Comparative Study of Clinical Effects of Intrathecal Hyperbaric Bupivacaine with Fentanyl versus Hyperbaric Bupivacaine in Patients with Lower Limb Surgeries

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Abstract

Objective: In a prospective study, clinical effects of intrathecal 0.5% hyperbaric bupivacaine 15 mg with fentanyl 25μg versus 0.5% hyperbaric bupivacaine 15 mg were compared in total 60 patients of ASA grade I and II undergoing lower limb surgeries. *Methods:* After receiving 500 ml lactated ringers solution without any premedication spinal anaesthesia was given in sitting position with 25 gauge quincke type spinal needle at L3-L4 space. Intrathecal 0.5% hyperbaric bupivacaine 15 mg with fentanyl 25μg or 0.5% hyperbaric bupivacaine 15 mg was given. Following factors were evaluated after the administration of spinal drug. Onset, maximum level and degree of sensory analgesia; Onset and degree of motor blockade, level of alertness and anxiety, hemodynamics, sensory and motor recovery, duration of effective analgesia and complications. *Results:* There was excellent intraoperative and early postoperative analgesia with addition of intrathecal fentanyl to bupivacaine as compared to giving intrathecal bupivacaine only. Sedation was an advantageous side effect inspite of pruritus and there was less nausea, vomiting and shivering with intrathecal fentanyl. Hemodynamic variables were unchanged with intrathecal fentanyl except respiratory rate which decreased upto 2 hours only. *Conclusion:* In patients with lower limb surgeries 25μg fentanyl along with 0.5% hyperbaric bupivacaine 15 mg is recommended inspite of mild pruritus with advantage of excellent intraoperative analgesia, sedation and prolonged postoperative analgesia.

Keywords: Intrathecal; Hyperbaric bupivacaine; Fentanyl; Lower limb surgeries.

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Introduction

Subarachnoid block is commonly used in India for surgical procedures below umbilicus. Subarachnoid block has maintained its popularity because there is profound analgesia and muscle relaxation. Hypotension, postspinal headache, meningitis and neurological complications are some disadvantages of subarachnoid block.

Bupivacaine is the most commonly used local anesthetic for spinal anaesthesia having short duration of action and higher doses results in cardiac toxicity. This is overcome by the use of adjuvants like opioids, dexmedetomidine, clonidine, midazolam and neostigmine [1]. There is high degree of satisfaction and low incidence

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of side effects and complications with intrathecal opioid [2]. Intrathecal opioids in combination with local anaesthetics act synergistically and intensify the sensory block without increasing the sympathetic block [3]. Intrathecal opioids with lower dose of local anesthetics provide adequate anaesthesia and prolong postoperative analgesia in patients with lower limb surgeries. This has been proved with opioids like fentanyl, sufentanil and meperidine [4].

Fentanyl is a pure opioid agonists acting on mµ receptor having high lipid solubility, faster onset and shorter duration of action with lesser cardiovascular depressive effects [5]. Fentanyl unlike morphine, has fewer tendencies to migrate rostrally to the fourth ventricle to cause delayed respiratory depression [4]. Intrathecal fentanyl added to local anaesthetic has excellent analgesia and no additional intravenous analgesic requirement intraoperatively due to complain of discomfort [6]. Animal studies have demonstrated the safety of fentanyl in subarachnoid space in view of neurotoxicity [7]. In some patients use of intrathecal opioid might be discouraged due to side effects like pruritus, nausea, vomiting, respiratory depression and urinary retention.

Aims and objectives of this study was to compare the intraoperative and postoperative effects of intrathecally administered fentanyl 25 µg along with 0.5% hyperbaric bupivacaine 15 mg in patients undergoing lower limb surgeries with respect to quality of sensory and motor nerve blockade, hemodynamic effects and level of alertness and anxiety in perioperative period, incidence of side effects and efficacy of fentanyl in immediate postoperative period. We used 25 µg of fentanyl as more than 25 microgram (µg) of it may cause respiratory changes as well increased the incidence of side effects.

Materials and Methods

This prospective randomized double blind study was conducted in the Department of Anaesthesiology and Intensive care at Seth Nandlal Dhoot Hospital, Aurangabad during the period of November 2012 to November 2013. After getting approval of the Institutonal ethical committee, (IEC), written informed consent was obtained from patients during the pre-anesthetic evaluation after explaining the study procedure and the surgical procedure, in the language they understand.

Total 60 ASA grade I-II patients of both sexes, age between 18 to 50 yrs, weight between 40-70 kg, undergoing lower limb surgeries like joint replacement, fixation of fractures and amputation of leg or foot, both elective and emergency of expected duration less than 120 minutes under spinal anaesthesia were included in the study. Patients refusing to give consent, history of hypersensitivity to local anaesthetic and opioids, neurological disorder, liver and cardiovascular disease, coagulopathy, patients on anticoagulant therapy, anatomical spine deformities (congenital or acquired), haemodynamic instability, infection at spinal injection site and ASA grade III – V patients were excluded from the study.

Total 60 patients were randomly divided into two groups i.e Group 'BF' and Group 'B' (30 patients in each group) with the help of computer generated randomization.

Group 'BF' – Patients receiving 15 mg 0.5% hyperbaric bupivacaine (3 ml) + 25 µg fentanyl (0.5 ml) (Fentanyl group)

Group 'B' – Patients receiving 15 mg 0.5% hyperbaric bupivacaine (3.0 ml) (Control group)

A detailed history and complete physical and systemic examination was done to rule out presence of major illness. All routine investigations like complete blood count, blood sugar, renal function test, serum electrolytes, urine examination, electrocardiogram and chest x ray were performed prior to surgery. Patients were given tablet ranitidine 150mg the night before and on the morning of surgery. Patient was kept nil by mouth (NBM) for 6 hours prior to the procedure. No premedication was used. All equipments and drugs necessary for resuscitation and general anaesthesia were kept ready. Peripheral oxygen saturation (SpO$_2$), non-invasive arterial pressure, electrocardiography (ECG) and heart rate were continuously monitored. Baseline heart rate, SpO$_2$ and BP were recorded. A vascular line was created through large vein with 18-guage catheter and in the operating room the patients were received preloading of 10 ml/kg of IV lactated ringers solution 15 minutes before the administration of spinal anaesthesia. Position of the table kept horizontal, sitting position was given to the patient. Under all aseptic precautions lumbar puncture was performed with Quincke type spinal needle of 25-gauge at L3-L4 space. After ensuring free flow of clear cerebrospinal fluid, anaesthetic drug was injected through spinal needle at the rate of 0.5 ml/sec into subarachnoid space. Patient was turned supine immediately.

For first 15 minutes during and after the spinal injection systolic, diastolic and mean arterial pressures, pulse rate, SpO$_2$ and respiratory

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rate were recorded every 2 minutes, then next 30 minutes these parameters were recorded every 5 minutes, next 60 minutes for every 10 minutes and afterwards they were recorded for every 15 minutes upto 180 minutes.

Sensory level was determined by pinprick using 20 guage hypodermic needle and was tested every 10 seconds. The onset of analgesia was defined as the interval from completion of subarachnoid injection i.e. '0' time to the loss of pinprick sensation at the knee joint (L_1). Maximum sensory dermatomal level was tested by pinprick in midclavicular line every minute until the level had stabilized for two consecutive tests. Afterwards sensory level was tested every 15 minutes until two-segment regression and upto complete sensory recovery to see the "Duration of Anaesthesia". Complete sensory recovery was defined as the return of sensation of great toe (S_1). Time taken to achieve maximum sensory level, two segment regression and complete sensory recovery was noted. Following operation the patients were interrogated every 15 minutes for pain at the operation site. Systemic narcotic analgesics were not given until patient demanded analgesia for pain. Time taken from the administration to subarachnoid anaesthetic drug to the time patient first demanded analgesic drug for pain was noted i.e. considered as the duration of effective analgesia.

The degree of analgesia was graded as: Grade I- Required general anaesthesia for completion of surgery, Grade II- Pain that required addition of analgesic drug (Analgesic dose of ketamine 0.25 mg/kg), Grade III- Mild discomfort but did not require systemic analgesia, Grade IV- No discomfort at all during the procedure.

The onset of motor block was defined as the time taken for completion of subarachnoid injection i.e. '0' time to the time when patient was just able to flex the knee and ankle but unable to rise the extended leg. It was tested every 10 seconds upto the onset. Motor block assessment was done with reference to specific myotomes (modified bromage scale). It was done by testing power of a specific joint movement of both lower limbs that were regarded as equivalent to the following five myotomes i.e. L_2= Hip flexion, L_3= Knee extension, L_4= Ankle dorsiflexion, L_5= Great toe dorsiflexion, S_1= Ankle plantarflexion (Kuusniemi et al., 2000) [8]. Complete motor block and intensity of motor block was recorded as myotome score and was calculated for each side. The maximum score being 5 points for one side 10 points in total. Recovery from motor blockade was recorded every 15 minutes. Recovery of motor block was defined as the ability of the

patient to flex the ankle but unable to flex knee. Duration of motor blockade was calculated from time '0' time up to recovery of motor block.

The level of alertness and anxiety during surgery will be designated as: (Belzarena S.D., 1992) [9] Grade I- Awake and nervous, Grade II- Awake and calm, Greade III- Sleepy and easily arousable, Grade IV- Sleepy and difficult to arouse. The level of alertness and anxiety was tested after 15 minutes and 90 minutes.

Intraoperative and postoperative complications such as hypotension, bradycardia, respiratory insufficiency, nausea, vomiting, shivering, pruritus were noted till complete recovery. A decrease in mean arterial BP of >20% of the baseline level was treated with rapid infusion of 200 mL of normal saline over 10 min. If this was ineffective, 5 mg ephedrine was given iv in incremental doses. Bradycardia (defined as a decrease in heart rate below 50 bpm) was treated with 0.5 mg atropine IV.

Continuous monitoring of O_2 saturation was done. Respiratory depression was defined as respiratory rate less than 10 per minutes. Inj. Naloxone was kept ready for respiratory depression / pruritus. Inj. Ondansetron 4 mg IV was given for nausea and vomiting. Other complications like shivering and itching i.e. pruritus were also noted.

Statistical Analysis

Analysis of data was performed using student's unpaired t- test (for finding the significance of difference between means of two independent samples), Chi-square test (a test of association between two events in binominal samples). 'P' value less than 0.05 was considered to be significant.

Results

In our study, a total of 60 patients (Group BF -30 patients, Group B – 30 patients) were enrolled and finally analyzed. Patients of the study groups were comparable with respect to demographic data [Table 1]. Statistical analysis revealed non-significant differences between the two study groups as regards to age, height, weight, duration of surgery.

Onset of sensory analgesia was 67.6 ± 7.7 sec in Groups BF and 71.6±10.1sec in Groups B which was not statistically significant (p>0.05). Onset was within 70 sec. in most of the patients (Table 2). Maximum sensory dermatomal level was between T_6 –T_{10}. The addition of fentanyl to bupivacaine did

not change the height of the block. The number of dermatomes blocked were 15.13 ± 2.37 in group BF versus 14.4 ± 1.64 in group B, a non-significant difference (p>0.05).

Time required to reach the maximum level of analgesia was 6.6 ± 1.3 min in Group BF and 7.04 ± 1.5 min in Group B statistically non significant (p>0.05). Most of the patients required 5-10 minutes for attaining maximum level (Table 2). Degree of Analgesia was assessed in both groups. All patients in Group BF had excellent analgesia (grade IV) whereas 2 patients in group B had minimal discomfort for which no analgesics were required and one patient in group B required supplemental analgesia (analgesic

dose of ketamine 0.25 mg/kg). Any patient did not require general anaesthesia (Figure 1).

Onset of motor block was 75.0 ± 7.63 sec in Group BF and 77.0 ± 9.50 sec in Group B statistically nonsignificant (p>0.05) (Table 2). All patients in both groups had complete motor blockade as assessed by inability to flex hip.

More patients in group BF were sleepy and easily arousable (10 after 15 minutes, 7 after 90 minutes) when compared with group B (2 after 15 minutes, 2 after 90 minutes). Two patients in group BF were awake and nervous after 15 minutes and one was awake and nervous after 90 minutes. Five patients in

Table 1: Patient demographic data

| Demographic Data | Groups | | 'p' value |
	BF Mean ± SD	B Mean ± SD	
Age (Yrs.)	31.3 ± 9.2	31.5 ± 8.19	p>0.05
Weight (kg)	55.6 ± 9.2	56.16 ± 8.9	p>0.05
Height (cms)	158.5 ± 6.6	158.2 ± 6.8	p>0.05
Duration of surgery (min)	97.16 ± 19.5	89.0 ± 23.83	p>0.05

Table 2: Sensory and motor block

| | Groups | | p Value |
	BF Mean ± SD	B Mean ± SD	
Sensory	67.6 ± 7.7	71.6 ± 10.1	p>0.05
Time required to reach maximum level	6.6 ± 1.3	7.04 ± 1.5	p>0.05
Motor onset	75.0 ± 7.63	77.0 ± 9.50	p>0.05
Two dermatome regression	84.0 ± 11.55	68.5 ± 8.5	p<0.001
Great toe sensations	174.0 ± 24.6	131.3 ± 17.16	p<0.001
Motor recovery	120.6 ± 9.4	120.6 ± 9.8	p>0.05
Duration of effective analgesia	239.0 ± 30.74	158.0 ± 17.49	p<0.001

Table 3: Level of alertness and anxiety

| Level of alertness and anxiety | Groups* | | | |
| | BF | | B | |
	After 15 min.	After 90 min.	After 15 min.	After 90 min.
I Awake and nervous	2 (6.6%)	1 (3.3%)	5 (16.6%)	5 (16.6%)
II Awake and calm	18 (60%)	22 (73.3%)	23 (76.6%)	23 (76.6%)
III Sleepy and easily arousable	10 (33.3%)	7 (23.3%)	2 (6.6%)	2 (6.6%)
IV Sleepy and difficult to arouse	0	0	0	0
Total	30	30	30	30

Table 4: Variations in respiratory rate

| Respiratory rate (per min) | Groups | | 'P' value |
	BF Mean±SD	B Mean±SD	
Preoperative	17.5±1.23	17.63±1.37	P>0.05
After 15 min.	11.6±1.35	17.43±1.47	P<0.05
After 45 min.	15.7±1.42	17.21±1.53	P>0.05
After 95 min.	15.9±1.51	17.18±1.41	P>0.05
After 180 min.	17.1±1.21	17.81±1.61	P>0.05

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group B were awake and nervous after 15 minutes and 5 were awake and nervous after 90 minutes 9 (Table 3).

Preoperative and intraoperative pulse rate and blood pressure showed nonsignificant difference in both groups (p>0.05). The incidence of hypotension was 6.66% in group BF and 10% in group B. Preoperative respiratory rate was comparable in both groups (p>0.05). Respiratory rate fall was significant in group BF after 15 minutes of giving spinal anaesthesia (p<0.05), however no case of respiratory depression (respiratory rate less than 10) was observed (Table 4). Preoperative, intraoperative and postoperative SpO_2% showed nonsignificant difference (p>0.05).

Time of onset of motor recovery was 120.6 ± 9.4 min in Group BF and 120.6 ± 9.8 min in Group B which was no significant statistically (p>0.05)

(Table 2). Complete sensory recovery was assessed in both groups. Time for two dermatome regression was increased in the group BF (84.0 ± 11.55 min) as compared to group B (68.5 ± 8.5 min) (p<0.001). Time for great toe sensations was also increased in group BF (174.0 ± 24.6 min) as compared to group B (131.3 ± 17.16 min) (p<0.001) (Table 2, Figure 2). Duration of effective analgesia was significantly more in group BF (239.0 ± 30.74 min) as compared to group B (158.0 ± 17.49 min) (p<0.001) (Table 2, Figure 3).

In group BF, 30% patients experienced side effects as compared to 33.3% in group B which is non-significant difference (p>0.05). The incidence of nausea and vomiting was less in group BF as compared to group B. The incidence of shivering was also less (0%) in group BF as compared to group B (13.3%). Pruritus was seen in 6 (20%) patients in group BF and was not distressing

Table 5: Incidence of side effects

Side effects	Groups*	
	BF Cases (%)	B Cases (%)
Nausea	1 (3.33%)	3 (10.0%)
Vomiting	1 (3.33%)	2 (6.66%)
Bradycardia	Nil	Nil
Hypotension requiring treatment	2 (6.66%)	3 (10%)
Respiratory depression	Nil	Nil
Pruritus	6 (20.0%)	Nil
Shivering	Nil	4 (13.33%)
Total patients having side effects.	9 (30.0%)	10 (33.3%)
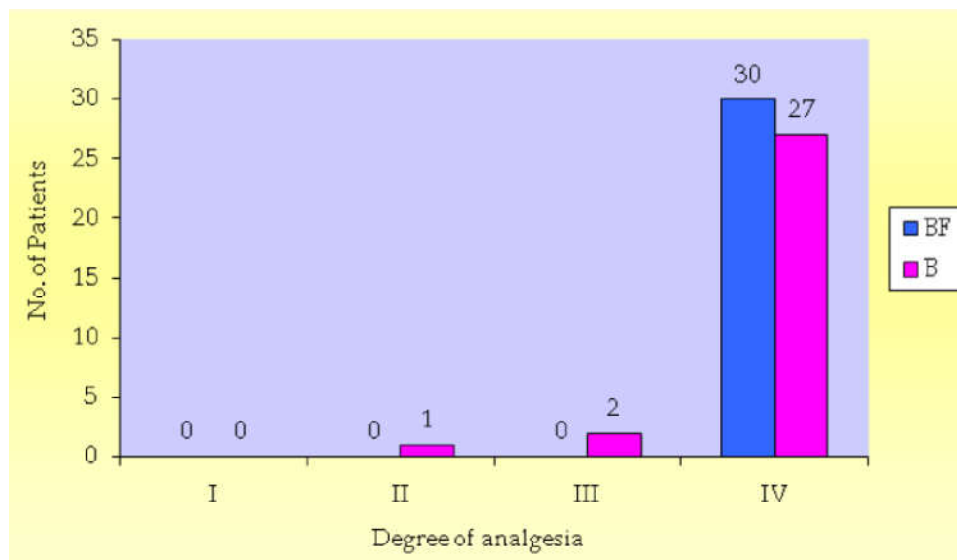
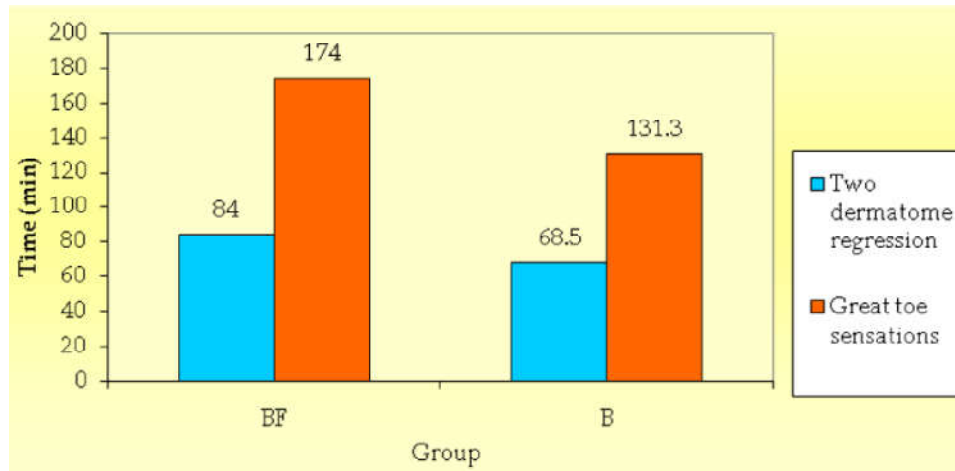**Fig. 1:** Degree of analgesia
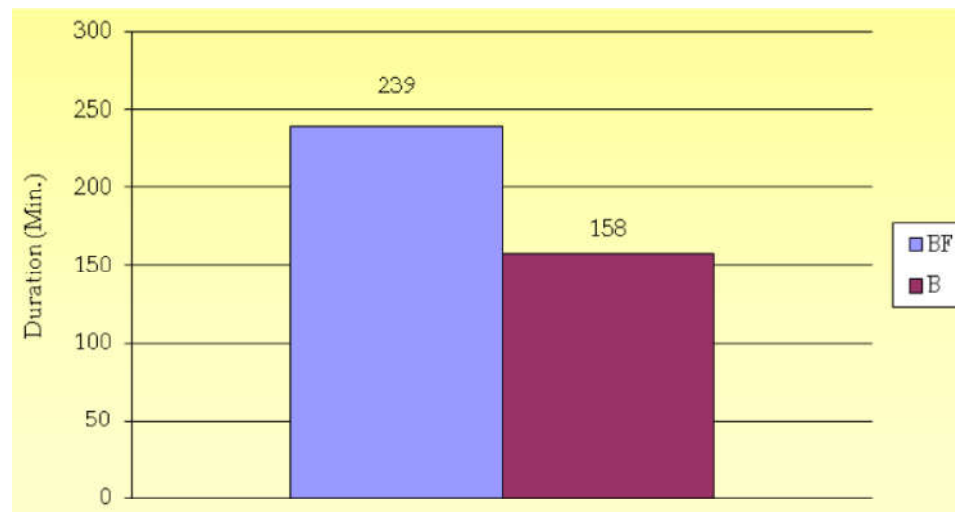
Fig. 2: Sensory recovery (Mean)

Fig. 3: Duration fo effective analgesia

and did not require any treatment. There was no evidence of respiratory depression in both groups. Three patients in group B and 2 patients in group BF require treatment for hypotension. There was no evidence of bradycardia in both groups. There was not a single case suggestive of neurotoxicity in present study (Table 5).

Discussion

Spinal anaesthesia has been proven to be the safest anaesthesia technique used for lower extremity surgeries [4]. Choice of anesthetic and analgesic has an important role in major orthopedic surgeries for both intraoperative and postoperative outcome [5]. Neuraxial opioids act at the mu receptors present in substantia gelatinosa of spinal cord to give analgesic effect and devoid of sympathetic nervous system denervation, skeletal muscle weakness or loss of proprioception [3].

Fentanyl 25 μg along with low dose bupivacaine gives stable intraoperative hemodynamics and good postoperative analgesia [10]. There is synergistic potentiating effect of fentanyl on bupivacaine in spinal anaesthesia [11]. Standard recommended dose of 0.5% Hyperbaric bupivacaine is 15 mg in lower limb surgeries which achieve T10 level of spinal anaesthesia [3].

In our study, we added 25 mcg fentanyl, a highly lipophilic opioid to 0.5% hyperbaric bupivacaine intrathecally. We observed that onset of sensory analgesia was within 70 sec. in most of the patients in both groups and it was not statistically significant (p>0.05) (Table 2). Similar to our study, Akanmu ON et al. [4], in their 60 patients undergoing elective open reduction and internal fixation of lower limb fractures, studied that onset of sensory block was not changed after addition of fentanyl to bupivacaine intrathecally. Mehta S et al. [3] in their 60 elderly patients undergoing elective orthopedic

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lower limb surgeries under spinal anaesthesia observed that there was delay in onset of adequate block in patients receiveing 25 mcg fentanyl along with 10 mg bupivacaine (128 ± 8.3 sec) as compared to patients receiving only 15 mg bupivacaine intrathecally (95 ± 10.32 sec). Addition of fentanyl reduces the pH of hyperbaric bupivacaine. This may be reason for delay in onset of adequate block which is not similar to our study.

In the present study, addition of fentanyl to bupivacaine did not change the height of the block (T_6 - T_{10}). Time required to reach the maximum level of analgesia was 5-10 min in both groups (p>0.05) (Table 2). Akanmu ON et al. [4], Kuusniemi et al. [8] and Biswas et al. [12] also found that there was no change in the maximum level of sensory block and no significant difference in time required to reach maximum level of analgesia when fentanyl was added to bupivacaine. Bano et al. [13], found that time to achieve highest sensory level was significantly shorter when 12.5 μg intrathecal fentanyl added to 0.75% bupivacaine 1.5 ml which is not similar to our study.

In the present study, all patients in group BF had excellent sensory analgesia (Grade IV). Two patients in group B had minimal discomfort and one patient require analgesic dose of ketamine because surgery was prolonged and regression of sensory block took place (Figure 1). Biswas et al. [12], found that 7 (35%) patients in group A who received 2 ml of 0.5% bupivacaine and no patient in group B who received 0.25 ml (12.5 μg) fentanyl with 2 ml of 0.5% bupivacaine complained of discomfort in intraoperative period. Siddik- Sayyid SM et al. [14] investigated that supplementation of spinal bupivacaine anaesthesia with intrathecal fentanyl for cesarean delivery provided better quality of anaesthesia.

In the present study, there was insignificant difference in both groups with respect to onset of motor blockade (Table 2). All patients in both groups had complete motor blockade. Similar to our study, Akanmu ON et al. [4], Khanna MS and Sing IKJP [6] and Biswas et al. [12] in their study observed that there was no difference in the time of onset of motor block when intrathecal fentanyl was added to bupivacaine which was similar to our study.

In the present study, significantly more patients in group BF were sleepy but easily arousable when compared with group B (Table 3). Bogra et al. 11, found that no intraoperative sedation in patients undergoing caesarean section receiving intrathecal bupivacaine only whereas 75-90% of parturients with fentanyl combination were drowsy but arousable.

In the present study, there were insignificant variations in the intraoperative pulse rate in both groups. No case of bradycardia was recorded (P>0.05). The predominant and usual effect of opioid on heart rate is to produce bradycardia resulting from stimulation of the central vagal nucleus [15]. Ben David et al. [16] investigated that baseline heart rate in patients for surgical repair of hip fracture receiving bupivacaine 4 mg plus fentanyl 20 μg was 88 ± 12 per min. as compared to patients receiving only bupivacaine 10 mg i.e. 90 ± 13 per min. No significant difference was found.

In the present study, the extent of fall in blood pressure after giving spinal anaesthesia was similar in both the groups (p>0.05) irrespective of preloading with 500 ml Ringer lactate. Hemodynamic status is not altered by the addition of fentanyl. Kim SY et al. [10] and Unal D et al. [17] observed that Fentanyl 20 μg with bupivacaine 4mg intrathecally provides spinal anesthesia with less hypotension. Mehta S et al. [3] observed that incidence of hypotension and use of vasopressors was much higher in bupivacaine group and was found to be statistically significant which is not similar to our study.

In the present study, the extent of fall of respiratory rate was more in group BF (p<0.05) upto 2 hours. However no case of respiratory depression was observed. The respiratory rate at the end of 3 hours was similar in both groups (p>0.05) (Table 4). Risk factors for respiratory depression are large doses, concomitant use of additional opioids and sedatives, and age more than 65 yr [18]. Akanmu ON et al. [4] and Mehta S et al. [3] in their study also observed that there was no any case of respiratory depression with use of intrathecal fentanyl along with bupivacaine which was similar to our study.

In the present study there was no significant difference in intraoperative and immediate postoperative SpO_2 in both groups (p>0.05). We have not given premedication and intraoperative sedation. Khanna M.S. and Singh IKJP [6], studied that addition of fentanyl to bupivacaine intrathecally results in fall in SpO_2 which was not similar to our study because their patients were premedicated with diazepam (5 mg orally) and received midazolam (1 mg increments) for intraoperative sedation which results in interaction of fentanyl and benzodiazepines on respiration.

In the present study, there was no significant difference in both groups with respect to motor

recovery (Table 2) (p >0.05). Similar to our study, Akanmu ON et al. [4] and Khanna M.S. and Singh IKJP [6] in their study observed that there was no prolongation of recovery of motor block with addition of intrathecal fentanyl to bupivacaine.

In the present study, time for 2 dermatomal regression was increased in group BF (p<0.001) as well time for complete recovery (return of pinprick sensation at great toe) was also increased in group BF (p<0.001) (Table 2, Figure 2). Goel et al. [19], studied the effect of different doses of fentanyl 7.5 μg, 10 μg, 12.5 μg added to 0.17%, 5 mg bupivacaine for day case surgery. They found that the time to two segment regression and S2 regression was significantly longer with 12.5 μg intrathecal fentanyl (p<0.01) than with the 7.5 μg and 10 μg fentanyl. Techanivate et al. [20], found that patients undergoing appendicectomy under spinal anaeshesia, number of segments regressed at 60 min are '0' for those receiving 4 ml 0.5% bupivacaine plus 20 μg fentanyl as compared to '2' segment regression for patients receiving 4 ml 0.5% bupivacaine, there was significant difference (p=0.007).

In the present study, the duration of analgesia was prolonged from 158 ± 17.49 min. to 239 ± 30.74 min. with addition of 25 μg fentanyl (p<0.001) (Table 2, Figure 3). Stocks GM et al. [21] investigated dose dependent increase in spinal analgesia with increasing intrathecal fentanyl. Akanmu ON et al. [4], Khanna M.S. and Singh IKJP [6], Biswas et al. (2002) [12] and Techanivate et al. [20] also found that there was prolonged effective analgesia when intrathecal fentanyl added to bupivacaine. Different from our study, Mehta S et al. [3] observed that total duration of sensory block was longer in patients receiving intrathecal bupivacaine only (227.6 ± 9.8 min) than intrathecal bupivacaine plus fentanyl (211.5 ± 14.2 min), however in their study dose of bupivacaine in fentanyl group is much lower which resulted in lower duration of sensory block.

In our study, there was insignificant difference in both groups (p>0.05) with respect to the incidence of side effects (Table 5). Shivering was seen in 4 patients in group B. Pruritus was seen in 6 patients in group BF. Patients in group BF have significantly less intraoperative nausea and vomiting compared to group B. Pruritus induced by neuraxial opioids is likely due to interaction with opioid receptors in the trigeminal nucleus and naloxone is effective in relieving pruritus [22]. Manullang TR et al. [23] and Obara M et al. [24] found that requirement of intraoperative antiemetics were less in the patients undergoing cesarean section who received intrathecal fentanyl with 0.5% hyperbaric bupivacaine as compared to those who receiving 0.5% hyperbaric bupivacaine only. Techanivate et al. [20] also found that 7 (35%) patients who had undergone appendicectomy suffered from shivering who had received 4 ml 0.5% bupivacaine with 20 μg fentanyl intrathecally as compared to 14 (70%) patients who had received 4 ml 0.5% bupivacaine (p=0.023). Patra et al. [25] observed that in patients, who had undergone endoscopic urologic surgeries, no patient had pruritus who received only 10 mg bupivacaine intrathecally, 14 patients had pruritus who received 7.5 mg bupivacaine and 25 μg fentanyl and 9 patients had pruritus who received 5 mg bupivacaine and 25 μg fentanyl.

Conclusion

We concluded that use of 25 μg fentanyl intrathecally along with 0.5% hyperbaric bupivacaine in patients with lower limb surgeries is benefitial as it gives excellent intraoperative analgesia, sedation and prolonged postoperative analgesia inspite of mild pruritus. Hemodynamic status is not altered by the addition of fentanyl.

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