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Research Article

Comparison of intrathecal sufentanil and hyperbaric bupivacaine with intrathecal hyperbaric bupivacaine for caesarean section

Shweta Pravin Mhambrey*, Shital S. Ahire, Sambharan Nayak

Department of Anesthesiology, Lokmanya Tilak Municipal General Hospital and Medical College, Sion, Mumbai, India

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***Correspondence:**
Dr. Shweta Pravin Mhambrey,
E-mail: dr.samnayak@gmail.com

ABSTRACT

Background: Sufentanil added to intrathecal bupivacaine for cesarean section has shown to improve intraoperative and postoperative analgesia without any adverse effects to the mother and neonate. In the present study we compare the effects of intrathecal sufentanil 5 µg and 8 mg of 0.5% hyperbaric bupivacaine with intrathecal 10 mg of 0.5% hyperbaric bupivacaine for caesarean section.
Methods: This study was performed in a 60 pregnant patients undergoing elective LSCS under spinal anaesthesia in a randomized, prospective double blind comparative method in Lokmanya Tilak Municipal General Hospital after taking approval from hospital ethics committee. After fulfilling requirements of inclusion criteria patients were randomly divided into 2 groups of 30 each. Study group (BS) received intrathecal sufentanil 5 µg with 8 mg of 0.5% hyperbaric bupivacaine and the control group (B) received intrathecal 0.5% hyperbaric bupivacaine 10 mg. Pre, intra and postoperative investigations were made accordingly.
Results: No significant differences were observed among demographic parameters like age, weight, height and duration of surgery ($p>0.05$). The results were statistically significant ($p<0.05$) when the two groups were compared for the sensory blockade and motor blockade and the time to first analgesic requirement was significantly ($p<0.05$) prolonged in group BS as compared to group B. Both the groups showed decrease in pulse rate as compared to the baseline in the intra-operative and postoperative period. A significant ($p<0.05$) fall in the systolic blood pressure in B group was observed compared to BS group from 4 min to 75. None of the patients in either group developed respiratory rate <10 per minute and fall in oxygen saturation throughout the observation period. The sedation scores of the both groups were comparable and are statistically significant ($p<0.05$) with each other.
Conclusions: A reduced dose of 0.5% hyperbaric bupivacaine (8 mg) in combination with sufentanil (5 µg) provides reliable spinal anesthesia for cesarean section with better hemodynamic stability and low incidence of minor side effects as compared to 10 mg hyperbaric bupivacaine.

Keywords: Lower segment cesarean section, Intrathecal sufentanil, Hyperbaric bupivacaine, Spinal anesthesia

INTRODUCTION

Neuraxial block for lower segment cesarean section (LSCS) has become increasingly popular amongst parturients, as most of them prefer being awake during birth of the baby.[1] Many practitioners prefer spinal anaesthesia to epidural block because of simplicity of technique, rapidity in onset of action and reliability in producing uniform sensory and motor blockade as also avoiding the much dreaded complication of aspiration due to delayed gastric emptying as seen with general anaesthesia.[2-4]

The disadvantages however are limited duration of action, lack of long lasting post-partum analgesia and visceral pain during manipulation of uterus or at the time of peritoneal closure associated with intra-operative nausea and vomiting. To overcome these problems,

intrathecal opioids are being added to local anaesthetics to produce synergistic effect and enhance analgesia from sub-therapeutic doses of local anaesthetics. Sufentanil a relatively new opioid having higher lipid solubility, analgesic potency and receptor affinity. Sufentanil added to intrathecal bupivacaine for cesarean section has shown to improve intraoperative and postoperative analgesia with no adverse effects on the mother and neonate.[5]

The aim of the present study was to evaluate the efficacy, analgesic potency, and dose response, duration of analgesia and side-effects of sufentanil when administered with low dose of bupivacaine intrathecally for cesarean section and compare these results with conventional dose of intrathecal bupivacaine.

METHODS

This study was performed in a 60 pregnant patients undergoing elective LSCS under spinal anaesthesia in a randomized, prospective double blind comparative method in Lokmanya Tilak Municipal General Hospital after taking approval from hospital ethics committee. Patients with age between 18 to 35 years, weight 45 to 65 kgs, height 145 to 160 cms and ASA class I and II patients were included in the study. Patients with all Contraindications to spinal anaesthesia, LSCS for fetal distress, ASA class III and IV patients and diagnosed cases of pregnancy induced hypertension (PIH), multiple pregnancies, APH, IUGR were excluded from the study. Patients were randomly divided into 2 groups of 30 each. Study group (BS) received intrathecal sufentanil 5 µg with 8 mg of 0.5% hyperbaric bupivacaine and the control group (B) received intrathecal 0.5% hyperbaric bupivacaine 10 mg. The anaesthetist performing the block made the study solution according to instructions obtained from an envelope and was not involved in the study.

Patients were subjected to complete general and systemic examination. Pre-operatively investigations like CBC, urine-routine and microscopy; BT, CT, BUN, serum creatinine and blood sugar were carried out. Patients who fulfilled inclusion criteria and satisfied the requirements of pre-operative evaluation were selected for the trial and written consent form was taken from them. Patients were familiarized with visual analogue scale (VAS).

All patients were kept fasting for overnight. IV cannulation with 18 to 20 Cannula was done. Baseline pulse rate, blood pressure and respiratory rate were recorded. Monitors like cardioscope and pulse oximeter were attached. Pre-loading with lactated ringers solution 10 – 15 ml/kg was done over 15-30 min. No sedative premedication was given to the patient. All patients were given inj. Ranitidine 50 mg. preoperatively. Patients were given sitting position for spinal anesthesia. Under strict aseptic precautions, sub-arachnoid block was given in L3-L4 interspace using 23 G spinal needle with allocated drug after confirming clear and free flow of CSF, Solution was injected over 10 sec. Parturient was made supine with 20 degree left lateral tilt. Oxygen was administered by Hudson's mask with an O2 flow @4l/min.

Heart rate (HR), non-invasive blood pressure, oxygen saturation, and respiratory rate were recorded. For the purpose of the study bradycardia defined as HR <50/min, monitored using a cardioscope and treated with inj. atropine 0.6 mg when needed. Systolic blood pressure (BP) was monitored using sphygmomanometer. Systolic BP below 30% of pre-induction value or 90 mm Hg whichever less was considered as hypotension. All such parturient were treated with rapid intravenous fluids and inj. ephedrine 6 mg bolus in incremental doses. Respiratory rate was watched for every 15 min after induction. SpO_2 was monitored using pulse oximeter.

Sensory blockade was assessed using pinprick method with 22 G hypodermic needle every 1 min for first 5 min and then at 2 min interval till maximum level of block was achieved. Onset of block defined as spinal time to achievement of L1 sensory level. The highest sensory level achieved after injection of the spinal drug noted beyond which there is no increase in the sensory level throughout the intra-operative period. The time taken to achieve the peak sensory level from the spinal time noted. After peak sensory level is achieved two segment regression of sensory blockade was checked every 15 minutes. Duration of sensory blockade was recorded as the time taken to regression to L1 level. Degree of motor blockade was assessed using Bromage scale. Onset of motor block defined as spinal time to achieve of bromage grade I motor block. Time for maximum motor block described as spinal time to achievement of maximum grade of motor blockade on bromage scale was noted. The maximum grade of motor block achieved on bromage scale noted and duration of motor blockade defined as spinal time to recovery of full range of lower extremity movements was considered.

Sedation score assessed by Campbell score and monitored every thirty minutes for first eight hours of spinal time. Postoperative pain was evaluated by visual analogue scale (VAS) score post operatively on scale of 0 to 10 every 30 min till 8 hours after SAB followed by assessment at 10,12,18 and 24 hrs. On a scale of 0 to 10 the patient was asked to quantify their postoperative pain with 0 as no pain and 10 as worst / maximum imaginable pain. In recovery room duration of complete analgesia was considered from the time of achievement of adequate sensory blockade to VAS score being 0 and duration of effective analgesia till the VAS score ≥4 at which injection tramdol 1 mg/kg will be given IV. Recovery room anesthetist was instructed regarding the administration of rescue analgesia. Instructions were given to withhold all intravenous and intramuscular analgesics till VAS score <4. Postoperatively patients were monitored for side effects like hypotension, bradycardia, respiratory depression, nausea and vomiting,

shivering pruritus, urinary retention and noted if occurred. Nausea/Vomiting was treated with injection ondansetron 4 mg IV diluted, pruritus with inj. diphenhydramine 25 mg IV Slowly. Neonatal outcome was assessed using Apgar score at 1 min, 5 min and 10 min interval.

Statistical analysis

Independent sample t-test was used for comparing age, height and weight between the two groups. Paired t-test was applied for comparison of pulse rate, blood pressure, respiratory rate, oxygen saturation, sensory blockade and motor blockade (onset as well as duration) and sedation scale. All values with $p<0.05$ was considered statistically significant.

RESULTS

No significant differences were observed among demographic parameters like age, weight, height and duration of surgery ($p>0.05$) as given in Table 1.

Table 1: Comparison of age, height, weight and duration of surgery between the two groups.

	Groups	N	Mean	SD	t-test for equality of means			
					T	df	Sig. (2-tailed) (P value)	Mean difference
Age (years)	Group B	30	23.83	2.854	0.151	58	0.881	0.100
	Group BS	30	23.73	2.243				
Weight (Kgs)	Group B	30	50.63	3.662	0.833	58	0.408	0.833
	Group BS	30	51.47	4.075				
Height (cms)	Group B	30	151.83	4.371	0.874	58	0.386	1.100
	Group BS	30	152.93	5.330				
Duration of surgery (min)	Group B	30	70.33	14.259	0.106	58	0.916	0.333
	Group BS	30	70.67	9.714				

Table 2: Comparison of sensory blockade and mean duration of analgesia among two groups.

Sensory blockade	Group	N	Mean	SD	t-test for equality of means			
					T	df	Sig. (2-tailed) (P value)	Mean difference
Sensory Blockade Onset (sec)	B	30	60.23	7.833	-5.771	58	0.000	-90.17
	BS	30	48.30	14.577				
Time for Highest sensory level (min)	B	30	14.40	2.430	-4.076	58	0.000	-2.600
	BS	30	11.80	2.511				
Time to 2 segment regression of sensory level (min)	B	30	88.23	10.944	4.315	58	0.000	17.100
	BS	30	105.33	18.744				
Sensory block Total Duration (min)	B	30	129.00	26.600	11.645	58	0.000	77.000
	BS	30	206.00	24.579				
Duration of analgesia (min)	B	30	218.00	27.089	9.299	58	0.000	62.167
	BS	30	155.83	24.638				

Table 3: Comparison of motor blockade among two groups.

Motor blockade	Group	N	Mean	SD	t-test for equality of means			
					T	df	Sig. (2-tailed) (P value)	Mean difference
Motor blockade onset (sec)	B	30	48.30	9.259	-5.960	58	0.000	-13.500
	BS	30	61.80	8.256				
Time for maximum motor blockade (min)	B	30	7.43	1.455	6.345	58	0.000	3.033
	BS	30	10.47	2.177				
Motor block total duration (min)	B	30	170.00	35.526	-8.756	58	0.000	-63.500
	BS	30	106.50	17.770				

Table 4: Comparison of sedation scores in the parturients in two groups.

Group	N	Sedation Scores	Chi-square test for equality of means		
			Chi-square	df	p value
B	30	II	60.000	1	0.000
BS	30	III			

Table 5: Comparison of mean pulse rate of parturients in the two groups.

Time	Mean pulse rate	N	Mean	SD	Levene's Test for equality of variances		t-test for equality of means		
					F	Sig	T	Df	P value
0 min	Group BS	30	98.50	6.553	0.067	0.796	-0.233	58	0.817
	Group B	30	98.90	6.764					
2 min	Group BS	30	94.97	6.589	0.224	0.638	-1.300	58	0.199
	Group B	30	97.30	7.293					
4 min	Group BS	30	88.67	7.522	0.040	0.842	-4.141	58	0.000
	Group B	30	96.43	6.996					
6 min	Group BS	30	84.30	7.644	1.228	0.272	-6.086	58	0.000
	Group B	30	95.57	6.663					
8 min	Group BS	30	81.43	7.973	1.959	0.167	-6.958	58	0.000
	Group B	30	94.77	6.826					
10 min	Group BS	30	83.90	7.341	0.988	0.324	-5.938	58	0.000
	Group B	30	94.77	6.826					
15 min	Group BS	30	87.07	7.543	0.953	0.333	-4.146	58	0.000
	Group B	30	94.77	6.826					
20 min	Group BS	30	89.77	7.623	1.368	0.247	-2.013	58	0.049
	Group B	30	93.50	6.715					
25 min	Group BS	30	91.67	7.265	0.800	0.375	-1.015	58	0.314
	Group B	30	93.50	6.715					
30 min	Group BS	30	90.83	7.697	1.794	0.186	-1.430	58	0.158
	Group B	30	93.50	6.715					
45 min	Group BS	30	87.87	7.510	1.824	0.182	-4.201	58	0.000
	Group B	30	95.57	6.663					
60 min	Group BS	30	85.47	7.389	1.706	0.197	-5.560	58	0.000
	Group B	30	95.57	6.663					
75 min	Group BS	30	87.87	7.510	2.903	0.094	-4.243	58	0.000
	Group B	30	95.37	6.111					
90 min	Group BS	30	85.47	7.389	1.268	0.265	-5.529	58	0.000
	Group B	30	95.33	6.397					
105 min	Group BS	30	87.87	7.510	3.331	0.073	-5.098	58	0.000
	Group B	30	96.73	5.860					
120 min	Group BS	30	85.47	7.389	6.998	0.010	-6.675	58	0.000
	Group B	30	96.27	4.891					
180 min	Group BS	30	85.50	7.619	6.934	0.011	-6.513	58	0.000
	Group B	30	96.27	4.891					
240 min	Group BS	30	86.37	8.011	7.122	0.010	-5.777	58	0.000
	Group B	30	96.27	4.891					
300 min	Group BS	30	86.47	8.080	7.133	0.010	-5.683	58	0.000
	Group B	30	96.27	4.891					

The onset of sensory blockade, time for highest sensory level was significantly ($p < 0.05$) earlier in group BS compared to group B and also time to 2 segment regression of sensory level and total duration of sensory block was significantly prolonged in group BS ($p < 0.05$). The time to first analgesic requirement was significantly

prolonged in group BS as compared to group B and the rescue analgesic was required earlier as given in Table 2. Table 3 presents the time for onset of motor blockade that was significantly earlier (P <0.05) in group B compared to group BS. The time required to achieve maximum motor block was significantly shorter (P <0.05) in group B when compared with BS and total duration of motor block was significantly longer (P <0.05) in group B compared to group BS.

Table 6: Comparison of systolic blood pressure of parturients in the two groups.

Time	Mean systolic BP	N	Mean	SD	Levene's Test for equality of variances		t-test for equality of means		
					F	Sig	T	Df	P value
0 min	Group BS	30	116.93	8.497	35.314	0.000	-0.639	58	0.525
	Group B	30	118.00	3.363					
2 min	Group BS	30	115.87	9.062	22.524	0.000	0.336	58	0.738
	Group B	30	115.27	3.695					
4 min	Group BS	30	114.13	9.511	1.702	0.197	3.724	58	0.000
	Group B	30	105.93	7.418					
6 min	Group BS	30	112.73	8.921	15.814	0.000	6.022	58	0.000
	Group B	30	101.53	4.918					
8 min	Group BS	30	116.67	7.761	37.211	0.000	11.709	58	0.000
	Group B	30	99.40	2.238					
10 min	Group BS	30	116.60	8.307	66.399	0.000	11.391	58	0.000
	Group B	30	99.20	0.997					
15 min	Group BS	30	117.27	7.799	36.748	0.000	11.809	58	0.000
	Group B	30	99.33	2.893					
20 min	Group BS	30	117.80	8.177	8.181	0.006	9.255	58	0.000
	Group B	30	101.67	4.929					
25 min	Group BS	30	117.20	7.327	5.162	0.027	9.458	58	0.000
	Group B	30	102.53	4.297					
30 min	Group BS	30	117.47	7.807	2.978	0.090	7.726	58	0.000
	Group B	30	103.60	5.975					
45 min	Group BS	30	116.60	8.422	6.283	0.015	4.523	58	0.000
	Group B	30	108.13	5.847					
60 min	Group BS	30	117.20	9.301	17.765	0.000	3.071	58	0.003
	Group B	30	111.23	5.171					
75 min	Group BS	30	117.07	8.674	20.820	0.000	2.424	58	0.018
	Group B	30	112.87	3.848					
90 min	Group BS	30	116.53	8.740	46.591	0.000	-.567	58	0.573
	Group B	30	117.47	2.224					
105 min	Group BS	30	116.40	9.239	41.649	0.000	-1.007	58	0.318
	Group B	30	118.13	1.889					
120 min	Group BS	30	117.27	7.746	41.868	0.000	-0.595	58	0.554
	Group B	30	118.13	1.889					
180 min	Group BS	30	117.87	8.320	44.008	0.000	-0.171	58	0.865
	Group B	30	118.13	1.889					
240 min	Group BS	30	118.47	7.099	14.032	0.000	0.595	58	0.554
	Group B	30	117.60	3.654					
300 min	Group BS	30	118.33	7.774	20.887	0.000	0.468	58	0.642
	Group B	30	117.60	3.654					

The sedation scores of the both groups were comparable and are statistically significant (p<0.05) with each other as tabulated in Table 4. Baseline pulse rate was comparable in both the groups. Both the groups showed decrease in pulse rate as compared to the baseline in the intraoperative and postoperative period. Though this

difference was statistically significant ($p<0.05$) in BS group, clinically it was not significant as the fall in pulse rate was within physiological range as shown in Table 5. A significant ($p<0.05$) fall in the systolic blood pressure in B group was observed compared to BS group from 4 min to 75 min after which there was no statistically significant difference in the systolic blood pressures between the 2 groups as given in Table 6.

Table 7: Comparison of respiratory rate of parturients in the two groups.

Time	Mean respiratory rate	N	Mean	SD	t-test for equality of means			
					T	Df	P value	Mean difference
0 min	Group BS	30	22.83	1.487	-0.431	58	0.668	-0.167
	Group B	30	23.00	1.509				
5 min	Group BS	30	22.83	1.487	-0.802	58	0.426	-0.300
	Group B	30	23.13	1.408				
10 min	Group BS	30	21.13	1.137	-1.462	58	0.149	-0.467
	Group B	30	21.60	1.329				
15 min	Group BS	30	21.13	1.137	0.000	58	1.000	0.000
	Group B	30	21.13	1.137				
20 min	Group BS	30	19.57	1.305	-1.737	58	0.088	-0.700
	Group B	30	20.27	1.780				
25 min	Group BS	30	19.57	1.305	-1.737	58	0.088	-0.700
	Group B	30	20.27	1.780				
30 min	Group BS	30	19.57	1.251	-2.522	58	0.014	-0.900
	Group B	30	20.47	1.502				
45 min	Group BS	30	19.57	1.251	-1.014	58	0.315	-0.333
	Group B	30	19.90	1.296				
60 min	Group BS	30	19.67	1.093	-0.238	58	0.813	-0.067
	Group B	30	19.73	1.081				
75 min	Group BS	30	19.67	1.093	-1.660	58	0.102	-0.400
	Group B	30	20.07	0.740				
90 min	Group BS	30	19.67	1.093	-2.328	58	0.023	-0.667
	Group B	30	20.33	1.124				
120 min	Group BS	30	19.67	1.093	-1.109	58	0.272	-0.300
	Group B	30	19.97	0.999				
150 min	Group BS	30	19.67	1.093	-0.761	58	0.450	-0.200
	Group B	30	19.87	0.937				
180 min	Group BS	30	19.57	1.305	-1.086	58	0.282	-0.367
	Group B	30	19.93	1.311				
240 min	Group BS	30	19.57	1.305	-1.790	58	0.079	-0.667
	Group B	30	20.23	1.569				
300 min	Group BS	30	19.57	1.305	-1.086	58	0.282	-0.367
	Group B	30	19.93	1.311				

As presented in Table 7 and 8 none of the patients in either group developed respiratory rate <10 per minute and fall in oxygen saturation throughout the observation period.

Neonatal outcome in the two groups was studied by comparing the APGAR score. There was no significant difference in the APGAR scores of the neonates in the two groups ($p >0.05$) as in Table 9.

DISCUSSION

In the present study comparison was made between intrathecal sufentanil and hyperbaric bupivacaine with intrathecal hyperbaric bupivacaine alone for caesarian sections. In this study patient in group BS achieved faster onset of sensory block, mean peak sensory level and longer duration of sensory block compared to group B.

These results are similar to the earlier findings of Lu et al.[6] The study found that the onset and time to achieve maximum motor block was significantly earlier in hyperbaric bupivacaine compared to intrathecal sufentanil and bupivacaine. The duration of motor block was also significantly prolonged in group B compared to group BS. These findings of the present study are similar to results of Ben David et al.[7]

Table 8: Comparison of SpO_2 of parturients in the two groups.

Time	Mean SpO_2 rate	N	Mean	SD	t-test for equality of means			
					T	Df	P value	Mean difference
0 min	Group BS	30	98.93	0.691	0.000	58	1.000	0.000
	Group B	30	98.93	0.691				
5 min	Group BS	30	99.13	0.730	-0.531	58	0.597	-0.100
	Group B	30	99.23	0.728				
10 min	Group BS	30	98.97	0.718	-1.758	58	0.084	-0.333
	Group B	30	99.30	0.750				
15 min	Group BS	30	98.93	0.691	-1.420	58	0.161	-0.267
	Group B	30	99.20	0.761				
20 min	Group BS	30	98.93	0.691	-1.089	58	0.281	-0.200
	Group B	30	99.13	0.730				
25 min	Group BS	30	99.20	0.610	-1.533	58	0.131	-0.233
	Group B	30	99.43	0.568				
30 min	Group BS	30	99.20	0.610	-0.413	58	0.681	-0.067
	Group B	30	99.27	0.640				
45 min	Group BS	30	99.20	0.610	-0.614	58	0.542	-0.100
	Group B	30	99.30	0.651				
60 min	Group BS	30	98.90	0.712	-2.023	58	0.048	-0.367
	Group B	30	99.27	0.691				
75 min	Group BS	30	98.90	0.712	-1.416	58	0.162	-0.267
	Group B	30	99.17	0.747				
90 min	Group BS	30	98.90	0.712	-1.577	58	0.120	-0.300
	Group B	30	99.20	0.761				
120 min	Group BS	30	98.90	0.712	-0.361	58	0.719	-0.067
	Group B	30	98.97	0.718				
150 min	Group BS	30	98.90	0.712	-1.577	58	0.120	-0.300
	Group B	30	99.20	0.761				
180 min	Group BS	30	98.90	0.712	-1.053	58	0.297	-0.200
	Group B	30	99.10	0.759				
240 min	Group BS	30	98.90	0.712	-1.053	58	0.297	-0.200
	Group B	30	99.10	0.759				
300 min	Group BS	30	98.90	0.712	-0.532	58	0.597	-0.100
	Group B	30	99.00	0.743				

Olofsson et al also found that there was statistically significant decrease in degree and duration of motor block when 7.5 mg of bupivacaine with 5 mg sufentanil was compared with 15 mg of bupivacaine.[8]

From the studies of Sundnes et al and Axelsson et al we can conclude that by reducing the dose of local anesthetic, the cephalad spread, degree of motor block and duration of motor block can be decreased.[9,10] The addition of sufentanil enhances the somatic analgesia thus achieving similar peak sensory levels with smaller dose of local anaesthetic thus induction to baby delivery time can be reduced. The mean duration of analgesia was significantly prolonged in group BS as compared to group B wherein the rescue analgesic was required earlier ($p<0.05$).

This advantage of postoperative pain relief for briefer duration after intrathecal sufentanil was due to its rapid clearance from cerebrospinal fluid. These results are consistent with the studies of Fournier et al and Dahlgren et al.[11,12] In this study, both the groups showed decrease

in the pulse rate as compared to the baseline throughout the observation period. Although, at intervals the fall in pulse rate in the BS group was statistically significant, it was clinically not significant as it was within physiological range. None of the patients had any episode of bradycardia intra or postoperatively.

Table 9: Comparison of APGAR scores in the neonates of the two groups.

	Group	N	Mean	SD	t-test for equality of means			
					T	df	Sig. (2-tailed) (P value)	Mean difference
APGAR 1M	B	30	8.50	0.572	-1.756	58	0.084	-0.233
	BS	30	8.73	0.450				
APGAR 5M	B	30	8.60	0.498	-0.803	58	0.425	-0.100
	BS	30	8.70	0.466				
APGAR 10M	B	30	8.50	0.509	-1.882	58	0.065	-0.233
	BS	30	8.73	0.450				

The present study showed the percentage reduction in the systolic blood pressure in the BS group was maximum up to 6.9% as compared to 21.98% in the B group. These findings are consistent with the results of Asehnoune et al.[13] No significant difference (P>0.05) between the mean respiratory rate in both the groups throughout the observation period. There was no respiratory depression in any of the patients of either group that was similar to studies of Olofsson et al.[8]

Nausea and vomiting was seen only in patients of group B. No clinically significant sedation occurred in any of the patients of either group. All the patients were awake but calm i.e. grade II to III sedation score. These results were similar to the studies of Jeffery et al.[6]

Pruritus was seen exclusively in the group that received sufentanil. 3 out of 30 patients suffered from pruritus in BS group which was not significant statistically. The patients had pruritus of mild intensity, not requiring treatment. Most itching occurred during recovery from anesthesia. Fournier et al concluded in their study that with 7.5 mg of intrathecal sufentanil, incidence of itching was 33%.[11]

Neonatal outcome in the two groups was studied by comparing the APGAR score. There was no significant difference in the APGAR scores of the neonates in the two groups (p >0.05). These results are similar with the studies conducted by Demiraran et al who compared the effects of different doses of intrathecal sufentanil (1.5, 2.5, 5 mg) when administered with 12.5 mg hyperbaric bupivacaine for cesarean section.

No differences were found in umbilical cord blood gases or in neonatal APGAR scores in the 3 groups.[14] In the present study no neonatal depressant effects were observed with 5 mg intrathecal sufentanil that are similar to the findings of Hansdottir V et al.[15]

CONCLUSION

A reduced dose of 0.5% hyperbaric bupivacaine (8 mg) in combination with sufentanil (5 µg) provides reliable spinal anesthesia for cesarean section with better hemodynamic stability and low incidence of minor side effects as compared to 10 mg hyperbaric bupivacaine. The added sufentanil provides an enhancement and increase in duration of sensory analgesia without intensifying the motor blockade.

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REFERENCES

1. Angelo DR, Smiley RM, Riley, Segal S. The serious complication repository project of the Society for Obstetric Anesthesia and Perinatology. Anesthesiology. 2014;120:1505-12.
2. Dharmalingam TK, Ahmad Zainuddin NA. Survey on maternal satisfaction in receiving spinal anaesthesia for caesarean section. Malays J Med Sci. 2013;20:51-4.
3. Aiono-Le TL, Butwick AJ, Carvalho B. A survey of perioperative anesthetics practices for cesarean delivery. Anesthesiol Res Pract. 2009;2009:1-7.
4. Butterworth J. Physiology of spinal anesthesia: what are the implications for management?. Reg Anesth Pain Med. 1998;23:370-3.
5. Vyas N, Sahu DK, Parampill R. Comparative Study of Intrathecal Sufentanil Bupivacaine Versus Intrathecal Bupivacaine in Patients Undergoing Elective Cesarean Section. J Anaesthesiol Clin Pharmacol. 2010;26(4):488-92.
6. Lu JK, Schafer PG, Gardner TL, Pace NL, Zhang S, Niu S, et al. The dose-response pharmacology of

intrathecal sufentanil in female volunteers. Anaesth analg. 1997;85:372-9.
7. Ben-David B, Solomon E, Levin H, Admoni H, Goldik Z. Intrathecal fentanyl with small-dose dilute bupivacaine: better anesthesia without prolonging recovery. Anesth Analg. 1997;85(3):560-5.
8. Olofsson C, Nygards EB, Bjersten AB, Hessling A. Low-dose bupivacaine with sufentanil prevents hypotension after spinal anesthesia for hip repair in elderly patients. Acta Anaesthesiol Scand. 2004;48(10):1240-4.
9. Sundnes KO, Vaagenes P, Skretting P, Lind B, Edstrom HH. Spinal analgesia with hyperbaric bupivacaine: effects of volume of solution. Br J Anaesth. 1982;54(1):69-74.
10. Axelsson KH, Edstrom HH, Sundberg AE, Widman GB. Spinal anaesthesia with hyperbaric 0.5% bupivacaine: effects of volume. Acta Anaesthesiol Scand. 1982;26(5):439-45.
11. Fournier R, Van Gessel E, Weber A, Gamulin Z. A comparison of intrathecal analgesia with fentanyl or sufentanil after total hip replacement. Anesth Analg. 2000;90(4):918-22.
12. Dahlgren G, Hultstrand C, Jakobsson J, Norman M, Eriksson EW, Martin H. Intrathecal sufentanil, fentanyl, or placebo added to bupivacaine for cesarean section. Anesth Analg. 1997;85(6):1288-93.
13. Asehnoune K, Larousse E, Tadie JM, Minville V, Droupy S, Benhamou D. Small-dose bupivacaine-sufentanil prevents cardiac output modifications after spinal anesthesia. Anesth Analg. 2005;101(5): 1512-5.
14. Demiraran Y, Ozdemir I, Kocam B, Yucel O. Intrathecal sufentanil (1.5µg) added to hyperbaric bupivacaine (0.5%) for elective cesarean section provides adequate analgesia without need for pruritus therapy. Journal of anaesthesia. 2006;20(4):274-8.
15. Hansdottir V, Hedner T, Woestenborghs R, Nordberg G. The CSF and plasma pharmacokinetics of sufentanil after intrathecal administration. Anesthesiology. 1991;74(2):264-9.

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