

Original Research Article

## Hemodynamic Stability and Analgesia with Different Doses of Intrathecal Fentanyl Added to Hyperbaric Bupivacaine in Patients Undergoing TURP – A Comparative Study

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**ABSTRACT**

**Background:** *Transurethral resection of prostate (TURP) is one of the most common procedures performed in elderly men for benign prostatic hypertrophy. Subarachnoid block is considered the technique of choice, as it is the fastest, most predictable and reliable form of regional anaesthesia. Several adjuvants have been added to hyperbaric bupivacaine to improve the quality of the block. Here we have evaluated the effects of two different doses of intrathecally administered fentanyl (12.5 microgram and 25 micro gram) along with hyperbaric bupivacaine, in patients undergoing transurethral resection of prostate.*

**Methods and findings:** *This prospective randomised double blind study was carried out in 75 ASA 1-11 adults aged 50 to 80 years of age who were scheduled to undergo TURP under sub arachnoid block. Patients were divided in to 3 groups. Group 1 received 0.5% bupivacaine heavy 1.5ml made to 2 ml with normal saline intrathecally. Group 2 received 0.5% bupivacaine heavy 1.5 ml +25 microgram fentanyl. Group 3 received 1.5ml bupivacaine+12.5 microgram fentanyl made to 2ml with normal saline. Onset of adequate sensory blockade, cardiovascular stability, duration of post op analgesia and incidence of complications were assessed and compared.*

**Results:** *Onset time for adequate block (T10) was significantly less for fentanyl groups when compared to bupivacaine alone group. Duration of analgesia was more for fentanyl groups when compared to bupivacaine alone group (p<0.05). But among fentanyl groups, the duration of analgesia was comparable (P>0.05) All three groups had comparable haemodynamic stability and there was no statistically significant difference in the occurrence of major side effects.*

**Conclusion:** *Addition of 12.5 microgram of fentanyl to 1.5cc of hyperbaric bupivacaine 0.5% is an effective and safe method to provide good intra operative anaesthesia and prolonged post operative analgesia for elderly patients undergoing TURP.*

**Keywords:** *TURP, Subarachnoid block, bupivacaine, fentanyl.*

**INTRODUCTION**

Benign Prostatic Hyperplasia (BPH) is a non malignant enlargement of prostate due to

excessive cellular growth of both the glandular and stromal elements of the gland. BPH is a very common problem among elderly males, not only

producing discomforting symptoms, but also obstructive uropathy and associated complications. With the improvement of fiberoptic instrumentation and better irrigating solutions, along with flexible and rigid catheters<sup>1</sup>, TURP has replaced the conventional open prostatectomy, to a large extent.

TURP is a minimally invasive procedure where a modified cystoscope is introduced through the urethra and the hypertrophied lobes are excised with an electrically energised wire loop. Bleeding is controlled with a coagulating current. Continuous irrigation is used to distend the bladder, clear the operative field and to wash away the blood and dissected tissue. TURP can be done under general anaesthesia or regional anaesthesia. It is universally agreed that the anaesthesia of choice for TURP is subarachnoid block because of the following reasons.

- Adequate anaesthesia and good relaxation
- Water intoxication and fluid overload can be recognised early in an awake patient.
- Accidental bladder perforation can be recognised easily if the spinal level is limited to T10 since the patient may experience abdominal/shoulder pain.
- Less blood loss.
- Mitigate the fluid overload.
- Provide postoperative analgesia.

But subarachnoid block has its own inherent complications in geriatric patients. The principal mechanism, where by the elderly accentuate their cardiac output is by increasing left ventricular diastolic volume and ventricular pre load<sup>2,3,4</sup>. But the ventricular filling in elderly is impaired as their atrial and ventricular myocardium is stiff and less compliant. So even a relatively small decrease in venous return as produced by vasodilatation of sympatholysis (as in sub arachnoid block), may significantly compromise stroke volume. With limited reflex mediated ability to increase heart rate, perioperative hypotension can be frequent and severe in older patients. In addition to physiological changes of aging, coexisting pathological conditions like diabetes mellitus,

chronic obstructive pulmonary disease, coronary artery disease etc. further complicate the anaesthetic outcome.

*So can we provide a better alternative to conventional subarachnoid block with local anaesthetic alone?*

It is well established that opioids have got a prominent action at the spinal cord level and it can be used safely for subarachnoid block. Opioids are known to have additive/synergistic analgesic effects with local anaesthetics. Addition of opioids to local anaesthetics will reduce the dose of local anaesthetic required to achieve adequate surgical anaesthesia, improve the quality of intra operative analgesia and prolong the postoperative analgesia. So addition of a potent opioid like fentanyl to hyperbaric bupivacaine (standard drug used for subarachnoid block) can reduce the dose of bupivacaine used and provide a more stable alternative in patients who are much prone for, but less equipped to cope with such situations, both intra and post operatively. This study evaluates the effect of 2 different doses of intrathecally administered fentanyl on the onset of sensory blockade of hyperbaric bupivacaine, quality of intra operative analgesia, cardiovascular stability and duration of post operative analgesia.

#### AIMS OF THE STUDY

1. To find out whether addition of fentanyl to bupivacaine would improve the quality of intra operative analgesia and prolong post operative analgesia.
2. To assess which of the two fentanyl – bupivacaine combinations is better in terms of cardiovascular stability, quality of intra operative analgesia, onset of adequate block, duration of motor block and prolongation of post operative analgesia.
3. To compare the incidence of side effects like hypotension, bradycardia, sedation, respiratory depression, pruritus, shivering, nausea and vomiting among the three groups.

## MATERIALS AND METHODS

This study was conducted after obtaining approval of the college ethics committee and written informed consent from all the patients. It was a double blind prospective study where 75 patients were randomly allocated into 3 groups of 25 each.

Group 1 - Patients in this group received 0.5% Bupivacaine heavy 1.5- ml made 2 ml with normal saline intrathecally.

Group 2 - Patients in this group received 0.5% Bupivacaine heavy 1.5ml + 25 microgram (0.5 ml) of Fentanyl intrathecally.

Group 3 - Patients in this group received 0.5% Bupivacaine heavy 1.5ml + 12.5 microgram of Fentanyl made into 2 ml with normal saline, intrathecally.

### Inclusion criteria

- ASA-I/II
- Age - 50 - 80 years
- Height- 150-180 cm

### Exclusion criteria

- ASA-III/IV
- Diabetes mellitus uncontrolled - Fasting Blood Sugar >150mg/dl.
- Hypertension - Systolic Blood Pressure > 180mm of Hg with or without antihypertensives
- Obese patients >75 Kg.
- Patients with serious systemic illness, psychiatric illness, mental retardation.
- All situations where regional anesthesia is contraindicated like coagulation abnormalities, spinal deformities etc.

### Monitors

- Non - Invasive Blood Pressure monitoring.
- Pulse oximeter.
- ECG
- Visual assessment of respiration.

### Pre operative preparation

All patients were kept fasting for 8 hours prior to surgery. They were pre medicated with Tab. Ranitidine (150 mg) + Tab Metoclopramide (10 mg) + Tab Alprazolam 0.5mg on the morning of surgery. Psychological preparation was done and

the procedure was explained to all patients in advance.

Baseline pulse rate, blood pressure and respiratory rate were recorded prior to surgery.

An intravenous access was established using an 18 G Cannula in the forearm vein and isotonic saline drip was started at a rate of 10 ml / kg/hr. Monitors including a pulseoximeter, blood pressure apparatus and an ECG monitor were routinely used. After giving local anaesthesia, subarachnoid block was given with a Quinke needle of 23 G size using either the midline or paramedian approach in the L 3/4 or L 2/3 space. The table was kept horizontal throughout. The patient was turned supine immediately. He was kept in supine position for about 7 minutes, before being positioned to Lithotomy. Throughout the procedure, patients received oxygen supplementation via a simple oxygen mask.

The time of administration of the spinal drug was taken as the zero hour. The level of spinal anaesthesia was assessed by response to pin prick. Pulse rate and blood pressure were checked every 2 minute for the first 20 minutes and every 5 minutes till the end of surgery and then every 15 - 20 minutes for 2 hours in the post anaesthesia care unit. Patients were followed up for 24 hours thereafter with routine post operative care in the post surgical ward.

The following parameters were assessed and compared.

- Time for adequate level of analgesia (Level T - 10, assessed with pin prick).
- Peak sensory level reached during the procedure, (assessed with pin prick).
- Time for motor block to recede to L3/4 level (Grade I Bromage motor scale).
- Duration of analgesia in terms of time for onset of mild pain post operatively as reported by the patient.
- Incidence of complications including – respiratory depression, hypotension, bradycardia, nausea and vomiting, pruritus, sedation and shivering.

Complications during surgery were treated as follows:-

- Hypotension - (30% fall from basal systolic BP or Systolic BP <90 mm of Hg) was treated with Inj. Mephenteramine 6mg IV.
- Bradycardia (Heart rate <50 beats per minute) was treated with Inj. Atropine 0.6 mg IV, if it was associated with hypotension.
- Respiratory depression was taken as respiratory rate < 10/ minute.

Those subjects who developed TURP syndrome later, were noted and excluded from the analysis.

The motor block was assessed using modified Bromage motor scale.

- 0 - No paresis - full movement of lower limb.
- 1 - Partial paresis - ability to flex knee, ankle.
- 2 - Partial paresis - ability to flex foot only.
- 3 - Partial paresis - ability to flex toes only.

## RESULTS

### Demographic data of patients

#### Statistical analysis of age

Group	No: of Patients	Mean age in years	Standard deviation	F value	Significance
1	25	67.80	6.32	1.206	0.305
2	25	67.68	8.17		
3	25	70.48	7.00		

#### Statistical analysis of Height

Group	No: of Patients	Mean height	Standard deviation	F value	Significance
1	25	164.24	7.86	1.192	0.309
2	25	161.24	7.06		
3	25	164	7.95		

#### Duration of surgery

Group	No: of Patients	Mean duration	Standard deviation	F value	Significance
1	25	45.40	12.74	3.060	0.053
2	25	55.80	16.25		
3	25	50.80	15.39		

All 3 groups were comparable with regard to age, height, physical status as well as duration of surgery.

- 4 - Full paresis - No movement.

Pain was assessed by Mc Gill Scoring System.

- 0 - No pain
- 1 - Slight pain.
- 2 - Discomfort due to pain.
- 3 - Unbearable pain.
- 4 - Excruciating pain

### Statistical analysis

A. The following parameters were statistically analyzed by ANOVA

- 1) Demographic data of patients.
- 2) Haemodynamic stability
- 3) Time taken for adequate block.
- 4) Time taken for recession of motor block.
- 5) Duration of analgesia.

B. Individual groups were separately compared with each other using Student's 't' test.

C. Incidence of intra operative and post operative side effects was analyzed using Pearson Chi square test.

**Peak sensory level of block**

Peak level	Control	Fentanyl 25 µg	Fentanyl 12.5 µg
T-5	0	0	0
T-6	6	5	6
T-7	5	8	6
T-8	10	11	10
T-9	3	1	3
T-10	1	0	0

**HAEMODYNAMIC STABILITY**

		BLPR	BLBP	PR5	BP5	PR10	BP10	PR15	BP15	PR20	BP20	PR30	BP30	PREND	BPEND
1	Mean	78.64	133.2	78.4	120.24	76.96	116.4	75.72	118.48	74.24	117.84	73.4	121.2	75	121.3
	N	25	25	25	25	25	25	25	25	25	25	25	25	23	23
	Std. Deviation	14.49	17.25	15.92	19.36	16.07	19.77	14.99	19.9	15.64	18.35	16.2	18.33	15.21	16.6
2	Mean	75.8	131.6	75.64	120	73.72	117.36	71.68	116.64	68.28	115.76	67.92	113.84	68.12	115.6
	N	25	25	25	25	25	25	25	25	25	25	25	25	25	25
	Std. Deviation	15.76	16.5	16	17.08	16.11	17.39	15.07	12.47	13.62	14.7	13.84	13.49	12.52	17.1
3	Mean	79.72	138.8	77.64	126.4	75.76	119.6	74.6	121.76	74.96	120.8	72.6	122	72.58	119.58
	N	25	25	25	25	25	25	25	25	25	25	25	25	24	24
	Std. Deviation	14.92	14.24	14.54	17.53	14.37	15.39	14.01	14.05	14.21	13.52	13.13	16.83	13.89	16.01
	F VALUE	0.452	1.387	0.211	1.014	0.278	0.217	0.503	0.673	1.595	0.654	1.049	1.894	1.529	0.754
	SIGNIFICANCE	0.638	0.256	0.81	0.368	0.758	0.805	0.607	0.513	0.21	0.523	0.356	0.158	0.224	0.474

Pulse rate and blood pressure were checked every 2 minutes for the first 20 minutes and every 5 minutes till the end of surgery.

Pulse rate and blood pressure of patients in group 1, 2 and 3 were analysed using ANOVA. All 3 groups had

comparable haemodynamic stability and there was no statistically significant difference in Pulse rate and Blood pressure intra operatively among the three groups.

**Time Parameters**

**Onset & recession of block and onset of pain**

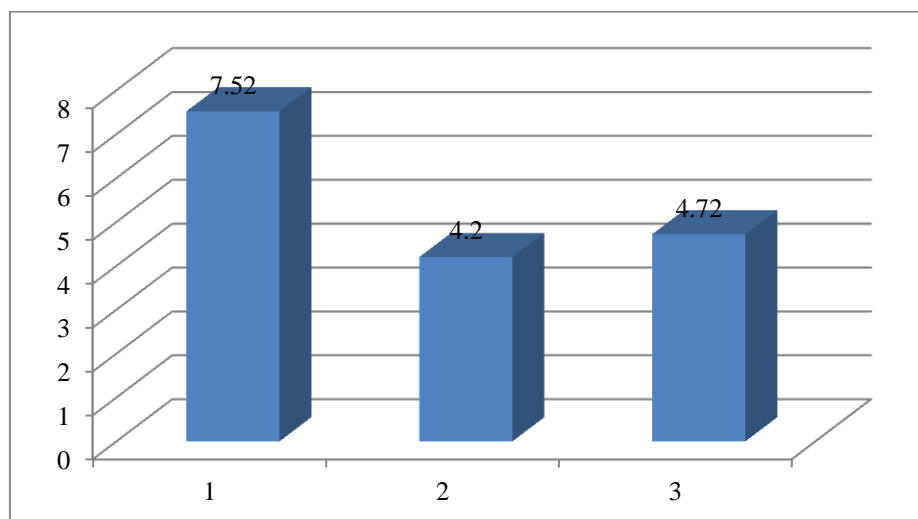
		Onset of Adequate block	Time for recession of block	Onset of pain
1	Mean	7.52	100	250.8
	N	25	25	25
	Std. Deviation	2.2	25.66	77.67
2	Mean	4.2	129.76	314
	N	25	25	25
	Std. Deviation	1.19	21.8	46.46
3	Mean	4.72	104.4	325.6
	N	25	25	25
	Std. Deviation	0.89	42.83	64.17
	F Value	33.907	6.521	9.875
	Significance	0	0.002	0

Mean time taken for onset of adequate block (T10) in group 1 was 7.52 minutes with a standard deviation of 2.2. In group 2, it was 4.2 minutes with a standard deviation of 1.19 and in group 3, it was 4.72

minutes with a standard deviation of 0.89. 3 groups were compared using ANOVA. F value was found to be 33.907. p value was found to be < 0.05 which

shows that there is statistically significant difference in the onset of adequate block among the 3 groups.

### Onset of block



Mean time taken for recession of motor block in group 1 was 100 minutes with a standard deviation of 25.66. In group 2, it was 129.76 minutes with a standard deviation of 21.80 and in group 3, it was 104.4 minutes with a standard deviation of 42.83. 3 groups were compared using ANOVA. F value was 6.521. p value was found to be  $< 0.05$ , showing that there is significant difference in recession of motor block statistically between the 3 groups.

### 3.Duration of analgesia

Mean time for onset of pain in group 1 was 250.80 minutes with a standard deviation of 77.67. In

Group 2, it was 314 minutes with a standard deviation of 46.46 and in group 3, it was 325.60 minutes with a standard deviation of 64.17. Analyzed using ANOVA, F value was 9.875 and p value was found to be  $< 0.05$ , which shows that there is statistically significant difference in duration of analgesia among the 3 groups.

By using ANOVA, we could find out that there was statistically significant difference in the time parameter among the 3 groups. To find out whether significant differences existed between the individual groups, the three groups were separately compared with each other using t test.

	Groups	N	Mean	Std. Deviation	t value	Significance (p value)
Onset of adequateblock	1	25	7.52	2.20	6.635	.000
	2	25	4.20	1.19		
Recession of block	1	25	100.00	25.66	-4.420	.000
	2	25	129.76	21.80		
Onset of pain	1	25	250.80	77.67	-3.492	.001
	2	25	314.00	46.46		

Comparing group 1 and 2, using t test, the time of onset of adequate level of sensory block (T10) was longer among group 1 (Bupivacaine group) than group 2 (Fentanyl group). Group 1 had their motor block

returned back to normal earlier than those among the group 2. Duration of analgesia was significantly better with group 2 than group 1.



	Groups!	N	Mean	Std. Deviation	tvalue	significance (p value)
onset of adequate block	1	25	7.52 j	2.20	5.8971	.000
	3	25	4.72	.89		
recession of block	1	25	100.00	25.66	-.441	.662
	3	25	104.40	42.83		
onset of pain	1	25	250.80	77.67	-3.712	.001
	3	25	325.60	64.17		

Comparing group 1 and 3, using t test, the time of adequate level of sensory block was longer for group 1 than group 3, while both groups demonstrated

comparable degree of recession of motor block. Post operative analgesia was better with group 3 than group 1

	Groups	N	Mean	Std. Deviation	t value	Significance (p value)
Onset of adequate block	2	25	4.20	1.19	-1.749	.087
	3	25!	4.72	.89		
Recession of block	2	25	129.76	21.80	2.639	.012
	3	25	104.40	42.83		
Onset of pain	2	25	314.00	46.46	-.732	.468
	3	25	325.60	64.17		

Comparing group 2 and 3, ie. Fentanyl 25microgram and Fentanyl 12.5microgram, group 3 had their motor block returned to normal considerably earlier than those among group 2,

while both groups showed, comparable time of onset of adequate level of sensory block and degree of post operative analgesia.

**SIDE EFFECTS**

SIDE EFFECTS	GROUP 1 (n=25)	GROUP 2 (n=25)	GROUP 3(n=25)
Bradycardia	2	3	3
Hypotension	4	4	2
Respiratory Depression	0	0	0
Nausea & vomiting	0	0	0
Pruritus	0	1	0
Sedation	0	0	0
Shivering	3	0	1

SIDE EFFECT	Parsons Chi-Square Value	Significance (p value )
Bradycardia	0.280	0.869
Hypotension	0.923	0.630
Respiratory Depression	0	0
Nausea & vomiting	0	0
Pruritus	2.027	0.363
Sedation	0	0
Shivering	3.697	0.157

The major side effects, analysed included Bradycardia, Hypotension, respiratory depression,

nausea and vomiting, pruritus, sedation and shivering. Results were compared and statistically

analysed using Pearson chi square test. There was no statistically significant differences in the occurrence of above mentioned side effects among the 3 groups

### Discussion

Trans urethral resection of prostate (TURP) is one of the most common procedures performed in elderly men for Benign Prostatic Hypertrophy. Spinal anaesthesia is considered the technique of choice as it is the fastest, most predictable and reliable form of regional anaesthesia. The recommended level of regional anaesthesia for TURP is T10 as it involves the structures - urethra (S2-S4), Prostate (T10-L2) and Bladder (T11)<sup>5</sup>. The standard recommended dose for this is Hyperbaric Bupivacaine 0.5% - 2cc or 10mg. By adding a small dose of narcotics to local anaesthetic solutions, the duration of anaesthesia and analgesia can be significantly prolonged.

The present study was undertaken to evaluate the effects of 2 different doses of intrathecally administered Fentanyl (12.5microgram and 25microgram) on the onset and duration of sensory blockade of hyperbaric Bupivacaine, the cardiovascular stability, quality of intraoperative analgesia, duration of post operative analgesia and the incidence of side effects.

Goel et al studied the different doses of Intrathecal Fentanyl and found out that 12.5microgram is the minimum effective dose of intrathecal Fentanyl that can be used in combination with a lower dose of hyperbaric bupivacaine to provide optimal surgical conditions<sup>6</sup>. So we chose 12.5 microgram and 25 microgram for our study. This was a prospective randomized double blind controlled trial, conducted on 3 groups of 25 patients each, undergoing TURP. All 3 groups were comparable with regard to age, height, physical status as well as the duration of surgery

#### A. Cardiovascular stability

One of the prime objectives of this study was to find out whether the new drug combinations provided a safer cardiovascular profile. Following subarachnoid injection, there was a significant fall

in systolic and diastolic pressure in all three groups compared to the baseline. Hypotension occurred in 4 patients in group -1, 4 patients in group - 2 and 2 patients in group - 3. All were treated with 6mg of mephenteramine. No statistically significant difference was observed in blood pressure measurement between 3 groups at baseline, after spinal injection, onset of anaesthesia, at 5, 10, 15 and 20 minutes after onset of anaesthesia, at the end of surgery as well as in the recovery room. Bradycardia ie. heart rate < 50bpm or < 30% of baseline Heart rate occurred in 2 patients in group 1, 3 patients each in group 2 and 3. This also statistically did not show any significant difference. The magnitude of hypotension was similar in all three groups. This is due to decrease in the sympathetic efferent activity after spinal anaesthesia, and is said to be dose related to bupivacaine. Fentanyl has been shown not to cause any alteration of sympathetic activity when added to bupivacaine. These findings are in agreement with the findings of Techanivate A et al (2004) who did similar study in subjects undergoing Appendicectomy<sup>7</sup>.

#### B. Time parameters.

##### 1. Time for onset of adequate block

No significant difference was seen among the 3 groups on comparing the onset time of sensory block. But the mean time for the block to reach T10dermatomal level was significantly longer in group 1 (Bupivacaine alone) ie. 7.52 minutes when compared to 4.2 minutes in group 2 (Fentanyl 25microgram) and 4.72 minutes in group 3 (Fentanyl 12.5microgram) [p value < 0.05]. Mean time for adequate block was comparable among the fentanyl groups.

The upper level of analgesia in individual patients after subarachnoid administration of drug was above T10 in 24 patients in group 1 and in all patients in group 2 and 3.

None of the patients required systemic rescue analgesia intra operatively. These findings are similar to study by Khan et al in TURP patients<sup>8</sup>.



## 2. Recession of motor block

Post operative period is usually associated with less ambulation and therefore the chance for stagnation of blood is more. This increases the risk of venous thromboembolism. This risk is even higher among elderly. In this study, duration of motor block in group 1 is  $100 \pm 25.66$  mts. In group 2 (25microgram Fentanyl), it is  $129.7 \pm 21.8$  mts & in group 3 (12.5microgram Fentanyl), it is  $104.4 \pm 42.83$  minutes. One interesting finding we got in this study was that Group 2 had a significantly longer duration of motor block than Group 3 and Group 1. Group 1 and Group 3 (12.5microgram Fentanyl) had comparable duration of motor block. This was an unexpected finding since Fentanyl is not known to have any effect on motor blockade. This may be due to addition of normal saline to Group 3

## 3. Duration of effective analgesia

Pain is a subjective experience and TURP is not a surgery with considerable post operative pain. Effective analgesia was assessed using McGill Scoring system. The duration of effective analgesia was taken as the interval between administration of spinal drug and the time at which patient complained of slight pain.

Duration of effective analgesia in group 1 was  $-250.8 \pm 77.67$  mts. Duration of effective analgesia in group 2 was  $-314 \pm 46.46$  mts. Duration of effective analgesia in group 3 was  $-325.6 \pm 64.17$  mts. Duration of analgesia was more for Fentanyl groups when compared to bupivacaine alone group ( $p < 0.05$ ). But among the Fentanyl groups the duration of analgesia was comparable ( $P > 0.05$ ). These findings are in agreement with findings of Karamaz A et al (2003)<sup>9</sup>, Yegin et al (2005)<sup>10</sup>, Singh H et al<sup>11</sup> (1995) etc.

## C. Other side effects

**1. Sedation and Respiratory depression:** There was no incidence of sedation or respiratory depression among the 3 groups. Respiratory depression due to neuraxial opioids is divided into 1) Early- within 2 hours of drug administration and 2) Late - that which occurs about 6-12 hours

later. Fentanyl is a short acting opioid because of its lipophilicity and is rapidly absorbed into the spinal cord and epidural fat. This decreases the concentration in CSF more rapidly and hence the risk of cephalad spread is reduced. It has also been found that vascular absorption. After intrathecal administration of opioids is clinically insignificant. This could explain the reduced incidence of respiratory depression.

## 2. Shivering

3 patients among bupivacaine group had shivering and 1 patient in (Fentanyl 12.5microgram) group 3 had shivering. There was no statistically significant difference among the three groups. It is thought that Fentanyl abolishes shivering by central mechanisms.

## 3. Pruritus

Only one patient who received 25µg of Fentanyl developed pruritus. Pruritus is considered one of the most common side effects of intrathecal opioids. It is thought to be mediated through the  $\mu$  receptors present centrally. Workers have found Ondansetron to be significantly useful for the treatment of this pruritus<sup>12</sup>.

## 4. Nausea and vomiting

None of the patients developed nausea and vomiting, even though, they are considered as a complication of intrathecal opioids. This is in agreement with the studies conducted by Mannulang et al (2000)<sup>13</sup> and Ouyang et al (2002)<sup>14</sup> as their studies proved that intrathecal Fentanyl can decrease intraoperative nausea and vomiting in pregnant patients undergoing caesarean section.

## Conclusion

After analyzing the results of our study we found that, addition of Fentanyl to 1.5 cc of hyperbaric Bupivacaine 0.5 % is associated with an earlier onset of sensory blockade, comparable cardiovascular stability and significant increase in the duration of post operative analgesia.

Addition of 25 microgram of Fentanyl to Bupivacaine did not have any added advantage over 12.5 microgram of Fentanyl, in terms of

adequate level of sensory blockade, cardiovascular stability, recession of motor blockade, duration of post operative analgesia or side effects.

To conclude, addition of 12.5 micrograms of Fentanyl to 1.5 cc of hyperbaric Bupivacaine 0.5% is an effective and safe method to provide good intra operative anaesthesia and prolonged post operative analgesia for elderly patients undergoing TURP.

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