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A Comparative Study Of Intrathecal Low Dose Bupivacaine With Fentanyl And Low Dose Levobupivacaine With Fentanyl In Transurethral Resection Of Prostate

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Abstract

Background: Benign prostatic hypertrophy is common among elderly age groups for which transurethral resection of the prostate is required in all symptomatic patients. Spinal anesthesia is the technique of choice for Transurethral resection of the prostate. It provides surgical anesthesia and postoperative analgesia and also had added advantage of preserving cerebral function which in turn allows the earliest recognition of TURP syndrome. Recently Levobupivacaine, a pure S- enantiomer of racemic Bupivacaine is introduced as an attractive alternative to bupivacaine. Its cardiovascular and central nervous system toxicity is lower as compared to Bupivacaine.

Aims and Objectives: To compare the intrathecal low dose of Bupivacaine with fentanyl and a low dose of Levobupivacaine with fentanyl in patients undergoing transurethral resection of the prostate concerning the time of onset and resolution of sensory and motor blockade, intraoperative hemodynamics, quality of analgesia.

Material and Methods: This Single-center Prospective, Randomized, Single Blinded Study was conducted at Tirunelveli Medical College and Hospital from January 2018 to July 2019. This study was done on 60 patients who had undergone TURP of ASA physical status I and II and allocated into two groups. Group L received 7.5mg Levobupivacaine with 25µg fentanyl and group B received 7.5mg bupivacaine with 25µg intrathecally.

Results: The hemodynamic parameters did not differ in both groups. The onset of sensory and motor block was longer in the levobupivacaine group compared to the bupivacaine group. The duration of motor and the sensory block was longer in the bupivacaine than in the levobupivacaine group. No significant difference in maximum dermatome was attained in both groups.

Conclusion: We concluded from this study that intrathecal administration of low dose 0.5% Levobupivacaine(7.5mg) plus fentanyl in elderly patients undergoing TURP was as safe as the administration of low dose hyperbaric Bupivacaine(7.5mg) plus fentanyl.

Keywords: TURP –transurethral resection of the prostate, levobupivacaine, bupivacaine, spinal anesthesia

INTRODUCTION

Benign prostatic hypertrophy(BPH) is common among elderly age groups for which transurethral resection of the prostate is required in all symptomatic patients. Nowadays increasing numbers of elderly patients coming for surgery due to longer life expectancy.[1] This group of the population has a greater anesthetic risk because of coexisting cardiovascular and pulmonary diseases. Spinal

anesthesia is the technique of choice for Transurethral resection of the prostate (TURP). It provides surgical anesthesia and postoperative analgesia and also had added advantage of preserving cerebral function which in turn allows the earliest recognition of TURP syndrome. [2]Racemic hyperbaric Bupivacaine has been considered as the local anesthetic of choice for spinal anesthesia. Recently Levobupivacaine, a pure S-enantiomer of racemic Bupivacaine is introduced as an attractive alternative to bupivacaine. Its cardiovascular and central nervous system toxicity is lower as compared to Bupivacaine. [3]There are only a few studies, about the clinical use of Levobupivacaine in spinal anesthesia. So this randomized, double-blind, prospective study was planned. In this study, the clinical effectiveness, hemodynamic effect, sensory and motor block characteristic of intrathecally administered isobaric 0.5% Levobupivacaineis compared with hyperbaric 0.5% Bupivacaine in patients posted forTransurethral resection of the prostate.[4,5]

MATERIAL AND METHODS: This is a Single-center Prospective, Randomized, Single Blinded Study that was conducted at urology theatre, Department of Anaesthesia, Tirunelveli Medical College and Hospital from January 2018 to July 2019. This study was done in 60(sample size) patients who had undergone Transurethral Resection of Prostate of ASA physical status I and II. Ethical committee approval and informed written consent from patients involved in this study are obtained before starting this study. inclusion criteria: Patients in the age group of 65-75yrs with physical status ASA I & ASA II posted for elective TURP.exclusion criteria: History of allergy to any drugs, Any contraindications to regional anesthesia, Abnormal coagulation profiles, Spinal Abnormalities, Patient with heart disease, respiratory disease, hepatic and renal disease, seizure disorder. Patients was allocated into two groups by simple randomization into group A and group B by computer-generated random number sequence.**Group A** – received 0.5% Levobupivacaine 7.5mg + inj fentanyl25mcg.

Group B – received 0.5% Bupivacaine 7.5mg + inj fentanyl 25mcg.25 gauge Quincke needle, Inj Levobupivacaine, Inj Bupivacaine, Inj Fentanyl. Preoperative assessment will be done. Anaesthetic machine was checked before starting the procedure. Ensure the availability of a working laryngoscope, oral airway,laryngeal mask airway, and endotracheal tube of various sizes. Make sure that the essential emergency drugs are available. Ensuring the operating table tilts are corrected. In the operating room routine monitoring including ECG, NIBP, the pulse oximeter was attached and baseline vital parameters was recorded. Intravenous access was secured with 18G venflon and a ringer lactate solution was started. Under strict aseptic precaution, lumbar puncture is to be performed at L3 and L4 interspace using 25 gauge Quincke needle in sitting a position and the study drug was injected after confirming the freeflow of CSF. Immediately after performing intrathecal injection patient wàs placed in a supine position and time was noted. Block characteristics was assessed every 2min till the end of the surgery. Sensory block was assessed by pinprick in the mid-clavicular line in each dermatome on both sides with a blunt 25G needle at a three-point scale –0-sharp pain, 1-dull pain (analgesia),2-no pain (anesthesia). Maximum height of the block and time was taken to achieve maximum height also recorded. Motor blockade was assessed based on a Modified Bromage Scale atsix-point scale, 1- complete block(unable to move feet or knees), 2-almost complete block(able to move feet only), 3-partial block(just able to move knees), 4-detectable weakness of hip flexion while supine(full flexion of knees), 5-no detectable weakness of hip flexion while supine, 6-able to perform partial knee bend. Onset of sensory blockade was defined as the time taken from the completion of the injection of the study drug until the patient did not feel the pinprick at T10 level. Onset of motor blockade was defined as the interval between intrathecal administration of drug and impairment in motor poweron movement.ECG, SPO2, AND NIBP will be monitored every 2min till the end of the surgery.

STATISTICAL ANALYSIS

Data were entered into Microsoft Excel (Windows 7; Version 2007) and analyses were done using the Statistical Package for Social Sciences (SPSS) for Windows software (trial version 22.0; SPSS Inc, Chicago). Descriptive statistics such as mean and standard deviation (SD) for continuous variables, frequencies, and percentages were calculated for categorical variables. Comparison between groups was analyzed using Chi-square test of independence and Fischers test (when appropriate) for categorical

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variables and Unpaired t-test or Non-parametric test analogous to t-test was used to compare quantitative variables depending on normality of distribution.

RESULTS

Table 1: Patient Demographics In Both Group B And L:

Variable	Group B Mean ± SD	Group L Mean ± SD	P-Value
Age (years)	68.9 ± 2.5	68.13 ± 1.6	0.167
Height (cm)	169.17 ± 2.8	167.93 ± 3.6	0.147
Weight (kgs)	65.5 ± 3.5	64.83 ± 3.6	0.477
ASA (I:II)	16:14	18:12	0.602
Duration of surgery (mins)	50.5 ± 2.5	51.83 ± 2.8	0.060

TABLE :1 There was no significant difference in the patient demographics of both groups B and L. The duration of surgery and ASA grade distribution also did not differ significantly in both groups. At baseline, both groups were comparable in terms of the above parameters.

Variable	Group B Mean ± SD	Group L Mean ± SD	P-Value
Heart rate (beat/min)	78.5 ± 7.2	77.1 ± 7.8	0.456
Mean arterial pressure (mmhg)	71.7 ± 1.7	71.2 ± 1.2	0.171
SPO2 (%)	99.2 ± 0.40	99.2 ± 0.43	0.759

Table 2: Haemodynamic Parameters During Surgery:

Table:2 The baseline hemodynamic parameter heart rate, mean arterial pressure, and SPO2 did not vary significantly in both groups (P>0.05)

Table 3: Characteristics Of Block In Both GroupsBand L:

Variable	Group B Mean ± SD	Group L Mean±SD	P-Value
Time of onset of sensory block (min)	6.43 ± 7.8	7 ± 0.0	0.694
Time of onset of motor block (min)	7 ± 0.525	11 ± 0.643	<0.001
Maximum sensory level	6.9 ± 0.89	8 ± 0.40	<0.001

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achieved (Thoracic dermatome)			
Time to two segmental regression (min)	84.3 ± 3.6	88.3 ± 1.9	<0.001
Time to S1 segment regression (min)	193.8 ± 8.9	183.8 ± 3.1	<0.001
Duration of sensory block (min)	226.4 ± 4.5	227.1 ± 6.2	0.673
Duration of motor block (min)	176.8 ± 5.4	150.1 ± 4.9	<0.001

Table :3 The mean time of onset of sensory block in group L (Mean (SD) - 7±0.0) was half a minute longer than group B (Mean (SD) – 6.4±7.8) but itwas not statistically significant (P > 0.05). Hence the mean duration of sensory block in group B (Mean (SD) – 226.4±4.5) was also not statistically different from group L (Mean (SD) – 227.1±6.2). The mean time of onset of motor block in group L (Mean (SD) - 11±0.64) was 4 minutes longer than group B (Mean (SD) - 7±0.52) and was statistically significant (P<0.001). The mean duration of motor block in group L (Mean (SD) - 150±4.9) was 26 minutes less than that of group B (Mean (SD) - 176±5.4) and it was significant (P<0.001). The mean maximum sensory level achieved in group L was more (Mean (SD) – 8±0.40) than group B (Mean (SD) – 6.9±0.89) and it was statistically significant (P<0.001). Meantime taken to two-segment regression was lower in group B (Mean (SD) – 84.3±3.6) than group L (Mean (SD) – 88.3±1.9) and was significant (P<0.001). But meantime taken for S1 segment regression was more for group B (Mean (SD) - 193±8.9) compared to group L (Mean (SD) – 183.8±3.1) and was statistically significant (P<0.001)

Table 4: Distribution Of Maximum Modified Bromage Scale Achieved:

MBS	**Group B**	**Group L**
1	24 (80%)	1 (3.3%)
2	6 (20%)	21 (70%)
3	0	8 26.7%)
P value	<0.001	

Table:4 The median MBS in group L is 2 [95% CI (2.1 – 2.3)] and in groupB the median MBS is 1 [95% CI (0.4 – 1.60] which was a significantdifference (p <0.001). The maximum spread of sensory block was T8 in group B and T9 in group L.

Table 5: Distribution Of Side Effects In Both YGroups B And L:

Side effects	**Group B Number of patients (%)**	**Group L Number of patients (%)**
Nausea	2 (6.7%)	1 (3.3%)
Shivering	7 (23.3%)	6 (20%)

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Pruritis	0 (0.0%)	0 (0.0%)
Bradycardia	0 (0.0%)	0 (0.0%)
Hypotension	0 (0.0%)	0 (0.0%)
Respiratorydepression	0 (0.0%)	0 (0.0%)
P value	<0.001	

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Hypotension	0 (0.0%)	0 (0.0%)
Respiratorydepression	0 (0.0%)	0 (0.0%)
P value	<0.001	

Table:5 The most common side effect in both groups was shivering which was found in around 20% of the patients. The next common is side effect isnausea. There was no significant difference among the distribution of side effects in both groups. The other threatening complications like bradycardia, hypotension, and respiratory depression were not found in any of the parameters. The stable hemodynamic parameters in both groupscan be the reason for this.

DISCUSSION

Geriatric group of population is always challenging for anesthetist as advancing age, co-morbidities, altered pharmacokinetics and pharmacodynamics properties

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of drugs increases the morbidity and mortality in these age group of patients. [6] Demerara Y, et.al reported that in the elderly population intrathecal administration of Bupivacaine was associated with a 40% increase in the incidence of hypotension compared to the young population. There is no ideal anesthetic technique that has been described in the elderly population. If a thorough understanding of changes that occurs in physiology and pharmacology is there, an optimal anesthetic technique can be designed. Spinal anesthesia is the most commonly used anesthetic technique for Transurethral Resection of Prostate surgery.

Levobupivacaine, the pure S enantiomer of racemic Bupivacaine, is a long-acting local anesthetic that has been recently introduced in the clinical routine. [7]Levobupivacaine is proving increasingly popular to replace Bupivacaine because of its similar efficacy and fewer cardiovascular and CNS side effects. In our study also demonstrated that Levobupivacaine provides similar efficacy compared to Bupivacaine administered intrathecally. Its pharmacokinetic properties are similar to those of racemic Bupivacaine. In most of the studies where the same doses of Levobupivacaine and Bupivacaine were used, sensory and motor block characteristics were found to be similar. Various studies suggested that intrathecal hyperbaric Bupivacaine is associated with a higher incidence of hypotension and bradycardia intraoperatively.[8] Levobupivacaine group compared to Bupivacaine in orthopedic surgery. Our study didn't found any significant difference in hemodynamic stability. It was possible probably because of dose of local anesthetic (LA) used was too small to produce any significant cardiovascular effect. The addition of fentanyl further helped in reducing the dose of local anesthetics.[9] Glaser C et al compared Bupivacaine alone and fentanyl added as an adjuvant to Bupivacaine and found that Bupivacaine alone is associated with a higher incident of hypotension. Our results showed that intrathecal hyperbaric Bupivacaine is associated with early onset of sensory & motor block as compared to isobaric Levobupivacaine. Hyperbaric bupivacaine may be attributed to it as it helped in the early cephalic spread of local anesthetics. Our results are in the line of other studies where both agentswere compared intrathecally. [10] Gupta A et. al compared intrathecal hyperbaric 0.5% Bupivacaine and isobaric 0.5% Levobupivacaine for lower abdominal surgeries and proved that hyperbaric Bupivacaine produces clinically and statistically significant earlier onset of sensory and motor block as compared to isobaric Levobupivacainefound that onset of motor block & progression of the block to T4 was significantly fast in Bupivacaine group when compared with Levobupivacaine in spinal anesthesia. [11]Our study results show that hyperbaric Bupivacaine produces dense motor block for a prolonged duration compared to isobaric Levobupivacaine. This result is well supported by various previous studies. The mean Maximum Modified Bromage scale achieved in Group B was significantly higher compared to Levobupivacaine. In the bupivacaine group, 20 patients had complete block while in the Levobupivacaine group only 4 patients had a complete motor block.[12] Karma A et. alcompared the same doses of Levobupivacaine and Bupivacaine during spinal anesthesia for cesarean delivery and reported that the duration of motor block and analgesia was shorter in the levobupivacaine. The addition of opioids further decreases the duration of motor block. [13] Kim SY, et al[30] studied that the addition of fentanyl to Levobupivaine significantly shortens the duration of motor block. The max sensory level achieved, two-segment regression time and regression time to S1 dermatome didn't have significant differences among both groups. There was no significant difference regarding adverse reactions. [14,15]

CONCLUSION

We concluded from this study that intrathecal administration of low dose 0.5% Levobupivacaine(7.5mg) plus fentanyl in elderly patients undergoing Transurethral Resection of Prostate was as safe as the administration of low dose hyperbaric Bupivacaine(7.5mg) plus fentanyl. Our result shows that there are no significant differences in hemodynamic stability and maximum sensory level between the two groups since we used a low dose of bupivacaine. Low-dose bupivacaine and levobupivacaine use in TURP surgeries should be prompted given the reduced incidence of hemodynamic adverse effects in the geriatric population. Our results, also suggest that intrathecal low-dose of isobaric Levobupivacaine fentanyl provides a lesser degree of motor block and for a short

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duration when compared with heavy Bupivacaine. Although onset is delayed with Levobupivacaine, it can be considered as a suitable alternative to Bupivacaine early ambulatory surgeries which requires less motor blockade. Various studies proved that using isobaric levobupivacaine in combination with fentanyl elicits effective sensorial blockade and lessmotor blockade with stable hemodynamic effects than hyperbaric bupivacaine in combination with fentanyl in various abdominal surgeries and orthopedic surgeries to achieve a reliable sensory block with earlier ambulation. We have done this research to throw light on t h e effect of low. dose Levobupivacaine especially in elderly patients who are undergoing various surgeries under spinal anesthesia because of better hemodynamic stability and fewer side effects.

REFERENCES

1. Akkamahadeur P, Srinivas HT, Siddesh A, Kadli N. Comparison of the efficacy of sufentanil and fentanyl with low-concentration bupivacaine for combined spinal-epidural labor analgesia. *Indian J Anaesth.* 2012;56:365–9.
2. Beers RA, Kane PB, Nsouli I, Krauss D – Does a mid-lumbar block-level provide adequate anesthesia for transurethral prostatectomy? Can J Anaesth, 1994;41:807-812.
3. Ben-David B, Frankel R, Arzumonov T, Marchevsky Y, Volpin G. Minidose bupivacaine–fentanyl spinal anesthesia for surgical repair of hip fracture of aged. *Anesthesiology.* 2000;92:6–10.
4. Bremerich DH, Fetsch N, Zwissler BC, Meininger D, Gogarten W, Byhahn C. Comparison of intrathecal bupivacaine and levobupivacaine combined with opioids for cesarean section. *Curr Med Res Opin.* 2007;23:3047–55.
5. Chaney MA. Side effects of intrathecal and epidural opioids. *Can J Anaesth.* 1995;42:891–903
6. Cuvas O, Basar H, Yeygel A, Turkyılmaz E, Sunay MM. Spinal anesthesia for transurethral resection operations: Levobupivacaine with or without fentanyl. *Middle East J Anesthesiol.* 2010;20:547–52.
7. Demerara Y, Ozdemir I, Kocaman B, Yucel O. Intrathecal sufentanil (1.5 μg) added to hyperbaric bupivacaine (0.5%) for elective cesarean section provides adequate analgesia without the need for pruritus therapy. *J Anesth.* 2006;20:274–8.
8. Erdil F, Bulut S, Demirbilek S, Gedik E, Gulhas N, Ersoy MO. The effects of intrathecal levobupivacaine and bupivacaine in the elderly. *Anesthesia.* 2009;64:942–6.
9. Girgin NK, Gurbet A, Turker G, Bulut T, Demir S, Kilic N, et al. The combination of low-dose levobupivacaine and fentanyl for spinal anesthesia in ambulatory inguinal herniorrhaphy. *J Int Med Res.* 2008;36:1287–92.
10. Glaser C, Marhofer P, Zimpfer G, Heinz MT, Sitzwohl C, Kapral S, et al. Levobupivacaine versus racemic bupivacaine for spinal anesthesia. *Anesth Analg.* 2002;94:194–8.
11. Gupta A, Axelsson K, Thörn SE, Matthiessen P, Larsson LG, Holmström B, et al. Low-dose bupivacaine plus fentanyl for spinal anesthesia during ambulatory inguinal herniorrhaphy: A comparison between 6 mg and 7.5 mg of bupivacaine. *Acta Anesthesiol Scand.* 2003;47:13–9.
12. Kamphuis ET, Kuipers PW, Venrooij GE, Kalkman CJ. The effects of spinal anesthesia with lidocaine and sufentanil on lower urinary tract functions. *Anesth Analg.* 2008;107:2073–8.
13. Kararmaz A, Kaya S, Turhanoglu S, Ozyilmaz MA. Low dose bupivacaine–fentanyl spinal anesthesia for transurethral prostatectomy. *Anesthesia.* 2003;58:526–30.
14. Kaur M, Katyal S, Kathuria S, Singh P. A comparative evaluation of intrathecal bupivacaine alone, sufentanil or butorphanol in combination with bupivacaine for endoscopic urological surgery. *Saudi J Anaesth.* 2011;5:202–7.
15. Kim SY, Cho JE, Hong JY, Koo BN, Kim JM, Kil HK. Comparison of intrathecal fentanyl and sufentanil in low-dose dilute bupivacaine spinal anesthesia for transurethral prostatectomy. *Br J Anaesth.* 2009;103:750–4.

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