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Original Research

To study Effect of ropivacaine and bupivacaine on heart rate for supraclavicular brachial plexus

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ABSTRACT:

Aim: To study Effect of ropivacaine and bupivacaine on heart rate for supraclavicular brachial plexus. **Methods:** 50 patients aged 20-60 years, weighing more than 50 kgs were taken up for the study. Patients were kept Nil per orally for 6 hours before the time of surgery and on the previous night premedicated with Diazepam 5 mg and Ranitidine 150mg. 50 patients ASA I and ASA II were randomly allocated with sealed envelope method into two different groups of 25 each. Both observer and participant were blinded. Group A: Received (n=25) 25 ml of 0.5% bupivacaine and Group B: Received (n=25) 25 ml of 0.5% ropivacaine. **Results:** Gender distribution in both groups was comparable. There is no statistically significant difference. Two groups were comparable with respect to their age, gender and weight. There was no statistically significant difference in heart rate between both groups ($p>0.05$). There is no significant difference of heart rate clinically. **Conclusion:** There was no statistically significant difference in heart rate between both groups ($p>0.05$). There is no significant difference of heart rate clinically.

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INTRODUCTION

Ever since William Stewart Halsted and Richard John Hall first reported the use of cocaine to block upper extremity nerves in 1884, brachial plexus regional anaesthesia has been used extensively by anaesthesiologists worldwide.[1] Supraclavicular block is preferred procedure for hand and fore-arm surgeries, as it is safe, has rapid onset and gives reliable anaesthesia. Success rates are better when a nerve stimulator is used as a clear response of the fingers is obtained at a seeking current which indicates a close proximity to the plexus.[2]

Various local anaesthetic agents and adjuvants are used for this purpose. Among them, bupivacaine has been the most widely used long-acting local anaesthetic agent. However, bupivacaine is associated with various CNS and cardiac side effects and unintended intravascular injection of bupivacaine lead to cardiac arrest, prolonged resuscitation and a disproportionally high number of deaths.[3,4] In search of better alternative, ropivacaine has been proposed as a promising drug with fewer cardiovascular and central nervous system toxic effects compared with bupivacaine.[5] Researchers have demonstrated lesser cardiac depression and fewer CNS effects when ropivacaine is injected intravenously. [6]

MATERIAL AND METHODS

This comparative study was carried out, after taking the approval of the protocol review committee and institutional ethics committee. 50 patients aged 20-60 years, weighing more than 50 kgs were taken up for the study. All the patients were evaluated thoroughly on the previous day of the surgery. A detailed history, complete physical examination and routine investigations were done for all patients were explained about procedure. Patients between ages 20-60yrs undergoing elective upper limb surgeries.

ASA class 1 and 2 and No history of allergy or sensitivity to above mentioned drugs were included in this study. Uncooperative and unwilling patient, Hypersensitivity to Drugs, History of neurologic or seizure disorder and ASA grade III and IV were excluded from the study.

Patients were kept Nil per orally for 6 hours before the time of surgery and on the previous night

premedicated with Diazepam 5 mg and Ranitidine 150mg. 50 patients ASA I and ASA II were randomly allocated with sealed envelope method into two different groups of 25 each. Both observer and participant were blinded.

Group A: Received (n=25) 25 ml of 0.5% bupivacaine.
Group B: Received (n=25) 25 ml of 0.5% ropivacaine.

RESULTS

Table 1: Basic parameter

			Group		Total
			Bupivacaine	Ropivacaine	
Gender	F	Count	9	6	15
		% within Group	18%	12%	30%
	M	Count	15	20	35
		% within Group	30%	40%	70%

Gender distribution in both groups was comparable. There is no statistically significant difference. Two groups were comparable with respect to their age, gender and weight.

Table 2: Heart rate between two groups

HR IN MIN	GROUP	N	Mean	Std. Deviation	T	Df	P Value
0	BUPIVACAINE	25	60.00	1.91	0.78	28	0.43
	ROPIVACAINE	25	59.66	1.39			
5	BUPIVACAINE	25	60.03	2.09	0.29	28	0.76
	ROPIVACAINE	25	59.90	1.44			
10	BUPIVACAINE	25	60.26	1.85	1.18	28	0.24
	ROPIVACAINE	25	59.73	1.43			
15	BUPIVACAINE	25	60.26	1.68	-0.85	28	0.4
	ROPIVACAINE	25	60.60	1.45			
30	BUPIVACAINE	25	61.20	1.74	1.98	28	0.05
	ROPIVACAINE	25	60.40	1.35			
45	BUPIVACAINE	25	60.76	1.61	1.32	28	0.19
	ROPIVACAINE	25	60.16	1.57			
60	BUPIVACAINE	25	60.80	1.88	0.73	28	0.45
	ROPIVACAINE	25	60.53	1.35			
90	BUPIVACAINE	25	60.63	1.69	0.14	28	0.88
	ROPIVACAINE	25	60.56	1.47			
120	BUPIVACAINE	25	60.80	1.62	0.42	28	0.67
	ROPIVACAINE	25	60.60	1.77			
150	BUPIVACAINE	25	60.63	1.42	-1.13	28	0.26
	ROPIVACAINE	25	61.10	1.60			
180	BUPIVACAINE	25	61.03	1.62	1.50	28	0.14
	ROPIVACAINE	25	60.40	1.24			
240	BUPIVACAINE	25	61.36	1.79	1.20	28	0.23
	ROPIVACAINE	25	60.93	1.08			
300	BUPIVACAINE	25	61.16	1.46	1.29	28	0.20
	ROPIVACAINE	25	60.7665	1.22			
360	BUPIVACAINE	25	61.10	1.60	0.07	28	0.93
	ROPIVACAINE	25	61.06	1.41			
420	BUPIVACAINE	25	61.70	1.31	1.41	28	0.16
	ROPIVACAINE	25	61.26	1.33			
480	BUPIVACAINE	25	62.00	1.72	0.56	28	0.57
	ROPIVACAINE	25	61.73	1.38			

There was no statistically significant difference in heart rate between both groups ($p>0.05$). There is no significant difference of heart rate clinically.

DISCUSSION

Brachial plexus block has long been considered a safe method when proper technique is followed, which includes monitoring and patient selection. However, being a very vascular area, brachial plexus blockade can set a potential place for absorption of local anaesthetics and the development of systemic toxicity. Worldwide, long acting bupivacaine has been the

most popular local anaesthetic for supraclavicular block in patients undergoing elective upper limb surgeries. But the CNS and CVS side effects are its limitations. Ropivacaine is the product of an intensive search for a safer alternative to bupivacaine.[7] Although safe, ropivacaine is found to be less potent than bupivacaine and has a slightly shorter duration of action along with some motor sparing qualities.[8] Ropivacaine has been extensively studied as an effective drug for labor analgesia and it has proved that it is comparable to bupivacaine in its efficacy with least side effect.[9,10]

In 1964, Winnie showed that the relation of the plexus and the subclavian artery to the midpoint of the first rib is not constant. He showed that there is a constant relationship between the anterior and middle scalene muscles, the plexus and the first rib. He inserted needle between the two muscles in the direction of space between them. Once a paraesthesia is obtained, a single injection is made into the space.[11]

In 1955, Pearson demonstrated that motor nerves could be located by electrical stimulation with an insulated needle. In 1969, Wright reported the block aid monitor for nerve blocks which popularized the technique making it more feasible.

Mohan IR et al. (2018) did a study on 60 patients who were scheduled for elective upper limb surgeries. They were divided into two groups. Group B received Bupivacaine 0.5% and group R received Ropivacaine 0.5%.They concluded that at equalvolumes Bupivacaine 0.5% has an advantage over Ropivacaine 0.5% for Supraclavicular Brachial Plexus block in terms of early onset of blockade and prolonged duration of blockade.[12]

Kundalwalet al. (2018) conducted a prospective randomized double blind study on 100 patients, where group B received bupivacaine and group R received ropivacaine by supraclavicular brachial plexus block. The onset of sensory block was earlier in ropivacaine and the duration of block is more in bupivacaine. In terms of analgesic effect ropivacaine was better.[13]

Modak S et al. (2016) conducted a prospective double blind randomized study involving 0 patients. They were randomly divided into two groups in which supraclavicular brachial plexus block was done using 30 ml of ropivacaine 0.5% and bupivacaine 0.5%. Ropivacaine had earlier onset of sensory and motor blockade compared to Bupivacaine. The duration of block was longer in ropivacaine. No statistically significant difference between two groups.[14]

Gonuguntla SB (2016) conducted a study of total 60 patients between 20 and 60 years age of either sex scheduled for upper limb surgeries. They randomly divided into Group A(Bupivacaine)and group B(Ropivacaine). He concluded that there were no much clinical differences in onset, duration and analgesia among bupivacaine and ropivacaine when injected in equal volumes for brachial plexus block by the supraclavicular approach.[15]

CONCLUSION

There was no statistically significant difference in heart rate between both groups ($p>0.05$). There is no significant difference of heart rate clinically.

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