

## Comparison of Subarachnoid Block with Low Dose Bupivacaine – Fentanyl and Conventional Dose of Bupivacaine for Transurethral Resection of Prostate

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### Abstract

### Original Research Article

**Background:** Sub Arachnoid block is the anaesthetic technique of choice for Transurethral Resection of Prostate (TURP) because the complications of the surgery can be detected early as the patient remains awake. But the side effects of sympathetic blockade in elderly are more with the conventional dose of Bupivacaine (7.5mg). We aimed to evaluate the effects of adding 25 mcg of Fentanyl to low dose Bupivacaine in Subarachnoid block for elderly patients undergoing TURP. **Methods:** 40 elderly patients of ASA 1 to 3 electively scheduled for TURP under lumbar subarachnoid block was enrolled and randomly grouped into group B and group F. Group B received 7.5 mg of 0.5% hyperbaric bupivacaine (1.5ml) and group F received 5mg of 0.5% Bupivacaine with 25 mcg of Fentanyl (total of 1.5ml) intrathecally. Level of peak sensory block, time to attain peak sensory block, maximum motor block, time to two segment regression, time to S2 segment regression, duration of motor block, haemodynamic stability and incidence of complications were compared. **Results:** The sensory block was adequate in both the groups. There was statistically significant difference in the maximum motor block and duration of motor block between the groups. Maximum motor block and duration of block were less in group F ( $p < 0.001$ ). Hypotension and shivering were more in group B. Addition of 25 mcg Fentanyl with low dose hyperbaric Bupivacaine provides adequate anaesthesia for TURP with better haemodynamic stability, early recovery from motor block and lower incidence of side effects in elderly patients when compared to the conventional dose of hyperbaric Bupivacaine.

**Keywords:** Sub arachnoid block, Fentanyl, Bupivacaine, elderly, TURP.

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## INTRODUCTION

Subarachnoid block or spinal anesthesia is preferred over general anaesthesia for Trans Urethral Resection of Prostate (TURP), because the complications like TURP syndrome, bladder rupture, and prostatic capsule perforation can be detected early as the patient remains conscious during the procedure [1]. Most of the patients undergoing TURP are elderly and have cardiopulmonary, endocrine and other comorbidities.

Elderly people may have increased vasomotor tone. In addition their myocardial beta receptor response is blunted in comparison to younger patients. As a result, when subjected to decreased sympathetic tone there will be a limited reflex increase in heart rate and myocardial contractility. So it is important to limit the distribution of spinal block to reduce the adverse hemodynamic and pulmonary effects in such patients.

For TURP, spinal anesthesia should extend to atleast the 10<sup>th</sup> thoracic dermatome. In order to reduce the side effects of conventional dose of hyperbaric Bupivacaine, many authors suggest the addition of opioids to reduce the total dose. Opioids and local anaesthetics together administered intrathecally were shown to have a potent synergistic analgesic effect [2-4].

Low dose local anaesthetics can limit the spinal block level and induce rapid recovery but low dose bupivacaine cannot produce adequate level of sensory block. Intrathecal Opioids [5] enhances the analgesia from sub therapeutic dose of local anaesthetic and make it possible to achieve successful anaesthesia using otherwise inadequate dose of local anaesthetics [6, 7].

In this study, we aimed to compare the effects of low dose 0.5% hyperbaric Bupivacaine 5mg+25 mcg of Fentanyl a short acting opioid with conventional dose of 0.5% hyperbaric Bupivacaine(7.5mg) in elderly patients undergoing TURP.

## MATERIALS AND METHODS

This randomized double blinded comparative study was done at Sree Mookambika Institute of Medical Sciences, Kulasekaram during the period of 2018 August to 2019 July. After approval of Institutional Ethical Committee, 40 elderly patients scheduled for elective TURP, who had given written informed consent, belonging to ASA-Physical status 1 to 3, between the age group of 60 to 80 were included in this study. Patients with uncontrolled hypertension, cardiac arrhythmias, any neurological disorders or history of any spinal surgeries, coagulopathy, allergy to local Anaesthetics and Fentanyl and ASA-PS more than 3 were excluded from this study. The patients were randomly allocated to two study groups according to the list of random numbers. Group B received 7.5 mg of 0.5% hyperbaric Bupivacaine and group F received 5 mg of 0.5% hyperbaric Bupivacaine with 25 mcg of Fentanyl. The total volume of the solution was 1.5 ml in both the groups.

Pre anaesthetic evaluation was done. All patients were visited on previous day of surgery, reassured, explained in detail about the Anesthetic technique and method of assessing sensory and motor blockade. Informed consent was taken. Advised fasting regime. All patients were given T.RANTAC 150 mg+ T.ALPRAZOLAM 0.25 mg on previous night and T.RANTAC 150 mg and T.METACLOPRAMIDE 10mg 2 hours before the procedure.

In the premedication room a multiparameter monitor was attached and baseline parameters like HR, NIBP, Respiratory rate and SPO2 were recorded and monitored throughout the perioperative period. An 18 G intravenous cannula was secured and 0.9% isotonic saline at a rate of 5ml/kg/hr were given over a period of 20 to 30 minutes before the procedure and continued intraoperatively. Under aseptic precautions, Lumbar Puncture was done using 26 G QUINCKE spinal needles in L3/L4 Interspace in lateral decubitus position and 1.5 ml of study drug injected intrathecally over 10 seconds. The study drug was prepared by another Anaesthesiologist and blunted to the anaesthesiologist who administered the drug. Patient was positioned supine immediately and all the monitors continued and supplemented oxygen at 4L/min throughout the procedure.

The sensory block was assessed using cold ice packs in the mid axillary plane bilaterally every 2 minutes from the injection till the sensory block reached the highest dermatomal level, and the motor block was assessed at the time of highest sensory level and was

considered maximum motor block. The highest sensory level was defined as the same block level that persisted for 4 consecutive tests. All patients were then placed in lithotomy position and surgery was started. After that sensory level was assessed every 10 minutes till 2 segment regression and 20 minutes interval until the recovery of S2 dermatome. Motor block was assessed with Modified Bromage Scale (0-able to move hip, knee and ankle, 1-unable to move hip but able to move knee and ankle, 2-unable to move hip and knee but able to move the ankle, 3-unable to move hip, knee and ankle.) Duration of motor block was considered as the time when modified Bromage scale returns to 0.

Highest dermatomal level of blockade, time taken to reach the highest level, motor block at the highest sensory level, time to two segment regressions, time to S2 sensory regression and duration of motor blockade were recorded.

The systolic and diastolic blood pressure, heart rate, oxygen saturation and respiratory rate were recorded every 3 minutes in the first 30 minutes and every 5 minutes throughout the surgery. SBP  $\leq$  90 mm of Hg or 30% decrease in baseline and heart rate less than 50 per minute were treated with Inj. EPHEDRINE 6 mg intravenously and INJ. ATROPINE 0.6 mg Intravenously respectively.

Adverse effects like hypotension, bradycardia, respiratory depression, shivering and pruritus were recorded. The statistical analysis was done using SPSS trial version 18. The student's t test was used to analyse the age, height, weight, duration of surgery, baseline and lowest BP, Recovery time and Sensory and Motor blockade, intergroup differences of peak sensory level and maximum motor block score were tested with Mann whitney U Test.

Data were expressed as Mean (SD), Median (Interquartile range [range] or number as appropriate and p value  $<0.05$  were taken as statistically significant.

## RESULTS

The demography of both the groups was comparable with respect to age, height, weight, ASA-PS class and mean duration of surgery (table 1).

Characteristic of spinal block (table 2). There were no significant difference in sensory levels in both the groups. Maximum motor block was lower in group F ( $p<0.001$ ) and duration of motor block was also shorter in group F which was statistically significant ( $p<0.001$ ).

Systolic blood pressure changes (fig.1) mean systolic pressures were lower in group B throughout the procedure. The lowest systolic pressure was statistically significant compared to group F ( $p<0.015$ ).

Diastolic pressures (fig 2) were also lower in group B compared to group F but was statistically not significant.

Incidence of side effects (Table 3) like hypotension and shivering were significantly higher in group B and one patient in each group developed bradycardia. No patients developed nausea, vomiting or pruritus.

**Table-1: Demographic profile (mean ±SD)**

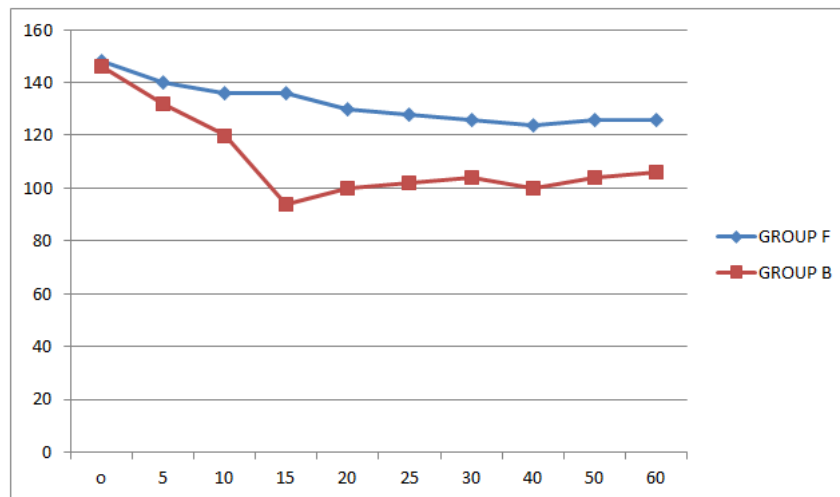
S.No	PARAMETERS	GROUP F	GROUP B
1.	Age in years	68.6±8.8	69.2±9.2
2.	Weight(kg)	64.4±6.1	65.2±7.3
3.	Height(cm)	167±8.8	169.2±6.8
4.	Duration of procedure(minutes)	32±16.7	34±12.3
5.	ASA-PS-1/2/3	5/12/3	6/12/2

\*SD-Standard deviation. \*ASA- American Society of Anaesthesiologist

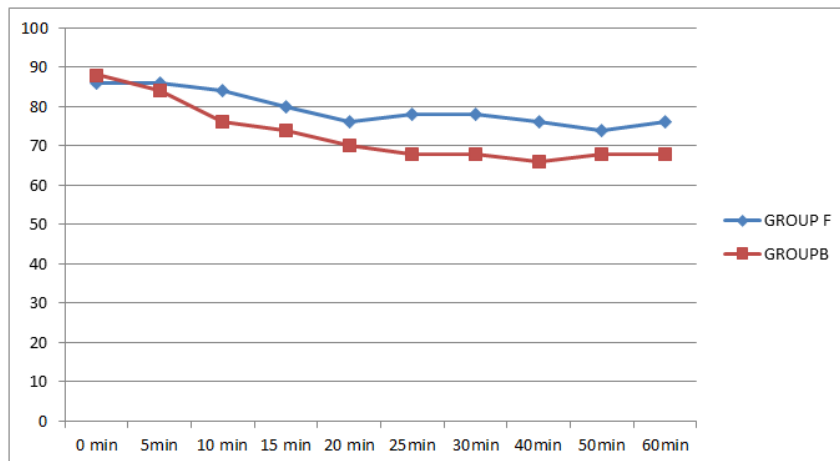
**Table-2: Values are Median (interquartile range [range]) or Mean ( SD)**

SNO	PARAMETERS	GROUP F	GROUP B
1	Peak sensory block level	T10(T8.5 – T10[T7 –T11])	T10(T8.25 –T10[T5 –T11])
2	Time to attain peak sensory block level (minutes)	7.8(1.3)	7.4(1.8)
3	Time for two segment regression (minutes)	54.8(12.5)	59.4(14.6)
4	Time to S2 regression (minutes)	88.6(12.8)	92.7(12.4)
5	Maximum motor block (Bromage score)	1(1-2[0-3])	2(2-3[1-3])*
6	Duration of motor block	104.6(15.6)	132.4(16.9)*

\*-Statistically significant (p<0.001)



**Fig-1: Systolic blood pressure changes**



**Fig-2: Diastolic Bloodpressure**

**Table-3: Side effects**

S.NO	Side effects	F	B
1.	Bradycardia	1	1
2	Hypotension	0	4*
3	Pruritus	0	0
4	Respiratory depression	0	0
5	Shivering	1	5*
6	Nausea	0	0
7	vomiting	0	0

\*p value &lt;0.05

## DISCUSSION

Opioid analogues have been used as additives in spinal anaesthesia to improve the onset of action, quality of analgesia and duration of block. Fentanyl, a lipophilic opioid has rapid onset and short duration of action following intrathecal administration.

Use of low dose Bupivacaine limit the level of spinal block, which is helpful in preventing haemodynamic instability in elderly patients with various comorbidities but may lead to patient discomfort due to inadequate anaesthesia.

In our study we used 0.5% hyperbaric Bupivacaine 5mg + fentanyl 25 mcg intrathecally which provided adequate level of anaesthesia for TURP with better haemodynamic stability than the conventional dose (7.5 mg.) of Bupivacaine.

The synergism between the opioids and the local anaesthetics may allow a reduction in the dose of local anaesthetics and reduce hypotension while still maintaining adequate anaesthesia. Ben David *et al.* [8] and Vaghadia *et al.* [9] in their study demonstrated that intrathecal opioids enhance analgesia without altering the degree of sympathetic blockade when added to the sub therapeutic level of local anaesthetics. Sensory block extending to the T10 dermatome level is necessary to provide adequate anaesthesia for TURP. In our study the sensory block was higher than this level which was similar to the study conducted by kuunsnieni KS *et al.* [6].

Ben David *et al.* [5] showed that fentanyl added to Bupivacaine did not affect median block level, but it intensified sensory blockade and increased the duration of sensory blockade. In this study intrathecal Fentanyl increased the dermatomal spread, increased the duration of sensory blockade with early recovery from motor blockade. The results are similar to the results of studies conducted by LIUS *et al.* [10] and Chen T Y *et al.* [11] In their studies it was demonstrated that fentanyl added to small dose of local anaesthetics improved the quality of block and increased the duration of sensory block without prolonging the recovery.

Intraoperative hypotension is a common event in the elderly patients undergoing surgery under spinal anaesthesia. The high incidence of coronary artery disease increased the risk of myocardial ischemia secondary to hypotension. In our study 4 patients (15%) developed hypotension in group B which was treated with Ephedrine. No incidence of hypotension in patients with group F. We have preloaded only 5ml/kg of fluid because fluid loading has not always been effective since they reduce physiological reserve of the elderly and makes them less able to increase the cardiac output in response to fluid loading.

One of the major side effect of intrathecal opioids especially morphine and bupernorphine is the delayed respiratory depression but the rapid uptake, faster onset and short duration of action of fentanyl and sufentanyl minimizes the rostral migration of the drug to the respiratory centre avoiding delayed respiratory depression. Varassies [12] showed that 25mcg of Fentanyl did not cause respiratory depression but 50mcg did. In our study no patients developed respiratory depression or oxygen desaturation during intraoperative or postoperative period.

Various studies reported pruritus following Intrathecal Fentanyl but in our study no patients complains of pruritus. Our study included only 20 patients which may be less.

Post spinal anaesthesia shivering is a common problem especially during TURP.5 patients in B group and 1 patient in F group developed shivering which was treated with 25 mg of TRAMADOL intravenously. Our study demonstrated that the incidence of shivering was significantly lower in group F than group B which was similar to the study reports of Kancy FC *et al.* [13] and chow T C *et al.* [14]. No patients developed nausea or vomiting in both the groups.

## CONCLUSION

Sub arachnoid block using low dose bupivacaine (5mg) with 25 mcg Fentanyl provides adequate anaesthesia for TURP with better haemodynamic stability ,early recovery from motor block and lower incidence of hypotension and shivering than the conventional dose(7.5 mg of Bupivacaine).Low dose bupivacaine with fentanyl is a better choice for spinal anaesthesia in high risk elderly patients undergoing TURP.

## LIMITATIONS

Number of patients enrolled in this study was less. We enrolled only 20 patients in the study group.

## REFERERNCES

1. Hong JY, Ynag SC, Ahn S, Kil HK. Preoperative comorbidities and relationship of comorbidities with post-operative complications in Patients undergoing transurethral prostate resection. *Journal of urology*. 185, 1374-1378(2011)
2. Akerman B, Arwestrom E, Post C. Local anaesthetics potentiate spinal morphine antinoception. *Analgesis*. 1998;67:943-8
3. Kim FY, Choje, Koo BN, Kim JM, Kil JK. Comparison of intrathecal fentanyl and bupivacaine in low dose dilute Bupivacaine spinal anaesthetics for transurethral prostatectomy. *British Journal of Anaesthesia*. 2009; 103: 750-754.
4. Akcaboy ZN, Akcaboy EY, Mutlu NM, Serger N, Aksu C, Gogus N. Spinal anesthesia with low-dose bupivacaine-fentanyl combination: a good alternative for day case transurethral resection of prostate surgery in geriatric patients. *Brazilian Journal of Anesthesiology*. 2012 Nov 1;62(6):753-61.
5. Ben David B, Solomon E, Levin H, Admani H. Intrathecal Fentanyl with small doses dilutes bupivacaine. Better anaesthesia without prolonging necessary Anaesth. *Analgesia*. 1997. 85; 560-5.
6. Kuisniemi KS, Pihlajamaki KK, Pitkanen MT, Herelius HY, Kirvelao OA. The use of bupivacaine and fentanyl for spinal anaesthesia for urologic surgery. *Anaesthesia and analgesia*. 2000; 91; 1452-6.
7. Sarella PJ, Halonen PM, Kortila KT, Comparison of 9mg of intrathecal plain and hyperbaric bupivacaine both with fentanyl for cesarean delivery. *Anaesthesia and analgesia*; 89; 1257-62.
8. Ben David B, Frankel R, Arzumov T, Marchevsky Y, Volpin .Minidose bupivacaine – fentanyl for surgical repair of hip fracture in the aged. *Anesthesiology*. 2000; 92; 6-10.
9. Vaghadia H, McLeod DH, Mitchel GW, Merrick PM. Small dose hypobaric lidocaine–fentanyl spinal anaesthesia for short duration outpatient Laproscopy. A randomized comparison with conventional dose hyperbaric lidocaine. *Anaesthesia and Analgesia*. 1997; 51; 1139-43.
10. Liu S, Chuu AA, Carpenter RL. Fentanyl prolongs lidocaine spinal anaesthesia without prolonging recovery. *Anaesthesia and Analgesia*. 1995; 80: 730-4.
11. Karmaz A, Kys S, Thrhanoglis S, Ozyilmaz MA. Low dose bupivacaine fentanyl spinal anaesthesia for transurethral Prostatectomy. *Anaesthesia*. 2003; 58: 526-30.
12. Varrassi G, Cellaric D, Caponga P. Evaluating effect of subarachnoid fentanyl in the elderly. *Anaesthesia*. 1992; 47: 558-62.
13. Kang FC, Tsai YC, Chang PJ, Chen TY, Subarachnoid Fentanyl with diluted small dose bupivacaine for cesarian section delivery. *Acta Anaesthesiologica Sinica*. 1998; 36: 207-14.
14. Chow TC, Cho PH, The influence of small dose intrathecal fentanyl on shivering during transurethral resection of prostate under spinal anaesthesia. *Acta Anaesthesiologica Sinica*. 1994; 32: 165-70.