Original Research Article

Comparative study of intrathecal fentanyl with bupivacaine and fentanyl midazolam with bupivacaine in spinal anaesthesia

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ABSTRACT

Introduction: Spinal anaesthesia is preferred for lower abdominal and lower limb surgeries. Bupivacaine is the most popular local anaesthetic for subarachnoid blockade because of less neurotoxicity. Intrathecal bupivacaine alone may be insufficient to provide prolonged post-operative analgesia, even with high sensory block. So, various adjuvants are used like ketamine, midazolam, clonidine, opioids, neostigmine etc. to prolong the effect of local anaesthetic.

Aims: To compare the effect of intrathecal fentanyl and fentanyl-midazolam combination with hyperbaric bupivacaine for quality of anaesthesia and post-operative analgesia.

Materials and Methods: Study was conducted on 60 patients aged 20-60 years and were randomly divided into two groups of 30 patients each. Group A received 0.5% bupivacaine heavy 3 ml (15mg) + fentanyl 0.5 ml (25μg) and Group B 0.5% bupivacaine heavy 2.8 ml (14mg) +fentanyl 0.5 ml (25 μg) + midazolam 0.2 ml (1mg). Total volume is 3.5 ml in both groups. They were assessed for quality of block, post-operative analgesia and perioperative complications.

Statistical Analysis used: Data were compared using t- test(unpaired). The level of significance used was p<0.05.

Results: There was a significant difference in onset and duration of sensory and motor block, time to administer first rescue analgesia in group B.

Conclusion: Addition of midazolam (1mg) to fentanyl with bupivacaine intrathecally gives better onset & duration of sensory & motor blockade and longer duration of post-operative analgesia.

1. Introduction

Spinal anaesthesia was first performed by Corning in 1885 and first used deliberately by Bier in 1898. Glucose containing solution for spinal anaesthesia was introduced by Barker in 1907. Since then hyperbaric solutions are in use for spinal anaesthesia.

Spinal anaesthesia is preferred over general anaesthesia for lower abdominal and lower limb surgeries as it is-

1. Simple to perform and economical.
2. Produces rapid onset of anaesthesia, analgesia with good muscle relaxation.
3. Causes better suppression of neuroendocrine stress response.
4. Prevent risk of aspiration of gastric contents.

All these advantages of spinal anaesthesia are offset by complain of post-operative pain when effect of local anaesthesia wears off due to relatively shorter duration of action of local anaesthetic drug.[1]

Concept of post-operative analgesia is gaining importance in elective, emergency and day care surgeries due to number of advantages:

1. Minimal psychological stress.
2. Improved haemodynamic stability and respiration.

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3. Relief from sympathetic over activity and prevention of peripheral or central sensitization.
4. Reduced post-operative complication like DVT.$
5. arly return to routine activities.[2]

Bupivacaine is the most popular local anaesthetic drug for subarachnoid blockade because of less neurotoxicity. However, intrathecal bupivacaine alone may be insufficient to provide prolonged post-operative analgesia, even with high sensory block. So, various adjuvants are used like ketamine, midazolam, clonidine, opioids, neostigmine etc.[3–5] to prolong the effect of local anaesthetic drug. Their site of action is different from that of local anaesthetic agent.

Fentanyl, a lipophilic opioid, after intrathecal administration diffuses into epidural space and subsequently into the plasma, suggesting that it acts not only through spinal opioid receptors but also systemically. Fentanyl added to bupivacaine intrathecally provides better surgical anaesthesia and increased reliability of block than intrathecal bupivacaine alone.[6]

In the quest for a newer, safer local anaesthetic additive, researchers have found that benzodiazepines lead to segmental block of nociception without any adverse effect on cardiovascular and respiratory system. There are benzodiazepine receptors throughout the nervous system, including the spinal cord, which show connections with gamma-aminobutyric acid (GABA) receptors. Intrathecal midazolam by binding to benzodiazepine receptors in the spinal cord increases the threshold for pain.[7,8]

So far, the literature reviewed several clinical studies have been conducted on intrathecal use of fentanyl and midazolam in various lower limb and abdominal surgeries. We conducted this study to compare the intrathecal fentanyl and fentanyl and midazolam combination with hyperbaric bupivacaine for quality of anaesthesia and post-operative analgesia in patients undergoing lower abdominal and lower limb surgeries.

2. Materials and Methods

The sample size was calculated using standard computer program which computed that approximately 26-30 patients should be included in each group with alpha error of 0.05 with power 80% and 95% confidence limit. So, final sample size was determined to retain 30 patients in each group for better validation of results.

Study was conducted on 60 patients aged 20-60 years, of either sex, ASA grade 1 or 2 posted for lower limb and lower abdominal surgeries after taking approval of the ethical committee.

All patients were randomly divided into two groups of 30 patients each.

Group A: 0.5% bupivacaine heavy 3 ml (15mg) + fentanyl 0.5 ml (25μg)

Group B: 0.5% bupivacaine heavy 2.8 ml (14mg) +fentanyl 0.5 ml (25 μg) + midazolam 0.2 ml (1mg)

Total volume of drug is 3.5 ml in both groups.

All the patients were evaluated preoperatively and those having history of allergy to drug & having any spinal deformity or infection on back, psychiatric illness, head injury was excluded from the study. Patients using any drug that modifies pain perception & on anticoagulants were excluded from study.

Detailed preoperative history of present illness & past history of illness/surgery/anaesthesia was taken & systemic and general examination was done on the previous day of surgery.

Back of patients were examined to rule out any spinal deformity & infection at local site.

Laboratory investigations viz, complete blood count, blood sugar, renal function test, liver function test, coagulation profile (PT-INR, APTT, BT & CT) and serum electrolytes were reviewed. Chest X-ray and Electrocardiogram were reviewed.

Procedure & VAS score were explained to the patients.

Written informed consent was taken from the patient and his/her relatives.

Patients were kept Nil by mouth for 6 hours prior to surgery.

2.1. In the operation theatre

1. Large bore intravenous line was taken and patients were preloaded with 10ml/ kg of Ringer's lactate solution.
2. Pulse oximeter, non-invasive blood pressure and ECG monitors were attached and base line readings were taken.
3. No narcotic or sedative premedication was given to any patient.

2.2. Equipment

1. An autoclaved tray consisting of adequate cotton swabs with swab holding forceps.
2. Antiseptic solutions and drapes.
3. Disposable 23G lumbar puncture needle.
4. Disposable 5 cc syringe, 2 cc syringe, 22G hypodermic needle.
5. An ampoule of hyperbaric bupivacaine 0.5%, an ampoule of preservative free midazolam & fentanyl.
6. An Emergency crash cart with all cardiopulmonary resuscitation equipments was kept ready.

2.3. Technique

1. Under all strict aseptic and antiseptic precaution, with patient in sitting/left lateral position, lumbar puncture was performed at L3-L4 intervertebral space with 23G Quincke needle and one of the selected drugs was

given after clear and free flow of CSF at the rate of 0.2 ml/second. Time of injection of drug was noted & patients were immediately turned to spine position.

2. Pulse, BP, RR and SpO_2 were recorded every 5 minutes till first half an hour then every 15 minutes till 1st hour & then every half an hour till the end of surgery.

2.4. Evaluation

2.4.1. Sensory block

1. Onset of sensory blockade was noted as loss of pinprick sensation from the time of subarachnoid injection.
2. Level of highest sensory dermatome was noted & was up to T10.

2.4.2. Motor block

1. Motor blockade was assessed by Bromage scale.
2. Onset of motor blockade (Time required to produce grade 3 motor block).
3. Time to regression of motor blockade score 3 to score 0 was noted.

Patients were assessed for degree of alertness/sedation & scoring was done as follows. (Table 2)

After establishment of adequate level of block, surgery was started and time of beginning and duration of surgery were noted.

Intravenous fluids were administered depending on the requirement of the patient.

Patients were given O_2 by ventimask at 4 L/min.

No sedative or analgesic medication was used during perioperative period.

Patients were observed for any perioperative complications like bradycardia, hypotension, sedation, shivering, nausea, vomiting, pruritic, post dural puncture headache and respiratory depression and treated accordingly.

Hypotension was defined as decline in systolic blood pressure >20% from the baseline and treated with injection Mephentermine 6 mg i.v. and intravenous fluids.

Bradycardia was defined as heart rate < 60 beats/mins and treated with injection atropine 0.6 mg i.v.

Pruritis was treated by injection chlorpheniramine 22mg i.v.

Shivering was treated with 100% oxygen, warm fluids and adequate covering.

Patients were monitored postoperatively for every half an hour till 5 hours and then every 1 hour till 12 hours after giving spinal anaesthesia.

Patients were inquired frequently for the degree of pain they felt with the help of visual analogue scale (VAS) and the time for the demand for analgesia was noted.

VAS involves use of a 10cm line on a piece of white paper and it represents patient's opinion of degree of pain. It was explained to all patients preoperatively that one end of the line i.e. '0' marks "no pain" at all, while other end i.e. '10' represents "worst pain" patient ever felt. Patient was asked to rate the degree of pain by making a mark on the scale. Thus, the pain score was obtained by measuring the distance from the '0' end to the indicated mark.

1. Method of judging post-operative analgesia:
2. Visual Analog Scale [11]

No analgesic was given unless requested by the patient or VAS score ≥4. Time to first dose of rescue analgesic was noted & time for regression to S2 dermatome was noted.

3. Results

Statistical analysis was done using SPSS software. Data was expressed as mean, mean + SD and percentage. Data were compared using t- test(unpaired). The level of significance was kept at 5%.

Table 4 shows demographic data of all the patients of both groups, which were comparable (p>0.05) in respect to age, height, weight, and ASA grading.

Table 6 compares onset of sensory block & time from injection to highest sensory level and onset time to achieve score 3 motor block & time for regression of motor block from score 3 to 0.

There was significant difference in both the groups. (p <0.05)

It also compares time to administer first rescue analgesia & time for regression of sensory block to S2 dermatome. There was significant difference in both the groups. (p <0.05)

Table 6 compares peri-operative hemodynamic parameters of both groups. All data were clinically comparable as p>0.05.

The duration of surgery in both groups is 129.666 ± 25.33 mins and 131.5 ± 19.34 mins respectively and is comparable as p value is >0.05.

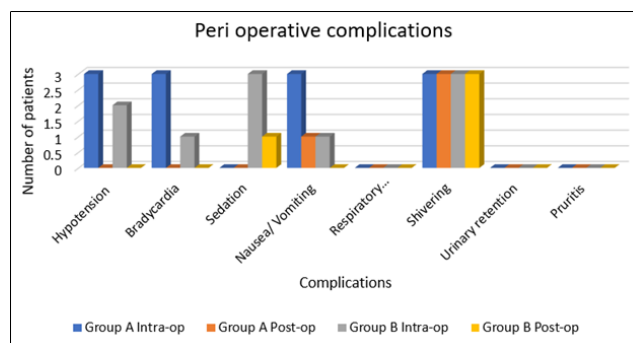**Fig. 1:** Peri-operative complications

Table 1: Bromage score [9]

Score	Criteria	Degree of block
0	Free movement of legs and feet with ability to raise extended legs	None
1	Inability to raise extended legs, knee flexion decreased but full flexion at ankle and feet present	33% (Partial)
2	Inability to raise legs or flex knees, flexion at ankle and feet present	66% (Partial)
3	Inability to raise legs, flex knees or ankle	Complete Paralysis

Table 2: Cherniksedation score (Criteria) [10]

Score	Criteria
5 (Alert)	Responds readily to name spoken in normal tone
4	Lethargic response to name spoken in normal tone
3	Responds only after name is called loudly and/or repeatedly
2	Responds only after mild prodding and/or shaking
1 (Asleep)	Does not respond after mild prodding and/or shaking

Table 3:

10	9	8	7	6	5	4	3	2	1	0
Worst Pain, Annoying		Severe Pain			Uncomfortable		Mild Pain		No Pain	

Table 4: Demographic data (Mean ± SD)

	Group A (n=30)	Group B (n=30)
Age (Years)	41.33 ± 7.84	43.766 ± 7.06
Weight (kg)	62.666 ± 3.16	63.1 ± 2.94
Height (cm)	164.63 ± 7.088	165.03 ± 6.04
ASA I: II	19: 11	21: 9

Table 5: Characteristics of sensory and motor block and total duration of analgesia in minutes (Mean±SD):

	Group A	Group B	p value
Onset of sensory blockade (min)	2.46 ± 0.68	2.13 ± 0.434	0.0276
Time from injection to highest sensory level (min)	4.53 ± 0.73	4.16 ± 0.64	0.0441
Onset time to achieve score 3 motor block (min)	7.73 ± 0.69	7.4 ± 0.49	0.036
Time for regression of motor block from score 3 to score 0 (min)	172.33 ± 26.38	193.03 ± 11.36	0.00021
Time for regression of sensory block to S2 dermatome (min)	214.16 ± 20.26	232.66 ± 24.90	0.0025
Time to administer first rescue analgesia (min)	380.66 ± 28.24	425.166 ± 51.65	0.00011

Intraoperative: Hypotension and bradycardia were more in Group A (10%) than Group B (6.66% and 3.33%). Nausea/Vomiting was seen more with Group A (10%). Shivering was seen equally (10%) in both groups. Sedation was seen only in Group B (10%).

Postoperative: Nausea/Vomiting was seen only in Group A (3.3%). Sedation was seen only in Group B (3.3%). Shivering was seen equally (10%) in both groups.

Respiratory depression, urinary retention and pruritus were not seen in any of the groups peri-operatively.

4. Discussion

Effective treatment of pain represents an important component of postoperative recovery. It serves to blunt autonomic, somatic, and endocrine reflexes with a resultant potential decrease in perioperative morbidity. Despite advances in treatment of postoperative pain, many patients still suffer from pain after surgery, probably due to difficulties in balancing postoperative analgesia with acceptable side effects.

Lower abdominal and limb surgeries are performed under spinal anaesthesia, as it is easy to perform, single shot technique when compared to epidural and general

Table 6: Peri-operative haemodynamic parameters

Duration (min)	Group A				Group B			
	Heart rate (Beats/min)	BP (SBP/DBP mm of Hg)	RR (per min)	SPO2(%)	Heart rate (Beats/min)	BP (SBP/DBP mm of Hg)	RR (per min)	SPO2(%)
0 min (pre - operative)	83.86	121.36/ 81.4	14.1	98.46	83.76	121.2/ 77.9	14.26	98.13
5 min (intra – operative)	82.73	123.86/ 80.63	14.1	98.26	83.73	113.4/ 77.23	14.43	98.43
10 min	80.4	121.36/ 80.8	13.9	98.36	80.56	116.93/ 73.4	14.33	98.26
15 min	81	126/ 78.2	14.1	98.46	81.43	122.06/75.73	14.33	98.36
20 min	81.4	121.03/ 77.66	13.93	98.5	81.16	117.73/74.73	14.23	98.26
25 min	81.5	121.23/ 72.26	14.03	98.6	82.93	117.2/79.5	14.13	98.26
30 min	81.06	114.93/ 70.53	14.36	98.33	81.93	118.2/72.33	14.16	98.3
45 min	81.3	110.6/ 68.13	14.3	98.5	81.33	113.13/77.8	14.33	98.4
60 min	80.3	110.4/ 69.86	14.1	98.5	80.86	116.73/72.6	14.03	98.2
90 min	80	109/ 71.03	14.4	98.4	80.53	110.8/78.63	14.2	98.26
120 min	81.03	111.46/ 71.73	14.4	98.43	81.73	114.46/78.93	14.2	98.43
150 min	85.63	111.93/ 71.8	14.03	98.46	83.23	114.73/70.66	13.66	98.33
180 min (post – operative)	83.03	115.86/ 75.53	14.26	98.23	83.46	118.13/74.9	14.33	98.26
210 min	84.63	118.5/ 76.26	14.4	98.4	82.96	117.06/73.6	13.86	98.4
240 min	81.66	120.53/ 76.63	14.3	98.43	83.66	123.2/74.46	14.06	98.36
270 min	81.7	119.96/ 75.73	13.96	98.43	81.6	116.96/78.2	14.26	98.23
300 min	83.13	121.26/ 78.2	14.1	98.5	81.13	117.73/75.13	14	98.5
360 min	79.96	121.86/ 77.73	14.06	98.5	80.7	120.63/75.13	13.96	98.23
420 min	85.93	122.6/ 78.43	14.3	98.46	83	119.26/79.26	14.1	98.46
480 min	85.06	122.43/ 78.36	14.13	98.3	82.46	121.46/78.26	13.73	98.33
540 min	84.13	123.3/ 82.6	14.2	98.23	81.6	118.93/75.8	14	98.16
600 min	81.36	124.46/ 82.93	14.16	98.53	82.53	124.73/71.26	13.76	98.26
660 min	81.9	118.36/ 80.83	13.9	98.53	83.9	121.6/78.56	13.7	98.26
720 min	82.26	125.7/ 83.1	14	98.46	80.2	113.26/75.7	13.63	98.33

Table 7: Sedation score

Sedation score	Group A	Group B
5	30	27
4	0	3
3	0	0
2	0	0
1	0	0

Sedation score was comparable in both groups($p > 0.05$)

anaesthesia. But its main drawback is that the analgesia is of limited duration. Hence, additives which cause the prolongation of the duration of motor as well as sensory block will be beneficial in reducing the morbidity of the patients in the postoperative period.

Several studies suggest midazolam as an effective adjuvant to prolong the duration of the subarachnoid block and spinal analgesia with better hemodynamic stability.[12,13] Many studies showed that there is synergism between intrathecal midazolam with local anaesthetic agents.[8,14–22]

The selection of dose of midazolam of 1 mg is based on the fact of several previous studies which suggest that duration of analgesia could be prolonged by 1 mg midazolam without additional side effects.[8,16–19,22]

Fentanyl is a synthetic lipophilic μ receptor agonist opioid with a rapid onset of action and unlike morphine, has fewer tendencies to migrate rostrally to the fourth ventricle in sufficient concentration to cause delayed respiratory depression.[23] It exerts its action through opioids receptors on the dorsal horn of spinal cord. It may have supraspinal spread and action. Studies[24] on animals suggested a synergism between opioids and local anaesthetic agents, they showed specific enhancement by opioids on the effects of intrathecal local anaesthetic agent on nociceptive afferent

but not on sympathetic efferent pathways.

Late rostral spread with small dose intrathecal fentanyl is less and studied by Harbhej Singh et al.[25] and Dalhgren G et al.[26] and they concluded that 25 mcg fentanyl is the safest dose. Hence, we have chosen dose of fentanyl 25 mcg.

In this study the demographic characteristics (age, sex, weight, height) and ASA status were not statistically significant between both groups of 30 patients each. (p>0.05)

All the patients in both groups were comparable in terms of haemodynamics perioperatively and sedation. (p>0.05)

In this study, there was statistically significant difference regarding onset of sensory block (Group A-2.46 ± 0.68 min, Group B-2.13 ± 0.434 min) and time from injection to highest sensory level (Group A- 4.53± 0.73 min, Group B-4.16 ± 0.64 min) between the two groups(p<0.05), onset of motor block (Group A-4.25 ± 0.41 min, Group B-4.05 ± 0.30 min) and time for regression of motor block (Group A- 172.33 ± 26.38 min), Group B-193.03 ± 11.36 min) between the two groups(p<0.05), time for regression of sensory block to S_2 (Group A- 214.16 ± 20.26 min), Group B-232.66 ± 24.90 min) between the two groups(p<0.05), time to first rescue analgesia (Group A- 380.66 ± 28.24 min), Group B-425.166 ± 51.65 min) between the two groups(p<0.05).

There were no significant side effects in both groups in our study.

B.N. Biswas et al.[27] in 2002 studied intrathecal fentanyl 12.5μg with bupivacaine and concluded that intrathecal fentanyl with bupivacaine prolongs the duration of analgesia (248±11.76 min) prolongs the duration of analgesia as compared to bupivacaine (150±10.48 min), with pruritis in 15% cases without any other significant side effects.

Ebied et al.[28] in 2015 assess the effect of intrathecal midazolam with bupivacaine-fentanyl in elderly patients undergoing endourologic procedures and concluded that adjuvant intrathecal midazolam resulted in intraoperative hemodynamic stability and safely potentiates postoperative analgesic effect of bupivacaine-fentanyl (210.9 ± 54.5 min) in spinal anaesthesia as compared to bupivacaine-fentanyl combination (150.8 ±41.9 min).

Gupta Anshu et al.[29] in 2015 conducted a study which was designed to study the efficacy of intrathecal midazolam in potentiating the analgesic duration along with sensorimotor blockade and concluded that it increases the onset of sensory block in fentanyl(25μg) & midazolam(1mg) in combination with bupivacaine (4.04 ± 0.86 min) as compared to fentanyl with bupivacaine (4.54 ± 0.93 min), increases the onset of motor block in fentanyl(25μg) & midazolam(1mg) in combination with bupivacaine (7.64±0.31 min) as compared to fentanyl with bupivacaine (7.68±0.46 min) as well as duration of motor block in fentanyl & midazolam with bupivacaine(201.2±11.57 min) as compared

to fentanyl with bupivacaine(192.2±21.17 min) and without any haemodynamic compromise with significant potentiation of the duration of analgesia with the addition of intrathecal midazolam to the bupivacaine fentanyl mixture (470.68±37.51 min) as compared to bupivacaine fentanyl combination (420.8±32.39 min).

Kurmanadh et al.[30] in 2017 compared the effects of intrathecal midazolam (1 mg) and fentanyl (25 micrograms) as additives to intrathecal hyperbaric bupivacaine (0.5%) for spinal anaesthesia and concluded that intrathecal combination of bupivacaine and midazolam (223.6 ± 35.5 sec) offers same advantages in terms of onset of sensory blockade with fewer side effects as compared to bupivacaine and fentanyl (227.9 ± 25.6 sec).

Poonam Motiani et al.[31] in 2011 studied intrathecal fentanyl(25μg) with bupivacaine versus sufentanil(5μg) with bupivacaine and plain bupivacaine and concluded that addition of either sufentanil or fentanyl increases the onset of sensory block [sulfentanil (4.0 ± 1.5 min), fentanyl (4.7 ± 1.7 min), plain bupivacaine(7.2± 2.1 min)], does not develop any change in heart rate or blood pressure during intraoperative period, prolonged duration of sensory block [sufentanil (5 μg) (150.2 ± 21.8 min) and fentanyl (25 μg) (143.2 ± 17.3 min)] as compared to bupivacaine alone (116.6 ±13.7 min).

Syed Ali Aasim et al.[32] in 2015 compared the analgesic efficacy and safety of intrathecal midazolam(1mg) and fentanyl (25 μg) as an additive agent to bupivacaine for lower abdominal elective surgeries and concluded that midazolam is as effective as fentanyl in prolonging the durations of both sensory block and analgesia with less side effects like hypoxia, hypotension, bradycardia or respiratory depression. Six patients (30%) complained of pruritus in the fentanyl group while no one in other (p <0.01).

Agrawal N et al.[14] in 2005 compared efficacy of intrathecal bupivacaine with intrathecal bupivacaine midazolam combination for post-operative pain relief and concluded that intrathecal midazolam added to bupivacaine prolongs duration of postoperative analgesia without prolonging the duration of dermatomal sensory block with no side effects. Time to first rescue analgesia in BM group (17.56± 8.87 hours) was significantly longer than that in B group (4±3.5 hours) (P<0.0001).

Anirban et al.[17] in 2013 concluded that the addition of 2mg preservative free midazolam to 0.5% hyperbaric bupivacaine for subarachnoid block in infraumbilical surgery prolongs the duration of effective analgesia as compared to bupivacaine alone and delays the need for postoperative rescue analgesics without having any sedative effect.

M.S. Khanna et al.[12] in 2002 compared plain bupivacaine versus bupivacaine with fentanyl in geriatric patients and concluded that intrathecal fentanyl(25μg) prolongs sensory block (219.65±7.02 min), duration of

analgesia, decreases post-operative pain with minimal haemodynamic alterations.

M.H. Kim et al.[19] in 2001 evaluated the post-operative analgesic effects of intrathecal midazolam with bupivacaine following haemorrhoidectomy and concluded that time to first rescue analgesia was in bupivacaine-midazolam(1mg) (6.03hrs) and bupivacaine-midazolam(2mg) (8.37hrs) was significantly longer than that of control group of bupivacaine (3.99 hrs).

Rajni Gupta et al.[13] in 2011 evaluated the onset and duration of sensory and motor block, hemodynamic effect, postoperative analgesia, and adverse effects of dexmedetomidine (5 μg) or fentanyl (25 μg) given intrathecally with hyperbaric 0.5% bupivacaine & concluded that intrathecal dexmedetomidine is associated with prolonged motor block (421 ±21 min) as compared to fentanyl (149.3±18.2 min). However, there was no significant difference in onset of motor block.

Farhad Saffari et al.[20] in 2012 demonstrated the possible effect of intrathecal midazolam(1mg) compared with bupivacaine as adjuvants in spinal anaesthesia in chronic opium abusers and concluded that it increases the duration of sensory block (140 ± 22 min) as compared to intrathecal fentanyl with bupivacaine (107 ± 18 min).

Yegin et al.[22] in 2004 evaluated the analgesic and sedative effects of intrathecal 2mg preservative free midazolam in perianal surgery under spinal anaesthesia and concluded that the addition of bupivacaine produces a more effective and longer analgesia with mild sedative effect.

5. Conclusion

In conclusion, though addition of fentanyl (25μg) to bupivacaine gives prolonged onset and duration of sensory & motor blockade and duration of analgesia but addition of midazolam (1mg) to this combination gives better onset & duration of sensory & motor blockade and longer duration of post-operative analgesia with comparable haemodynamic in both groups and without any side effects. So, addition of intrathecal fentanyl-midazolam to bupivacaine is a better choice.

6. Source of Funding

None.

7. Conflict of Interest

The authors declare that there is no conflict of interest.

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