

MAGNESIUM SULPHATE VS CLONIDINE AS AN ADJUVANT TO 0.5% BUPIVACAINE IN EPIDURAL ANAESTHESIA FOR PATIENTS UNDERGOING LOWER LIMB SURGERIES: A COMPARATIVE STUDY

Anand Masih Lakra¹, Pratibha (Jain) Shah², Omprakash Sundrani³, Manju Tandon⁴, K. K. Sahare⁵, Jaya Lalwani⁶, D. S. Patel⁷

HOW TO CITE THIS ARTICLE:

Anand Masih Lakra, Pratibha (Jain) Shah, Omprakash Sundrani, Manju Tandon, K. K. Sahare, Jaya Lalwani, D. S. Patel. "Magnesium Sulphate Vs Clonidine as an Adjuvant to 0.5% Bupivacaine in Epidural Anaesthesia for Patients Undergoing Lower Limb Surgeries: A Comparative Study". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 73, September 10; Page: 12680-12690, DOI: 10.14260/jemds/2015/1828

ABSTRACT: Epidural anesthesia is a safe and inexpensive technique with the advantage of providing surgical anesthesia and prolonged postoperative pain relief. To address the problems of limited duration of action and to improve the quality of analgesia intra-operatively and postoperatively, various adjuvants have been added to bupivacaine. The present study is designed to evaluate the effect of magnesium sulphate vs clonidine as an adjunct to 0.5% Bupivacaine in epidural anesthesia for patients undergoing lower limb surgeries in terms of onset, duration and degree of sensory and motor block, sedation and pain. 90 patients of age group 18-60 years of ASA grade I & II of either sex undergoing lower limb surgeries were included in this prospective study who were randomly allocated into three groups. Group A received bupivacaine 0.5%(19ml) +normal saline 0.9% (1.0ml), Group B received bupivacaine 0.5%(19ml)+magnesium sulphate 50mg dissolved in 0.9% normal saline (1.0ml) and Group C received bupivacaine 0.5%(19ml) +clonidine 150µgm(1.0ml). Assessments of sensory block were performed at 5, 10, 15, 20, 25, 30 min and then every 10 min until the return of normal sensation.). Assessment of motor block were performed immediately after the assessment of sensory block until the return of normal motor function. The onset and end of all degrees of motor blocks were assessed bilaterally according to the Modified Bromage scale. Duration of analgesia, patient's satisfaction, duration of motor block and adverse effects were assessed and recorded. We concluded that co-administration of epidural magnesium sulphate 50MG with bupivacaine 0.5% produces predictable rapid onset of surgical anesthesia without any side-effects, and addition of clonidine 150µgmto epidural bupivacaine 0.5% produces prolonged duration of anesthesia with sedation. The results of our study suggest that magnesium may be a useful alternative as an adjuvant to epidural bupivacaine as clonidine.

KEYWORDS: Epidural anesthesia, Bupivacaine, Clonidine, Magnesium sulphate.

INTRODUCTION: Regional anesthesia is the most frequently used anesthesia for orthopedic lower limb surgeries. Epidural placement is the safe, effective means of providing surgical anesthesia and postoperative analgesia. Recent developments have led to greater patient satisfaction and accelerated functional recovery, allowing earlier discharge from hospital. The quality of the epidural anaesthesia has been reported to be improved by the addition of adjuvants like opioids, ketamine, midazolam. But none of them have established in regular clinical use because of their adverse effects.

Magnesium is an abundant cation in the body, essential to numerous physiological activities. Magnesium is a non-competitive N-methyl-D-aspartate (NMDA) receptor antagonist, and inhibits voltage-gated calcium channels.

ORIGINAL ARTICLE

Clonidine functions as a sympatholytic by stimulating presynaptic α_2 -receptors leading to decreased release of norepinephrine at both central and peripheral adrenergic terminals. In addition to its influence on the autonomic nervous system, it is well established that clonidine is an effective analgesic, and this is also attributable to its α_2 -agonist activity.

AIMS AND OBJECTIVES: The present study was conducted to compare the effect of magnesium sulphate vs. clonidine as an adjunct to bupivacaine 0.5% for lower limb surgeries in terms of:

1. Onset of sensory and motor block
2. Duration of sensory and motor block
3. Degree of motor block
4. Adverse effect.

MATERIALS AND METHODS: After obtaining institutional ethical committee approval and caregivers written informed consent 90 patients of age group 18-60years of ASA grade I & II of either sex undergoing lower limb surgeries were included in this prospective study.

Patient with contraindication to epidural anaesthesia or having cardiovascular diseases, known history of allergy to study drugs, Bleeding diathesis, Local and systemic infection, Psychiatric illness, Chronic headache and backache in the past and on anticoagulant therapy were excluded from the study.

After a detailed history, general and systemic examination and necessary investigations patients were randomly allocated into three groups.

- Group A received bupivacaine 0.5% (19ml) + normal saline 0.9% (1.0ml).
- Group B received bupivacaine 0.5% (19ml) + magnesium sulphate 50mg dissolved in 0.9% normal saline (1.0ml).
- Group C received bupivacaine 0.5% (19ml) + clonidine 150 μ gm (1.0ml).

After securing IV access with appropriate cannula all patients were preloaded with ringer lactate solution 10 ml/kg over 20 minutes prior to the procedure. In sitting position, under all aseptic precautions, L3-L4 or L2-L3 interspace was identified by counting down from T7 vertebra and local infiltration of 2ml 2% lignocaine was done at one of the interspaces. A Tuohy's epidural needle 18G was inserted through the midline approach and epidural space was located by loss of resistance method. Direction of the bevel was kept cephalad in all the cases. A disposable sterile multi hole 18G epidural catheter 2-3cm cephalad was threaded in the epidural space and was secured with adhesive tape. The patients were placed in supine position. A test dose of 2% xylocaine with adrenaline (1: 200000), 3 ml was given to exclude the possibility of intradural or intravascular placement of catheter. Following this, 19 ml of the 0.5% bupivacaine + normal saline 0.9% (1ml) total volume of 20 ml, 0.5% bupivacaine+MGSO₄ 50mg (1ml) total volume of 20ml or bupivacaine 0.5%+clonidine 150 mcg (1ml) total volume of 20 ml were injected through the epidural catheter at a rate of 4 ml/min. Surgery was started when adequate surgical anaesthesia was obtained. Adequate surgical anaesthesia in this context signified no pain after using a clamp to pinch the skin within the area of incision and by pin prick method. Oxygen supplementation done via facemask at 3ltr/min intra operatively. Treatment of hypotension and bradycardia was carried out with inj. mephentermine 3MG and atropine 0.6MG IV and repeated if necessary.

ORIGINAL ARTICLE

Intra operative monitoring was done for heart rate, blood pressure, oxygen saturation and respiratory rate initially at every 5 minutes intervals for 30 minutes and after that at 10 minutes intervals for the entire duration of surgery. Assessments of sensory block were performed at 5, 10, 15, 20, 25, 30 min and then every 10 min until the return of normal sensation. The onset and end of analgesia was determined bilaterally by pin prick method. Analgesia was recorded at dermatome levels S3, S1, L5, L3, L1, T12, T10, T 8, T7 and T6; together with the maximal spread of analgesia (Upper and lower spread). Assessment of motor block were performed immediately after the assessment of sensory block until the return of normal motor function. The onset and end of all degrees of motor blocks were assessed bilaterally according to the Modified Bromage scale: 0= No motor block (ability to move hips, knees and ankles), 1=inability to raise extended leg (Able to flex knee); 2=inability to flex knee (Able to flex foot only); and 3 = inability to flex ankle joint (Unable to flex foot or knee) (Datta S. and Camann W. et al 1995).¹ During the procedure patients were monitored for any complications and side effects and managed accordingly.

At the end of surgery the patient were monitored in the recovery room and then in post-operative ward. Duration of analgesia, patient's satisfaction, duration of motor block and adverse effects were assessed and recorded. Epidural catheter was removed after 72 hours.

Onset of sensory block was defined as the time taken for the analgesia to make its first objective appearance from the time of injection of drug is assessed by superficial pinprick method at 2 minutes interval till the occurrence of complete analgesia.

Extent of Block was defined as maximum upper and lower level of spread of analgesia which was determined by counting number of spinal dermatomes blocked.

Duration of analgesia was defined as the time interval between the injection of drug in epidural space till the regression of analgesia by two segment from the maximum height of analgesia achieved. Effectiveness of sensory Block was judged at the end of surgery as following: (Bjornestad E. and Smedvig J.P. 1999).²

Excellent = no pain

Satisfactory = acceptable pain, no need for supplementary analgesics

Unsatisfactory = unacceptable pain, requiring supplementary analgesics.

Onset of motor block was defined as the time taken for onset of motor block from the time of injection.

Degree of motor block was assessed by using modified Bromage scale:

- Grade 1 – inability to elevate extended leg (able to flex knee)
- Grade 2 – inability to flex knee (able to move foot only)
- Grade 3 – inability to flex ankle
- Grade 4 – complete motor paralysis (Datta S. and Camann W. et al 1995).¹

Duration of motor block was defined as the time taken for complete motor recovery from the time of the injection of the drug.

Heart rate below 60/min or a fall of more than 20% of preoperative value was considered as bradycardia.

Fall in the blood pressure of more than 20% of preoperative value was considered as significant hypotension. All the observations were recorded and tabulated. Results were analysed statistically by paired t test (p value < 0.05 was considered significant).

ORIGINAL ARTICLE

OBSERVATIONS AND RESULTS:

TABLE 1: Both the groups were comparable with respect to demographic profile.

Sl. NO.	VARIABLES	GROUP A (MEAN±SD)	RANGE	GROUP B (MEAN±SD)	RANGE	GROUP C (MEAN±SD)	RANGE	P VALUE
1.	Age(yrs)	38.97±12.53	20-60	39.63±11.27	20-60	42.80±12.88	18-60	>0.05
2.	Sex(m:f)	29.99±8.20	30(M)	28.0±9.32	30 (M)	29.20-6.08±	30 (M)	>0.05
3.	Weight(kgs)	53.50±6.169	40-60	57.13±10.67	50-60	50.00±5.497	30-60	>0.05
4.	Height(cms)	162.66±6.36	140-160	165.4±3.83	140-155	161.7±4.71	140-160	>0.05
5.	Duration of surgery(mins)	99.0±8.34	60-100	99.83±8.35	60-110	99.93±8.65	60-180	>0.05

Table: 1 Demographic Profile

LEVEL OF SENSORY BLOCK	GROUP A (n=30)	GROUP B (n=30)	GROUP C (n=30)
T8	15(50%)	16(53.33%)	16(53.33%)
T7	10(33.33%)	9(30%)	10(33.33%)
T6	5(16.66%)	5(16.66%)	4(13.33%)

Table 2: Shows the highest sensory levels achieved in various groups

ONSET TIME OF SENSORY BLOCK (mins)	GROUP A(n=30)	GROUP B (n=30)	GROUP C (n=30)
MEAN±SD	14.20±2.058	10.0±2.243	13.73±2.243
RANGE	12-18	8-12	10-18
p value	< 0.05 (significant)		

Table 3: Shows the onset time of sensory block at T8 level

2 SEGMENT REGRESSION TIME(mins)	GROUP A (n=30)	GROUP B (n=30)	GROUP C (n=30)
MEAN	164.0±34.20	170.7±17.17	180.3±26.51
RANGE	100-170	110-170	110-180
	p value < 0.05 (significant)		

Table 4: shows the time for 2 segment sensory regression

MEAN DURATION OF SENSORY BLOCK (mins)	GROUP A	GROUP B	GROUP C
MEAN±SD	139.1±18.58	330.5±26.14	334.0±31.39
RANGE	100-150	150-350	150-350
P VALUE	<0.05	<0.05	<0.05

Table 5: Shows the mean duration of sensory block

ORIGINAL ARTICLE

GRADES OF MOTOR BLOCK	GROUP A(n=30)	GROUP B(n=30)	GROUP C(n=30)
GRADE 1	30(100%)	30(100%)	30(100%)
GRADE 2	21(70%)	19(63.33%)	19(63.33%)
GRADE 3	9(30%)	10(33.33%)	10(33.33%)
P > 0.05 (not significant)			

Table 6: shows the number and percentage of patients who achieved different grades of motor blockade, assessed by using modified bromage scale

Onset Time of Motor Block (min)	Grade 1 in groups			Grade 2 in groups			Grade 3 in groups		
	A	B	C	A	B	C	A	B	C
Mean±SD	23.03±2.44	18.47±2.95	15.13±1.167	24.79±0.787	20.76±1.48	17.11±1.054	21.56±1.944	18.10±1.054	16.32±1.250
P value	<0.05			<0.05			<0.05		

Table 7: Shows that the mean onset time for different grades of motor block

DURATION OF MOTOR BLOCK (MINS)	GROUP A(n=30)	GROUP B(n=30)	GROUP C(n=30)
MEAN±SD	142.7±11.28	289.8±33.00	293.7±19.21
RANGE	100-150	150-300	200-300
P < 0.05(Significant)			

Table 8: Shows the mean duration of motor block

STUDY PERIOD(min)	GROUP A	GROUP B	GROUP C	P VALUE
BASE LINE (Prepidural)	77.13±12.86	79.67±5.616	74.83±1.315	> 0.05
5	82.10±8.837	79.63±5.092	70.77±4.057	> 0.05
10	78.67±6.547	77.13±6.506	70.03±4.687	> 0.05
15	81.43±4.127	77.20±7.104	57.13±1.871	> 0.05
20	77.80±4.313	77.07±4.773	60.80±5.410	> 0.05
25	75.60±4.538	77.53±5.476	66.83±1.578	> 0.05
30	70.27±6.002	78.23±3.369	66.67±1.061	> 0.05
40	71.50±4.316	76.67±5.561	64.27±3.073	> 0.05
50	70.40±5.604	76.53±4.882	64.60±1.499	> 0.05
60	73.20±4.661	75.40±5.450	65.77±1.357	> 0.05
70	69.70±4.538	76.20±5.224	67.43±3.501	> 0.05
80	73.20±6.002	76.60±4.882	64.10±9.929	> 0.05
90	71.00±4.316	76.13±5.450	66.27±9.822	> 0.05
END OF SURGERY	66.67±5.604	77.13±5.224	69.97±5.555	> 0.05

Table 9: Shows the mean values of pulse rate at various time intervals

ORIGINAL ARTICLE

STUDY PERIOD (min)	GROUP A	GROUP B	GROUP C	P VALUE
BASE LINE (Preepidural)	122.7±5.517	117.4±5.519	117.3±2.881	>0.05
5	120.9±5.270	116.0±3.681	117.3±2.881	>0.05
10	118.8±3.671	119.7±3.073	114.0±5.465	>0.05
15	119.1±3.003	117.0±2.671	109.4±6.887	>0.05
20	115.9±2.982	117.0±2.546	107.2±3.764	>0.05
25	114.6±3.286	117.0±2.606	105.1±5.519	>0.05
30	111.1±5.191	118.7±2.693	104.3±5.369	>0.05
40	112.1±4.792	117.3±2.881	106.6±3.266	>0.05
50	112.9±3.812	119.9±3.016	104.3±5.369	>0.05
60	116.5±3.928	119.4±3.113	104.3±5.369	>0.05
70	117.9±3.546	117.3±2.881	100.9±5.099	>0.05
80	119.0±3.378	117.0±2.606	104.3±5.369	>0.05
90	117.4±5.119	118.7±2.693	104.3±5.369	>0.05
END OF SURGERY	117.4±5.519	117.3±2.881	107.2±3.764	>0.05

Table 10: Shows the mean Systolic blood pressure at various time intervals

STUDY PERIOD(min)	GROUP A	GROUP B	GROUP C	P VALUE
BASELINE(Preepidural)	82.63±4.582	80.06±4.08	81.53±7.477	>0.05
5	75.57±2.542	78.63±4.60	80.13±7.477	>0.05
10	74.50±3.093	78.8±5.27	77.23±9.239	>0.05
15	74.20±3.764	77.76±4.63	73.23±6.907	>0.05
20	73.43±3.380	77.07±3.67	73.50±6.668	>0.05
25	74.27±2.016	78.30±3.07	74.93±3.657	>0.05
30	73.03±4.958	74.30±9.75	76.13±7.143	>0.05
40	76.23±3.963	74.0±8.60	76.30±4.284	>0.05
50	77.47±6.027	76.43±4.85	71.07±5.186	>0.05
60	75.63±4.460	76.03±4.70	74.93±6.341	>0.05
70	78.47±4.539	79.37±3.96	75.80±6.116	>0.05
80	77.07±4.386	79.10±4.77	71.87±5.488	>0.05
90	77.73±5.445	79.73±3.67	71.30±5.415	>0.05
END OF SURGERY	77.57±5.237	79.60±3.67	76.50±3.330	>0.05

Table 11: Shows the mean Diastolic blood pressure at various time intervals

STUDY PERIOD(min)	GROUP A	GROUP B	GROUP C	P VALUE
BASELINE(Preepidural)	14.87±1.008	15.00±0.94	14.80±0.99	>0.05
5	14.77±1.357	15.03±0.67	15.23±1.406	>0.05
10	15.23±1.406	15.03±0.67	15.23±1.406	>0.05
15	14.80±1.606	15.23±0.72	14.80±1.606	>0.05
20	14.40±1.453	15.03±0.67	14.60±1.192	>0.05
25	14.67±1.124	15.13±1.042	14.60±1.102	>0.05

ORIGINAL ARTICLE

30	14.93±1.015	15.14±1.042	14.60±1.102	>0.05
40	14.93±1.015	15.00±0.94	15.00±0.94	>0.05
50	14.60±1.329	15.03±0.67	15.03±0.67	>0.05
60	15.27±1.363	15.03±0.67	15.03±0.67	>0.05
70	14.87±1.525	15.23±0.72	15.23±0.72	>0.05
80	14.27±1.363	15.03±0.67	15.03±0.67	>0.05
90	14.63±1.159	15.03±0.67	15.03±0.67	>0.05
END OF SURGERY	14.62±1.115	15.13±1.042	15.13±1.042	>0.05

Table 12: Shows the mean respiratory rate (per min) at various time intervals

STUDY PERIOD (min)	GROUP A (MEAN±SD)	GROUP B (MEAN±SD)	GROUP C (MEAN±SD)	P VALUE
Baseline (Pree-pidural)	98.43±0.89	98.33±1.03	98.43±0.89	> 0.05
5	98.70±0.99	98.13±0.90	98.70±0.99	> 0.05
10	98.86±0.86	98.23±0.94	98.86±0.86	> 0.05
15	98.07±0.78	98.13±0.94	98.07±0.78	> 0.05
20	98.10±0.88	98.27±0.78	98.10±0.88	> 0.05
25	98.10±0.76	98.93±0.94	98.10±0.76	> 0.05
30	98.96±0.89	98.30±0.84	98.96±0.89	> 0.05
40	98.23±0.68	98.50±0.78	98.23±0.68	> 0.05
50	98.27±0.87	98.33±0.88	98.27±0.87	> 0.05
60	98.23±0.77	98.07±0.87	98.23±0.77	> 0.05
70	98.27±0.74	98.33±0.88	98.27±0.74	> 0.05
80	98.13±0.94	98.27±0.78	98.13±0.94	> 0.05
90	98.33±0.88	98.17±1.05	98.33±0.88	> 0.05
End of surgery	98.47±0.97	98.66±0.77	98.47±0.97	> 0.05

Table 13: Shows the mean SPO₂ at various time intervals

SL. No.	SIDE EFFECTS	GROUP A		GROUP B		GROUP C	
		No.	%	No.	%	No.	%
1.	HYPOTENSION	5	16.66	3	10	18	60
2.	BRADYCARDIA	8	26.66	4	13.33	20	66.66
3.	NAUSEA	6	20	2	6.66	4	13.33
4.	VOMITING	0	0	0	0	0	0
5.	SHIVERING	6	20	4	13.33	10	33.33
6.	PRURITUS	0	0	0	0	0	0
7.	SEDATION	0	0	0	0	7	23.33

Table 14: Shows the incidence of side effects in all the three groups

QUALITY OF ANAESTHESIA	GROUP A		GROUP B		GROUP C	
	No.	%	No.	%	No.	%
Excellent	25	83.33	26	86.66	28	93.33%
Satisfactory	3	10	1	3.33	2	6.66%
Unsatisfactory	2	6.66	3	10	0	0

Table 15: Shows the overall quality of epidural anaesthesia

DISCUSSION: The aim of the study was to compare the Effect of magnesium sulphate and clonidine as an adjunct to bupivacaine 0.5% in lower limb surgeries”.

In our study highest level of sensory anaesthesia achieved in maximum number of cases was T8 in all study groups. There was no significant difference in the highest level of sensory blocks achieved among the groups ($p > 0.05$) calculated by applying ANNOVA test (A-B, A-C and B-C) (Table- 2).

Zand F, Razavizadeh MR, Azemati S. et al (2004).³ showed that the sensory block was at the level of T₁₀ in patients receiving a total volume of 18 ml plain 0.5% bupivacaine in different groups. In our study the highest level of sensory block is T8 which may be because of difference in the dose and volume of the drug given.

ONSET TIME FOR SENSORY BLOCK: The mean onset time for sensory block was assessed at T8 dermatome. The mean time to achieve sensory block was 14.20 ± 2.058 mins, 10.0 ± 1.337 mins and 13.73 ± 2.243 mins with range of (12-18, 8-12 and 10-18) in groups A, B and C respectively. Onset time of sensory block was fastest in MGSO₄ group and slowest in control group. The difference among the groups was statistically significant. ($p < 0.05$) calculated by applying ANNOVA test (A-B, A-C and B-C) (Table 3).

Barakat A.R. et al (2006).⁴ found that the mean onset time for sensory blockade was 16.0 ± 7.50 mins and 19.20 ± 8.90 mins in bupivacaine and clonidine groups respectively, which was 14.20 ± 2.058 mins in control group and 13.73 ± 2.243 mins in clonidine group in our study as the volume taken was 20ml in there and our study too but the difference in the onset time for sensory analgesia could be due to block given in lateral decubitus position without head down tilt in their study which we gave in sitting position with head down tilt.

TIME FOR 2 SEGMENT SENSORY REGRESSION: In our study the mean duration for 2 segment sensory regression was 164.0 ± 34.20 mins, 170.7 ± 17.17 mins and 180.3 ± 26.51 mins with the range of (100-170, 110-170 and 110-180) in groups A, B and C. The difference among the three groups was statistically significant. ($p < 0.05$) calculated by applying ANNOVA test (A-B, A-C and B-C) (Table-4).

Dobrydnjov I, Axelsson K, Samarutel J et al (2002).⁵ observed that the time for 2 segment sensory regression was 98.0 ± 29.10 mins for control group and 100.02 ± 12.08 mins for clonidine group which was 164.0 ± 49.0 mins for control group and 180.3 ± 26.51 mins for clonidine group in our study. There was a statistically significant difference among the groups, although the individual duration time was less than our study. This could be contributed to less amount of drug (15ml) used in their study as compared to amount (20ml) used in our study.

ORIGINAL ARTICLE

Nidhi Bidyut Panda, Kumar Selva et al (2009).⁶ observed that 2 segment sensory regression time was 229.3mins for MGSO₄ which was 170.23±37.28mins for bupivacaine MGSO₄ group in our study. The difference could be due to 25µgm epidural fentanyl given along with the bupivacaine and MGSO₄ in their study.

TOTAL DURATION OF SENSORY BLOCKADE: In our study mean duration of total sensory blockade was 139.10±18.58mins, 330.5±26.14mins and 334.0±31.39mins with the range of (100-150, 150-350 and 150-350) in groups A, B and C respectively. Difference among the groups was statistically significant which was higher in both MGSO₄ and clonidine group as compared to the control group with minimal difference between MGSO₄ and clonidine group (p<0.05) calculated by applying ANNOVA test (A-B, A-C and B-C) (Table-5)

INCIDENCE OF MOTOR BLOCK: In our study the number and percentage of patients who achieved different grades of motor blockade were assessed by using modified bromage scale. Grade 1 block was achieved by all the patients in groups A, B and C. Grade 2 motor block was achieved in 21(70%), 19(63.33%) and 19(63.33%) in groups A, B and C respectively. The number and percentage of patients who achieved grade 3 motor block was 9(30%), 10(33.33%) and 10(33.33%) in groups A, B and C respectively. Comparison among groups was statistically insignificant. (P>0.05) calculated by applying ANNOVA test (Table 6)

Huang Yuan-Shiou H, Liu-Chi L, Billy KH et al (2007).⁷ observed that the occurrence of motor block in the bupivacaine and clonidine group was 83%, 59%, 21% for grade 1, 2 and 3 respectively, which was 100%, 63.33% and 33.33% for grade 1, 2 and 3 in clonidine group of our study and the difference could be due to higher volume 20ml of drug we used which was only 15ml in their study.

ONSET TIME FOR MOTOR BLOCK: In our study the mean onset time for different grades of motor block was 23.03±2.44, 24.79±0.787 and 21.56±1.944mins in group A of grades 1, 2 and 3 motor blocks respectively, 18.47±2.95, 20.76±1.48 and 18.10±1.054mins for grades 1, 2 and 3 motor block respectively in group B and 15.13±1.16, 17.11±1.054 and 16.32±1.250mins in group C for grades 1, 2 and 3 motor block respectively. Comparison among groups showed statistically significant difference. (<0.05) calculated by applying ANNOVA test (Table-7).

DURATION OF MOTOR BLOCK: In our study mean duration of motor block for group C was longer than group A and group B, which was 142.7±11.28mins, 289.8±33.00mins and 293.7±19.21mins with the range of (100-150, 150-300 and 200-300) in groups A, B and C respectively. Comparison among the groups showed statistically significant difference which was longer in both MGSO₄ and clonidine group as compared to the control group with minimal difference between MGSO₄ and clonidine group. (P< 0.05) calculated by applying ANNOVA test (A-B, A-C and B-C) (Table-8)

Eisenach JC, De Kock M, Klimscha W. et al (1996).⁸ observed that the duration of motor block was significantly shorter in the bupivacaine clonidine group was 164±54mins as compared to 293.7±19.21mins in bupivacaine clonidine group in our study which was higher because of volume of drug taken 18 ml in there and 20ml in our study.

ORIGINAL ARTICLE

HYPOTENSION AND BRADYCARDIA: In our study the incidence of hypotension was 5(16.66%), 3(10%) and 10(60%) in groups A, B and C respectively. It was highest in group clonidine group and lowest in control group. ($p>0.05$) (A-B, A-C and B-C) (Table-10 and 11).

Incidence of bradycardia was 8(26.66%), 4(13.33%) and 20(66.66%) in groups A, B and C respectively. It was highest in group clonidine group and lowest in MGSO₄ group. ($p>0.05$) (A-B, A-C and B-C)(Table-9).

RESPIRATORY CHANGES: In our study none of the patients in either of the groups had drop in respiratory rate (RR<12/min) and respiratory depression (SpO₂<90%) ($p>0.05$). (Table- 12 and 13). Thus the results of our study are comparable to previous studies.

QUALITY OF ANAESTHESIA: In our study it was observed that the quality of the epidural anaesthesia was excellent in 25(83.33%), 26(86.66%) and 28(86.66%) patients in groups A, B and C respectively and satisfactory in 3(10 %), 1(3.33%) and 2(6.66%) patients in groups A, B and C respectively and unsatisfactory in 2(6.66%) group A, 3(10%) group B and none of group C patients respectively. (A-B A-C and B-C) (Table-15)

Syal K, Dogra RK, Goel A et al (2011).⁹ found that the anaesthesia was satisfactory in 93% patients and unsatisfactory in 7% cases in bupivacaine group as compared to 10% and 6.66% in our study for control group it could be because of lower concentration 0.125% bupivacaine with normal saline and total volume was 10ml in their study which was 0.5% bupivacaine and normal saline with total volume of 20 ml in our study.

CONCLUSION: Our study revealed that co-administration of epidural magnesium sulphate 50MG with bupivacaine 0.5% produces predictable rapid onset of surgical anaesthesia without any side-effects, and addition of clonidine 150µg to epidural bupivacaine 0.5% produces prolonged duration of anaesthesia with sedation. The results of our study suggest that magnesium may be a useful alternative as an adjuvant to epidural bupivacaine as clonidine. The results of the present investigation suggest that it reduces the frequency of postoperative systemic analgesics requirement and increases postoperative analgesia without any effect on onset of anaesthesia and motor blockade.

BIBLIOGRAPHY:

1. Datta S., Camann W., Bader A., Vander Burgh L. Clinical effects and maternal and fetal plasma concentrations of epidural ropivacaine versus bupivacaine for cesarean section. *Anesthesiology*. 1995; 82(6): 1346-52.
2. Bjørnstad E, Smedvig JP, Bjerkreim T, Narverud G, Kollerøs D, Bergheim R. Epidural ropivacaine 7.5MG/ml for elective Caesarean section: A double-blind comparison of efficacy and tolerability with bupivacaine 5MG/ml. *Acta Anaesthesiologica Scandinavica* 1999; 43: 603-608.
3. Zand F, Razavizadeh MR, Azemati S. Comparative study of onset and duration of action of 0.5% bupivacaine and a mixture of 0.5% bupivacaine and 2% lidocaine for epidural anaesthesia. *Acta Med Iran*. 2004; 42: 256-8.
4. Barakat, A. R. and Scott, N. B. Epidural clonidine for total hip replacement. *Anaesthesia-Analgesia*, 2006; 61: 1007-1008.

ORIGINAL ARTICLE

5. Dobrydnjov I, Axelsson K, Samarütel J, Holmström B. Postoperative pain relief following epidural bupivacaine combined with epidural or oral clonidine. *Acta Anaesthesiol Scand.* 2002; 46(7): 806-14.
6. Nidhi Bidyut Panda, M.D., Selva Kumar, M.D. epidural anaesthesia in mild preeclamptic patients undergoing caesarean section block the duration of epidural anaesthesia and the postoperative analgesia requirement. *Acta Anaesthesiol Scand* 2009; (9, 1): 1-84.
7. Huang Yuan-Shiou H, Liu-Chi L, Billy KH, Sheen MJ, Chun-Chang Y, Chih-Shung W, et al. Epidural clonidine for postoperative pain after total knee arthroplasty: A dose-response study. *Anesth Analg.* 2007; 104: 1230-5.
8. Eisenach JC, De Kock M, Klimscha W. Alpha (2)-adrenergic agonists for regional anesthesia. A clinical review of clonidine. *Anesthesiology.* 1996; 85: 655-74.
9. Syal K, Dogra R, Ohri A, Chauhan G, Goel A Epidural labour analgesia using Bupivacaine and Clonidine. *Regional anesthesia and pain medicine*, January 2011;3 6/1(46- 50): 1098-7339.

AUTHORS:

1. Anand Masih Lakra
2. Pratibha (Jain) Shah
3. Omprakash Sundrani
4. Manju Tandon
5. K. K. Sahare
6. Jaya Lalwani
7. D. S. Patel

PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of Anaesthesiology & Critical Care, Pt. J.N.M. Medical College, Raipur, C. G.
2. Associate Professor, Department of Anaesthesiology & Critical Care, Pt. J.N.M. Medical College, Raipur, C. G.
3. Assistant Professor, Department of Anaesthesiology & Critical Care, Pt. J.N.M. Medical College, Raipur, C. G.
4. Assistant Professor, Department of Anaesthesiology & Critical Care, Pt. J.N.M. Medical College, Raipur, C. G.

FINANCIAL OR OTHER

COMPETING INTERESTS: None

5. Professor & HOD, Department of Anaesthesiology & Critical Care, Pt. J.N.M. Medical College, Raipur, C. G.
6. Associate Professor, Department of Anaesthesiology & Critical Care, Pt. J.N.M. Medical College, Raipur, C. G.
7. Assistant Professor, Department of Anaesthesiology & Critical Care, Pt. J.N.M. Medical College, Raipur, C. G.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Omprakash Sundrani,
H. No: 19, Phase 1,
Harsh Vihar, Daldal Seoni,
Mowa, Raipur, Chhattisgarh.
E-mail: sundraniop@rediffmail.com

Date of Submission: 23/08/2015.
Date of Peer Review: 26/08/2015.
Date of Acceptance: 04/09/2015.
Date of Publishing: 08/09/2015.