## ORIGINAL ARTICLE

# EFFECTS OF INTRATHECAL BUPIVACAINE WITH NORMAL SALINE VERSUS BUPIVACAINE WITH FENTANYL IN PATIENTS UNDERGOING SURGERY

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## ABSTRACT

**Objective:**To know the effects of intrathecal 0.5% Bupivacaine 2.5 cc with 0.5 cc normal saline and 0.5% Bupivacaine 2.5 cc witth 25 μg fentanyl for various lower abdominal surgeries.

**Methods:** A comparative study were conducted in 60 (ASA grade I / II) patients. The onset and duration of both sensory and motor blockade was compared using relevant scales i.e. Sensory scale and Bromage Scale. - Intra-operative and post-operative hemodynamic monitoring was done. The complications which occurred were noted and studied. - The duration of analgesia after sensory wear off was compared between the 2 groups using Visual Analogue Scale. - Quality of post-operative analgesia was studied between the groups.

**Results:** The duration of sensory and motor block as well as duration of effective analgesia was significantly longer in the bupivacaine–fantanyl group as compared with both bupivacaine–normal saline groups.

**Conclusion:** Addition of intrathecalfantanyl to bupivacaine was more advantageous than bupivacaine with normal saline with special regard to its analgesic properties among surgical patients.

**Keyword:-**bupivacaine, fentanyl, intrathecal

## INTRODUCTION

PAIN is defined as an "unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage". Postoperative analgesia is now getting prime importance since few years in elective; emergency as well as day care surgeries. It is becoming popular all over world due to number of advantages to patient, hospital and community such as -1) Minimal psychological stress. 2) Decreased post-operative complication. 3) Greater flexibility about timing of surgery with rapid return to routine activities. 4) It improves respiration, hemodynamic stability and relieves sympathetic overactivity. [1,2,3]

Over the past few years, post-operative analgesia has evolved from intravenous injections of pain killers to complex and skillful techniques requiring advanced knowledge, equipment and drugs. The aim is to have the technique which is minimally invasive, takes less time and causes minimal alteration in routine activities. The technique should give prolonged analgesia, be economically acceptable and have the least number of complications.[4-8]

Regional anaesthesia is preferred to general anaesthesia because of less risk of aspiration and other complications associated with tracheal intubation. There is enhanced ability to communicate with the patient and greater potential 2 for post-operative analgesia. There is reduced incidence of post-operative residual paralysis, nausea, vomiting, lethargy and central respiratory depression. Among regional anaesthesia, spinal anaesthesia is a simple, reliable technique which is quick in onset. Short acting local anaesthetic like lignocaine is now being questioned for various reports of transient to permanent neurological damage. In contrast, use of Bupivacaine in spinal anaesthesia is rarely followed by neurological symptoms. For the same reason, we accepted it as our basic drug for anaesthesia and decided to study the effectiveness of injection fentanyl with injection. Bupivacaine intrathecally for post-operative analgesia.[9-15]

The present study was designed to compare effect of intrathecal 2.5 cc Bupivacaine 0.5% heavy with 0.5 cc normal saline and 2.5 cc Bupivacaine 0.5% heavy with fentanyl 25 μg in various urological, gynaecological and general surgeries.

## METHODOLOGY

The present study was conducted in 60 patients. Patients accepted for the study were all ASA I or II physical status in the age group of 16-60 years posted for various lower abdominal surgeries, under spinal anaesthesia. The patients were divided into 2 groups, group A and group B with each having 30 patients.

**Pre-operative evaluation:** Detailed pre-anaesthetic check-up was done when patients were referred in pre-anaesthetic clinic. Patients having contraindications to spinal anaesthesia like spinal deformity, local infection, bleeding diathesis, mental retardation or neurological deficit were excluded from study group. Routine laboratory tests like Hb%, renal function tests, serum electrolytes, urine examination, blood sugar and chest x-ray were done in all cases. Patients were explained about the procedure in detail and written consent was obtained. All patients were instructed to fast for minimum 8 hours prior to scheduled time of surgery. No patients received any sedative and narcotic premedication before arrival in operation theatre.

On arrival in the operation theatre, usual monitoring like ECG, pulse- oximetry, blood pressure cuff were applied and baseline pulse, BP, Respiratory rate were noted. I.V. line was secured with 18G intravenous cannula and preloading with 500 ml of Ringer lactate was done in all patients. After giving lateral position, lumbar puncture was done in L3 - L4 space with no.25G Quincke's spinal needle by median route. After confirming free flow of CSF, drug was injected over 10 seconds.

**Study participants and procedure:** They were divided into 2 groups and received following drugs in spinal anaesthesia. Group A: 2.5cc of 0.5 Bupivacaine heavy + 0.5 cc Normal saline Group B: 2.5 cc of 0.5% Bupivacaine heavy + 25 µg fentanyl (0.5cc). Immediately after completion of the block patients were returned to normal position and following observations were recorded. All the times were recorded from the point of injection of drug in CSF. The onset and duration of sensory blockade were assessed by using pinprick test, bilaterally in midclavicular line every 2 minutes for first 20 minutes and then every 5 minutes till level is stabilised. Highest level of sensory block and time to reach highest level were recorded. Motor blockade was assessed by using Bromage scale and its onset time is recorded. This is defined as the time to reach grade of 3 in Bromage scale. [31,43]Grade 0: Full flexion of knees and feet, Grade 1 Just able to flex the knees, full flexion of feet, Grade 2 Unable to flex the knees, some flexion of feet, Grade 3 Unable to move legs or feet. Duration of grade 3 of Bromage scale was noted and time to recover to grade 0 of Bromage scale was noted.

After the establishment of adequate level of analgesia, surgery was started and time of begining of surgery was noted. I.V. fluids were continued intraoperatively at the rate of 2 ml/kg/hour. Intraoperatively pulse, BP and SPO2 were monitored every 5 min. for first 30 min. and thereafter every 15 min till the end of surgery. Bradycardia was defined as pulse rate < 60 / min and was treated with inj. Atropine 0.6 mg I.V. Hypotension was fall in BP more than 30% of baseline value and was treated with I.V. fluids and injection. Mephentermine sulphate 6 mg if required. Any other complication like nausea, vomiting, inadequate block were noted and any supplementation in form of sedatives analgesics or anaesthetic agent was recorded.

At the end of surgery, surgical time was recorded and patients were observed in PACU till the patient complained of pain as per Visual Analogue Scale. Rest, foot end elevation and hydration were advised. The time taken for 2 segment regression (T1) and total duration of motor blockade was noted. Patients were allowed to ambulate when (a) sensory block is regressed to S2 level and time noted (T2. and (b) complete recovery of motor blockade. All the patients were kept in PACU under observation with continuous ECG monitoring, SPO2, pulse, BP and respiratory rate. Duration in minutes after surgery was noted in those patients who had unbearable pain and this was considered as 25 as per VAS. This time was labelled as T4 min and data was used in discussion. The VAS score of ≤ 25 mm is considered analgesic success. Duration of analgesia was observed from time to S2 segment wear off (T2) i.e. sensory reversal to time of request of analgesic dose.

**Monitoring of complications:** Patients were observed carefully for any complications. Retention of urine was defined as time to urination (from induction) > 6 hours or feeling distress or pain whatever is less. Accepted measures to get relief are reassurance, hot water bag and catheterisation. All urosurgical patients had catheterisation post-operatively before shifting the patient to PACU, so retention of urine was not observed post-operatively. At the time of transferring the patient to their respective ward, patients were prescribed oral analgesics or inj. Diclofenac sodium 1 amp. i.m. as and when required. They were instructed to drink plenty of fluids and rest for the remainder of day. They were also asked to report complications like headache, backache, dysaesthesia in buttocks, thigh and lower limb upto 1 week.

**Statistical analysis:**Data were analysed using Unpaired 't' test and Fischer exact test with $P < 0.05$ considered statistically significant. Data were presented as mean values, Mean ± SD and numbers (percent). Hemodynamic parameters were represented graphically as well as in tables.

## RESULTS

Highest level of sensory blockade was T6 in both groups. There was no significant difference in onset time and the time to reach highest sensory level in both groups. The time intervals for sensory level to regress 2 segments (T1) and Sensory regression to S2 dermatome (T2) were prolonged in group B patients compared to group A (12% and 14% respectively) ($P < 0.001$). The judgement of sensory blockade by sensory scale is almost same in both patients. The onset of motor blockade was similar in both group of patients. The assessment of motor blockade done by Bromage scale showed that duration of motor blockade was not prolonged by addition of fentanyl. The onset of spinal block is almost same in both groups.

**Table 1: Demographic characteristics**

| Variable | Group A (n=30) | Group B (n=30) |
|---|---|---|
| **Age** (Years) | 36.8 ± 5.8 | 37.2 ± 3.4 |
| **Gender** | | |
| Male | 13 | 12 |
| Female | 17 | 18 |
| **Height** (cms) | 158.2 ± 3.84 | 154 ± 4.36 |
| **ASA** | | |
| Grade - I | 24 | 24 |
| Grade - II | 6 | 6 |
| **Surgeries** | | |
| Gynecological | 13 | 11 |
| Urological | 07 | 07 |
| General | 10 | 12 |

Group A: bupivacaine + normal saline,
Group B: bupivacaine + fentalnyl

**Table 2: Characteristics of block**

| Variable | Group A(n=30) | Group B (n=30) |
|---|---|---|
| **Characteristics of sensory block** | | |
| Mean Time of Onset (Mean ± SD) min. | 7 ± 2.4 | 7.2 ± 3 |
| Highest Sensory level | T6 | T6 |
| Mean Time from injection to Highest sensory level | 11 ± 3.4 | 12 ± 2.2 |
| Mean Time for 2 segment regression from highest sensory level - T1 | 150 ± 7.4 | 162 ± 8.2 |
| Mean Time for sensory regression to S2 from highest sensory level. T2 | 180 ± 12.4 | 206 ± 6.4 |
| **Characteristics of motor block** | | |
| Mean Onset to grade III motor block | 8.6 ± 4.1 | 8.4 ± 3.2 |
| Mean Duration of Grade III motor block | 110 ± 30 | 124 ± 18 |
| Mean Time to reach grade 0 from grade III -(Recovery time) | 160 ± 40 | 168 ± 35 |

Group A: bupivacaine + normal saline, Group B: bupivacaine + fentalnyl

**Table 3: Patient's judgment of block as per sensory scale**

| | Group A(n=30) | Group B (n=30) |
|---|---|---|
| A | 23 | 25 |
| B | 7 | 5 |
| C | 0 | 0 |
| D | 0 | 0 |

Group A: bupivacaine + normal saline, Group B: bupivacaine + fentalnyl

Table -3 shows comparison of Patient's judgment of block as per sensory scale in bothe the groups.

**Table 4: Pre-operative hemodynamic parameters (mean)**

| Parameter | Group A(n=30) | Group B (n=30) |
|---|---|---|
| Pulse (beats / min) | 79.4 | 77.03 |
| SBP/DBP) mmHg | 126.6 / 81 | 127.53 / 84.33 |
| SPO2% | 98.4 | 98.5 |
| RR (per min) | 14.2 | 13.8 |

Gr A: bupivacaine + normal saline, Gr B: bupivacaine+fentalnyl

Table -4 shows comparison of mean values of perioperative hemodynamic parameters in bothe the groups.

**Table5: Early intra operative hemodynamic parameters (mean)**

| Time (min) | Group A(n=30) | | | | Group – B (n=30) | | | |
|---|---|---|---|---|---|---|---|---|
| | Pulse* | SBP/DBP@ | SPO2 % | RR# | Pulse* | SBP/DBP@ | SPO2 % | RR# |
| 5 | 80.73 | 131.8/84.3 | 99 | 13 | 97.06 | 123.4/76.13 | 99 | 13 |
| 10 | 77.33 | 114./46 / 79 | 98.5 | 13.5 | 81.76 | 115.33/74.36 | 98.5 | 13.5 |
| 15 | 75.13 | 108.9/73.67 | 99 | 13.5 | 77.8 | 113/88.26 | 99 | 13 |
| 20 | 77.13 | 110/73.4 | 99 | 13 | 76.76 | 111.46/74 | 98.5 | 13.5 |
| 25 | 76.67 | 111.73/76.67 | 98.5 | 13.5 | 80.26 | 117.53/78 | 99 | 13.5 |
| 30 | 80.67 | 114.6/74.8 | 99 | 13.5 | 78.93 | 120.73/77 | 99 | 13 |
| 45 | 89.53 | 123.8/77.34 | 99 | 13.5 | 78 | 118.13/76 | 98.5 | 13 |
| 60 | 87.33 | 120.86/84 | 98.5 | 13 | 77.5 | 117.4/76.8 | 99 | 13.5 |

Group A: bupivacaine + normal saline, Group B: bupivacaine + fentalnyl; *rate per minute;@Systolib BP / Diastolic BP in mmHg; #Respiratory rete per minute

**Table 6 Early post-operative hemodynamic parameters (mean)**

| Time (min) | Group A (n=30) | | | | Group B (n=30) | | | |
|---|---|---|---|---|---|---|---|---|
| | Pulse* | SBP/DBP@ | SPO2 % | RR# | Pulse* | SBP/DBP@ | SPO2 % | RR# |
| Imme diate in PACU | 82.26 | 121.66 / 79.26 | 99 | 13.5 | 80.06 | 115.73 / 75.8 | 99 | 13 |
| 30 | 77.53 | 122 / 80.3 | 98.5 | 13 | 78.8 | 118.26/74.67 | 99 | 13.5 |
| 60 | 79.3 | 146.8/80.6 | 99 | 13.5 | 75.26 | 115.66/75 | 98.5 | 13 |
| 90 | 78.06 | 124.06 / 81.46 | 99 | 13 | 76.73 | 119.67/76.67 | 99 | 13.5 |
| 120 | 82.46 | 127.2/80.46 | 98.5 | 13.5 | 78.8 | 121.86/77.46 | 99 | 13 |

Group A: bupivacaine + normal saline, Group B: bupivacaine + fentalnyl; *rate per minute;@Systolib BP / Diastolic BP in mmHg; #Respiratory rete per minute

**Table 7 Comparison of analgesia, complications and response in both groups**

| Variable | Gr A(n=30) | Gr B (n=30) |
|---|---|---|
| **Recovery and analgesia** | | |
| Mean Time to feel first pain (T3) | 202 ± 9.8 | 299 ± 17.3 |
| Mena Time to feel unbearable pain or time of analgesic requirement (T4) - VAS > 25 mm | 234 ± 14.2 | 364 ± 15.4 |
| Duration of analgesia | | |
| T3 - T2 | 11.4 | 93 |
| T4 - T2 | 45.6 | 158.4 |
| **Intraoperative complications** | | |
| Hypotension (H) | 4 | 5 |
| Bradycardia (B) | 4 | 3 |
| Nausea and Vomiting (V) | 1 | 2 |
| **Post-operative complications** | | |
| Hypotension (H) | 1 (3.33%) | 5 (16.6%) |
| Vomiting (V) | 1 (3.33%) | 0 |
| Pruritis (Pr) | 0 | 3 (10%) |
| Urinary retention (RU) | 1 (3.33%) | 2 (6.66%) |
| **Patient response (subjective)** | | |
| Good | 0 | 26 |
| Fair | 6 | 4 |
| Poor | 24 | 0 |

The table shows that there is no significant difference in hemodynamic parameters in early intra-operative period in both groups. Oxygen saturation and respiratory rate are unaffected in both groups. This suggests that even addition of 25 mcg fentanyl intrathecally does not cause respiratory depression and does not alter hemodynamic parameters.

The time to feel first pain and time of analgesic requirement is prolonged significantly compared to Group A in group B. ($P < 0.001$) Only 3 patients were having urinary retention post-operatively. 2 were relieved with hot water and one patient was catheterised. The patients were shifted to the ward immediately as soon as unbearable pain is felt after giving oral / parenteral analgesic. The patients' response to intrathecal fentanyl 25 μg along with 0.5% Bupivacaine was superior to plain 0.5% Bupivacaine with 0.5 cc normal saline. (table -6)

## DISCUSSION

Majority of studies for intrathecal fentanyl were done for 10, 20 and 25 μg. In this study we selected 25 μg fentanyl intrathecally[20,28,30,18]. Intrathecal route is better because drug is readily available in CSF to saturate opioid receptors in central nervous system, no separate injection has to be given as the drug is injected with Bupivacaine 0.5% at the time of lumbar puncture and low dose is needed. In our study there was marginal difference between onset of sensory [ 7 ± 2.4 min (A) vs 7.2 ± 3 min (B) ] and motor [8.6 ± 4.1 min (A) vs 8.4 ± 3.2 min (B) ] blockade between group A and B. This suggests that onset of sensory and motor blockade is not affected by addition of fentanyl. H. Singh et al[31,30] found that the onset of bupivacaine induced spinal block was not enhanced in fentanyl treated patients.

In our study the volume of drug was kept constant in both groups and median block height was $T_6$ in both groups[27,30] (median range $T_{6\text{-}10}$). As the drug and dose of Bupivacaine 0.5% heavy was similar for both groups, block intensity as indicated by degree of motor blockade and time to reach highest sensory level was unaltered in both groups. This suggested that addition of fentanyl intrathecally with Bupivacaine 0.5% does not alter intensity of motor and sensory blockade in SA. The judgement of sensory block as per sensory scale[3] is same in both groups (Table-5). In our study the duration of sensory spinal blockade as measured by 2 segment regression and $S_2$ segment of wear off time in group A are considered standard and compared with group B. The 2 segment sensory

wear off time was higher in group B compared to group A. ($P < 0.001$) [150 ± 7.4 / 162 ± 8.2 and 180±12.4 / 206 ± 6.4], 12 and 14% respectively (Table-4). Thus initiation of sensory reversal begins at an average 158 min. with 2.5 cc of 0.5% Bupivacaine heavy[35].

Roussel JR[31] studied addition of fentanyl to Bupivacaine 0.5% for spinal blockade and concluded that fentanyl does not enhance onset of sensory and motor block produced by 12.5 mg of intrathecal Bupivacaine 0.5%. Our study goes parallel with his conclusion. This suggests that addition of fentanyl with Bupivacaine 0.5% intrathecally does not alter onset of spinal blockade. The duration and recovery time of motor blockade were almost equal in both groups[3] (Table-6). H. Singh et al[31] found that addition of fentanyl 25 μg does not enhance onset of sensory and motor block. The time required for 2 segment regression and sensory regression to $L_1$ dermatome was 74 ± 18 min and 110 ± 33 min vs 93 ± 22 and 141 ± 37 min in group A with Bupivacaine 0.75% - 13.5 mg and group B with 0.75% - 13.5 mg Bupivacaine + 25 μg fentanyl respectively ($P < 0.05$) showing increased duration of sensory block in fentanyl treated patients.

Bruce Ben - David et al[3] found that in patients receiving 0.5% 1 cc Bupivacaine and 0.5% 1 cc Bupivacaine with 10 μg Fentanyl intrathecally in knee arthroscopic surgeries, the mean times to two segment regression was 53 vs 67 min ($P < 0.01$) and 120 vs 146 min. ($P < 0.05$) respectively. Our study also found significant difference ($P < 0.001$) in 2 segment regression and S2 segment regression time.

Hypotension and bradycardia are normal physiological responses during spinal anaesthesia. In our study we found that addition of fentanyl in group B does not altered the hemodynamic parameters. We found the higher incidence of hypotension in group B (5) compared to group A (4). Incidence of bradycardia was found more in group A (4) than group B (3). This suggests that addition of fentanyl intrathecally causes marginal hypotension as associated with SA. The early intra-operative hemodynamic parameters are depicted in graph and Table 8 and 9. ($P > 0.05$) Shanon MT[32] et al studied hypotension after intrathecal fentanyl with Bupivacaine 0.5% heavy and observed that SBP and MAP decreased 10% and 14% respectively following intrathecal fentanyl. No patient from either group needed any treatment for hypotension. He concluded that intrathecal fentanyl produces minimal hemodynamic changes with / without prior fluid administration. The graph-I show that pulse rate and BP are stable in both groups. Respiratory rate and oxygen saturation are unaffected in both groups implying that intrathecal fentanyl 25 μg is safe. Belzarena et al[7] found that fentanyl > 0.5 μg/kg intrathecally is associated with decreased respiratory rate and increased incidence of pruritis.

The early post-operative hemodynamic parameters are depicted in graphII and table 10 show that these parameters were stable in both groups. Assessment of pain has always been troublesome for clinical investigators for years. Till today there is no reliable method to evaluate pain. Wolfe stated, 'it is not easy to measure something if one is not sure that one is measuring'. This applies to whole field of pain management. As discussed earlier pain is notoriously variable in different individuals and same surgical incision can elicit a several fold variation among different individuals. The easiest to use and most studied tool is the Visual Analgesic Scale[45] (VAS). It is a simple tool, which measures the subjective pain of the patient at a given time. The scale consists of a ruler with markings from 0-10 or 0-100. The patient is asked to state their present perception of pain, assuming 0 to be no pain at all and 100 to be worst possible they could imagine. The pain score before and after treatment are useful to know the efficacy of treatment modality as well as a research tool. VAS was used for the assessment for depth of analgesia. Post operative pain started at around 200 min in group A which was considered as standard. After this, all the patients were scrutinised every 15 min. Main tool for assessment of analgesia were patients facial expression, Hemodynamic data, respiratory rate and $SPO_2$, movement of limbs in bed, sedation if present. Pain started at around 300 min group B. The intensity of pain was highest for 93 minutes after sensory wear off in group B compared to group A which was at 11.4 min. Patients in group B were comfortable by look, vitals were stable, patients were awake and able to move limbs in bed. An absolute VAS score ≤25 mm was defined as an analgesic success. (Table-12)[45]. The mean value of $SPO_2$ was comparable in both groups at different time intervals. None of the patients in any group showed hypoxia ($SPO_2$< 94% for > 12 min/hr) at any time during study. Our study correlates with Grant P Raymer et al Wooper DW et al[39]. Who found that intrathecal fentanyl upto 25 μg does not cause respirattory depression. The reasons may be interpreted as- 1) Analgesia was excellent to adequate in group B. 2) Study included minimal dose of fentanyl. 3) Patients were awake and comfortable in group B which added safety factor in relation to respiratory depression. 4) The operations involving lower abdominal organs, which excluded ribs, diaphragm or upper abdominal muscles, respiratory pattern and rate were not altered at all.

A study of Herman NL[16] et al, on analgesia, pruritis and ventilation after intrathecal fentanyl concluded in a dose response relationship of analgesia with the drug, concluding higher the dose, more the complications. In this regard, S2 segment wear off time (T2)

and time to feel first pain (T3) were suggesting requirement for analgesia as sensory blockade has been reversed. But in group B, as addition of fentanyl provided pain relief for some period after S2 segment wear off, time difference between T2 and T3 found more than that of group A. These values showed pattern of $A_{T3-T2} < B_{T3-T2}$ (Table-12), $T_3 - T_2$ for group A and group B were 11.6 min. and 93 min. respectively. (Table-12). As personal interpretation, expression and explanation of pain varied a lot, total duration of post-operative analgesia is considered from S2 segment wear off time ($T_2$) to requirement of analgesic supplementation ($T_4$). This showed group $A_{T4-T2}$ < group $B_{T4-T2}$ (Table-12) ($P<0.01$). Hence post-operative analgesia due intrathecal drugs administration i.e. $T_4 - T_2$ was found to be more in group B than in group A. Ashok Kumar B, Newman LM[2] conducted a study for intrathecal administration of fentanyl for post-operative analgesia and observed the analgesia time of 94.5 min with 25 mcg Fentanyl in 2.5 cc 0.5% Bupivacaine. Our study goes parallel with their observations. Thus addition of Fentanyl caused almost 4 times increase in total duration of analgesia. ($P < 0.01$) The efficacy of drug is justified by side effects and complications associated with it. The patients were observed in PACU for most common side effects of spinal anaesthesia and opioids. The most common side effect of fentanyl observed were hypotension, vomiting, urinary retention, respiratory depression, pruritis and sedation. (Table-13). It was considered as fall in BP more than 30% of baseline which found in 3.33%(1) and 16.6% (5) patients post-operatively in group A and B respectively. It is a known complication of SA, so whether fall in BP occurred due to Bupivacaine 0.5% or fentanyl is matter of debate. No patient required any specific treatment. ($P > 0.05$) PONV after lower abdominal surgery and SA are common complications which occurred in 3.33%(1) in group A but none in group B. In contrast to I.V. fentanyl which is usually expected to cause CTZ stimulation and vomiting, intrathecal fentanyl has opposite effect. None of the patient in group B required antiemetic treatment for PONV[23]. It is a known complication of spinal anaesthesia. In our study among group A and B, 3.33% (1) and 6.66% (2) were having retention of urine, respectively, 14 of our patients, had undergone urosurgical surgery and they were catheterised intraoperatively, whether retention was due to SA or intrathecalfenttanyl is not concluded and yet to be followed up for more conclusion. 10%(3) of patients in group B developed compared to group A in which none complained the same. Patients were reassured and I.V. injection chlorpheniramine maleate 22 mg was given. It might have occurred as a part of pharmacological effect of fentanyl. In the study by Vaghadiaet al[41], pruritis was also found to be of mild to moderate intensity. Bruce Ben David et al[3,7] studied intratthecal fentanyl with Bupivacaine and found 12% incidence of pruritis in patients. Out study parallels his study.

None of our patients had even mild degree of hypoxia during spinal anaesthesia. This suggested thatt even 25 mcg fentanyl intrathecally does not cause any degree of respiratory depression in patients. The reasons may be-All surgeries were elective, All patients were ASA grade I and II, Patients were fully awake, not sedated.,Fentanyl given intrathecally acts on $\mu_2$ opioid receptors (spinal cord) and not on $\mu_1$ receptor (Brain). So respiratory depression does not occur, the dose of fentanyl was 25 μg which is far less to cause significant depression of respiration. None of the patients in our study complained of post-dural puncture head ache or transient neurological symptoms. Varassiet al[42] demonstrated that the subarachnoid administration of 25μg fentanyl during spinal anaestthesia in non premedicated men did not alter respiratory rate, end tidal $CO_2$, minute ventilation, respiratory drive and $SPO_2$. Our study correlates with this study.

## CONCLUSION

It was concluded that - - There is no difference in onset of sensory and motor blockade in both groups. - The duration of motor blockade is unaffected by the addition of fentanyl.The time to reach the highest sensory level is same in both groups. The time of sensory wear off was prolonged by fentanyl. Addition of fentanyl provides analgesia after reversal of sensory blockade. Intra-operative hemodynamics were unaltered even with addition of 25 μg fentanyl in group B compared to group A, suggesting that fentanyl provides hemodynamic stability without altering maximum block height.The incidence of PONV is decreased in group B suggesting antiemetic effect of intrathecal fentanyl. Acceptability amongst patients in group B was very good as they were awake, comfortable and satisfied compared to group A suggesting good quality analgesia.

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