

Efficacy of Magnesium Sulphate in the Treatment of Eclampsia

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Objective: To evaluate the effectiveness of magnesium sulphate ($MgSO_4$) in the treatment of eclampsia
Design: A cross sectional study **Place and duration of study:** This study was carried out at DHQ Hospital Faisalabad over a period of 2 ½ years from June 2002 to December 2004. **Methods:** out of a total 7000 pregnant patient 72 patients had eclampsia and they were admitted through emergency obstetrics care unit. These patients were managed according to the set Protocol-Magnesium sulphate ($MgSO_4$) started as an anticonvulsant in patient who had no contraindication to this agent. Efficacy of $MgSO_4$ in term of control of fits, recurrence of fits, toxicity, maternal and foetal out come were noted. **Result:** Over 2½ study period out of 7000 pregnant patients, 72 patients were admitted through emergency obstetrics care unit with eclampsia (1.02%). Only 2(2.7%) patients were booked. 45(62.5%) patients were primigravida and 27(37.5%) were multigravida. The age ranged between 16-40 years. 56(77.7%) patients were admitted with antepartum, and 14(19.4%) had postpartum eclampsia. Out of 72 patients magnesium sulphate was started in 66(91.6%) patients because of the presence of contraindications in 6(8.3%) patients. In these six patient injection Diazepam was used as an anticonvulsant. Magnesium sulphate was effective in 58(87.8%) patient. 52 patients delivered by caesarean section and 20 delivered vaginally. Patients on magnesium therapy delivered 60(90.9%) alive babies. Two patients had recurrent convulsions. Magnesium sulphate was with hold in 6 (9%) patients because of toxicity. **Conclusion:** Magnesium sulphate was safe and effective anticonvulsant. Convulsions were controlled in 58(87.8%) of patients. Recurrent convulsions occurred only in 3% patients. Monitoring was mainly clinical due to lack of monitoring facilities of serum magnesium level.
Key words: Magnesium Sulphate, Convulsion, Eclampsia, Maternal, Perinatal mortality, Morbidity, recurrence of convulsion

Eclampsia is the occurrence of one or more convulsions in association with the syndrome of pre-eclampsia. It is relatively uncommon in developed countries where it complicates about one in every 2000 deliveries. Eclampsia can be 20 times more common in developing countries and it probably account for more than 50000 maternal deaths world wide each year¹. In UK incidence of eclampsia is 4.9/10000 maternities with a case fatality rate of 1.8%². Only 38% of eclamptic seizures occur ante partum, 18% occur during labour and a further, 44% occur post partum¹.

Any women with eclampsia is at risk of suffocation while the seizure is happening. After wards she may still be at risk, depending on the degree of brain damage that triggered the fit and the severity of the underlying pre-eclampsia³.

Almost one in 50 women suffering eclamptic seizures die, 22% will require ventilation and 35% will have at least one major complication including pulmonary oedema, renal failure, disseminated intravascular coagulation, HELLP syndrome, acute respiratory distress syndrome, stroke or cardiac arrest. Still birth or neonatal death occurs in approximately one in 14 cases of eclampsia¹.

The maternal morbidity and mortality is related to the number of convulsions. The control of convulsions is therefore important in reducing maternal morbidity and mortality⁴.

Eclampsia is an obstetric emergency, which requires multidisciplinary management (obstetrician, neonatologist anaesthetist). Anticonvulsants may be used for short term pending delivery or in special circumstances such as medical retrieval. Magnesium sulphate ($MgSO_4$) infusion

for eclamptic seizure has been shown to give better maternal and foetal out come when compared to other anticonvulsant such as phenytoin and diazepam⁵.

Magnesium sulphate has become the first and preferred choice for treatment and prevention of seizure. It does not cause maternal or neonatal sedation. It appears to have a peripheral site of action at the neuro muscular junction and does not cross the intact blood brain barrier. It may however relax the constricted cerebral circulation in eclampsia. Magnesium sulphate is associated with significant reduction in the recurrence of convulsions compared with diazepam, phenytoin and lytic cocktail⁶.

The aim of this study was to evaluate the efficacy of magnesium sulphate, in terms of control of its side effects, toxicity, recurrence of fits and fetomaternal out come.

Patients and methods:

This descriptive study was conducted between June 2002 to December 2004 on pregnant patients presented with eclampsia at DHQ Hospital Faisalabad. It is the main referral hospital in the region where about 3000 women are delivered each year. All patients delivered in the labour ward of DHQ Hospital Faisalabad during the study period were considered to sort out pregnancies complicated by eclampsia. During the two and half year period, 7000 women were delivered at DHQ Hospital. Of these 72 cases of eclampsia were diagnosed. The data was recorded on a specially designed Performa. Eclamptic patients stabilized their blood pressure controlled by oral or intravenous antihypertensive agents. Magnesium sulphate therapy was started after exclusion of contraindication (exclusion

criteria) to use of this drug i.e. absent patellar reflex, respiratory rate less than 16 per minutes and urine output less than 30 ml per hour. A full blood count, renal function, liver function and complete urine analysis done. In this study monitoring of magnesium sulphate therapy was clinical because best of serum magnesium level is expensive and result received very late.

Protocol for the use of magnesium sulphate was a loading dose of 4g of MgSO₄ in 12cc of distilled water in 20cc disposal syringe making 20% solution, given intravenously at 5 to 10 minutes. An intramuscular regime of 5g at the time of the initial intravenous loading dose deeply in the upper outer quadrant of each buttock given.

Every 4 hours thereafter 5 g of a 50% solution of magnesium sulphate injected deeply in the upper outer quadrant of alternate buttock but only after assuring that patellar reflex is present, respiratory rate is more than 16 per minute and urine output is more than 30ml/hour.

Magnesium sulphate toxicity was observed by absent patellar reflex, depressed respiratory rate. Once toxicity was diagnosed magnesium sulphate was then withheld and 1g of calcium gluconate was given intravenously to treat this toxicity. Mode of delivery was according to obstetrics indications. Magnesium sulphate was discontinued 24 hours after delivery. Data was collected and statistical analysis was done. It was a descriptive study and study population was followed in a prospective manner.

Results:

During 2½ years study period total number of deliveries were 7000.72 patients had eclampsia (1.02%). Only 2(2.71) patients were booked. Out of these 72 patients fifteen patients had history of hypertension but were not taking proper treatment. 45(62.5%) patients were primigravida and 27(37.5%) were multigravida. Most of the patients were uneducated and belonged to poor socio-economic status. Age of patients ranged between 16-40 years and the gestational age at the time of first seizure ranged from 24 to 41 weeks. 56(77.7%) patients were admitted with ante partum and 14(9.4%) had postpartum eclampsia. Only two patient had both antepartum and intrapartum seizures. Methyldopa Nifedipine, Isosorbide-dinitrite were used as an antihypertensive. When magnesium sulphate was used as an anticonvulsant then only 2(3%) patients had recurrence of convulsions. Toxicity developed in 6 (9.09%) patients. 52(72.2%) patients were delivered by lower segment caesarean section, 10(13.8%) were delivered vaginally at hospital. 11(15.2%) patient delivered at home. Sixty babies were borne alive. Six were fresh still birth and four babies died during early neonatal period. Half of these deaths occurred in premature babies. Overall apgar score was more than 8 at one minutes in 46 babies.

Table 1: Distribution of booked and unbooked patients. (n=72)

	n=	%age
Booked	2	2.7
Unbooked	70	97.2

Table 2: Relation ship of eclampsia to parity

Parity	n=	%age
Primigravida	45	62.5
Multigravida	20	27.7
Grand Multigravida	7	9.7

Table 3: Distribution of rural and urban patients.

Areas	n=	%age
Rural	58	80.5
Urban	14	19.4

Table 4: Distribution of maternal age in eclampsia.

Age	n=	%age
< 20 years.	4	5.5
21-25 years	34	47.2
26-30 years	10	13.8
31-35 years	20	27.7
> than 35 years	4	5.5

Table 5: Educational status of the patients.

Education	n=	%age
Primary	4	5.5
Secondary	1	1.3
None	67	93

Table 6: Socio-economic status of the patient.

Socio-economic Status	n=	%age
Higher class	0	0
Upper middle class	0	0
Lower middle class	12	16.6
Poor class	60	83.3

Table 7: Period of gestation at the time of presentation of eclamptic patients

Period of gestation	n=	%age
24-32	10	13.8
33-37	42	58.3
38-41	20	27.7

Table 8: Distribution of eclampsia.

Type of Eclapsia	n=	%age
Antepartum	56	77.7
Intrapartum	2	2.7
Post partum	14	19.4

Table 9: Mode of delivery of eclamptic patients.

Mode of delivery	n=	%age
Normal vaginal delivery in hospital	3	4.1
Normal vaginal delivery at home.	11	15.2
Lower segment caesarean Section	52	72.2
Instrumental delivery	6	8.3

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Table 10: Efficacy of Magnesium Sulphate (n=66)

Efficacy	n=	%age
Control of fits	58	87.8
Recurrence of fits	2	3
Withhold of MgSO ₄ due to toxicity	6	9

Table 11: Observed toxicity of Magnesium Sulphate

Type of toxicity	n=	%age
Respiratory depression	4	6
Loss of deep tendon reflex	2	3
Double vision	0	0
Slurred speech.	0	0

Table 12: Foetal outcome in patients using Magnesium Sulphate as an anticonvulsant

Fetal outcome	n=	%age
Alive	60	90.9
Still birth	6	9.0
Neonatal death	4	6
Apgar score at birth		
> 8 at 1 minute	46	69.6
< 6 at 1 minute	14	21.2
0 at 1 minute	6	9.0

Conclusion:

Most of eclamptic patients were unbooked and belonged to low socioeconomic status. Magnesium sulphate proved to be an effective anticonvulsant (87.8%) with its low convulsion recurrence rate and good fetomaternal outcome.

Discussion:

Eclampsia is the third commonest cause of maternal mortality after hemorrhage and infection⁴. Eclampsia rates are known to be higher in developing countries than developed countries. This has been attributed to the availability of antenatal care and specifically to screening for pre-eclampsia⁷.

The incidence reported from India is 1.56%⁸. In UK its incidence is 0.05% (that is one in every 2000 deliveries). The incidence of eclampsia in this study was 1.02%. Most of our patients were unbooked, primigravida, uneducated and belonged to poor socio-economic status.

Most of the patients (77.7%) developed antepartum convulsions showing lack of antenatal care.

The morbidity and mortality is related to the number of convulsions. The control of convulsions is therefore important in reducing maternal morbidity and mortality⁵. Magnesium sulphate is now recognized as the treatment of choice for the control of convulsions in eclampsia. There is evidence that it is more effective anticonvulsant than diazepam in the treatment of eclampsia.

Also magnesium sulphate makes further fits less likely than treatment with diazepam¹. In this study

magnesium sulphate has been statistically proved to be effective for control of fits. Magnesium sulphate toxicity causes loss of deep tendon reflex followed by respiratory-arrest. In most cases therapy can be monitored safely by hourly measurement of the patellar reflex and respiratory rate. In this study monitoring of magnesium sulphate therapy was by clinical evaluation alone. Magnesium Sulphate toxicity detected in six (9%) patients, when the patients were on their third or fourth dose.

Recurrent convulsions developed only in two patients (3%). Efficacy of Magnesium Sulphate in controlling convulsions was 87.8%. Incidence of convulsions reduced by 52% and 67% when Magnesium Sulphate is compared with diazepam and phenytoin on respectively¹.

Magnesium Sulphate is associated with a reduction in maternal death when compared to diazepam⁹. There is also a substantial reduction in the risk recurrence of further fit. It appears to be substantially more effective than diazepam for treatment of eclampsia. There was no maternal death recorded in patient on Magnesium Sulphate therapy. Few babies had apgar score less than eight at five minutes and few babies with a length of stay in special care baby unit more than seven days, associated with magnesium sulphate, showing good fetal outcome with this therapy.

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