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Comparison of single loading dose magnesium sulphate regimen with low dose magnesium sulphate regimen in the treatment of eclampsia

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Abstract

Introduction: Eclampsia contributes to maternal mortality in developing, underdeveloped world. Various drugs have been tried to treat eclampsia. Magnesium sulphate has become the drug of choice due to various advantages and is associated with adverse outcome for both mother and fetus if not used correctly. This study was undertaken to know safety, efficacy of reduced doses of Magnesium sulphate as compared to standard dose.

Materials and Method: After obtaining institution ethical clearance and written informed consent this study was conducted on 60 subjects for 2 years. Patients diagnosed as eclampsia and presenting with generalized tonic clonic seizure during antenatal, intrapartum, postnatal were included. Group A received single loading dose of magnesium sulphate (4gm (20%) I V over 3-5 min followed by 10gm (50%) deep i.m. (5gm in each buttock)). Group B patients received low dose magnesium sulphate (4gm (20%) i.v. over 3-5 min followed by 6gm (50%) deep i.m. (3 gm in each buttock) and maintenance dose of 3 gm i.m., every 4 hourly in alternate buttock) which was continued 24 hours after last convulsion or delivery whichever is later. Mode of delivery, recurrence of convulsion, maternal and fetal morbidity and mortality were studied.

Results: Maternal and foetal outcome was comparable in both the groups. There was no significant difference with regards to recurrence of convulsions. There was no statistically significant increase in incidence of caesarian section in group B compared to group A ($p>0.05$).

Conclusion: Single dose regime controls the eclamptic convulsions with good maternal and neonatal outcome.

Keywords: Eclampsia, Low dose, Magnesium sulphate

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Introduction

Eclampsia is one of the serious and catastrophic complications of pregnancy that has a major impact on foetal and maternal outcome. Cost effective treatment of the patient is one of the major concern in developing countries as large number of the patients are of poor economic status.(1) Eclampsia continues to be a major cause of maternal and perinatal morbidity and mortality throughout the world. It accounts for 11% of maternal deaths in developing countries and 9% in Asia. The main principle in management of eclampsia is control of convulsions.(2) Magnesium Sulphate is drug of choice in the management of eclampsia. Various doses and regimens are practices throughout the world.

Magnesium Sulphate, acts by reducing end plate sensitivity to acetylcholine in peripheral myoneural junction and reduces neuromuscular irritability. It also blocks N-methyl D-aspartate and calcium channels thus preventing seizure genesis and cerebral vasospasm respectively.(3) Despite its efficacy, narrow therapeutic index is of concern regarding perinatal and maternal toxicity and outcome. Therefore any effective regime that would require less medication and labour would be attractive especially in developing and under developed countries. In this study we aimed to compare effectiveness of single loading dose of magnesium sulphate regimen with low dose regimen on recurrence of the convulsion, mode of delivery, maternal and fetal morbidity or mortality.

Materials and Method

After obtaining institution ethical clearance and written informed consent this study was conducted on 60 subjects for 2 years. The inclusion criteria were patients with history of eclampsia after 20 week gestation till postnatal period of 6 weeks. Exclusion criteria were patients who received anticonvulsants before admission, associated complications like cerebrovascular accidents, renal failure, aspiration pneumonitis and known case of epilepsy. A routine blood and urine investigations related to eclampsia were carried out in all patients. Routine hemodynamic monitoring like, pulse rate, blood pressure, respiratory rate, oxygen saturation, knee jerk and urine output were monitored. In Group A patient received single loading dose of magnesium sulphate i.e. 4.gm (20%) I V over 3-5 min followed by 10 gm (50%) deep i.m. (5 gm in each buttock) and observed for recurrence of convulsion. In Group B patients received low dose magnesium sulphate i.e. 4 gm (20%) i.v. over 3-5 min

followed by 6 gm (50%) deep i.m. (3 gm in each buttock) and maintenance dose of 3 gm i.m., every 4 hourly in alternate buttock which was continued 24 hours after last convulsion or delivery whichever is later. If patient convulses with single loading dose, a MgSo4 2 grams i.v. slowly administered. Any patient who had second time recurrence of convulsion received standard Pritchard's magnesium sulphate regimen. Mode of termination was planned according to the gestational age, viability of the fetus, and the bishops scoring. Patients were induced with prostaglandin E1, prostaglandin E2 and augmented with Oxytocin infusion. Cesarean section was done for obstetric indications or for failed induction. After delivery the patients were monitored for 24-48 hours in eclampsia ward. Neonatal outcome was recorded in terms of maturity, type of birth and mortality. Outcome measures studied are recurrence of convulsions, safety and efficacy of mgso4 regimes, perinatal morbidity and mortality, maternal morbidity and mortality.

Results

Total numbers of eclampsia cases in the study period were 89out of which 60 cases were selected in the study based on inclusion and exclusion criteria. The demographic parameters like age, parity, gestational age were comparable in both groups and no significant statistical differences were observed. Table 1 shows distribution of eclampsia patients with respect to time of presentation in group A and B. The differences in the incidence in two groups were statistically not significant (p=0.34).

Table 1: Distribution of patients according to type of Eclampsia

Type	Group A		Group B	
	Number of patients	Percentage (%)	Number of patients	Percentage (%)
Antepartum	17	56.67	15	50.00
Intrapartum	8	26.67	10	33.33
Postpartum	5	16.67	5	16.67
Total	30	100	30	100
χ^2 value	0.34			
p-value	0.84, (Not significant, p>0.05)			

Table 2 shows the distribution of patients according to the parity. There is no statistical significant difference is noted between the groups.

Table 2: Showing Distribution of patients according to parity

Parity	Group A		Group B	
	Number of patients	Percentage (%)	Number of patients	Percentage (%)
Primigravida	20	66.67	23	76.67
P1	7	23.33	2	6.67
P2	3	10.00	5	16.63
P3	0	0.00	0	0.00
Total	30	100	30	100
χ^2 value	3.48			
p-value	0.17, NS, (Not significant, p>0.05)			

Table 3 shows the time interval between, onset of first convulsion to the treatment. There was no statistically significant difference was noted between the groups. (p=0.93)

Table 3: Time interval between the onset of convulsion to the initiation of treatment

Convulsion to treatment interval (hours)	Group A		Group B	
	Number of patients	Percentage (%)	Number of patients	Percentage (%)
<2	8	26.67	9	30.00
3-4	6	20.00	7	23.33
5-6	8	26.67	8	26.67
>6	8	26.67	6	20.00
Total	30	100	30	100
χ^2 value	0.42			
p-value	0.93, (Not significant, p>0.05)			

Table 4 shows, 93.33% of patients in Group A and 96.67% in Group B convulsions were controlled. 2 patients (6.67%) in Group A and 1 patient (3.33%) in Group B had recurrence of convulsions which was not statistically significant (p=0.35).

Table 4: Control of convulsion and recurrence in both the groups

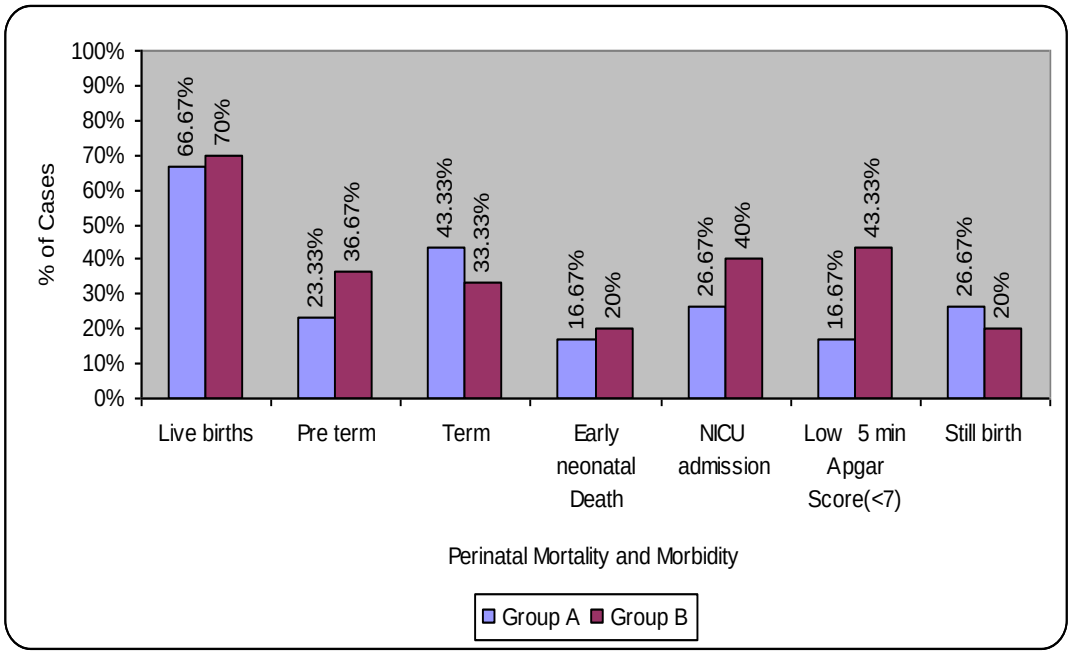
Convulsions	Group A		Group B	
	Number of patients	Percentage (%)	Number of patients	Percentage (%)
Controlled	28	93.33	29	96.67
Recurrence	2	6.67	1	3.33
Total	30	100	30	100
χ^2 value	0.35			
p-value	0.55, (Not significant, p>0.05)			

Table 5 shows the mode of delivery in both the groups. The p value is 0.15 suggesting there is no statistical difference between the groups.

Table 5: Mode of delivery of the baby

Mode of delivery	Group A		Group B	
	Number of patients	Percentage (%)	Number of patients	Percentage (%)
Premature stillbirths	2	6.67	3	10.00
Vaginal	12	40.00	9	30.00
Instrumental (forceps)	1	3.33	0	0.00
LSCS	14	46.67	18	60.00
Undelivered	1	3.33	0	0.00
Total	30	100	30	100
χ^2 value	3.12			
p-value	0.15, (Not significant, p>0.05)			

Graph 1: Perinatal morbidity and mortality



Graph 1 compares percentage of babies having perinatal morbidity and mortality between the two groups. No statistical significance seen with regards to perinatal morbidity or mortality (p=<0.05).

Table 6: Distribution of maternal mortality

Time of death	Group A		Group B	
Antepartum	No	%	No	%
	1	3.33	0	0
Postpartum	1	3.33	1	3.33
Total	2	6.67	1	3.33
χ^2 value	2.25			
p-value	0.13, (Not significant, p>0.05)			

Table 6 depicts in Group A one patient (3.33%) in antepartum and one in postpartum died where as in group B one patient died in postpartum period. But there is no statistical difference noted between the two groups.

Eclampsia manifests as seizures and is commonly seen in underdeveloped and developing countries. It remains an important cause of maternal mortality especially in resource-challenged countries that lack access to prenatal care. Magnesium sulpahte is the drug of choice in the management of eclampsia.[4] Different dosing and route of administration were successfully tried. Out of various regimens the Pritchard regimen is most widely accepted in the management of eclampsia patient.[5] The ideal effective drug dosage for any particular drug should be as low as possible so as to avoid the side effects of it.

The single loading dose protocol of 14 grams magnesium sulphate given 4 grams intravenously and 10 grams intramuscularly was effective as an anticonvulsant in 93.33% of eclampsia patients in the present study. Only 6.67% of the patients needed the continuation of the maintenance doses. The similar results were observed in a study conducted by Suyajana et.al where in the single dose of the MgSO4 had cured 90.84% of the women during antepartum and intrapartum eclampsia with the recurrence rate of 9.16%.[5]

The mode of delivery of baby in our study was both vaginal (53.36%) and by LSCS (46.67%) method. The percentage of patients in whom the forcep delivery was conducted in group A and B was 3.33% and 0%. In a similar study conducted by the author Bembalgi S et al showed that the incidence of LSCS was 32% in patient receiving single dose of MgSO4 therapy. This can be explained by, a lower percentage of primigravida (23%) in the study group. Percentage of primigravida in our study was 66.67 % and 76.67% in group A and B respectively.[6]

The neonatal outcome is depicted in graph 1. Which shows a higher incidence of preterm and early death in group B are higher in comparison with group A, but not statistically significant. This may be due to the possible intrauterine growth retardation which is commonly observed in preeclampsia and eclampsia patients.[7] The possible cause for early neonatal deaths may be due to birth asphyxia, respiratory distress syndrome and or septicemic shock.

A total of 8 patients were treated for convulsion within 2 hours in group A, whereas in group B it is 9. Between 3 hours to 6 hours a total of 14 patients in group A and 15 patients in group B received the treatment. Similarly after 6 hrs of onset of convulsion 8 patients received treatment in group A and 6 in group B. There is no significant statistical difference observed between the groups. The initiation of the treatment mainly depends upon the knowledge of the patient or accompanying relative and availability of the transport facility. In this study the type transportation or the reason for delayed patient admission of the patient were not studied. In a developing or underdeveloped countries the lack of public transport and emergency services are not uncommon.

In our study the maternal mortality was observed in case of group A (6.67%). In a similar study conducted by Regmi et al showed the maternal mortality of 2.32%. The higher incidence in our study might be due to the maternal factors and lower sample size.[8] The similar maternal mortality rate was observed (4.5%) in a study conducted by the author Sibai et al[9] There was no maternal mortality was observed in group B.

The perinatal morbidity and mortality is studied in both the groups and no statistical significant differences were noted between the groups. The still birth was 26.67% and 20% in group A and B respectively. This could be due to prematurity and low birthweight as described by the author Suyajna et. al where in pernatal mortality was found to be 24.8%.[5]

Conclusion

In comparison with standard regimen the single dose regime can be used safely and effectively for the treatment of eclampsia with no significant difference of outcome. A further study with larger sample size with multicentric trial in Indian population is required to support our findings.

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