

ORIGINAL RESEARCH**Comparison of Effectiveness of 0.5% Bupivacaine with Neostigmine and 0.5% Bupivacaine Alone in Spinal Anaesthesia for Infra Umbilical Surgeries at a Tertiary Care Hospital****¹Akhilesh Mishra, ²Vineet Mishra, ³Vrushali Moharil, ⁴Abha Singh**

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ABSTRACT

Introduction: Pain is the fifth vital sign and a critical focus of the anaesthesiologist. Pain is perhaps elaborated as an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Acute post operative pain is a complex physiological reaction to tissue-injury, visceral distension or disease. It is manifested by autonomic, psychological and behavioural responses that result in patient specific unpleasant, unwanted sensory and subjective emotional experience. Postoperative pain leads to delayed mobilization and its associated complications. With the development of an expanding awareness of the epidemiology and pathophysiology of pain, more attention is focused on the multimodal management of pain to improve the quality of pain relief, augment functionality, leading to early mobilization, and reduce physiological and emotional morbidity. Hence the present study was done at our tertiary care centre to compare the effectiveness of intrathecal neostigmine (50 mcg) combined with 0.5 % bupivacaine (Hyperbaric) with 0.5 % bupivacaine (Hyperbaric) alone in spinal anaesthesia for infra umbilical surgeries.

Materials and Methods: The present prospective study was undertaken to compare the effectiveness intrathecal neostigmine (50 mcg) combined with 0.5% bupivacaine (Hyperbaric) with 0.5% bupivacaine (Hyperbaric) alone in spinal anaesthesia for infra umbilical surgeries. After obtaining local ethical committee approval & a written informed valid consent, a prospective study was conducted on 100 patients (Random sampling based on type of surgery) undergoing infra umbilical surgery under spinal anaesthesia. The patients were randomly divided into following two groups with 50 subjects in each group where group-A received Intrathecal Bupivacaine 0.5% (Hyperbaric) 3ml + 50µg of neostigmine (0.1ml) and group-B were given Intrathecal Bupivacaine 0.5% (Hyperbaric) 3ml.

Results: No statistical difference was observed which was tested by applying unpaired t test ($p > 0.05$). Group A had 27 (54%) male patients and 23 (46%) female patients whereas Group B had 28 (56%) male patients and 22 (44%) female patients. The gender distribution in the two groups as per Fisher's test were comparable and statistically not significant ($p > 0.05$). Group A had 33 patients (66%) with Class I grading and 17 (34%) patients with Class II grading, whereas Group B had 35 (70%) patients with Class I

grading and 15 (30%) patients with Class II grading. The ASA Grading of the patients between two groups were comparable and statistically not significant as per Fisher's test ($p>0.05$).

Conclusion: The present study concluded that when intrathecal neostigmine 50 mcg was added to 0.5% hyperbaric bupivacaine there was significantly early onset of sensory block and longer duration of motor blockade. The mean time required to attain maximum motor block was also significantly lesser.

Keywords: Spinal Anaesthesia, Block Anaesthesia, Neostigmine, Bupivacaine.

INTRODUCTION

“Pain is a more terrible lord of mankind than even death itself” - said Nobel laureate *Albert Schweitzer*. Pain is perhaps the most feared symptom of disease, which man is always trying to alleviate and conquer since ages. The relief of pain has been the fundamental aspect of the practice of anaesthesiology and remains one of the most important and pressing responsibilities of the anaesthesiologist.

Pain is the fifth vital sign and a critical focus of the anaesthesiologist. Pain is perhaps elaborated as an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Acute post operative pain is a complex physiological reaction to tissue-injury, visceral distension or disease. It is manifested by autonomic, psychological and behavioural responses that result in patient specific unpleasant, unwanted sensory and subjective emotional experience. Postoperative pain leads to delayed mobilization and its associated complications. With the development of an expanding awareness of the epidemiology and pathophysiology of pain, more attention is focused on the multimodal management of pain to improve the quality of pain relief, augment functionality, leading to early mobilization, and reduce physiological and emotional morbidity. Sedating the patient more than what is required may jeopardise the patient's safety. While levels of sedation progress in a dose-response continuum, it is not always possible to predict precisely how an individual patient will respond to a particular dose.¹ Oversedation may be associated with untoward effects of respiratory and cardiovascular depression resulting in higher chances of airway instrumentation and hypotension leading to a prolonged stay in the post-anaesthetic care unit, entailing increased burden on staff, bed availability and associated costs.² Appropriate monitoring of depth of sedation thus remains important, as also the search for an agent with a shorter recovery time.

Among the local anesthetics, 0.5% hyperbaric bupivacaine is the most commonly used drug for spinal anesthesia.³ The most important disadvantage of single injection SAB is the limited duration. Adjuvants have been in long term usage along with local anesthetics to prolong the duration of anesthesia and analgesia. Prolongation of pain relief by various adjuvants like opioids (like morphine,⁴ fentanyl⁵) ketamine,⁶ clonidine,⁷ and neostigmine⁸ were investigated by various investigators. However, each drug has its limitations and side effects, and the need for alternative methods and drugs always exist.

Hence the present study was done at our tertiary care centre to compare the effectiveness of intrathecal neostigmine (50 mcg) combined with 0.5 % bupivacaine (Hyperbaric) with 0.5 % bupivacaine (Hyperbaric) alone in spinal anaesthesia for infra umbilical surgeries.

MATERIALS AND METHODOLOGY

The present prospective study was undertaken to compare the effectiveness intrathecal neostigmine (50 mcg) combined with 0.5% bupivacaine (Hyperbaric) with 0.5% bupivacaine (Hyperbaric) alone in spinal anaesthesia for infra umbilical surgeries. After obtaining local ethical committee approval & a written informed valid consent, a prospective study was conducted on 100 patients (Random sampling based on type of surgery) undergoing infra

umbilical surgery under spinal anaesthesia. The patients were randomly divided into following two groups with 50 subjects in each group where group-A received Intrathecal Bupivacaine 0.5% (Hyperbaric) 3ml + 50µg of neostigmine (0.1ml) and group-B were given Intrathecal Bupivacaine 0.5% (Hyperbaric) 3ml.

The inclusion criteria of the study participants include those within age range of 30 – 60 years, ASA grade – I and II and those whose weight are in the range of 40 – 70 kgs. Unwilling patients, Patients who were contraindicated for spinal anaesthesia, pregnant females and those who had history of angina, palpitations, syncope and ECG abnormalities, finally those who are under beta blockers, calcium channel blockers and any other psychiatric medications are relatively excluded from the study. Quantitative data is presented with the help of Mean and Standard deviation. Comparison within the study groups is performed by using an unpaired t test as per results of normality test. Qualitative data is analysed with the help of frequency and percentage table. Association within the study groups is evaluated by using Fisher test, student 't' test and Chi-Square test. 'p' value less than 0.05 is taken as significant statistically.

RESULTS

Table – 1 shows comparison between age and weight among both the groups. No statistical difference was observed which was tested by applying unpaired t test ($p > 0.05$).

In table – 2, comparison of the study participants based on gender distribution was observed. Group A had 27 (54%) male patients and 23 (46%) female patients whereas Group B had 28 (56%) male patients and 22 (44%) female patients. The gender distribution in the two groups as per Fisher's test were comparable and statistically not significant ($p > 0.05$).

The results shown in table -3 showed that Group A had 33 patients (66%) with Class I grading and 17 (34%) patients with Class II grading, whereas Group B had 35 (70%) patients with Class I grading and 15 (30%) patients with Class II grading. The ASA Grading of the patients between two groups were comparable and statistically not significant as per Fisher's test ($p > 0.05$).

Table 4 depicted that 30% patients each in Group A underwent Appendectomy and Inguinal Hernia Repair procedure while 20% patients each underwent Abdominal Hysterectomy and IT Fracture procedure. 28% patients each in Group B underwent Appendectomy and Inguinal Hernia Repair procedure while 22% patients each underwent Abdominal Hysterectomy and IT Fracture procedure. The comparison of surgical procedure in the two groups as per Chi-Square test were comparable and statistically not significant ($p > 0.05$).

Table – 5 shows that the duration of surgery (hours) in both the groups were comparable. No statistically significant difference was found by applying unpaired t test ($p > 0.05$).

Table 1: Comparison of study group as per age (years) and weight (kg)

Variable	Group A			Group B			Unpaired T test	P value
	N	Mean	SD	N	Mean	SD		
Age (years)	50	44.16	14.72	50	45.88	10.73	0.667	0.51
Weight (kg)	50	70.88	6.52	50	68.28	8.99	1.65	0.10

Table 2: Comparison of Sex of patients within groups

Sex	Group A		Group B		Fisher test value	p Value
	N	%	N	%		
Male	27	54%	28	56%	0.843	$p > 0.05$
Female	23	46%	22	44%		
Total	50	100%	50	100%		

Table 3: Distribution of patients according to ASA Grading

ASA Grading	Group A		Group B		p Value
	N	%	N	%	
I	33	66%	35	70%	p>0.05
II	17	34%	15	30%	
Total	50	100%	50	100%	

Table 4: Comparison of Surgical procedures done on patients within groups

Surgical Procedure	Group A		Group B		Chi-Square value	p Value
	N	%	N	%		
Appendectomy	15	30%	14	28%	0.164	p>0.05
Inguinal Hernia Repair	15	30%	14	28%		
Abdominal Hysterectomy	10	20%	11	22%		
IT Fracture	10	20%	11	22%		
Total	50	100%	50	100%		

Table 5: Duration of Surgery in both Groups

	Group A		Group B		Unpaired t test	p value
	Mean	SD	Mean	SD		
Duration of surgery(mins)	54.32	1.78	54.98	2.26	1.622	0.11

DISCUSSION

Pain is perhaps the most feared symptom of disease, which man is always trying to alleviate and conquer since ages. The relief of pain has been the fundamental aspect of the practice of anaesthesiology and remains one of the most important and pressing responsibilities of the anaesthesiologist.

In the present study the mean age and weight was 44.16 (SD 14.72), 70.88 (SD6.52) in group A and 45.88 (SD 10.73), 68.28 (SD 8.99) in group B respectively and it was comparable in both the groups. No statistical difference was found by applying unpaired t test (p>0.05). Similarly, the duration of surgery (hours) in both the groups were comparable. The results obtained were comparable with the study conducted by Yoganarasimha N et al.⁹

Group A had 27 (54%) male patients and 23 (46%) female patients whereas Group B had 28 (56%) male patients and 22 (44%) female patients. Group A had 33 patients (66%) with Class I grading and 17 (34%) patients with Class II grading, whereas Group B had 35 (70%) patients with Class I grading and 15 (30%) patients with Class II grading. The gender distribution and ASA Grading of the patients between two groups were comparable and statistically not significant.

30% patients each in Group A underwent Appendectomy and Inguinal Hernia Repair procedure while 20% patients each underwent Abdominal Hysterectomy and IT Fracture procedure. 28% patients each in Group B underwent Appendectomy and Inguinal Hernia Repair procedure while 22% patients each underwent Abdominal Hysterectomy and IT Fracture procedure. The comparison of surgical procedure in the two groups as per Chi-Square test were comparable and statistically not significant (p>0.05).

Group A showed early onset of sensory block (98.70±7.44 secs) compared to Group B (160.24 ± 9.01 secs) and this difference was statistically significant (p< 0.05). The spread of sensory block was similar in both groups. Similarly In a comparative study done by YoganarasimhaN et al⁹, the group that received neostigmine and bupivacaine showed early onset of sensory block compared to the group that received intrathecal clonidine and bupivacaine. The cephalad spread of sensory block was similar in both groups.

Yoganarasimhan et al⁹, conducted a prospective randomized experimental study observed that addition of 50 µg neostigmine significantly enhanced the onset of sensory block and motor block as compared to clonidine. Neostigmine group showed well maintained haemodynamics. The group that received intrathecal clonidine and bupivacaine had prolonged analgesia (362 ± 36 mins) compared to the group that received neostigmine and bupivacaine (300 ± 25 mins)(P < 0.05) with no serious adverse effects noted perioperatively in either group.

Shah JR et al¹⁰ in a comparative study observed that addition of intrathecal fentanyl to bupivacaine was more advantageous than bupivacaine with normal saline with special regard to its analgesic properties among surgical patients.

CONCLUSION

The present study concluded that when intrathecal neostigmine 50 mcg was added to 0.5% hyperbaric bupivacaine there was significantly early onset of sensory block and longer duration of motor blockade. The mean time required to attain maximum motor block was also significantly lesser.

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