Original Article

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Evaluation of Efficacy of Epidural Clonidine with 0.5% Bupivacaine for Postoperative Analgesia for Orthopaedic Lower Limb Surgeries

Anaesthesia Section

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ABSTRACT

Objective: The objective of this study is to evaluate the efficacy of epidural clonidine in intra and postoperative analgesia, the level of sedation caused by clonidine and monitor its side effects.

Materials and Methods: Forty patients of ASA1 & ASA2 scheduled for lower limb orthopaediac surgeries were chosen for the study. Study group received 50µg of clonidine diluted to 1ml along with first dose of epidural injection and Control group received 1ml of normal saline along with first dose of epidural. Intra and postoperative vitals, verbal pain rating scale (VRS), sedation score and number of rescue anlgesics required postoperatively were noted. Patients received rescue analgesic when VRS was 1.

Results: Addition of clonidine to bupivacaine definitely improves the quality of analgesia by reducing the overall pain score, prolonging the duration of the time of first rescue analgesia and causing reduction of total analgesic consumption in the postoperative period without any hemodynamic instability. Sedation may be beneficial during the intraoperative period.

Conclusion: Epidural clonidine produces long lasting, good quality analgesia with good level of sedation and with minimal side effects.

Keywords: Epidural anaesthesia, Postoperative analgesia, Regional anaesthesia

INTRODUCTION

Recent advances in neurosciences have demonstrated that peripheral tissue injury may lead to long alterations in central processing with reduction in pain threshold, amplification of response to pain. Comparable alterations may also occur following surgical trauma, resulting in amplification and prolongation of postoperative pain.

Postoperative pain may give rise to various physiological and psychological phenomena and hence postoperative pain treatment should be an integral component of the routine surgical and anaesthetic management because it can help to reduce morbidity and complications as well as accelerate rehabilitation [1]. Good and effective perioperative pain control attenuates the surgical stress response and is vital for early mobilization and postoperative discharge [2].

Regional anaesthesia is the most frequently used anaesthesia for orthopaedic lower limb surgeries. Epidural anaesthesia is a central neuraxial block technique with many applications. Epidural anaesthesia can be used as sole anaesthetic for procedures involving the lower limbs, pelvis and lower abdomen. The main advantage of epidural anaesthesia is the ability to maintain continuous anaesthesia after placement of an epidural catheter, thus making it suitable for procedures of longer duration. This feature of retaining the epidural catheter also enables the use of this technique into the postoperative period for analgesia, using lower concentrations of local anaesthetic drugs or in combination with different agents.

Clonidine hydrochloride is an imidazole derivative with alpha–2 adrenergic agonistic activity, can be used as an additive to local anaesthetics in nerve blockade and central neuraxial blockade. Following local anaesthetics and opioids, clonidine is the most studied drug used for human neuraxial analgesia. Although the systemic administration of clonidine can provide analgesia, its primary site of antinociceptive action appears to be at the spinal level [3]. Alpha - 2 receptors at the spinal cord level are thought to be responsible for the analgesic properties of α2-adrenergic agonists.

This study was designed to evaluate the analgesic efficacy of bupivacaine and clonidine mixture given through lumbar epidural route in patients undergoing elective orthopaedic lower limb surgeries, comparing the quality of analgesia with epidural pain bupivacaine and also to calculate the number of postoperative analgesic doses required.

MATERIALS AND METHODS

This randomized and placebo controlled study was performed at a Tertiary Medical College Hospital in Chennai. Forty patients were chosen for the study and by simple random sampling they were divided as 20 patients for each group. Patients who were posted for orthopaedic lower limb surgeries in the age group of 18 years to 65 years belonging to ASA physical status I & II were chosen for the study. After getting approval by the institutional ethical committee and after obtaining written informed consent from each patient, the study was conducted.

All patients were assessed preoperatively before enrolling for the study. No premedication was given. On arrival in the operating room, baseline cardio respiratory parameters viz., Heart Rate (HR), Systolic blood pressure (SBP), Diastolic blood pressure (DBP), Mean arterial pressure (MAP) and Respiratory rate (RR) were recorded. A good intravenous access was established using 18G IV cannula. Preloading was done with ringer's lactate solution at 10 ml/kg.

Patients were allocated randomly into two equal groups (20 in each group). Group P (placebo) received 1 ml of normal saline with the first dose of epidural 0.5% bupivacaine. Group C (clonidine) received 50µg of fixed dose of clonidine diluted with normal saline to 1 ml epidurally along with the first dose of bupivacaine.

With the patient in sitting posture, after informing the procedure to the patient & under strict aseptic precautions, epidural space was identified at L3-L4 interspace using 16G Tuohy needle by loss of resistance technique. Epidural catheter was threaded in a cephalad direction & 4 cm of catheter length was kept inside the epidural space. A test dose of 3 cc of 1.5 % lignocaine with adrenaline (5µg/ml) was given. After confirming negative result for test dose, epidural catheter was fixed and secured with tapes. A standard anaesthetic technique was followed in all patients.

Epidural 1st dose - 14 ml of 0.5% bupivacaine + 1ml of placebo or 50 µg of injection clonidine diluted with normal saline to 1 ml.

Epidural 2nd dose - 6ml of 0.5% bupivacaine (90 min after 1st dose)

Patients with duration of surgery between 2-2:30 hours requiring standard 2 doses of epidural local anaesthetics were only taken up for study. Time of incision was noted. Heart rate (HR), Systolic blood pressure (SBP), Diastolic blood pressure (DBP), Mean arterial pressure (MAP) and Respiratory rate (RR) were continuously monitored intraoperatively and noted every 10 min. Ramsay sedation scale (RSS) was also noted every 30 min.

All patients were given oxygen supplementation (4-5 L/min) through Hudson's face mask. No intravenous opioid analgesics were supplemented during the study. Intravenous fluid management was done based on Mean arterial blood pressure and surgical blood loss.

Ramsay Sedation Scale

1. Patient is anxious and agitated or restless, or both.
2. Patient is co-operative, oriented and tranquil.
3. Patient responds to commands only.
4. Patient exhibits brisk response to light glabellar tap or loud auditory stimulus.
5. Patient exhibits a sluggish response to light glabellar tap or loud auditory stimulus.
6. Patient exhibits no response.

The epidural catheter was retained in position. Postoperatively the patient was transferred to the Post Anaesthetic Care Unit (PACU) where PR, SBP, DBP, SPO_2 & RR monitored continuously and recorded every hour. The intensity of pain was measured by using the verbal pain rating scale.

Pain Score (Verbal Rating Score)

Grade 0 - No complaint of pain

Grade 1 - Patient complaints of pain but tolerable (mild pain)

Grade 2 - Patient complaining of severe pain and demands relief

(Moderate pain)

Grade 3 - Patient restless and screaming with pain (Severe pain)

When the patient complained of pain, the pain intensity was assessed based on verbal rating scale & if pain score reaches 1, epidural top up of 6ml of 0.125% bupivacaine was given to the patient.

The time of first rescue analgesia (TFA) was calculated from the time of injection of study drug in the epidural space to the time when the verbal rating pain score reached 1 in the postoperative period. Number of epidural top-ups (6 ml of 0.125% bupivacaine) required by each patient for a period of 48 hours was noted in both the groups. Patients were observed for any side effects like hypotension, bradycardia, respiratory, depression and shivering.

RESULTS

Patients in both the groups were similar in terms of age, sex, height, weight distribution [Table/Fig-1] and type of surgery. All the data were expressed as mean ± standard deviation (SD). Qualitative variables were compared with 'Chi-square test' and quantitative

S.NO	PARAMETERS	GROUP		p-VALUE
		GROUP P	GROUP C	
		MEAN ± SD	MEAN ± SD	
1.	Age (y)	40.60 ± 7.40	36.85 ± 9.59	p-0.183(NOT SIGNIFICANT)
2.	Gender (Male:Female)	15:5	17:3	p-0.695(NOT SIGNIFICANT)
3.	Height (cm)	164.00±5.73	166.65±6.01	p-0.152(Not Significant)
4.	Weight (kg)	59.60±5.16	59.50±6.10	p-0.956(Not Significant)

[Table/Fig-1]: Comparison of age, sex, height and weight distribution

	GROUP P	GROUP C	p-VALUE
DURATION OF SURGERY(h)	2.14 ± 0.07	2.12 ± 0.07	p – 0.359 NOT SIGNIFICANT

[Table/Fig-2]: Duration of surgery

S.NO	PARAMETERS (MIN)	GROUP		P-VALUE P<0.05-SIG
		GROUP P	GROUP C	
		MEAN ± SD	MEAN ± SD	
1.	HR PRE-OP	94.10 ± 11.81	97.05 ± 12.81	.441(NOT SIG)
2.	HR10	92.20 ± 8.16	94.70 ± 11.69	.438(NOT SIG)
3.	HR20	88.90 ± 8.70	90.40 ± 12.12	.656(NOT SIG)
4.	HR30	85.95 ± 7.52	87.30 ± 11.77	.668(NOT SIG)
5.	HR40	84.80 ± 8.29	87.10 ± 12.81	.504(NOT SIG)
6.	HR50	83.85 ± 8.34	85.45 ± 13.03	.646(NOT SIG)
7.	HR60	82.75 ± 8.66	84.90 ± 11.79	.515(NOT SIG)
8.	HR70	81.95 ± 9.24	82.55 ± 10.73	.851(NOT SIG)
9.	HR80	82.35 ± 8.96	81.65 ± 9.9.52	.812(NOT SIG)
10.	HR90	83.00 ± 9.59	82.00 ± 11.94	.908(NOT SIG)
11.	HR100	84.55 ± 9.02	83.6 ± 10.51	.761(NOT SIG)
12.	HR110	86.30 ± 7.55	85.7 ± 10.26	.834(NOT SIG)
13.	HR120	84.15 ± 10.00	86.85 ± 10.21	.594(NOT SIG)
14.	HR130	87.30 ± 8.41	86.20 ± 10.28	.713(NOT SIG)
15.	HR140	87.00 ± 8.60	88.65 ± 11.08	.602(NOT SIG)
16.	HR150	90.70 ± 8.98	90.70 ± 10.53	1.00(NOT SIG)

[Table/Fig-3]: Heart rate

S.NO	PARAMETERS (MIN)	GROUP		P-VALUE P<0.05-SIG
		GROUP P	GROUP C	
		MEAN ± SD	MEAN ± SD	
1.	RR PRE OP	15.80 ± 1.58	19.75 ± 1.56	0.268(NOT SIG)
2.	RR 10	14.45 ± 1.47	15.20 ± 1.28	0.093(NOT SIG)
3.	RR 20	14.65 ± 1.87	15.10 ± 1.41	0.396(NOT SIG)
4.	RR 30	14.40 ± 2.37	14.55 ± 1.76	0.822(NOT SIG)
5.	RR 40	14.10 ± 2.04	14.30 ± 1.45	0.724(NOT SIG)
6.	RR 50	14.25 ± 1.58	14.30 ± 1.49	0.919(NOT SIG)
7.	RR 60	14.45 ± 2.01	14.45±1.27	1.000(NOT SIG)
8.	RR 70	14.55 ± 2.44	14.65 ± 1.27	0.872(NOT SIG)
9.	RR 80	14.70 ± 2.12	14.85 ± 1.35	0.792(NOT SIG)
10	RR 90	14.50 ± 1.76	14.35 ± 1.56	0.777(NOT SIG)
11.	RR 100	14.60 ± 1.50	14.35 ± 1.35	0.583(NOT SIG)
12.	RR 110	14.80 ± 1.73	14.40 ± 1.53	0.445(NOT SIG)
13.	RR 120	14.75 ± 2.07	14.80 ± 1.05	0.923(NOT SIG)
14.	RR 130	15.50 ± 2.91	15.00 ± 1.17	0.480(NOT SIG)
15.	RR 140	14.95± 1.47	14.90 ± 0.97	0.899(NOT SIG)
16.	RR 150	15.00 ± 1.45	15.05 ± 0.99	0.900(NOT SIG)

[Table/Fig-4]: Respiratory rate

S.NO	PARAMETERS (MIN)	GROUP		p-VALUE p<0.05-SIG
		GROUP P	GROUP C	
		MEAN ± SD	MEAN ± SD	
1.	SBP PRE-OP	128.80 ± 6.68	130.20 ± 6.47	0.505(NOT SIG)
2.	SBP 10	120.20 ± 11.70	118.65 ± 5.85	0.600(NOT SIG)
3.	SBP 20	110.05 ± 11.64	107.40 ± 10.88	0.462(NOT SIG)
4.	SBP 30	113.85 ± 13.51	112.70 ± 6.85	0.736(NOT SIG)
5.	SBP 40	114.90 ± 9.29	108.30 ± 22.37	0.231(NOT SIG)
6.	SBP 50	116.00 ± 8.57	111.05 ± 7.16	0.055(NOT SIG)
7.	SBP 60	115.70 ± 9.81	110.25 ± 5.98	0.041(SIG)
8.	SBP 70	116.00 ± 7.38	108.70 ± 8.97	0.008(SIG)
9.	SBP 80	114.80 ± 7.96	112.95 ± 7.51	0.454(NOT SIG)
10.	SBP 90	114.50 ± 7.04	111.80 ± 8.47	0.280(NOT SIG)
11.	SBP 100	113.65 ± 8.56	110.35 ± 7.88	0.212(NOT SIG)
12.	SBP 110	118.35 ± 5.38	112.45 ± 7.30	0.006(SIG)
13.	SBP 120	120.35 ± 5.33	113.75 ± 8.90	0.007(SIG)
14.	SBP 130	117.55 ± 5.05	113.00 ± 8.37	0.044(SIG)
15.	SBP 140	118.70 ± 6.34	114.80 ± 7.46	0.083(NOT SIG)
16.	SBP 150	124.10 ± 3.74	120.00 ± 8.03	0.045(SIG)

[Table/Fig-5]: Systolic blood pressure

S.NO	PARAMETERS (MIN)	GROUP		P-VALUE P<0.05-SIG
		GROUP P	GROUP C	
		MEAN ± SD	MEAN ± SD	
1.	DBP PRE OP	82.40 ± 3.01	81.85 ± 4.93	0.673(NOT SIG)
2.	DBP 10	75.20 ± 8.70	74.00± 6.02	0.615(NOT SIG)
3.	DBP 20	68.15± 10.38	65.50 ± 10.18	0.420(NOT SIG)
4.	DBP 30	69.40 ± 9.63	69.15 ± 6.36	0.923(NOT SIG)
5.	DBP 40	71.60 ± 7.80	67.65 ± 15.14	0.306(NOT SIG)
6.	DBP 50	72.20 ± 8.35	68.70 ± 4.47	0.107(NOT SIG)
7.	DBP 60	73.20 ± 7.88	67.85 ± 3.74	0.009(SIG)
8.	DBP 70	72.55 ± 7.75	66.95 ± 5.60	0.013(SIG)
9.	DBP 80	71.75 ± 6.48	70.70± 4.95	0.568(NOT SIG)
10	DBP 90	72.65 ± 6.55	69.45 ± 4.87	0.088(NOT SIG)
11.	DBP 100	72.50 ± 7.49	69.85 ± 5.54	0.211(NOT SIG)
12.	DBP 110	74.30 ± 5.10	70.45 ± 4.42	0.015(SIG)
13.	DBP 120	75.35 ± 6.67	71.85 ± 5.61	0.080(NOT SIG)
14.	DBP 130	73.30 ± 5.19	70.95 ± 5.07	0.156(NOT SIG)
15.	DBP 140	74.90 ± 6.20	71.65 ± 4.33	0.062(NOT SIG)
16.	DBP 150	79.15 ± 3.04	78.10 ± 4.61	0.401(NOT SIG)

[Table/Fig-6]: Diastolic blood pressure

variables were compared with the 'student t-test'. The level of statistical significance was set at $p < 0.05$. There was no significant difference in the duration of surgery (hour) between the two groups [Table/Fig-2].

During the intraoperative monitoring, there were no significant changes in heart rate [Table/Fig-3] and respiratory rate [Table/Fig-4] among the two groups. Difference in Systolic blood pressure monitoring between two groups were found to be significant only during 60,70,110,120,130,150 minutes [Table/Fig-5]. Difference in Intraoperative Diastolic Blood Pressure monitoring between the two groups were found to be significant only during 60, 70 and 110 minutes [Table/Fig-6]. Difference in Intraoperative Mean Arterial Pressure monitoring between the two groups were found to be significant only during 60, 70 and 110 minutes [Table/Fig-7].

According to Chi- square test, Difference in Ramsay Sedation Scale (RSS) between the two groups was significant at 30 min (p-0.003), 60 min (p<0.001) and 90 min (P<0.001). Difference in

S.NO	PARAMETERS (MIN)	GROUP		P-VALUE P<0.05-SIG
		GROUP P	GROUP C	
		MEAN ± SD	MEAN ± SD	
1.	MAP PRE OP	97.85 ± 3.51	97.90 ± 4.74	0.970(NOT SIG)
2.	MAP 10	90.40 ± 9.34	88.80 ± 5.61	0.516(NOT SIG)
3.	MAP 20	81.85 ± 10.05	78.85 ± 10.35	0.359(NOT SIG)
4.	MAP 30	83.85 ± 9.94	83.80 ± 5.52	0.984(NOT SIG)
5.	MAP 40	86.20 ± 8.15	84.65 ± 4.58	0.463(NOT SIG)
6.	MAP 50	86.70 ± 8.15	83.00 ± 4.66	0.086(NOT SIG)
7.	MAP 60	88.25 ± 8.97	82.05 ± 4.31	0.008(SIG)
8.	MAP 70	86.90 ± 7.38	80.85 ± 6.44	0.009(SIG)
9.	MAP 80	86.00 ± 6.58	84.70 ± 5.55	0.504(NOT SIG)
10.	MAP 90	86.40 ± 6.32	83.45± 5.77	0.132(NOT SIG)
11.	MAP 100	85.85 ± 7.76	83.65± 5.31	0.302(NOT SIG)
12.	MAP 110	89.35 ± 5.30	84.60 ± 5.04	0.006(SIG)
13.	MAP 120	89.80 ± 6.13	85.85 ± 6.22	0.050(NOT SIG)
14.	MAP 130	88.25 ± 4.35	85.05 ± 5.79	0.055(NOT SIG)
15.	MAP 140	88.90 ± 6.07	86.20 ± 4.80	0.127(NOT SIG)
16.	MAP 150	94.00 ± 2.95	91.75 ± 5.15	0.098(NOT SIG)

[Table/Fig-7]: Mean arterial pressure

TIME (min)	RSS	GROUP P	GROUP C	TOTAL	P-VALUE
30	1 Count % Within Group	20 100%	12 60%	32 80%	0.003
	2 Count % Within Group	0 0%	8 40%	8 20%	
60	1 Count % Within Group	20 100%	0 0%	20 50%	<0.001
	2 Count % Within Group	0 0%	20 100%	20 50%	
90	1 Count % Within Group	20 100%	6 30%	26 65%	<0.001
	2 Count % Within Group	0 0%	14 70%	14 35%	
120	1 Count % Within Group	20 100%	19 95%	39 97.5%	0.999
	2 Count % Within Group	0 0%	1 5%	1 2.5	
150	1 Count % Within Group	20 100%	20 100%	40 100%	1.000

[Table/Fig-8]: Ramsay sedation scale

RSS between the two groups was not significant at 120 min and 150 min respectively [Table/Fig-8].

The postoperative pain score (verbal rating scale) was found to be significantly low at 4, 12, 18 and 24 hours in Group C when compared to Group P. Significantly low pain scores were observed at 4, 12, 18 and 24 hours intervals in patients belonging to Group C ($p < 0.001$ at 4,12 and 24 hours intervals and p -0.004 at 18 hours interval) than Group P [Table/Fig-9]. The study demonstrated that pain relief was significantly better ($p < 0.05$) in patients who received epidural bupivacaine with clonidine than the patients who received epidural bupivacaine with placebo. The mean time of first rescue analgesia (hours) was found to be (6.05±0.65 hours) in Group C as compared to (3.27±0.53 hours) observed in Group P which was statistically significant (P-0.001) [Table/Fig-10].

The no of postoperative epidural top ups for next 48 hours were significantly low (4 or 5 doses) in group C compared to (6 or 7 doses) in Group P [Table/Fig-11].

DISCUSSION

A number of clinical trials have been conducted to prove the efficacy of anti- nociceptive effect of α2 agonists using different techniques

TIME IN HOURS	RSS	GROUP P	GROUP C	TOTAL	CHI-SQUARE TEST
2	0 COUNT % WITH IN GROUP	18 90%	20 100%	38 95%	p-0.487 NOT SIG
	2 COUNT % WITH IN GROUP	2 10%	0 0%	2 5%	
4	0 COUNT % WITH IN GROUP	0 0%	19 95%	19 47.5	p<0.001 SIG
	1 COUNT % WITH IN GROUP	16 80%	1 5%	17 42	
	2 COUNT % WITH IN GROUP	4 100%	0 100%	4 100%	
6	0 COUNT % WITH IN GROUP	6 30%	8 40%	14 35%	p-0.741 NOT SIG
	1 COUNT % WITH IN GROUP	14 70%	12 60%	26 65%	
8	0 COUNT % WITH IN GROUP	0 0%	4 20%	4 10%	p-0.072 NOT SIG
	1 COUNT % WITH IN GROUP	19 95%	16 85%	35 87.5%	
	2 COUNT % WITH IN GROUP	1 5%	0 0%	1 2.5%	
12	0 COUNT % WITH IN GROUP	0 0%	2 10%	2 50%	p<0.001 SIG
	1 COUNT % WITH IN GROUP	7 35%	18 90%	25 62.5%	
	2 COUNT % WITH IN GROUP	13 65%	0 0%	13 32.5%	
18	1 COUNT % WITH IN GROUP	5 25%	15 75%	20 50%	p-0.004 SIG
	2 COUNT % WITH IN GROUP	15 75%	5 25%	20 50%	
24	1 COUNT % WITH IN GROUP	1 5%	11 55%	12 30%	p-0.001 SIG
	2 COUNT % WITH IN GROUP	19 95%	9 45%	28 70%	
36	1 COUNT % WITH IN GROUP	18 90%	20 100%	38 95%	p-0.487 NOT SIG
	2 COUNT % WITH IN GROUP	2 90%	0 0%	2 5%	
48	1 COUNT % WITH IN GROUP	0 0%	2 10%	2 5%	p-0.487 NOT SIG
	2 COUNT % WITH IN GROUP	20 100%	20 100%	40 100%	

[Table/Fig-9]: Verbal rating scale

	GROUP		P-VALUE
	GROUP P	GROUP C	
Time of first rescue analgesia (h)	3.27 ±0.53	6.05 ± 0.65	0.001 SIGNIFICANT

[Table/Fig-10]: Time of first rescue analgesia

NO. OF DOSES		GROUP		Total
		GROUP P	GROUP C	
4	Count	0	19	19
	% within GROUP	0%	95.0%	47.5%
5	Count	0	1	1
	% within GROUP	0%	5.0%	2.5%
6	Count	15	0	15
	% within GROUP	75.0%	0%	37.5%
7	Count	5	0	5
	% within GROUP	25.0%	0%	12.5%
Total	Count	20	20	40
	% within GROUP	100.0%	100.0%	100.0%

[Table/Fig-11]: No of epidural top ups

and different types of drugs with conflicting results. The use of epidural techniques also offers the advantage of effective prolonged postoperative analgesia as compared to nerve blocks and local infiltrations.

The dose-dependent antinociceptive effects of clonidine were demonstrated in 1981. These effects are partly mediated by spinal cord muscarinic and nicotinic receptors and the release of acetylcholine and by the activation of inhibitory noradrenergic pathways. In experimental studies, animal models and clinical trials, subarachnoid opioids, local anaesthetics and $\alpha 2$ adrenergic agonists show synergistic or additive interactions. Intrathecal or epidural clonidine is not neurotoxic [3].

In this randomized and placebo controlled study, we have evaluated the analgesic efficacy of bupivacaine with clonidine mixture given through lumbar epidural route in patients undergoing orthopaedic lower limb surgeries.

In this study, we found that bupivacaine and clonidine administered epidurally, reduced the amount of analgesic that patients required postoperatively suggesting that clonidine may enhance the analgesic effect of bupivacaine. This study correlates with the meta-analysis done by Armand et al., which concluded that epidural clonidine clearly produced an analgesic effect and reduced the need for other analgesics [4].

The level of sedation intraoperatively was monitored using Ramsay Sedation Scale. The patients in Group C were well sedated and comfortable than in Group P [Table/Fig-8]. This study correlates with the study conducted by Vieira AM et al., and Parker RK et al., in which they concluded that the association of clonidine and local anaesthetic (ropivacaine [5,6], bupivacaine [7-9]) had produced longer analgesia and sedation [10].

Pain intensity was assessed using the verbal rating scale (VRS) postoperatively. Significant lower VRS scores after 2,4,6,8,12,18,24,36,48 hours [Table/Fig-9], in group C has demonstrated the clinical advantage of administering mixture of bupivacaine and clonidine through lumbar epidural route for effective postoperative analgesia [8,11-17].

Duration of analgesia was significantly more in group C patients receiving bupivacaine and clonidine mixture (6.05±0.64 h) as compared to Group P (3.26±0.53 h). The demand for supplementary epidural top-ups over 48 hours postoperatively was significantly low in group C than Group P [Table/Fig-10]. This correlates with the study of Armand et al., [4].

In this study the dosage of clonidine was fixed at 50 µg for all patients in Group C. Because of the low dose of clonidine used, when compared to Thimmappa M et al., and Gupta S et al., the incidence of side effects were very low [6,8]. Two patients of placebo Group (10% of Group P) and two patients of clonidine group (10%

of Group C) had episodes of hypotension with a MAP< 70 mm Hg during intraoperative period [Table/Fig-4-6] who were managed with a single dose of ephedrine 6 mg iv and crystalloids, and this may be as a result of epidural bupivacaine as such. Postoperatively none of the patients had episode of hypotension. No incidence of any bradycardia [Table/Fig-3] was noted in both the group during intraoperative and postoperative period.

CONCLUSION

Single dose administration of clonidine and bupivacaine mixture given through lumbar epidural route provides effective postoperative analgesia in patients undergoing elective orthopaedic lower limb surgeries, without any hemodynamic instability. Epidural clonidine significantly reduces the postoperative analgesic consumption and also provides good sedation.

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