

Epidural Bupivacaine and Bupivacaine-Magnesium Sulphate Combination in Lower Abdominal Surgeries: A Comparative StudySainath¹, Vinod V Hudgi², Ajaykumar³, Kashibai⁴¹Senior Resident, Department of Anaesthesiology and Critical Care, ESIC Medical College, Kalaburagi²Senior Resident, Department of Anaesthesiology and Critical care, ESIC Medical College, Kalaburagi³Senior resident, Department of Emergency Medicine, ESIC Medical College and Hospital, Kalaburagi⁴Assistant Professor, Department of Anaesthesiology and Critical Care, MNR Medical College and Hospital, Fasalwadi, Sangareddy

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Abstract:

The epidural technique became popular as it had some specific advantages over spinal anaesthesia. The feasibility of extended duration and differential blockade extended its application into other fields like post operative analgesia, chronic pain relief and obstetric pain relief. But some inherent negative points of epidural technique like delayed onset and patchy analgesia persist. Various attempts have been made to rectify these negative points.

Keywords: Epidural, Dexmedetomidine, Anaesthesia

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Introduction

Epidural anesthesia was first performed by Spanish military surgeon Fidel Pages in 1921 in lumbar region. In 1949 Curbelo used Tuohy equipment for continuous blockade. The epidural technique became popular as it had some specific advantages over spinal anaesthesia. The feasibility of extended duration and differential blockade extended its application into other fields like post operative analgesia, chronic pain relief and obstetric pain relief. But some inherent negative points of epidural technique like delayed onset and patchy analgesia persist. Various attempts have been made to rectify these negative points.[1]

Combined spinal-epidural technique got introduced in an attempt to rectify this and has become popular. Various additive drugs have been tried along with local anaesthetics in an attempt to hasten the blockade to improve the quality of block.[2]

Among drugs that have been tried, magnesium sulphate deserves special mention. Even though magnesium sulphate has been used for various other purposes, its entry into anaesthetic armamentarium is new. Magnesium sulphate has been described to possess various properties. The potentiation of local anaesthetic drugs is one among them. So my study aims to evaluate the effect of its addition to local anaesthetic in epidural blockade. [3,4]

Along with local anesthetic agent other additive drugs are Epinephrine, Clonidine, Dexmedetomidine, Neostigmine, Ketamine, and Benzodiazepines.

Magnesium sulphate a potent antagonist of NMDA receptors when used epidurally is claimed to hasten the onset of sensory blockade. Magnesium also causes physiological Calcium channel blockade and decreases the postoperative opioid requirements. [5,6]

Materials and Methods

This study was conducted, Department of Anaesthesiology, ESIC Medical College, Kalaburagi, on 50 ASA grade I or II patients undergoing elective lower abdominal surgeries. Lumbar epidural anesthesia was performed to all the patients. The age of the patients ranged from 23- 70 weighing 45-80 kg and height ranging from 150 – 172 cm. all patients were thoroughly examined preoperatively. Informed consent was obtained from all of them.

In the assessment room, vital parameters like pulse, blood pressure, and base line investigations like hemoglobin, urine analysis for albumin and sugar, blood sugar, urea and creatinine and Electrocardiogram were checked. Thorough examination of all the systems and airway assessment was done.

Exclusion criteria including significant co-existing diseases, long term analgesic use, and contraindications to regional anaesthesia such as local infection and bleeding diathesis.

Results

Of the fifty patients involved, 25 belonged to group C and other 25 belonged to group S

Age distribution: The age distribution in group S 23-73. Age distribution in control group 27-70. the mean age and age distribution was similar statically.

Table 1: Age

Age In Years	Group S	Group C
20-40	23	27
Maximum	73	70
Mean	48.33	44.6

Weight distribution: Weight distribution in group S 54-80, while in control group 52-72. Meanweight of the patients were comparable.

Table 2: Weight

Weight in kg	Group S	Group C
Range	54-80	52-72
mean	66.32	65.52

Height distribution:

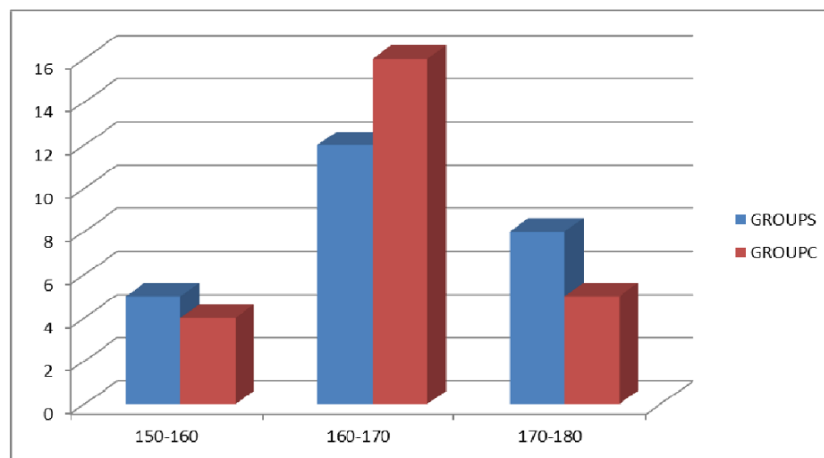


Figure 1:

Height distribution in group S 156-172 cms, while in control group 153-172. Mean height in both group patients were comparable.

Table 3: Height

Height in cm	Group S	Group C
Range	156-172	153-172
Mean	164.36	165.08

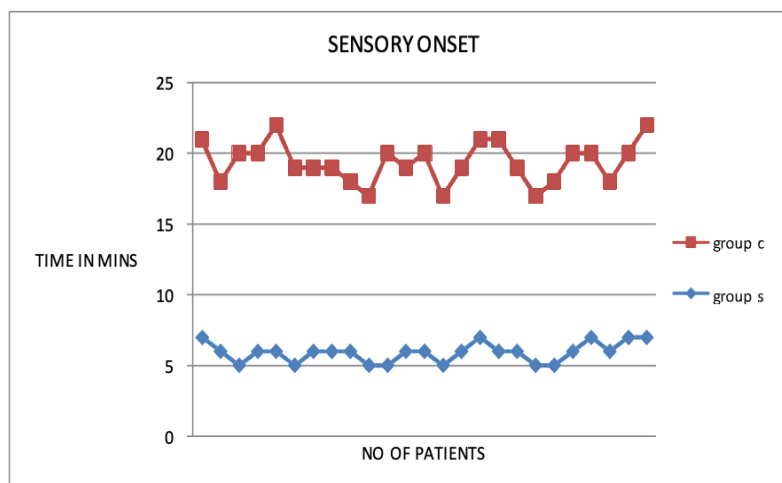


Figure 2: Sensory Onset

Table 4: Sensory blockade

Sensory blockade min	Group C	Group S	P value
Onset	13.44± 1.16	5.92±0.70	<0.0001

Table 5: Motor blockade

Motor blockade	Group S	Group C	P value
Onset	12.48± 2.67	16.16± 0.94	<0.0001



Figure 3: Two Segment Regression Time

Table 6: Two Segment Regression Time

Two Segment Regression Time Min	Group S	Group C
Mean ± SD	145.36±4.97	136.96±8.19

Table 7: Duration of Post-Op Analgesia

Duration of Post-Op Analgesia Mins	Group S	Group C
Mean ± SD	231.04±12.63	228.48±8.81

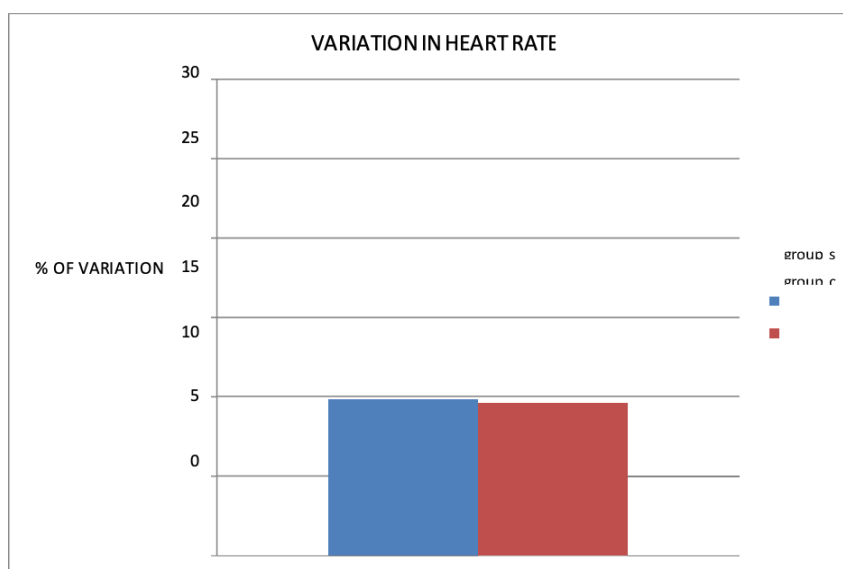


Figure 4: Variation in Heart Rate

Table 8: Percentage of heart rate changes(below the base line level)

	Group S	Group C
Heart rate changes % (mean)	9.84	9.64

Parameters	Group S	Group C	P Value
Age	48.3± 13.00	44.6±13.213	0.3233
Height	165.08±5.445	164.36±5.345	0.639
Weight	66.32±7.767	65.52±7.428	0.7148
Onset of Sensory Block	5.92±0.702	13.44±1.158	<0.0001
Onset of Motor Block	12.48± 2.650	16.16±0.943	<0.0001
Two Segment RegressionTime	145.36±4.97	136.96±8.19	<0.0001
Duration of Post Op Analgesia	231.04±12.633	228.48±8.813	0.41

Discussion

The primary aim of this study was to evaluate the effect of adding magnesium sulphate to Bupivacaine in Epidural anaesthesia. The safety of Epidural magnesium sulphate administered in humans and animals have been established. Simpson and Kroin demonstrated in animals that epidural magnesium sulphate has a safety profile. The dose of magnesium sulphate used in this study was based on data Tam-moy Ghatak and Girish Chandra where 50 mg of magnesium sulphate added to epidural Bupivacaine. In their study magnesium sulphate has quickens the onset of sensory blockade. The duration of post-

operative analgesia is also increased. In the study group the time of onset of sensory blockade was 5.92±0.702 mins, whereas in control group was 13.44±1.158(p value <0.0001) which shows that there is a significant difference in the onset time. The addition of magnesium sulphate has definitely decrease the sensory onset time.[7,8]

The time of onset of Motor blockade in study group was 12.48±2.670 whereasin the control group Motor blockade was 16.16±0.943(p value <0.0001) which shows that the difference is statistically significant.[9,10]

Table 9: Parameters

Parameters	Group S	Group C	P Value
Onset of Sensory Block	5.92±0.702	13.44±1.158	<0.0001
Onset of Motor Block	12.48± 2.650	16.16±0.943	<0.0001

Two Segment Regression Time



Figure 5: Two segment regression time

The mean duration of two segment regression time in study was 145.36±4.974,whereas in control group was 136.96±8.19 (p value <0.0001).

Table 10: Two Segment Regression Time

Two Segment Regression Time Min	Group S	Group C	P Value
Mean \pm SD	145.36 \pm 4.97	136.96 \pm 8.19	<0.0001

Table 11: Duration of post-operative analgesia

Duration Of Post Op Analgesia Mins	Group S	Group C	P Value
Mean \pm SD	231.04 \pm 12.63	228.48 \pm 8.81	0.4033

The duration of post-operative analgesia was 231.40 \pm 12.633 mins in study group and 228.48 \pm 8.813 in control group (pvalue <0.41) which shows 2 groups were not statistically significant. The probability value was detected by unpaired two sample student 't' test.[11,12]

This implies that additive of magnesium sulphate to epidural Bupivacaine will quickens the onset of sensory blockade with minimal prolongation of post-operative analgesia.[13,14]

This correlate the study of T. Ghatak and G. Chandra of addition of epidural magnesium sulphate to bupivacaine to reduce the time of onset of sensory blockade.[15]

Other Parameters: The change in Heart rate was 9.84% in study group whereas in control group 9.64% which shows there is no significant change. The usage of Ephedrine was also there is no significant changes.

Conclusion

This study concludes that epidural magnesium sulphate when added to bupivacaine will shorten the onset of sensory blockade significantly in patients undergoing elective lower abdominal surgeries without increasing the incidence of side effects.

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