcg/kg), propofol (2 mg/kg All patients received an intraoperative injection of 8 mg of dexamethasone. Volume-controlled breathing, isoflurane, and intravenous atracurium (0.1 mg/kg) were used to maintain anesthesia.

The patients were extubated and taken to the post-operative PACU, where the recovery anesthesiologist was informed that local anesthetics had been administered to the patients out of concern for their safety. The recovery anesthesiologist was blinded to the category intervention at this point, and muscle relaxant was reversed by a mixture of Inj. Neostigmine (0.05 mg/kg) and Inj. Glycopyrrolate (0.008 mg/kg). The patients were administered rescue analgesia (postoperatively for VAS 4) while in recovery. Paracetamol was the first rescue analgesic utilized, followed by Tramadol, and Diclofenac was the third. In the first 24 hours following surgery, VAS (Visual Analogue Scale) pain levels were examined.

(At 2 hours, 4 hours, 8 hours, 12 hours, and 24 hours into the shift) PEFR, which was measured preoperatively at the time of assessment (the best of the three readings was taken), postoperatively at the end of 24 hours, and arterial blood gas variables were measured in the first 24 hours to evaluate the change in respiratory function, were used to measure respiratory function.

Results

Among those having a laparoscopic chole-cystectomy. Two categories of 240 patients were randomly selected: Category 1 (Oblique sub-costal TAP block) and Category 2. (Port site infiltration). Patients in Category 1 had a mean age of 41.10± 11.16 years, whereas those in Category 2 had a mean age of 42.33± 9.70 years.

According to the Student t-test ($p>0.05$), there was no statistically significant difference between the categories in terms of mean age, gender, BMI, and ASA grade.

Table 1: General characteristics

General Characteristics	Category 1	Category 2	P value
Age (years)	41.10 ± 11.16	42.33 ± 9.70	>0.05
Gender			>0.05
Male	68 (56.7%)	64 (53.3%)	
Female	52 (43.3%)	56 (46.7%)	
Mean BMI	25.54 ± 4.18	25.43 ± 4.00	>0.05
ASA grade			>0.05
I	80 (66.7%)	86 (71.7%)	
II	40 (33.3%)	34 (28.3%)	

The average operation time in Category and Category B was similar (41.16± 9.14 mins vs. 42.31±9.44 mins). According to the Student t-test, the mean time of analgesia was comparable between the categories and not statistically significant (54.70± 9.78 minutes vs. 56.50± 7.34 minutes; $p>0.05$). Heart rate, systolic and diastolic blood pressure, and oxygen saturation levels were comparable amongst the categories intraoperatively throughout the trial, according to a student t-test ($p>0.05$). Peak Expiratory Flow Rate (PEFR) was not significantly different between the two categories at baseline (372.70± 55.42 vs. 373.50± 56.25 l/min; $p>0.05$), however Category 2's PEFR was significantly lower than Category 1's at 24 hours after surgery (Student t-test: 329.42± 17.72 vs. 266.42±

39.16 l/min; p0.05). Both the baseline partial pressure of carbon dioxide ($PaCO_2$) (40.74±6.39 mmHg vs. 41.36±5.47 mmHg; p>0.05) and the $PaCO_2$ at 24 hours after surgery (44.44±9.41 mmHg vs. 47.14±9.26 mmHg; p>0.05) did not differ significantly between the two categories.

Table 2: Operative parameters

Operative parameters	Category 1 (Mean ± SD)	Category 2 (Mean ± SD)	P value
Mean duration of Surgery (mins)	41.16 ± 9.14	42.31 ± 9.44	>0.05
Duration of Analgesia (mins)	54.70 ± 9.20	56.50 ± 7.33	>0.05
PEFR			
Initial	372.70 ± 55.42	373.50 ± 56.25	>0.05
Post op 24 hours	329.42 ± 17.72	266.42 ± 39.16	<0.05
$PaCO_2$ (mmHg)			>0.05
Initial	40.74 ± 6.36	41.36 ± 5.47	
Post op 24 hours	44.44 ± 9.41	47.14 ± 9.26	

The VAS scores on shift were comparable between the two categories, but according to a Student t-test, Category 1's VAS scores at the post-operative time intervals (2 hours, 4 hours, 8 hours, 12 hours, and 24 hours) were substantially lower than Category 2's (p 0.05).

Table 3: Comparison of VAS score at various postoperative time intervals

VAS	Category 1 (Mean ± SD)	Category 2 (Mean ± SD)	p value
On shift	1.86 ± 0.30	1.26 ± 0.28	>0.05
2 hours	1.29 ± 0.33	2.41 ± 0.46	<0.05
4 hours	1.25 ± 0.30	2.29 ± 0.33	<0.05
8 hours	1.29 ± 0.33	2.33 ± 0.46	<0.05
12 hours	1.31 ± 0.32	2.31 ± 0.43	<0.05
24 hours	1.33 ± 0.33	2.32 ± 0.36	<0.05

22 (18.3%) and 4 (3.3%) of the patients in Categories 1 and 2, respectively, needed rescue analgesics. According to the Chi-Square test (p0.05), it was shown that a considerably less proportion of patients in Category 1 needed rescue analgesics than in Category 2.

Table 4: Distribution of Rescue Analgesic

Requirement of Rescue Analgesic	Category 1 (%)	Category 2 (%)	p Value
Yes	4(3.3%)	22 (18.3%)	<0.05
No	116 (96.7%)	98 (81.7%)	

In Category 1 and Category 2, respectively, 4 (5%) and 10 (8.3%) patients experienced nausea and vomiting. The incidence of nausea and vomiting was lower in Category 1 than in Category 2, although according to the Chi Square test, this difference was not statistically significant (p>0.05).

Table 5: Post-operative complications

Post-operative complications	Category 1 (%)	Category 2 (%)	p Value
Nausea and Vomiting	6 (5%)	10 (8.3%)	>0.05
No complications	114 (95%)	110 (91.7%)	

Discussion

The frequency of myocardial ischemia can be reduced by providing appropriate postoperative analgesia, which also lowers the neuro-endocrine stress response and postoperative respiratory problems [6]. In the neuro-fascial plane between the internal oblique and the transversus abdominis muscle, local anesthetic is injected using the localized anesthetic technique known as TAP block to block the abdominal neural afferents. Unreliable unilateral supraumbilical analgesia is produced by the ultrasound-guided sub-costal transversus abdominis (STA) block, a recently described variant of the TAP [7]. According to the Student t-test used in this investigation, there was no statistically significant difference between the categories in terms of mean age, gender, BMI, or ASA grade ($p>0.05$). This is comparable to investigations done by Abdelmaboud MA, Bhalekar P, and others. In the Abdelmaboud MA research, no statistically significant differences were detected between the research categories in terms of age, sex, BMI, or the length of the surgery when assessing the clinical value of TAP block as analgesic after lower abdominal procedures in morbidly obese patients [8-10]. According to Bhalekar P et alinvestigation .'s into whether sub-costal TAP block lessens the need for rescue analgesics after laparoscopic chole-cystectomy, both categories had equivalent mean ages, sex distributions, mean weights, ASA physical statuses, and surgical times. Peak expiratory flow rate (PEFR) did not differ significantly between the two categories at baseline (372.70 ±55.42 vs. 373.50 ± 56.25 l/min; $p>0.05$), but Student t-test results showed that PEFR significantly decreased in Category 2 compared to Category 1 at 24 hours after surgery (329.42 ±17.72 vs. 266.42 ± 39.16 l/min; p0.05), indicating that TAP block is This is comparable to the studies of Basaran B et al. and Abdelmaboud MA. The PEFR between the two categories at baseline was not significantly different, however at 2, 6, and 12 hours after surgery, category C (the control category) had a significantly lower PEFR than category T (the TAP category). In a randomized, double-blind research, Basaran B et al. found that the OSTAP category had improved FVC values at 2 ($p=0.029$) and 24 ($p=0.019$) hours. Values for FEV1/FVC and PEFR were comparable between categories [11-14]. In our research, the VAS scores at the start of the shift were comparable between the two categories, but the VAS scores at the post-operative time points (2 hours, 4 hours, 8 hours, 12 hours, and 24 hours) were substantially lower in Category 1 than in Category 2 according to the Student t-test (p 0.05). According to studies by Abdelmaboud MA, Basaran B et al., Bhalekar P et al., and Saliminia A et al., this is the case. According to a research by Bhalekar P et al., patients in Category B (the sub-costal TAP category) had significantly lower mean VAS scores at rest and on coughing than patients in Category A throughout the first 24 hours following operation (control category). The sub-costal TAP category had lower VAS scores than the control category at 1 hour (3.44 vs. 5.17), 6 hour (3.94 vs. 6.44), 12 hour (1.94 vs. 3.39), and 24 hour (1.94 vs. 3.39), according to Saliminia A et alresearch .'s on the effectiveness of transverse abdominis plane block in reducing postoperative pain in laparoscopic chole-cystectomy (0.83 vs. 1.44). In the current research, it was shown that 2 (3.3%) and 11 (18.3%) patients in Categories 1 and 2 needed rescue analgesics, respectively (Inj. Paracetamol, Inj. Tramadol, Inj. Diclofenac) [15-18]. According to the Chi-Square test (p0.05), it was shown that a considerably less proportion of patients in Category 1 needed rescue analgesics than in Category 2. Studies by Abdelmaboud MA, Erbabacan E et al., El Dawlatly AA et al., Ra YS et al., Ghisi D et al., Chen CK et al., Bhalekar P et al., Carrie C et al., Sharma P et al., and Basaran B et al., Bhanulakshmi M. After lower abdominal surgery, Erbabacan E.

et alresearch .'s comparing TAP block with IV patient-controlled analgesia (PCA) utilizing opioids found that TAP block was better to IV-PCA because it begins its analgesic impact sooner and lessens the systemic effects of the morphine used in PCA. Research on the effectiveness of the sub-costal TAP block by Tolchard, S. Patients in the sub-costal TAP category required morphine and tramadol in 1/21 (4.8%) and 6/21 (28.6%) patients, respectively, whereas control category required morphine and tramadol in 3/22 (13.6%) and 8/22 (36.4%) patients postoperatively, which was not statistically significant. This was in comparison with conventional port site infiltration in laparoscopic chole-cystectomy. In our research, it was shown that 6 (5%) and 10 (8.3%) patients in Categories 1 and 2, respectively, had nausea and vomiting [19,20]. The incidence of nausea and vomiting was lower in Category 1 than in Category 2, although according to the Chi Square test, this difference was not statistically significant ($p>0.05$). This result was in line with investigations by Basaran B et al. and Abdelmaboud MA. Unwanted postoperative outcomes include patient suffering, anguish, confusion, and heart issues, as well as extended hospital stays and costs, are all linked to poorly managed pain. It has been demonstrated that adequate surgical pain management helps high-risk patients experience less perioperative morbidity from acute coronary events and thrombotic events. Local anesthetic (LA) inhibition of pain impulses provides efficient analgesia for abdominal surgery, either alone or in combination with other analgesics with the development of accurate target identification systems for ultrasonic imaging [21-22].

Conclusion

The hospital-based, randomized, observer-blinded, interventional research found that adding a sub-costal TAP block to a standard multimodal analgesic regimen, as opposed to port site infiltration, provided superior postoperative analgesia with regard to pain and post-operative respiratory functions measured by PEFR after laparoscopic chole-cystectomy. Additionally, VAS score at post-operative time intervals (2,4,8,12, and 24 hours) was significantly lower in TAP.

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Original Research Article

Bupivacaine Versus 2 Chloroprocaine Spinal Anesthesia Comparison Study at a Tertiary Hospital

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Abstract

Background: For surgery on the lower abdomen and lower limbs, spinal anesthesia is a tried-and-true, dependable, and safe anesthetic approach. It is simple to administer, acts quickly, poses little danger of infection, and has a low failure rate.

Aims & objectives: The goal of the current study was to compare the effectiveness and readiness for discharge of the two local anesthetics used for spinal anesthesia, Bupivacaine and 2-Choroprocaine.

Material and Methods: The current study was a short-duration (60min) elective ambulatory perineal surgery (such as a hemorrhoidectomy, a fistula in ano, a rectal biopsy, etc.) or gynecological procedure (such as a check curettage, hysteroscopy, etc.) prospective randomized double-blind study conducted in patients of 18 to 60 years of age, ASA grades 1 and 2, in 60 patients were randomly divided into two groups using a computer-assisted table: Group B received 40 mg of 1-chloroprocaine and Group C received 10 mg of bupivacaine hydrochloride as the spinal anesthetic.

Results: In terms of mean age, gender, and ASA grade distribution, there was no discernible statistical difference between the two groups. A statistically significant difference was found between groups B and C for the mean time for onset of sensory block, mean time for onset of motor block, mean time to achieve maximum sensory block, mean duration of sensory block, and mean duration of sensory block. The chloroprocaine group showed better results in these areas. The mean length of stay in group C was 1.40 ±0.64 days and group B was 1.42 ± 0.82 days. There was significant difference in length of stay in two groups. ($p<0.05$) The mean time to ambulation in group C was 225.46 ±56.22 and group B was 265.36 ±58.46 minutes. The time it took for two groups to ambulate varied significantly. ($p<0.05$) This demonstrates that patients in Group C are discharged and ambulated earlier than those in Group B.

Conclusion: In comparison to intrathecal Bupivacaine, intrathecal 2 percent 2-Chloroprocaine has the advantages of early ambulation and early hospital discharge. It also has an earlier and more satisfactory onset of sensory and motor block, the desired level of spinal block, and an adequate duration of sensory and motor block.

Keywords: Intrathecal, 2-Chloroprocaine, Bupivacaine, spinal anesthesia, short duration surgeries

Introduction

For surgery on the lower abdomen and lower limbs, spinal anesthesia is a tried-and-true, secure, and dependable anesthetic approach [1]. It is simple to administer, acts quickly, poses little danger of infection, and has a low failure rate. In order to allow for early patient release and minimal side effects, a spinal anesthetic should have a rapid onset and faster offset of its own effect. However, no local anesthetic can deliver a block that is quick to start, predictable in length, effective and reliable, recovers quickly, and has no adverse effects [2]. Smaller doses of the long-acting local anesthetic hyperbaric bupivacaine have been tried in an ambulatory context. With these smaller doses, the block's duration is still protracted, and they might not be enough anesthetic [3]. Bupivacaine frequently causes urinary retention, which extends the period before discharge for individuals who are ambulatory. Then, 2-chloroprocaine is available in a formulation devoid of preservatives and has been administered to patients all over the world without causing neurotoxicity [4]. The main benefits of 2-chloroprocaine are a quicker recovery from anesthesia and a quicker release from the hospital due to its shorter period of action, appropriate duration, and density of block for short-term operations [5].

Aims & objectives: The goal of the current study was to compare the effectiveness and readiness for discharge of the two local anesthetics used for spinal anesthesia, Bupivacaine and 2-Choroprocaine.

Material and Methods

The current study was a hospital-based prospective randomized double-blind study carried out in Central India's Department of Anaesthesia. The study lasted for 18 months. The institutional ethical committee approved the study.

Patients must be between the ages of 18 and 60, have an ASA score of 1 or 2, be willing to participate in the study, and be scheduled for elective ambulatory perineal surgery (such as a hemorrhoidectomy, a fistula in ano, a rectal biopsy, etc.) or a short-duration gynecological procedure (such as check curettage, hysteroscopy, etc.).

Exclusion standards: patients with an ASA rating of 3 or 4. those who are sensitive to or allergic to bupivacaine or chlorprocaine. Patients who cannot undergo spinal anesthesia (INR > 1.3, Platelets 75 000, anticoagulant usage). neurological illness patients (multiple sclerosis, symptomatic lumbar herniated disc, spinal stenosis). patients who are restricted in fluids (cardiac and renal insufficiency). By computer assisted table, 120 patients were randomly divided into two groups, each with 60 participants. 10 mg of 0.5 percent Bupivacaine Hydrochloride were given to Group B (bupivacaine) (n=60).

40 mg of 1-% 2-chloroprocaine was given to group C (n=60). One day before the procedure, a preanesthetic examination was performed. Patients had evaluations for any systemic disorders, and lab tests were documented. The patients were informed of the spinal anesthesia process, and their written agreement was acquired.

Prior to the surgery, all patients fasted for at least six hours. After the patient was moved to the OT, an 18G cannula was used to ensure IV access, and 10ml/kg of crystalloids were then infused. ECG, NIBP, and Spo2 probe monitors were all linked. Heart rate, SBP, DBP, and Spo2 were recorded at baseline. The patient was then placed in a sitting position while being painted and draped while taking aseptic precautions. The free flow of cerebrospinal fluid was then tested utilizing a midline approach and a 25 gauge Quincke Babcock spinal needle to puncture the L3-L4 region. The patient was randomly assigned to receive an intrathecal injection of either 0.5 percent bupivacaine or a 2 percent 2-CP formulation

without preservatives or bisulfite. A facemask was used to provide 5 L/min of oxygen.

When the sensory block had regressed to the S2 dermatome, the sensory and motor blocks were assessed every three minutes for 15 minutes, every five minutes for 45 minutes, every ten minutes for 60 minutes, and ultimately every 15 minutes. The patient's ECG, pulse oximetry, and blood pressure (both systolic and diastolic) were all monitored throughout the procedure. A lack of cold sensation greater than T10 was deemed to be surgical readiness.

Descriptive statistics were used in the statistical analysis.

Microsoft Excel was used to collect and compile the data, and SPSS 23.0 was used to analyze it. For the continuous variables, ratios and proportions were determined, while for the categorical variables, frequency, percentage, averages, and standard deviations (SD) were computed.

Depending on the situation, either the chi-square test or the Fisher exact test was used to examine differences in proportions between qualitative variables. A statistically significant value was defined as one with a P value less than 0.5.

Results

There was no significant statistical difference in mean age, gender and ASA grade distribution amongst two groups.

Table 1: Demographic profile

Characteristics	Group C (n=60) (%)	Group B (n=60) (%)	P Value
Mean age (years)	38.26 ±13.44	38.48 ±11.82	0.783
Gender			
Male	46	42	0.71
Female	14	18	
ASA			
I	36	42	0.42
II	24	18	

Vital signs such as heart rate, systolic and diastolic blood pressure, oxygen saturation, and mean arterial pressure were assessed at baseline and at 0, 3, 5, 10, 15, 20, 25, 30, 45, 60, 90, 120, 150, 180, and 240 minutes after spinal anesthesia, and there was no statistically significant difference between Group C and Group B. In group C, the mean time for the start of sensory block was 4.26± 1.64 seconds, whereas in group B, it was 4.29± 1.92 seconds. It was statistically significant that the mean time for the onset of sensory block differed. In group C, the mean time for the beginning of motor block was 5.26± 0.29 seconds, whereas in group B, it was 5.32± 0.46 seconds. The difference in the motor block's average onset time was statistically significant. (P <0.5) In group C, the mean time to reach the maximal sensory block was 12.06± 3.24 minutes, but in group B, it was 13.38± 3.82 minutes. It was statistically significant that the difference in mean to obtain the greatest sensory block. (P <0.05) In group C, the mean time of the sensory block was 153.06± 19.38 minutes, but in group B, it was 194.32± 21.22 minutes. The variation in the average length of the sensory block was statistically very significant. (P <0.0001) In group C, the mean motor block lasted 169.52± 19.76 minutes, but in group B, it lasted 197.36± 21.39 minutes. Statistics showed that the difference in the mean time for a motor block was quite significant. (P <0.0001)

Table 2: Anaesthesia characteristics

Parameters	Group C	Group B	P value	
Onset of Sensory block (sec)	4.26 ±1.64	4.29 ±1.92	0.02	Significant
Onset of motor block (sec)	5.26 ±0.29	5.32 ±0.46	0.02	Significant
Time to achieve maximum sensory block (minutes)	12.06 ±3.24	13.38 ±3.82	0.01	Significant
Duration of sensory block (minutes)	153.06 ±19.38	194.32 ±21.86	<0.0001	Highly Significant
Duration of motor block (min)	169.52 ±19.76	197.36 ±21.39	<0.0001	Highly Significant

Out of a total of 120 patients, it was shown that 32 (53.33%) of Group C patients and 28 (46.67%) of Group B patients, respectively, had a maximal level of sensory block at T6. When two groups were statistically compared, the degree of sensory block did not differ between the two. (p>0.05).

Table 3: Maximum level of sensory block

Level	Group C	Group B	P value
T4	16	12	X2=1.44; DF=3; P=0.69*
T6	32	28	
T8	10	16	
T10	02	04	

(P>0.05 Statistically Not Significant)

Out of a total of 120 patients, it was shown that Bromage 3 had the greatest degree of motor block, with 56 (93.33%) and 60 (96.67%) patients in Group R and Group B, respectively. When two groups were compared, there was statistically no discernible difference in the degree of motor blockage. (p>0.05)

Table 4: Intensity of motor blockade

Intensity	Group C	Group B	P value
Bromage 1	00	00	X2=1.07; DF=2; P=0.31*
Bromage 2	04	0	
Bromage 3	56	60	

(P>0.05 Statistically Not Significant)

There were 10 (8.33 percent) patients with back discomfort out of a total of 120 individuals. 6 from group B and 4 from group C (6.67%) (10 percent). When complications between two groups were statistically compared, there was no difference. (p>0.05)

Table 5: Complications

Complication	Group C (n=60)	Group B (n=60)	Total
Headache	02	02	04
Transient neurologic symptoms	02	02	04
Back Pain	04	06	10

The average length of stay in groups C and B was 1.40 ±0.64days and 1.42 ± 0.82 days, respectively. The length of stay in the two groups varied significantly. (p<0.05) The

mean time to ambulation in group C was 225.46 ±56.22 minutes, while that in group B was 265.36 ±58.46 minutes. The time taken for ambulation in the two groups varied significantly. ($p<0.05$) This demonstrates that patients in Group C are discharged earlier than those in Group B and are ambulated earlier.

. Table 6: Hospital stay among various groups

Stay	Group C (n=60)	Group B (n=60)	P value
Length of stay	1.40 ±0.64	1.42 ±0.82	<0.05 (S)
Time to ambulation (min)	225.46 ±56.22	265.36 ±58.46	<0.05 (S)

Discussion

One of the cornerstones of balanced anaesthesia is the management of pain during and after operation. Despite experiencing varying levels of popularity over the many years since it was first used in clinical practice, spinal anesthesia remains one of the fundamental procedures in contemporary anesthesia [6,7]. To enhance the effectiveness of intraoperative and postoperative pain treatment, many medications have been tested in subarachnoid blocks together with local anesthetics. Because it enables early detection of symptoms brought on by overhydration, transurethral resection syndrome, and bladder perforation, spinal anesthesia has been routinely employed for urologic procedures. Long-acting local anesthetic bupivacaine is administered in lesser dosages in the ambulatory context. With these smaller doses, the block's duration is still protracted, and they might not be enough anesthetic [8]. The main benefits of 2-chloroprocaine are a quicker recovery from anesthesia and a quicker release from the hospital due to its shorter period of action, appropriate duration, and density of block for short-term operations. Age, sex, and ASA grade demographic characteristics were comparable between the two groups. No difference between them was statistically significant ($p>.05$). Marie Andre'e Lacasse et al., Ben Gys et al., and C Camponovo et al. reported similar findings. In a study conducted by Ben Gys et al., the beginning time of sensory block in both groups was 10.8 min in the C group and 11.1 min in the B group, with a statistically significant difference between the two groups [9,10]. Similar results were found in the current investigation, and C Camponovo et al. found no statistically significant difference between the groups' beginning times for sensory block. In contrast to the current study, this was. The mean time for the beginning of motor block was 5.26± 0.29 seconds in group C and 5.32 ±0.46 seconds in group B, according to our study. The difference in the motor block's average onset time was statistically significant. (P <0.5). According to a research by Camponovo et al., Group C experienced motor block onsets that were statistically different from Group B (5 vs. 6 min). Chloroprocaine group in An Teunkens et al. study had a considerably faster time for motor block onset than bupivacaine group. In group C, the mean time of the sensory block was 153.06 ± 19.38 minutes, but in group B, it was 194.32 ± 21.86 minutes. The difference in the average length of the sensory block was statistically very significant. (P <0.0001) Similar results were found by Ben Gys et al., who found that the median duration of sensory block at the T10 dermatome was substantially longer in the B group (5.3 hours) than the C group (2.8 hours). ($p<0.05$) According to a study by Marie-André Lacasse, the 2-CP group's sensory block lasted for less time than the bupivacaine group (146 min vs 329 min, a difference of 185 min; P0.001). According to a research by C. Camponovo et al., Group C demonstrated significantly faster resolution of sensory blocks (105 vs. 225 min). In the study by An Teunkens et al., patients in the chloroprocaine group recovered from sensory block in considerably less time

(median, 2.6 hours; P 0.0001) than those in the bupivacaine group (6.1 hours). In group C, the mean motor block lasted 169.26 ±19.38 minutes, compared to 197.18± 21.78 minutes in group B. Statistics showed that the difference in the mean time for a motor block was quite significant. (P <0.0001) C According to a study by Camponovo et al., Group C experienced faster onsets of motor block (5 vs. 6 min), maximal sensory block level (8.5 vs. 14 min), and resolution of both sensory and motor blocks (105 vs. 225 min) [11]. When compared to the chloroprocaine group, Yoos et al. found that the time to complete motor block regression was substantially longer with bupivacaine. According to a study by Marie-Andrée Lacasse, the 2-CP group's motor block duration was noticeably shorter. In the study, 10 (8.33 percent) of the 120 patients overall had back pain. When complications between two groups were statistically compared, there was no difference. (p>0.05) In a study conducted by Marie-Andrée Lacasse et al. and Ben Gys et al., similar results were observed. In a study conducted by Marie-Andre'e Lacasse et al., they found that the 2-CP group had considerably shorter times to ambulation, micturition, and eligibility for discharge. When 40 mg of 2-CP and 7.5 mg of small-dose bupivacaine were compared in a volunteer trial by Yoos et al., the time to simulated discharge was substantially longer with bupivacaine [12,13,14].

Conclusion

In comparison to intrathecal Bupivacaine, intrathecal 2 percent 2-Chloroprocaine has the advantages of early ambulation and early hospital discharge. It also has an earlier and more satisfactory onset of sensory and motor block, the desired level of spinal block, and an adequate duration of sensory and motor block. Given all of the aforementioned benefits, patients scheduled for short or ultra-short duration procedures are advised to have spinal anaesthetic using 2% 2-Chloroprocaine.

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