Journal of Cardiovascular Disease Research

ISSN:0975 -3583,0976-2833 VOL 11, ISSUE 03, 2020

Original research article

A COMPARATIVE STUDY OF LOW DOSE BUPIVACAINE-FENTANYL WITH PLAIN BUPIVACAINE IN SPINAL ANAESTHESIA FOR TRANSURETHRAL PROSTATECTOMY INTRODUCTION

[1]Dr. V Vamsi Krishna Reddy, [2]Dr. K Gopi Chand

[1]Assistant Professor, Department of Anaesthesia, Mamata Medical College, Khammam, Telangana, India

[2]Professor, Department of Anaesthesia, Mamata Medical College, Khammam, Telangana, India

Corresponding Author:

Dr. V Vamsi Krishna Reddy

Abstract

Introduction: Elderly patients undergoing transurethral resection of the prostate (TURP) often present with complex cardiac, pulmonary, and metabolic conditions. This study evaluates the efficacy and safety of combining Fentanyl with hyperbaric Bupivacaine in spinal anesthesia for this patient group.

Material and Methods: Conducted at Mamatha General Hospital, this study involved 100 ASA grade II-III patients aged 60-80 years, divided into two groups. Group I received 1.5 ml of 0.5% hyperbaric Bupivacaine, while Group II received 1 ml of Bupivacaine with an additional 25 µg of Fentanyl. The study focused on the onset times for sensory and motor blocks, the duration of analgesia, and hemodynamic stability.

Results: Group II exhibited a faster onset of sensory (mean 2.35 minutes) and motor blocks (mean 5.26 minutes) compared to Group I (mean 3.51 and 6.39 minutes, respectively). The time to reach T_{10} dermatomal level was shorter in Group II, and the duration of analgesia was prolonged (214.7 minutes in Group II vs. 177.28 minutes in Group I). Group II also showed better hemodynamic stability, with fewer instances of hypotension and bradycardia. Pruritus was more common in Group II, aligning with previous findings.

Conclusion: The addition of 25 µg Fentanyl to 5 mg hyperbaric Bupivacaine enhances the onset and duration of spinal blocks without significant adverse effects, offering a viable anesthetic option for elderly TURP patients. This combination provides effective anesthesia with improved hemodynamic stability, crucial for patients with existing comorbidities.

Keywords: Transurethral Resection of the Prostate, Spinal Anesthesia, Fentanyl, Bupivacaine, Elderly Patients, Anesthetic Efficacy.

ISSN:0975 -3583,0976-2833 VOL 11, ISSUE 03, 2020

Introduction

The patients undergoing TURP are elderly with co-existing cardiac and pulmonary diseases with compromised reserves. Spinal anesthesia is the most widely used technique for this procedure as the elderly patients tolerate regional anesthesia better and as the signs and symptoms of water intoxication, fluid over load, bladder perforation which are associated with TURP Can be detected at the earliest [1].

It is also important to limit the distribution of spinal block to reduce adverse haemodynamic and pulmonary effects is such patients. For decades Hyperbaric 5% lignocaine has been the local anaesthetic of choice for spinal anesthesia for urologic procedures for rapid recovery. However several editorials have questioned the used of Lignocaine for spinal anesthesia because of the frequency of Transient neurological symptoms [2]. These observations generated interest in alternative local anesthesia solution, the addition opioids to small doses of local anaesthestics administered intrathecally has a synergistic effect in augmenting the blocks without prolonging the motor recovery [3].

The use of spinal opioids has grown rapidly since their first application in 1979. The aim of using neuraxial opioids is to achieve as good analgesia as with systemic administration and to do it with smaller doses and systemic concentration and the risk of systemic side effects. This lead to the use of intrathecal Morphine but, was associated with side effects like respiratory depression, nausea, vomiting due to slower uptake and longer duration of action with higher CSF concentration with rostral spread of the narcotic. These considerations lead to the use of more lipophillic drugs such as Fentanyl, Sufentanil. Which are more potent and has the advantages\over Morphine such as rapid uptake with short duration of action with low CSF concentration with limited rostral spread of narcotic and less respiratory depression and early motor recovery compared to Morphine [4].

The various physiological alterations in elderly patients may cause significant increases in maximum spread, rate of onset of motor block and cardiovascular instability regardless of solution used. Age related changes in spinal anatomy, Nerve physiology and cardiovascular reflexes with these changes in the elderly has lead to limit the distribution of spinal block. This lead to the use of small doses of local anesthetic combined with lipophillic opioids administered intrathecally, to produce enhancement of spinal anesthesia without prolonging motor recovery and reduce adverse cardiovascular and pulmonary effects in such patients [5].

The present study is aimed at evaluating the efficacy of intrathecal Fentanyl as an adjuvant to intrathecal Bupivacaine (Hyperbaric) in patients undergoing Transurethral resection of prostate.

Methodology

In this prospective randomized comparative study at Mamatha General Hospital, 100 ASA grade II-III patients aged 60-80 years undergoing transurethral resection of the prostate were divided into two groups: Group A received 1.5 ml of 0.5% hyperbaric bupivacaine, and Group B received 1 ml of the same bupivacaine plus 25 μg fentanyl. Exclusions included refusal of spinal anesthesia, need for general anesthesia, anticoagulant therapy, and specific medical conditions like bleeding disorders and CNS disorders.

ISSN:0975 -3583,0976-2833 VOL 11, ISSUE 03, 2020

Standard intraoperative monitoring was conducted, and lumbar punctures were performed at the L3-L4 space using a 23G Whittacre spinal needle after local anesthesia. The study evaluated sensory and motor block onset, hemodynamic parameters, postoperative analgesia needs, and complications like hypotension and bradycardia, which were managed with mephentermine and atropine, respectively. Postoperative pain was assessed with a visual analogue scale and managed with Paracetamol, Tramadol, or Morphine as needed.

The collected data was analyzed using IBM SPSS software. A P-value of less than 0.05 was considered statistically significant. Qualitative variables were presented as mean ± standard deviation, while quantitative variables were expressed in terms of frequencies and percentages.

Results

Table 1: Onset of Motor block

Group I (minutes)	Group II (minutes)
6.39	5.28

t=8.217, $p<0.001$

We observed that the onset of motor block was faster in group II (5.28 minutes) as compared to group I (6.39 minutes) which was statistically significant.

Table 2: Mean pulse rate

Mean pulse rate / min	Pre	0 min	10 min	20 min	30 min	40 min	60 min	90 min
Group I	77.08	76.18	73.72	72	71.92	71.92	71.46	71.3
Group II	76.88	75.18	73.42	73.42	72.08	71.8	73.12	73.82
Total	76.98	75.68	73.57	72.71	72	71.86	72.29	72.56

Fchange = 16.416, $p<0.001$; Fchange x groups = 1.682, $p<0.110$

Mean pulse rate were compared both groups and found to be statistically insignificant

Table 3: Means of mean arterial pressure

Mean MAP	Pre	0 min	10 min	20 min	30 min	40 min	60 min	90 min
Group I	99.96	95.96	92.54	89.94	89.06	88.86	87.86	87.9867
Group II	95.22	93.72	91.82	91.06	89.6	89.86	89.78	89.62
Total	97.59	94.84	92.18	90.05	89.33	89.36	88.82	88.80

Fchange = 112.76, $p<0.001$; Fchange x groups = 14.066, $p<0.001$

MAP was compared in both groups and was found to be statically insignificant.

ISSN:0975 -3583,0976-2833 VOL 11, ISSUE 03, 2020

Table 4: Mean Respiratory rate

Respiratory rate cycles/min	Pre	0 min	10 min	20 min	30 min	40 min	60 min	90 min
Group I	15.74	15.84	15.74	15.78	16.24	16.02	15.94	16
Group II	15.42	15.44	15.78	15.84	15.78	15.84	15.68	15.92

$p<0.702$

Mean respiratory rate was lower in group II and was statistically insignificant with P value <0.702

Table 5: Time for two segment regression

Time in minutes	Group I (minutes)	Group II (minutes)
Minimum	60	68
Maximum	73	73
Mean	66.06	63.08

t= - 4.483, $p<0.001$

In our study the mean time of sensory regression was 66.06 minutes in group I and 63.08 in group II and was statistically significant.

Table 6: Duration of Analgesia

Mean Duration of Analgesia	Group I (minutes)	Group II (minutes)
	177.28 ±12.05	214.7 ±11.53

t= -15.856, $p<0.001$

The mean time for rescue analgesia was 214.7 minutes in group II as compared to 177.28 minutes in group I and is significant.

Table 7: Intraoperative complications

Intraoperative complications	Group I	Group II
Nil	27	41
Hypotension	7	0
Bradycardia	6	2
H + B	1	0
Pruritis	0	5
Nausea	4	0
Vomiting	0	0
Shivering	5	2
Respiratory depression	0	0
Total	50	50

$p<0.001$

ISSN:0975 -3583,0976-2833 VOL 11, ISSUE 03, 2020

The Intraoperative complication were comparable in both groups and resulted that group I 7 patients (14%) had hypotension has compared to 0% in group II. Bradycardia was observed in 6 patients (12%) in group I and 2 patients (4%) in group II. Hypotension and Bradycardia was observed in 1 patient (2%) in group I. Pruritis was observed in 5 patients (10%) in group II and was not observed in group I. Nausea was observed in 4 patients (8%) in group I. Shivering was noted in 5 patients (10%) in group I and 2 patients (4%) of group II.

Discussion

The efficacy of combining Fentanyl with hyperbaric Bupivacaine in spinal anesthesia for elderly patients undergoing transurethral resection of the prostate (TURP) was studied. The study comprised patients aged 60-80, who typically present with co-morbidities like cardiac, pulmonary, and metabolic disorders. They were divided into two groups: Group I received 1.5 ml of 0.5% hyperbaric Bupivacaine, while Group II was administered an additional 25 µg of Fentanyl with 1 ml of Bupivacaine.

Consistent with findings from similar studies (e.g., Dahlgren *et al*., 21), the inclusion of Fentanyl resulted in a quicker onset of sensory and motor blocks. Group II showed a mean sensory block onset of 2.35 minutes and motor block onset of 5.26 minutes, significantly faster than the 3.51 and 6.39 minutes observed in Group I. This aligns with Carpenter observation [6] that 25 µg of Fentanyl can enhance the efficacy of spinal blocks. Furthermore, our study noted a shorter time to reach T_{10} dermatomal level in Group II, similar to findings by Tarkkilla *et al*. [7]. The maximum height of sensory block was comparable in both groups, supporting the notion that Fentanyl does not significantly alter the peak effect of Bupivacaine but enhances its onset and spread.

In terms of analgesia duration, Group II experienced prolonged effects, averaging 214.7 minutes compared to Group I's 177.28 minutes, echoing the synergistic interaction between intrathecal opioids and local anesthetics noted in previous research [8]. Group II also demonstrated better hemodynamic stability, a crucial factor in elderly patients with cardiac conditions, as also observed in studies by Larson *et al*. [9].

While Group II experienced a higher incidence of pruritus, a common side effect noted in research by Gardin *et al*., intraoperative complications like hypotension and bradycardia were less frequent [10]. Postoperative monitoring revealed no significant complications such as dural puncture headaches or transient neurological symptoms, in line with findings by Voulgarpolos *et al*. [11].

In conclusion, our study corroborates previous research that suggests intrathecal Fentanyl, when added to Bupivacaine, offers enhanced onset and spread of anesthesia, prolonged analgesia, and improved hemodynamic stability, without significant adverse effects. This makes the combination of 25 µg Fentanyl with 5 mg hyperbaric Bupivacaine a viable and effective option for spinal anesthesia in elderly patients undergoing TURP.

References

1. Kararmaz A, Kaya S, Turhanoglu S. Low dose Bupivacaine Fentanyl spinal anaesthesia in transurethral prostatatectomy. Anaesthesia. 2003;58:526-530.
2. Kuusniem KS, Pihlajamaki KK, Pitkanen MT. The use of Bupivacaine and Fentanyl for spinal anaesthesia for urologic surgery. Anaesthesia and Analgesia.

ISSN:0975 -3583,0976-2833 VOL 11, ISSUE 03, 2020

2000;91:1452-1456.
3. Saryela PJ, Halomen PM, Kortula KT. Comparison of 9 mg of intrathecal plain and hyperbaric Bupivacaine both with Fentanyl for caesarean delivery. Anaesthesia and Analgesia. 1999;89:1257-1267.
4. Tejwani GA, Pattan AKM, Donald JS. Role of spinal opioid receptors in the antinociceptive interactions between intrathecal morphine and Bupivacaine Anaesthesia and Analgesia. 1992;4:726-734.
5. Wange, Chakrabarti MK, Whitwam JG. Specific enhancement by Fentanyl on the efforts of intrathecal Bupivacaine on nociceptive afferent but on sympathetic afferent pathways in dogs. Anaesthesiology. 1993;41:807-812.
6. Carpenter RL. Hyperbaric lignocaine spinal anaesthesia: Do we need an alternative. Anesth Analg. 1995;81:1125-8
7. Tarkkilla P, Huttala J, Tuomien M. Transtient radicular irritation after spinal anaesthesia with hyperbaric 5% Lignocaine. Br. J Anaesth. 1995;74:328-329.
8. Lee JA, Atkinson RS, Watt MJ. Anatomy. Chapter 2 in sir Robert Macintosh`s lumbar puncture and spinal analgesia- Intradural and extradural, Fifth edition, Churchill livingstone; c1985. p. 93-117.
9. Larson Jr. Spinal, epidural and caudal blocks. Chapter 16 in clinical anaesthesiology, Third edition Mc graw Hill; c2002. p. 253-282.
10. Grubb BD. Peripheral and central mechanism of pain. Br. J Anaesth. 1998;81:8-11.
11. Gardin JM, Arnold AM, Bild ED. Left ventricular diastolic filling in the elderly: The cardiovascular health study. American Journal of Cardiology. 1998;82:345-51.
12. Voulgarpolos D, Palmer CM. Coral anaesthestic pharmacology. Chapter in cedric Prys Roberts Burnall Brown Jr, International practice of Anaesthesia, Butterworth Heinman International edition, 2/138/1-19.