

Comparative study of hyperbaric bupivacaine and pentazocine in patients undergoing cesarean section under spinal anesthesia

Selvakumaran P¹, Anand B^{2*}, Thirumaaran U G²

¹Assistant Professor, ²Professor, Department of Anesthesiology, Meenakshi Medical College and Research Institute, INDIA.

Email: cheetoo26@gmail.com

Abstract

Background: The administration of opioids intrathecally as a sole anesthetic has proven to be effective in providing adequate surgical anesthesia without much hemodynamic instability. This study aims to determine the efficacy and safety of intrathecal Pentazocine as a sole anesthetic drug in patients undergoing lower segment caesarean section. **Study Design:** It was a randomized control double blinded study conducted in 200 patients undergoing lower segment caesarean section. **Methods:** The patients were randomly divided into 2 groups of 100 patients in each group. Group A received 1.5 ml (45 mg) intrathecal Pentazocine and Group B received 1.5ml intrathecal 0.5% Bupivacaine heavy before surgery. Duration of surgery, onset of sensory, and motor blockade and their duration, heart rate (HR), mean arterial pressure (MAP), and time for first rescue analgesia were statistically analyzed. **Results:** Onset of sensory blockade (2.65±0.78 vs 3.67±1.01 minutes) and motor blockade (2.43±1.13 vs 3.10±1.09 minutes) was earlier in Group A. Group B produced highest level of sensory blockade (T4) in majority of patients. Duration of analgesia is prolonged with Group B (2.46 ±0.496 vs 5.45±1.78 hours). Degree of motor blockade was better in group A, how ever duration of motor blockade was similar in both the groups. Group B patients were hemodynamically more stable intraoperatively and post operatively than Group A. **Conclusion:** Because of adequate surgical anesthesia, intraoperative hemodynamic stability and prolonged post-operative analgesia, we recommend the use of intrathecal Pentazocine as a sole anesthetic agent for lower segment caesarean sections.

Key Words: Pentazocine, Cesarean sections, Bupivacaine, Analgesia.

*Address for Correspondence:

Dr. Anand B., Professor, Department of Anesthesiology, Meenakshi Medical College and Research Institute, INDIA.

Email: cheetoo26@gmail.com

Received Date: 13/08/2018 Revised Date: 20/09/2018 Accepted Date: 03/10/2018

DOI: <https://doi.org/10.26611/10159211>

Access this article online

Quick Response Code:



Website:

www.medpulse.in

Accessed Date:
14 February 2019

bupivacaine is used for LSCS Intrathecal Pentazocine has been shown to produce sufficient analgesia and motor blockade for surgical procedures below umbilicus with motor paralysis and prolonged post-operative analgesia.^{1,6,7} Providing a good postoperative pain relief will reduce the postoperative morbidity, allows early ambulation and early discharge. To the best of our knowledge only very few studies are available regarding the use of intrathecal Pentazocine especially in obstetric population. This study determines the efficacy and safety of intrathecal Pentazocine as a sole anaesthetic drug in patients undergoing elective LSCS

INTRODUCTION

Spinal anesthesia (SA) is very popular for cesarean section because it offers a profound sensory and motor block of high quality.¹Goals of spinal anesthesia are to Provide effective surgical anesthesia, adequate postoperative analgesia and minimal maternal and neonatal side effects.^{2,3,4,5} Commonly Hyperbaric

MATERIAL AND METHODS

This study was done at Meenakshi Medical College, Kanchipuram after obtaining the institutional ethical committee clearance. Patients were randomly allocated into two groups (Group A and Group B) by closed

envelope method. An elaborate Pre operative assessment were done. Premedication with T.Ranitidine 150mg and T.Metoclopramide 10mg night before surgery and on the morning of surgery with sips of water were advised. Patients were Nil per Oral (NPO) for 8 hours prior to surgery. Inside the operating room an intravenous access was established with 18G cannula and patient were preloaded with 15 ml/kg of Ringer lactate. Basic monitors (ECG,NIBP,SpO₂) were attached. Baseline heart rate(HR), Mean arterial pressures (MAP), SpO₂) were noted. Patient in left lateral position, Spinal anaesthesia was given with study drug {Group A- 1.5ml Hyperbaric bupivacaine, Group B – 1.5ml (45mg) pentazocine} using 25G Quincke’s spinal needle. Patients were immediately placed in the supine position. Intra operatively sedation or analgesia were not given to any of the patients. The following parameters were observed and recorded

- Onset of motor blockade
- Highest level of sensory blockade
- Degree of motor blockade (Bromage scale)
- Apgar score of the new born
- Duration of motor blockade (Grade 4 power to Grade 1 power)
- Total duration of post operative analgesia (Time for first analgesic - TFA)
- Degree of maternal sedation (Ramsay sedation score)
- Hemodynamic variables (0,1,3,5,10,15,30,45,60, 90,120 min)
- Incidence of Post operative nausea and vomiting(PONV),Pruritis, etc

RESULTS

Statistical analysis was done using statistical software SPSS21.0. Quantitative data was assessed with student t test. P value less than 0.05 is considered statistically significant

Demographic profile: Age, Height, Weight, Number of patients are identical in both groups.

Table 1

	Group A (n = 100)	Group B (n=100)	p Value
Age (Years)	27.21±3.80	26.35±4.08	>0.05
Height (cm)	158±1.3	156±1.8	>0.05
Weight (Kg)	65.13±13.4	64.42±9.6	>0.05

Mean baselines HR and MAP: Baseline HR and MAP were statistically comparable in both the groups

Table 2

Parameter	Group	Mean	SD	P Value
Baseline HR	A	79.77	12.82	0.790
	B	82.63	15.70	
Baseline MAP	A	98.4	11.04	0.244
	B	96.33	5.68	

Comparison of difference of mean HR at various time intervals from baseline HR: The difference of mean HR from baseline HR were statistically similar.

Table 3:

Time	Group	Mean	SD	p Value
1 min	A	0.80	4.55	0.436
	B	0.37	6.07	
3 min	A	3.37	6.46	0.200
	B	1.87	9.32	
5 min	A	7.00	11.25	0.314
	B	4.50	8.92	
10 min	A	9.43	12.97	0.203
	B	5.37	10.88	
15 min	A	7.10	13.22	0.790
	B	8.53	13.73	
30 min	A	4.73	14.81	0.300
	B	7.67	12.69	
45 min	A	3.57	14.38	0.371
	B	6.25	13.70	
60 min	A	1.93	13.75	0.271
	B	6.10	13.84	
90 min	A	1.19	11.42	0.094
	B	7.43	9.66	
120 min	A	1.33	11.0	0.723
	B	2.50	0.71	

Comparison of difference of mean MAP at various time intervals from baseline MAP: The difference of baseline MAP to MAP at subsequent intervals had statistically significant difference between the two groups at 1,3,5,30,45,60 minutes. The fall in MAP was more in Group A.

Table 4

Time	Group	Mean	SD	p Value
1 min	A	8.23	6.95	0.003
	B	1.73	6.76	
3 min	A	15.83	7.13	0.001
	B	7.67	10.3	
5 min	A	20.3	7.76	0.003
	B	13.3	12.43	
10 min	A	21.8	10.2	0.431
	B	15.37	14.36	
15 min	A	17.07	10.13	0.468
	B	17.73	15.89	
30 min	A	12.27	9.11	0.008
	B	19.57	16.14	
45 min	A	9.23	9.15	0.002
	B	17.13	14.25	
60 min	A	8.57	8.94	0.033
	B	13.25	12.19	
90 min	A	8.54	9.52	0.516
	B	4.82	11.39	
120 min	A	9.94	9.65	0.957
	B	8.11	6.72	

Onset of sensory blockade: Onset of sensory blockade was faster in group A and it was statistically significant.

Table 5

Onset of sensory blockade(min)	Group	N	Mean	SD	P Value
	A	100	2.650	0.786	<0.05
	B	100	3.677	1.016	

Onset of motor blockade: Onset of motor blockade was quicker in group A similar to that of the onset of the sensory block.

Table 6:

Onset of motor blockade (mins)	Group	N	Mean	SD	P Value
	A	100	2.433	1.131	<0.05
	B	100	3.108	1.099	

Highest level of sensory blockade achieved in group A (68%) was T6, whereas the majority in group B (73%) achieved T4 sensory blockade

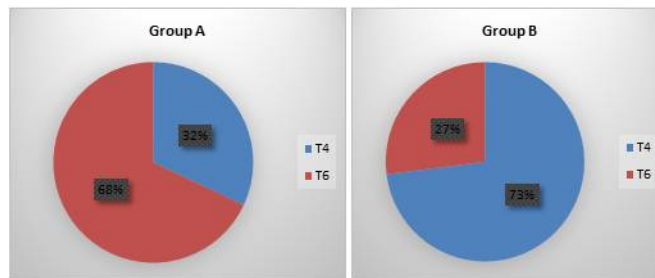


Figure 1:

Intensity of motor blockade: Majority of patients in group A showed a motor blockade of grade 4, whereas group B showed grade 3 blockade. p value is less than 0.05 which is statistically significant.

Table 7:

Group	Bromage Scale				p Value
	Grade 1	Grade 2	Grade 3	Grade 4	
A	0	9	15	76	<0.05
B	0	15	57	28	

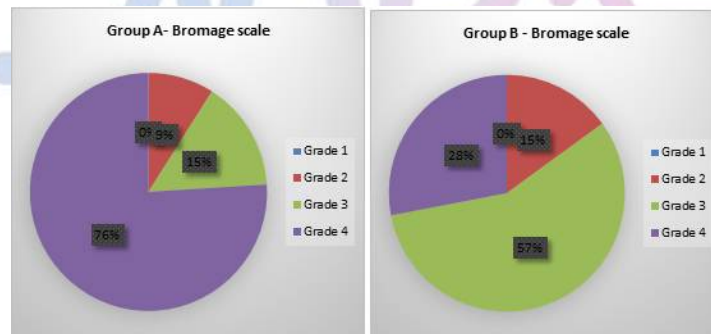


Figure 2:

Duration of Sensory block: Duration of sensory block was significantly prolonged in group A (122.55±13.60) mins as compared to group B (107.36±19.77) mins (P < 0.05) which is statistically significant.

Table 8:

Group	N	Mean	SD	p Value
A	100	122.558	13.604	<0.05
B	100	107.366	19.780	

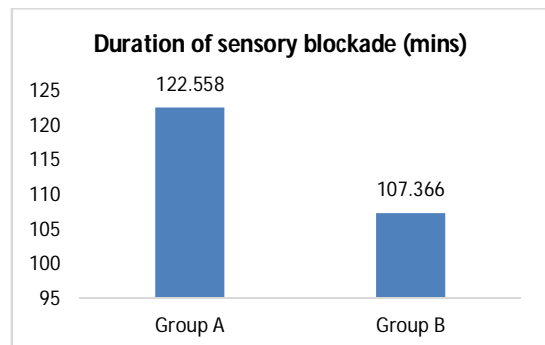


Figure 3

Duration of motor blockade: Duration of motor blockade is similar in both the groups i.e. p Value > 0.05.

Table 9:

Group	N	Mean	SD	p Value
A	100	139.387	13.381	0.550
B	100	137.354	17.450	

Figure 4:

Time for First Analgesia (TFA): Group A required first analgesia earlier than Group B, which was statistically significant (p<0.05). Group B patients required first analgesia in (5.45±1.78) h compared to (2.45±0.49)h in Group A.

Table 10:

Group	N	Mean (hours)	SD	p Value
A	100	2.457	0.496	<0.05
B	100	5.453	1.785	

Ramsay sedation scale (RSS): Ramsay sedation scores were comparable in both the groups.

Table 11:

Group	N	Mean	SD	p Value
A	100	1.55	.500	>0.05
B	100	1.54	.501	

Apgar Scores: Apgar scores of the new borns at 1 min and 5 min were statistically similar in both the groups.

Table 12:

APGAR SCORES	Group	N	Mean	SD	p Value
At 1 min	A	100	6.92	0.961	p>0.05
	B	100	7.03	0.858	
At 5 min	A	100	7.90	1.040	
	B	100	7.71	1.018	

Incidence of complications: There is no difference in the incidence of complications between the two groups.

Table 13

Complications	No. of patients in group A	No. of Patients in group B	p Value
Nausea and Vomiting	5	7	p > 0.05
Pruritis	0	1	
Respiratory depression	0	0	

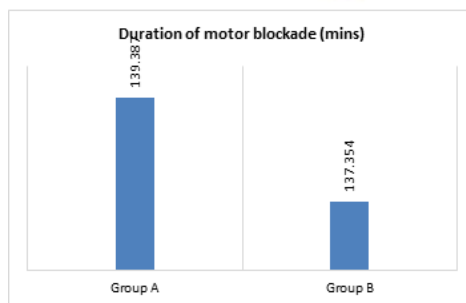


Figure 4

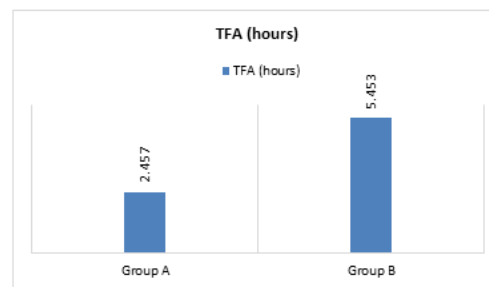


Figure 5

DISCUSSION

The administration of pentazocine intrathecally as a sole anesthetic has proven to be effective in providing adequate surgical anesthesia without much hemodynamic instability². There was no significant difference statistically between the two groups in terms of duration of surgical anesthesia. Intrathecal administration is technically easy and it provides better and longer duration of analgesia with minimal side effects due to specific action on opiate receptors present in the spinal cords^{4,5}.

Because of its action on opiate receptors its intrathecal deposit can cause all effects of the subarachnoid administration of the local anesthetics i.e. motor blockade, sensory blockade and sympathetic blockade⁶. Sensory and Motor blockade were obtained in all patients. Onset of motor and sensory blockade was slower, this can be attributed to slower rostral spread of pentazocine because of their high lipid solubility¹. Significantly low MAP in Group B at 1, 3 and 5 min, probably was because local anesthetic caused more intense sympathetic

blockade. At the same time, no significant difference between groups in the MAP at 10 and 15 min could be because the hypotension in group B was corrected with IV fluids or vasopressors. The significantly reduced MAP in group B evident again at 30, 45 and 60 min could again be explained because of persisting local anesthetic induced hypotension. By 90-120 min, the insignificant difference in the MAP in both groups could be because, the vasodilation caused by the sympathetic blockade had started to wean off and intravascular volume had been expanded by intraoperative IV fluids. The hemodynamic stability following intrathecal Pentazocine could be advantageous in high risk patients with coronary artery disease, hypovolemia and also in old age with the added advantage of prolonged post-operative analgesia. Though opioids were believed to cause few adverse effects like nausea, vomiting, pruritis and respiratory depression. There was no increased incidence of the above mentioned side effects in group B. The longer duration of analgesia in group B can be attributed to the interaction of intrathecal Pentazocine with opiate receptors which are richly distributed in the posterior horn cells of spinal cord responsible for blocking nociceptive impulses and causing sedation following intrathecal Pentazocine due to its agonistic action on kappa opioid receptors which are responsible for sedation and spinal analgesia.

CONCLUSION

Intrathecal Pentazocine as a sole anesthetic agent for Elective Caesarean Section produces adequate surgical

anesthesia, prolonged post operative analgesia with better hemodynamic stability without increasing incidence of any side effects.

REFERENCES

1. Hamber EA, Viscomi CM. Intrathecal lipophilic opioids as adjuncts to surgical spinal anesthesia. *Reg Anesth Pain Med* 1999; 24:255-63.
2. Shekhar Tiwari C, Agnihotri VM. Intrathecal pentazocine as sole anaesthetic agent. *Indian J Anaesth* 1997; 40:30-6.
3. Cheun JK, Cho ST. Spinal anesthesia with pentazocine for total abdominal hysterectomy. *J Anesth* 1988; 2:98-100.
4. Swaraj, Saxena R, Sabzposh SW, Shakoor A. Effect on intrathecal pentazocine on postoperative pain relief. *J Indian Med Assoc* 1988; 86:93-6.
5. Chawla R, Arora MK, Saksena R, Gode GR. Efficacy and dose-response of intrathecal pentazocine for post-operative pain relief. *Indian J Med Res* 1989; 90:220-3.
6. Seewal R, Shende D, Kashyap L, Mohan V. Effects of addition of fentanyl (10, 20, 30 and 40 mcg) intrathecally to 0.5% hyperbaric bupivacaine on perioperative analgesia and subarachnoid characteristics in lower. *Am Soc Anesthesiol* 2002; 96:A885.
7. *Anesth Essays Res.* 2013 Jan-Apr; 7(1): 49-53. doi: 10.4103/0259-1162.113989 Efficacy and safety of intrathecal pentazocine as a sole anesthetic agent for lower limb surgeries.
8. Efficacy of dose response of intrathecal pentazocine for postoperative pain relief. *Indian journal of medical council* 1989 June 90-220-3.

Source of Support: None Declared
Conflict of Interest: None Declared