Original Research Article

Comparative study of intrathecal bupivacaine with buprenorphine and bupivacaine with tramadol

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Abstract

Background: Intrathecal local anaesthetic provide adequate sensory and motor block necessary for all infra umbilical surgeries. **Aim**: The study is to compare Buprenorphine and Tramadol in their efficacy as adjuvants to subarachnoid block. **Materials and Methods**: A total of 80 patients of ASA Grade 1 and 2, between the age group of 18-65 years who were under going lower limb and lower abdominal (Below umbilical) surgeries included in the study. They were randomized in to two groups group B and group T which were given 3ml of 0.5% hyperbaric bupivacaine+60mcg of buprenorphine and 3ml of 0.5% hyperbaric bupivacaine+25mg of tramadol respectively. **Results**: Time of onset of sensory block was tested with pinprick which was not significantly differed in both the groups but duration of sensory blockade , motor block and duration of analgesia were more with buprenorphine than tramadol. Heart rate, blood pressure, respiratory rate, saturation all were comparable in both the groups throughout the intra operative period. Intraoperatively sedation score was assessed using Modified Ramsay Sedation Scale and there was higher incidence of sedation with Buprenorphine group. Nausea and vomiting were significantly higher in group T, with p-value<0.001. **Conclusion:** Buprenorphine is better choice as Intrathecal adjuvant with Bupivacaine when compared with Tramadol.
Key Words: Buprenorphine, Tramadol, Bupivacaine.

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INTRODUCTION

Spinal anaesthesia is the most preferred regional anaesthesia technique as it is easy to perform, economical and produces rapid onset of anaesthesia and muscle relaxation. The aim of intrathecal local anaesthetic is to provide adequate sensory and motor block necessary for all infra umbilical surgeries. Hyperbaric bupivacaine is the most commonly used intra thecal local anaesthetic. Various adjuvant shave been added to bupivacaine HCl to shorten the onset of block and prolong the duration of block. Buprenorphine, a mu receptor partial agonist with low intrinsic activity, when given intrathecal, significantly prolongs the duration of spinal block. Tramadol a mu receptor agonist and weak kappa and delta receptor agonist which prolongs the duration of analgesia. In addition to mu receptor agonist effects tramadol also enhances spinal descending inhibitory pathways by inhibition of neuronal reuptake of norepinephrine and serotonin as well as presynaptic stimulation of serotonin release Therefore, the present study is performed to compare Buprenorphine and Tramadol in their efficacy as adjuvants to subarachnoid block.

MATERIALS AND METHODS

It is a prospective study done in total 80 patients in patients posted for major surgeries, below umbilical level at Osmania general hospital Hyderabad were chosen for the study.

Inclusion Criteria

- ASA physical status class I and II

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- Age between18–60 years of either sex.

Exclusion Criteria

- Emergency surgery
- Deformities of the spine
- Hypersensitivity to any of the drugs
- Contraindications to spinal anaesthesia, patient refusal, bleeding diathesis.

It is routine protocol followed in our hospital. So from all the patients we have chosen 80ASAI and II patients scheduled form major surgeries under spinal anaesthesia were chosen. Pre-anesthetic check-up was done one day prior to the surgery. Patients were evaluated for any systemic diseases and laboratory investigations recorded. The procedure of SAB was explained to the patients. The patients were educated about the use of visual analogue scale. Preparation of patients included period of overnight fasting. Patients were premediated with Tab. Rantac 150mg and Tab. Alprazolam 0.5mg H/S.

Procedure: Patients shifted to Operating table, Baseline vitals were recorded. I.V access was obtained on the forearm with No.18 G I.V cannula and all patients were preloaded with 15ml/Kg, Ringer's Lactate, 15minsbefore the surgery. Patients were randomly allocated in to groups. Under strict asepsis, using 23 G Quincke-babcock spinal needle, lumbar puncture was performed at L3-L4space. Group B received 3ml, 0.5% hyperbaric bupivacaine + Buprenorphine 60 mcg Group T received 3ml, 0.5% hyperbaric bupivacaine + Tramadol 25mg Intraoperatively pulse rate, non-invasive blood pressure, electro cardiogram, SpO2 was recorded, at0min, 2min, 4min, 8min,10min,15min, 30min, 45min, 60min and 90min. Time of onset of sensory block was noted using pinprick method, time of onset of motor block was noted. Motor block was assessed with Modified Bromage scale:

Bromage 0: the patient is able to move the hip, knee and ankle

Bromage 1: The patient is unable to move the hip but is able to move the knee and ankle.

Bromage 2: The patient is unable to move the hip and knee but able to move the ankle

Bromage 3: the patient is unable to move the hip, knee and ankle.

Modified Ramsay sedation scale was used for intraoperative sedation

1= agitated, restless

2= cooperative, tranquil

3= responds to verbal commands while sleeping

4= brisk response to glabellar tap or loud noise while sleeping

5= sluggish response to glabellar tap or loud noise while sleeping

6= no response to glabellar tap or loud noise while sleeping

Hypotension (>20%fall of baseline blood pressure) was treated with bolus dose of6mgephedrinei.v. Bradycardia (pulse rate<50bpm), was treated with 0.6 mg atropine i.v. Incidence of respiratory depression defined as respiratory rate less than 9/min and SpO2 less than 90% on room air, was noted. Side effects if any were noted. Postoperatively regression of the sensory block and the motor blockade to reach modified Bromage was noted. Pain was assessed using" Visual Analogue Scale" advocated by Revill and Robinsonin. It is linear scale, consists of 10 cm line anchored at one end by a label such as "No pain" and other end by" Worst pain unimaginable". Patient simply marks the line to indicate the pain intensity.

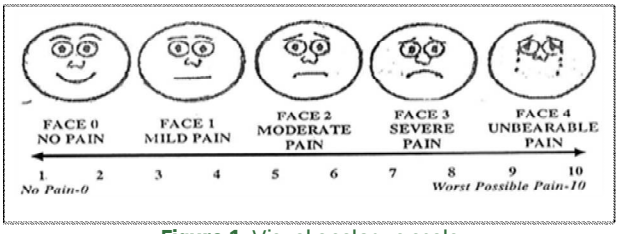

Figure 1: Visual analogue scale

Descriptive statistical has been carried out in the present study. Results on continuous measurements are presented on Mean ± SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5% level of significance. The following assumptions on data is made. Assumption:

1. Dependent variables should be normally distributed,
2. Samples drawn from the population should be random, Cases of the samples should be independent. Student test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. Chi-square/Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups. Statistical analysis was done by applying Chi-square test, Anova test and students 't' test to analyse the data, p value was determined.

   P<0.05 is significant, P<0.001 is highly significant.

RESULTS

In total 80 patients we equally distributed 40 males and 40 females.

Table 1: Demographic distribution of study groups

Parameter		Mean	SD	P-value
Age	Group-B	41.5	8.1	0.22
	Group-T	43.86	10.95	
Height	Group-B	155.5	5.85	0.92
	Group-T	155.66	5.16	
Weight	Group-B	57.16	9.68	0.66
	Group-T	58.12	12.35	

Above table shows that there is no statistical significance in age, height and weight characteristics among study groups [p-value>0.05]

Table 2: Comparison of variables in both groups

		N	Mean	SD	Pvalue
Time of onset of sensory block(min)	Group-B	40	3.22	0.6	0.051
	Group-T	40	3.3	0.832	
Time of sensory regression toS1(min)	Group-B	40	225.79	41.88	<0.0001
	Group-T	40	187.42	8.32	
Onset of motor block	Group-B	40	3.3	0.54	<0.0001
	Group-T	40	3.85	0.80	
Regression to bromage-0 (min)	Group-B	40	204.68	34.45	<0.0001
	Group-T	40	153.22	7.93	
Duration of analgesia	Group-B	40	293	33.7	<0.0001
	Group-T	40	168.34	10.81	

Time of onset of sensory block is higher in Group T with p value 0.052, which is statistically not significant. Time of sensory regression to S1is higher in Group B, with p<0.0001, which is statistically highly significant Meantime of onset of motor blockade is higher in Group T, with p<0.0001,which is statistically highly significant Meantime of regression to bromage-0 is higher in Group B, with p<0.0001,which is statistically highly significant Mean duration of analgesia is higher in Group B, with p<0.0001,which is statistically highly significant

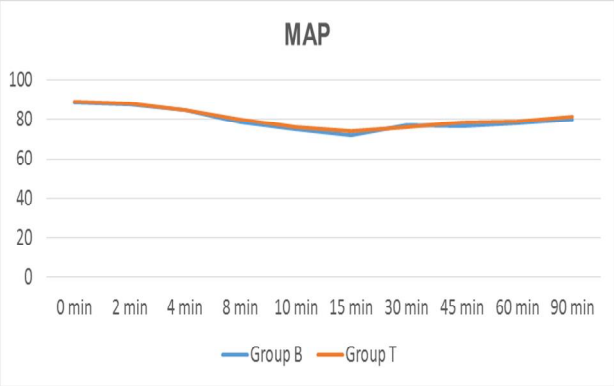

Figure 2: Variation of MAP in study groups

Both the groups have similar MAP values throughout the intraoperative and postoperative periods with p>0.05.

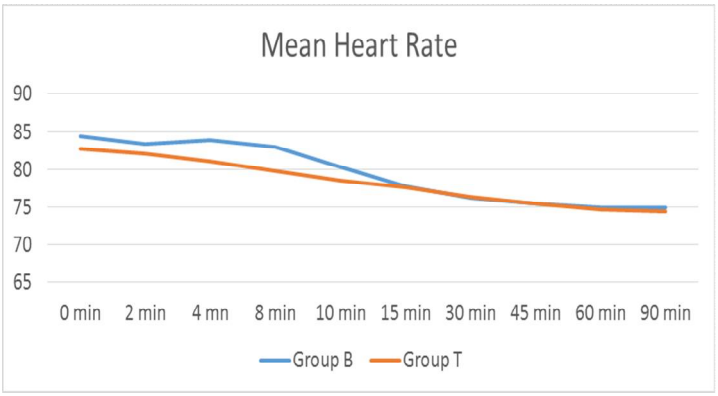

Figure 3: Variation of HR in study groups

Variation in heart rate in both groups is not statistically significant as p>0.05. variation in mean respiratory rate are comparable in both the groups with p value1 indicating statistical insignificance Variation in mean spo2 values are comparable in both the groups with p value1, which is statistically insignificant

Table 3: Comparison of modified Ramsay sedation Score between two groups studied

	GROUPS	Mean	Std. Deviation	P VALUE
MODIFIED RAMSAY SEDATION SCORE 30 mins	GROUP-B	2.1	0.58	0.044
	GROUP-T	2	0	
MODIFIED RAMSAY SEDATION SCORE 60 mins	GROUP-B	3.08	0.24	<0.001
	GROUP-T	2	0	
MODIFIED RAMSAY SEDATION SCORE 90 mins	GROUP-B	3.44	0.51	<0.001
	GROUP-T	2.16	0.37	
MODIFIED RAMSAY SEDATION SCORE 120 mins	GROUP-B	2.16	0.58	0.679
	GROUP-T	2.2	0.44	
MODIFIED RAMSAY SEDATION SCORE 150 mins	GROUP-B	2.1	0.24	1
	GROUP-T	2.1	0.24	
MODIFIED RAMSAY SEDATION SCORE 180 mins	GROUP-B	2.1	0.24	1
	GROUP-T	2.1	0.24	

Comparison of the MODIFIED RAMSAYSEDATION SCORE 30 mins, 60 mins and 90 mins between the two groups shows that MODIFIED RAMSAYSEDATION SCORE 30 mins is higher in GROUP B group and is statistically significant with a p-value.

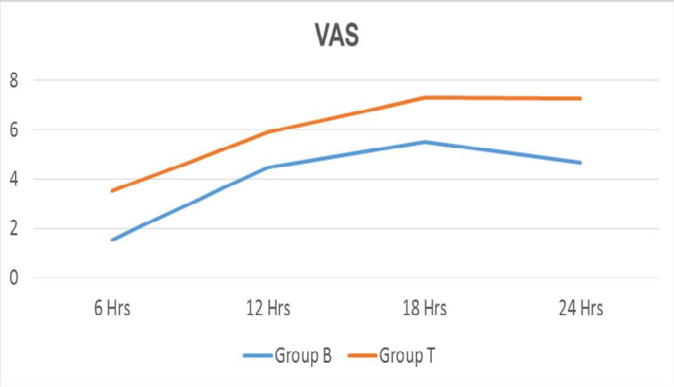

Figure 4: Comparison of VAS among the two groups studied

Comparison of the VISUAL ANALOGUE SCALE 6Hrs, 12 hrs, 18 hrs and 24 hrs between the two groups shows that VISUALAN ALOGUE SCALE 6Hrs is higher in Group-T and is statistically significant with a p value of <0.001

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Table 4: Distribution of side effects in study groups

Side effects	Number of patients (%)		P-value
	Group-B	Group-T	
Nausea	12(24)	29(58)	<0.001
Vomiting	10(20)	20(40)	<0.001
Pruritus	0	0	-
Hypotension	21(42)	14(28)	0.141
Bradycardia	3(6)	0	0.242

Nausea and vomiting are significantly higher in group T, with p-value < 0.001. Hypotension and bradycardia are more in group B which is statistically in significant.

DISCUSSION

Hyperbaric bupivacaine is the most commonly used intrathecal local aesthetic. Various adjuvants have been added to bupivacaine to shorten the onset of block and prolong the duration of block. Opioid administration has been demonstrated to provide postoperative analgesia after a variety of surgical procedures, at the cost of increased risk of respiratory depression. Buprenorphine is a mixed agonist-antagonist type of opioid with along duration of action. The high lipid solubility, high affinity for opioid receptors and prolonged duration of action makes buprenorphine a suitable choice for intrathecal and peripheral nerve site administration. Tramadol is a centrally acting analgesic that has moderate affinity for mu receptors1 and weak kappa and delta opioid receptor affinity. It has less respiratory depressant effect because it has 6000 fold less affinity for mu receptors compared to morphine.[3] It also inhibits serotonin and norepinephrine reuptake in the spinalcord and has no reported neurotoxicity. Therefore tramadol has the potential to provide effective postoperative analgesia, with no risk of respiratory depression after central neuraxial administration. However pruritus, nausea, vomiting, urinary retention and risk of unpredictable respiratory depression[4] have directed the clinicians to use a lower dose of tramadol that can be used intrathecally to produce effective and prolonged analgesia with out such complications. Lower abdominal and lower limb surgeries may be performed under local, regional (spinal or epidural) or general anaesthesia. Spinal block is still the first choice because of its rapid onset, superior blockade, low risk of infection as from catheter in situ, less failure rates and cost-effectiveness, but has the drawbacks of shorter duration of block and lack of adequate post operative analgesia. Therefore, the present study was performed to compare Buprenorphine and Tramadol in their efficacy as adjuvants to spinal anaesthesia. This study comprised of 80 cases of ASA grade I and II, of both sexes and age ranging between18 to 60years, posted for routine surgeries of lower abdomen and lower limb. These 80 patients were given either of the two sets of intrathecal drugs randomly so that each group comprised 40 patients. In our study design Group-B received 0.5% of hyperbaric Bupivacaine 3 ml with Buprenorphine (60mcg) and Group-T received 0.5% hyperbaric Bupivacaine 3 ml with Tramadol (25mg) injected intrathecally .J.A.Alhashemi.et.al (2003)[5] used Bupivacaine 0.5% heavy 3ml with 25mg Tramadol for postoperative pain relief in patients undergoing transurethral resection of prostate (TURP). Dr G.Prathap Rao.et.al (2015)[6] used Bupivacaine heavy 3ml with 60mcg of Buprenorphine in subarachnoid block for patients undergoing transurethral resection of prostate (TURP).

Demographic profile: The demographic data compared between two groups were Age, Sex, Height, Weight. Both sexes are equally distributed (25 each) among two groups. Patients included in this study, were between 18 – 60 yrs. of age and the mean age in our study groups were similar in terms of age, height, weight (Table-1 and sex. Similar age, weight and height distribution was also seen in the study of Torres *et al*[7], Susmita Chakraborty *et al* (2008)[8]and B.N. Biswas *et al* (2002).[9]

Sensory Block

a) Onset of sensory block: In the present study, the onset of sensory block was tested by pin-prick method, this has been the commonest method of testing the onset of sensory block. The mean time of onset of sensory block seen in different groups was found (p>0.05) (Table 4) statistically not significant. This showed that there is no effect of Tramadol or Buprenorphine on onset of sensory block. Dr Alok Pratap Singh (2015)[6] in his comparative study of intrathecal bupivacaine with bupivacaine-tramadol and bupivacaine-

fentanyl for post-operative pain relief in lower abdominal and lower limb surgeries found no statistical difference in onset of sensory block with addition of tramadol or fentanyl to bupivacaine intrathecally. Khan FA, Hamdani GA[10](2006) in their study of Comparison of intrathecal fentanyl and buprenorphine in urological Surgery also found no difference in time of onset of sensory blockade.

b) **Time of sensory regression to S1:** The mean time of sensory regression to S1 in group B was statistically highly significant with p<0.0001 (Table 4). It implied that sensory block is prolonged more with buprenorphine than with tramadol. Dr Alok Pratap Singh (2015)[6]in his comparative study of intrathecal bupivacaine with bupivacaine-tramadol and bupivacaine-fentanyl for post-operative pain relief in lower abdominal and lower limb surgeries found prolonged sensory block with both fentanyl and tramadol which is more with fentanyl (6.86 + 0.75) than tramadol (4.58 + 0.46). Khan FA, Hamdani GA[10](2006) in their study of Comparison of intrathecal fentanyl and buprenorphine in urological Surgery also found significant prolongation of sensory block with both fentanyl and buprenorphine with 70% of pts in fentanyl group showed sensory regression to L1 60 min postoperatively compared to 35% pts in buprenorphine group. Dalvi NP, Patil N[11] in their study "Comparison of Effect of Intrathecal Fentanyl-bupivacaine and Tramadol-bupivacaine Combination on Postoperative Analgesia in Lower Abdominal Surgeries" found the duration of sensory blockade was to be longer with intrathecal fentanyl than intrathecal tramadol. Biswas *et al*[9] found that the duration of sensory blockade was longer in the patients who received intrathecal bupivacaine with fentanyl than the patients who received intrathecal bupivacaine alone. Torres *et al* (1993)[7] compared the analgesic efficacy of intrathecal Tramadol and Bupivacaine with Fentanyl and Bupivacaine in moderate to severe postoperative pain. They concluded that intrathecal administration of Bupivacaine with Tramadol or Fentanyl prolongs the duration of sensory block was more prolonged in Fentanyl group as compared to the Tramadol group. M. Ravishankar *et al* (2002)[12] in their respective studies concluded that when Tramadol was added to Bupivacaine it increases the analgesic effect of the spinal block. All these studies showed when compared between fentanyl and tramadol sensory block is more prolonged in fentanyl group, between buprenorphine and fentanyl it is more prolonged in buprenorphine group. In our present study, sensory block is more prolonged with buprenorphine than tramadol.

Motor Block

a) **Onset of motor block:** In our present study mean time of onset of motor block (Table 4). On intergroup comparison p<0.0001 is statistically highly significant. Onset of motor block is earlier in buprenorphine group than tramadol group. Dr Alok Pratap Singh (2015)[6]in his comparative study of intrathecal bupivacaine with bupivacaine-tramadol and bupivacaine-fentanyl for post-operative pain relief in lower abdominal and lower limb surgeries found no significant difference in onset of motor block among tramadol, fentanyl and plain bupivacaine groups. Khan FA (2006)[10] in their study of Comparison of intrathecal fentanyl and buprenorphine in urological Surgery also found no significant difference in time of onset of motor block among plain bupivacaine group (4.35 min), buprenorphine (5.1 min) and fentanyl group (4.95 min) Dalvi NP, Patil N[11] in their study " Comparison of Effect of Intrathecal Fentanyl-bupivacaine and Tramadol-bupivacaine Combination on Postoperative Analgesia in Lower Abdominal Surgeries", it was found that patients receiving fentanyl and tramadol had nearly the same onset of motor block (2.47 ± 0.777 *vs* 2.6 ± 0.62 minutes)

b) Mean time of regression to Bromage-0: In our present study mean time of regression to bromage-0 is statically highly significant with p<0.0001. It concluded that duration of motor block is more in buprenorphine group than tramadol group. Dalvi NP, Patil N[11] in their study "Comparison of Effect of Intrathecal Fentanyl-bupivacaine and Tramadol-bupivacaine Combination on Postoperative Analgesia in Lower Abdominal Surgeries" found the duration of motor block was longer in group Fentanyl as compared to group Tramadol and was statistically highly significant (263.66 ± 40.97 *vs* 214.66 ± 26.61 minutes, p< 0.001). It implies that the motor recovery and street fitness was delayed in fentanyl group as compared to the tramadol group. In our study also motor recovery was earlier with tramadol.

Khan FA, (2006) in their study of Comparison of intrathecal fentanyl and buprenorphine in urological

Surgery found no significant differences among fentanyl and buprenorphine groups in state of motor block at 4 hrs, which implied that fentanyl and buprenorphine are comparable in terms of motor blockade. In our study, also buprenorphine group had prolonged motor blockade like fentanyl group in Khan FA et. al study.[10] Duration of Analgesia: In our present study Mean duration of analgesia in group B was is statistically highly significant with p <0.0001. Dalvi NP, Patil N[11] in their study "Comparison of Effect of Intrathecal Fentanyl-bupivacaine and Tramadol-bupivacaine Combination on Postoperative Analgesia in Lower Abdominal Surgeries" found the duration of postoperative analgesia to be significantly prolonged in fentanyl group as compared to the tramadol group. Chakraborty *et al*[8] found that the duration of postoperative analgesia was longer in the patients receiving intrathecal bupivacaine- tramadol than the patients receiving only bupivacaine. Ravishankar[12] found that the duration of postoperative analgesia was significantly longer in the patients receiving intrathecal lignocaine-tramadol than in the patients receiving lignocaine only. Capogna G, Celleno D[13]. "Intrathecal buprenorphine for postoperative analgesia in the elderly patients" A study on 90 patients aged 56-85 years scheduled for suprapubic prostatectomy randomly received intrathecally either bupivacaine 30mg (group A), bupivacaine 30mg plus buprenorphine 0.03 mg (group B) or bupivacaine 30mg plus buprenorphine 0.045 mg (group C). They concluded that prolonged postoperative analgesia in the groups that received buprenorphine and as the dose of buprenorphine was increased the duration of analgesia also more. Above studies showed that duration of analgesia was prolonged when opioids were added to intrathecal bupivacaine and is more so with buprenorphine, fentanyl than tramadol, in our present study also the results were similar. These results were consistent with experimental evidence of a synergistic interaction between spinal opioids and local anaesthetics. This is due to separate mechanisms of action of both the drugs. Intrathecal opioids inhibit nociceptive afferent synaptic transmission via A delta and C fibbers by opening presynaptic potassium channels to inhibit transmitter release and thus reduce calcium influx. There is also a direct postsynaptic effect with hyperpolarization and reduced neuronal activity. Local anaesthetics work primarily by causing blockade of voltage-gated sodium channels in the axonal membrane and, possibly, a further effect on presynaptic inhibition of calcium channels. Hemodynamic Parameters: In the present study there was no significant difference between both the groups with respect to intraoperative and postoperative mean heart rates and mean arterial blood pressures(MAP) with p>0.05 Dalvi NP, Patil N[11] in their study " Comparison of Effect of Intrathecal Fentanyl-bupivacaine and Tramadol-bupivacaine Combination on Postoperative Analgesia in Lower Abdominal Surgeries" also found no significant difference between fentanyl and tramadol groups with respect to heart rates and systolic and diastolic blood pressures. Dr Alok Pratap Singh (2015)[6]in his comparative study of intrathecal bupivacaine with bupivacaine-tramadol and bupivacaine-fentanyl for post-operative pain relief in lower abdominal and lower limb surgeries found no significant difference in mean heart rates, mean arterial pressures among control, fentanyl and tramadol groups. Torres *et al* (1993)[7], M. Ravishankar *et al* (2002)[12], Sushmita Chakraborty *et al* (2008)[8] found no significant change in pulse rate and blood pressure in their respective studies. Khan FA, Hamdani GA (2006)[10] in their study of Comparison of intrathecal fentanyl and buprenorphine in urological Surgery found no significant differences among fentanyl and buprenorphine groups with respect to systolic, diastolic blood pressures and mean heart rates. Similar results were also found in other studies. Hypotension is anticipated sequelae after neuraxial block but the addition of either Tramadol or Fentanyl to bupivacaine has not produced significant difference from the control group. As all the patients in the present study were of ASA grade I and II and were properly preloaded with 15ml/kg of Ringer's Lactate, no episode of moderate or severe hypotension was encountered. Respiratory parameters There was no significant difference between both the groups (P>0.05) in respiratory rate and oxygen saturation, there was no episode of any respiratory depression in both groups M.Ravishankar *et al* (2002)[12], and Susmita Chakraborty *et al* (2008)[8] found that intrathecal Tramadol with hyperbaric Bupivacaine does not cause respiratory depression. Similar results were also found in other studies. Sedation: In the present study sedation was assessed by MRSS, the scores were higher at 30 min in group B which was statistically insignificant with p=0.04, and again at 60 min and 90 min which statistically significant. At 120 min, 150 min, 180 min it is higher in group T but statistically insignificant with p values 0.68, 1, 1 respectively. Sedation is more with buprenorphine than tramadol in our study. Dalvi NP, Patil N[11] in their study "Comparison of Effect of Intrathecal Fentanyl-bupivacaine and Tramadol-bupivacaine Combination on Postoperative Analgesia in Lower Abdominal Surgeries" found that Patients from fentanyl group were more sedated than the patients from tramadol group. No patient had any evidence of delayed respiratory depression or hypoxia in both the groups

Postoperative Analgesia: In our study, postoperative analgesia was assessed by VAS at 6hr, 12hr, 18hr, 24hr. The scores were lower in buprenorphine group than

tramadol group which was statistically highly significant with p values < 0.001. Khan FA, Hamdani GA[10] (2006) in their study of Comparison of intrathecal fentanyl and buprenorphine in urological Surgery found the mean time for the spinal injection to the first requirement of postoperative analgesia was significant with p <0.001. these results explain the lower VAS scores in buprenorphine group. Dalvi NP, Patil N[11] in their study "Comparison of Effect of Intrathecal Fentanyl-bupivacaine and Tramadol-bupivacaine Combination on Postoperative Analgesia in Lower Abdominal Surgeries" found low VAS scores in fentanyl than tramadol and Total analgesic requirement during the observation period of 24 hours was noted. Group F patients required fewer doses of analgesics as compared to group T. So, between fentanyl and tramadol VAS was lower in fentanyl group, between fentanyl and buprenorphine VAS was lower in buprenorphine group, in our study VAS scores were lower in buprenorphine group compared to tramadol group.

Side effects: Nausea and vomiting were significantly higher in group T, with p value <0.001. Hypotension and bradycardia were more in group B which is statistically insignificant. Dalvi NP, Patil N[11] in their study found 14 pts experienced nausea, 11 pts experienced vomiting in tramadol group. Dr Alok Pratap Singh(2015)[6] in his comparative study of intrathecal bupivacaine with bupivacaine-tramadol and bupivacaine-fentanyl for post-operative pain relief in lower abdominal and lower limb surgeries found that one patient in control group 2 pts each in fentanyl and tramadol group had bradycardia. There were 2, 3, 3 patients in Group control, tramadol and fentanyl groups respectively, who had hypotension. Although incidence of hypotension was more with Tramadol and Fentanyl group, none of the patient had moderate to severe hypotension. Nausea and Vomiting was most common in tramadol group (5 patients), followed by fentanyl group (2 patients) and control group (1 patient). There were no incidences of headache, respiratory depression, pruritus or constipation intra-operatively and post-operatively. These results were supporting our study After spinal administration opioids undergo redistribution by rostral spread, which explains the occurrence of side effects due to intrathecal opioids. Opioids reach the cisterns of brain 3-6 hrs after the intrathecal administration and then the respiratory centre through ventral pons 85,86. A lipid soluble nonionised drug like buprenorphine passes rapidly via the arachnoid granulations into venous and lymphatic vessels which allows minimal increase in csf concentration with very low risk of respiratory depression. The effect of lipophilic opioids is brief due to rapid clearance from spinal cord sites.

CONCLUSION

Addition of Buprenorphine (60mcg) with hyperbaric bupivacaine significantly prolongs both sensory and motor block. Intraoperatively, there was less incidence of side effects with Intrathecal Buprenorphine when compared to Intrathecal tramadol with hyperbaric bupivacaine. The postoperative 24 hours analgesic requirements were significantly less in the Buprenorphine group than tramadol group. To conclude, Buprenorphine (60mcg) seems to be an attractive alternative to tramadol(25mg) as an adjuvant to spinal bupivacaine in surgical procedures. It provides good quality of intraoperative analgesia, haemodynamically stable conditions, and excellent quality of postoperative analgesia. Hence, Buprenorphine seems to be a better choice as Intrathecal adjuvant with Bupivacaine when compared with Tramadol.

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