EVALUATION OF SINGLE EPIDURAL BOLUS DOSE OF MAGNESIUM ADJUVANT TO EPIDURAL FENTANYL IN PATIENTS UNDERGOING ELECTIVE CAESAREAN SECTION

ABSTRACT

Aims and Objectives: Aim of study is to evaluate effect of single epidural bolus of magnesium as an adjuvant to epidural fentanyl in patients undergoing an elective caesarean section.

Method: Following approval of institutional grant committee, 60 patients undergoing elective caesarean section were allocated into two groups of each thirty. Epidural block was performed in one group with 0.5% bupivacaine and fentanyl and other group with 0.5% bupivacaine, fentanyl and magnesium sulfate. All parameters will be observed and compared as onset and duration of analgesia.

Results: Mean onset of sensory block in control group was 14.2 min and magnesium group was 11.3 min. Mean onset of motor block in control group was 13.4 min and magnesium group was 13.6 min. Mean duration of analgesia in control group was 247.27 min and magnesium group was 319.57 min.

KEYWORDS

Magnesium, fentanyl, bupivacaine, epidural block

INTRODUCTION

Epidural anaesthesia is a safe technique, has a unique feature of segmental blockade and better control over hemodynamic variables. Magnesium has anti nociceptive effects based on physiological calcium antagonism and non competitive antagonism of NMDA receptors. This is a double blinded randomized study conducted in 60 patients for elective caesarean section where magnesium is used as adjuvant for bupivacaine and fentanyl in epidural block to observe

1) Onset and duration of intra operative analgesia
2) Efficacy of magnesium as adjuvant to fentanyl
3) Adverse effects if any associated with magnesium

AIMS AND OBJECTIVES:

Evaluation of single epidural bolus of magnesium as an adjuvant to epidural fentanyl in patients undergoing an elective cesarean section.

1. To compare the onset and duration of intraoperative and postoperative analgesia.
2. To evaluate the efficacy of single bolus administration of magnesium epidurally as an adjuvant to epidural fentanyl
3. Adverse effects if any associated with magnesium.

METHOD OF COLLECTION OF DATA:

Sixty patients were randomly allocated into two groups of thirty each using computer-generated random numbers.

GROUP F: Thirty patients received epidurally a volume of 19ml of drug consists-17ml bupivacaine 0.5%+1ml (50mcg) of fentanyl+1ml normal saline.

GROUP FM: Thirty patients received a similar volume of 19ml of drug consists 17ml bupivacaine 0.5%+1ml(50mcg) of fentanyl, +1ml magnesium sulfate 50mg, epidurally.

After giving epidural block using bupivacaine, fentanyl with or without magnesium all parameters will be observed and compared.

INCLUSION CRITERIA:

1. The patient belongs to ASA grade I and II.
2. Age between 18 to 35 years.
3. The elective cesarean section with or without tubal ligation
4. Patients Height >150 cms, weight <100 kgs

EXCLUSION CRITERIA:

1. Patient refusal.
2. Patient belonging to ASA grade III & grade IV.
3. Infection at the area of injection.
4. Coagulation abnormalities if any.
5. Hypersensitive to local anaesthetics.

8. Alcohol/drug abuse

PREANAESTHETIC EXAMINATION:

The pre-anesthetic checkup was done one day prior to the surgery. Patients were evaluated for any systemic disease and laboratory investigations recorded. The procedure of epidural block was explained to the patient and written informed consent was obtained. Preparation of the patient included a period of overnight fasting.

STATISTICAL ANALYSIS:

All the data were presented as the mean ± standard deviation and number of patients. Mean and the Standard deviation was calculated for continuous variables. Independent sample t-test was used to compare two different means. Chi-square test was used to test the association between categorical variables. p-value <0.05 is considered as statistically significant.

DISCUSSION:

Epidural anaesthesia is a safe and inexpensive technique with the advantage of providing surgical anaesthesia and prolonged postoperative pain relief. It is also an effective treatment of operative pain blunts autonomic, somatic and endocrine responses.

Activation of NMDA receptors causes an influx of calcium and sodium ions into the cells and efflux of potassium ions, and the initiation of central sensitization. Central sensitization has an important role in pain perception and is considered to be one of the mechanisms implicated in the persistence of postoperative pain.

Magnesium is the fourth most plentiful cation in our body. It has antinociceptive effects in animal and human models of pain. Magnesium is a noncompetitive antagonist of the NMDA receptor and causes a voltage-dependent blockade of ion channels producing a dramatic reduction of NMDA-induced currents thereby preventing central sensitization resulting from peripheral nociceptive stimuli. So in the present study magnesium was taken as an epidural adjuvant to fentanyl epidural undergoing elective cesarean section.

ONSET OF SENSORY BLOCK

The Mean onset of sensory block (T6 level) for the control group was 14.2 min and for magnesium group was 11.3 min.

The Mean onset of sensory block for magnesium group was earlier than the control group which was statistically significant (p<0.001), and it was similar to study done by Riham Hasani et al. and in their study magnesium group was resulted in the faster onset of sensory block.

ONSET OF MOTOR BLOCK (TIME TO REACH BROMAGE SCALE TWO)

The Mean onset of the motor block for the control group was 13.4 min and for Magnesium group was 13.6 min. The Mean onset of the motor
block for Magnesium group was earlier than Fentanyl group, but it was statistically not significant.

In the studies of A. Bilir et al., Sonali Banwait et al. they found that no difference in the quality of motor block was noted between two groups.

Figure 1: Bar diagram showing Time for the onset of sensory block and Time for the onset of motor block

DURATION OF SENSORY BLOCK
Mean duration of sensory block in the control group was 247.27min, and in Magnesium group was 319.57min. The Mean duration of sensory block in Magnesium group greater than the control group and it was statistically highly significant (p < 0.001).

In a study of Sonali Banwait et al. conducted in 60 patients, they showed similar results.

DURATION OF MOTOR BLOCK
The Duration of the motor block for control group was 132.17min, and the Duration of the motor block for Magnesium group was 133.76min. The Duration of the motor block for Magnesium group was slightly greater than control group, but it was statistically not significant. It was similar to the study done by Yousef AA et al

TIME FOR TWO SEGMENT REGRESSION:
In our present study, the time for two segment regression in control group was 96.4min and the time for two segment regression in Magnesium group was 116.13min. The time for two segment regression in Magnesium group was greater than control group, and it was statistically significant (p < 0.001). In a study done by Shrushi et al. there was a significant difference between the groups in the time for two segment regression of sensory blockade was 95min in Group M(magnesium) and 55min in Group C(control) which was statistically significant.

Figure 2: Bar diagram showing Distribution of participants by the total duration of sensory and motor block(min), time for two dermatomal segment regression

VAS (VISUAL ANALOGUE SCALE):
In the present study, VAS score was assessed at a 1st hour, 2nd hour, 3rd hour, 4th hour, and at 5th hour. It was observed that patients with magnesium group when compared with control group, showed lesser VAS score than the control group and it was statistically significant at about first and 2nd hours of the postoperative period. Studies done by A. Bilir et al., Sonali Banwait et al., P V Praveen Kumar et al, Farouk et al, and A Gupta et al. who observed less VAS score in magnesium groups when compared with control group.

Figure 3: Bar diagram showing VAS scoring

ADVERSE EFFECTS:
Adverse effects of magnesium group were lesser than the control group, but this was not statistically significant. (p < 0.05). In control group, five patients experienced adverse effects, among them two patients had pruritis, two patients had to shiver, and one patient had nausea and vomiting. In magnesium group, one patient had nausea and vomiting, and another patient had pruritis. No signs of the central nervous system and cardiovascular toxicity were reported in any patients. This is in correlation with a study done by Tanmoy Ghatak, Girish Chandra R et al.

Figure 4: Bar diagram showing the side effects observed in the groups

CONCLUSION:
From the present study, it can be concluded that
1) Magnesium prolongs the sensory block when given as an epidural adjuvant to opioids.
2) Epidural magnesium showed the insignificant effect on the motor block.
3) Minimal adverse effects were seen with epidural magnesium.

REFERENCES: