ORIGINAL ARTICLE

OUTCOME OF LOW MAINTENANCE DOSE MGSO4 IN ECLAMPSIA PATIENTS OF A TERTIARY CARE HOSPITAL OF GUJARAT, INDIA- A PROSPECTIVE STUDY

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ABSTRACT

Background: Eclamptic convulsions are life-threatening emergencies and require proper treatment to decrease maternal morbidity and mortality. Amongst the principles of management of eclampsia, the first and foremost is the control of convulsions. In the last decade researchers in developing countries (like India) are constantly striving to steadily decrease the doses of MgSo4 regimes in view of decrease the toxicity of MgSo4 therapy.

Methodology: Present study was a prospective interventional study and hdsanalysed all antenatal, intranatal and postnatal cases diagnosed as eclampsia and admitted to Obstetric ward, HDU, ICU (medical and surgical), IMC of Shree Krishna Hospital and Pramukhswami Medical college, Karamsad. All patients of Eclampsia admitted in the hospital during the study period were included in the study. Patients fulfilling the inclusion criteria, MgSo4 4gm was administered slowly intravenously over 10-15 minutes as loading dose and maintenance dose 0.5g/hr continue up to 24 hrs of delivery or 24hrs after convulsions whichever was later. Those patient were developed recurrent convulsion, they were given 2g MgSo4i.v. stat and maintenance dose was converted in standard dose 1g/hr.

Results: In the present study we could achieve the average serum magnesium level around 3.3-3.4 mEq/L. These were below therapeutic range for eclampsia but within the range of normal blood level. Even serum magnesium level in subtherapeutic range, 89.2%patients had not developed recurrent convulsions. 33(71.73%) patients delivered Vaginally and 13(28.26%) were delivered by LSCS. Most common indicationsfor LSCS were fetal distress in 1st stage of labour followed by severe oligohydroamniosis and failure of induction of labour.

Conclusion: Low maintenance dose of magnesium sulphate therapy is effective for controlling convulsion in cases of eclampsia. The toxicity is reduced to nil. There was no maternal complication due to recurrent convulsions because patient was under close monitoring and immediately the stepping up of dose was enough.

Keywords: Eclampsia, MgSo4, Stillbirth, LSCS

INTRODUCTION

Hypertensive disorders of pregnancy are unpredictable Multiorgan disorder unique to human pregnancy. Pregnancy Induced Hypertension has been a recognized pathological entity since the time of Hippocrates and ancient Greeks complicating 5-20% pregnancies.

Convulsions in preeclampsia that cannot be attributed to any other factor defined as Eclampsia. Hypertensive disorders are important cause of maternal and fetal morbidity and mortality. Approximately 1,00,000 women die worldwide annually because of eclampsia, A majority of these maternal deaths occur in low-income countries where the quality of maternity care is often inadequate.[1]

Eclamptic convulsions are life-threatening emergencies and require proper treatment to decrease maternal morbidity and mortality. Amongst the principles of management of eclampsia, the first and foremost is the control of convulsions.

Implementation of MgSo4 would be strengthened if guidelines and recommendations for practice could be based on reliable evidence about the comparative effects of alternative regimens. Regimens for administration of MgSo4 have evolved over the years, but have not been formally evaluated.[2]It is therefore rel-

evant to assess the pros and cons of alternative strategies for administration. It is particularly important to assess the minimum effect dose and duration of treatment.

In the last decade researchers in developing countries (like India) are constantly striving to steadily decrease the doses of MgSo4 regimes in view of decrease the toxicity of MgSo4 therapy, limitation of trained staffs for its administration and monitoring of patients during MgSo4 therapy, our Indian women who on an average weigh much less than the western women and decrease the cost oftreatment in poor resource countries.

The present study was undertaken with an objective of assessing efficacy and toxicity of low maintenance dose of MgSo4in the treatment of eclamptic women with low weight or body mass index in our institute

METHODOLOGY

Present study was a prospective interventional study and hdsanalysed all antenatal, intranatal and postnatal cases diagnosed as eclampsia and admitted to Obstetric ward, HDU, ICU (medical and surgical), IMC of Shree Krishna Hospital and Pramukhswami Medical college, Karamsad. The study was reviewed and permitted by Institutional Human Resource Ethics Committee.

Study Period: 1st May 2012 to 30th June 2013 (i.e. 14 months).

Inclusion Criteria: Antenatal, intranatal, and postnatal women with appearance of convulsion without other causes was diagnosed as eclampsiaand patients who were weighing less than 50 kg by visual estimate.

Exclusion Criteria: It includes pregnancy with other causes of seizures were excluded such as known case of epilepsy and weight of patient>50kg.

Subject recruitment: All consecutive subjects fulfilling the inclusion criteria were taken in the study.

After admission the main aim was to prevent further convulsions, to control hypertension, and to stabilize the patient.

Patients fulfilling the inclusion criteria, MgSo4 4gm was administered slowly intravenously over 10-15 minutes as loading dose and maintenance dose 0.5g/hr continue up to 24 hrs of delivery or 24hrs after convulsions whichever was later. Those patient were developed recurrent convulsion, they were given 2g MgSo4i.v. stat and maintenance dose was converted in standard dose 1g/hr.

Serum magnesium level were measured three times. First within 30 mins of starting MgSo4 therapy, 2nd after 4 hours of therapy and 3rd after 8 hours of therapy.

Measures were taken to prevent aspiration & asphyxia due tongue fall during convulsions. Oxygen support was given. Foley's catheterization was done.

Clinical parameters measures toxicity of MgSo4 are i) Deep tendon reflex, ii) Respiratory rate, and iii) Cardiac rhythum

Antihypertensives (like Labetalol, Nifedipine or Nitroglycerine nitrate) were used to controlsevere hypertension and were administered as intermittent to keep diastolic blood pressure at about 90 mmHg as per department protocol.

Obstetric management was carried out after stabilizing the patient.

Patients with unfavorable cervix but adequate pelvis were induced for labour after cervical ripening with misoprostol. And LSCS were done according to obstetric indications.

Those admitted in labour without contraindication for vaginal delivery were monitored continuously on CTG and delivered vaginally.

RESULTS

This is a Prospective study of 46 cases of eclampsia at Pramukhswami Medical College, Karamsad, Anand from May 2012 to June 2013(i.e. 14 months)

Table 1: Status of patients with respect to receiving loading dose of MgSo4 (n=46)

Status of patients	No. (%)
Adequate loading dose	15(32.61)
Inadequate loading dose from outside)	10(21.74)
No treatment from outside	11(23.91)
Direct Emergency Admission	10(21.74)

Table 2: Maintenance Dose of MgSo4 in gm/hr (n=46)

Maintenance Dose	No. (%)
0.5	40 (86.96)
0.5 to 1	5 (10.87)
0.5 to 0.3	1 (2.17)

Table 3: Serum magnesium level in meq/L

Sample	Mean (sd)
30 mins after loading dose of MgSO4 therapy	3.40 (1.2)
4 hours after starting of MgSo4 therapy	3.32 (0.8)
8 hours after starting of MgSo4 therapy	3.30 (0.7)

sd=Standard Deviation

Table 1 shows that only Out of total 46 patients, 15(41.66%) of referred patients received adequate

loading dose of MgSo4 treatment before referral.In our institute, loading dose 4gm IV MgSo4 was given in 31(67.39%) patients on admission followed by maintenance dose.

Table 4: Total MgSo4 Dose (gm)(n=46)

Total MgSo4 Dose(gm)	No. (%)
<=20	23 (50.00)
21-25	8 (17.39)
26-30	7 (15.21)
31-35	5 (10.86)
36-40	1 (2.17)
>40	2 (4.34)

Table 5: Mode of Delivery (n=46)

Mode of Delivery	No. (%)
Vaginal Delivery	31 (67.39)
Instrumental Vaginal Delivery	2 (4.34)
LSCS	13 (28.26)

Table 6: ICU admissions and Ventilator support

Critically ill patients	No. (%)
I.C.U admissions	6 (13.04)
Ventilator support	
Non invasive	2 (4.34)
Invasive	3 (6.52)

Table 7: Perinatal outcome (n=46)

Perinatal outcome	No. (%)
Live Births*	39 (84.78)
Still Births	8 (17.39)
Neonatal death	5 (10.87)
Term Delivery	20 (43.47)
Preterm Delivery	17 (36.95)
Immature Delivery	2(4.34)
Low Birth Weight	31 (65.95)
IUGR	7 (15.21)

*One twin delivery

Table 2 shows that, all patients were given Low maintenance dose 0.5gm/hr of MgSo4intravenously by infusion pump.Amongst them, 5(10.87%) patients required to be increased maintenance dose from 0.5 to 1 gm/hr because of recurrent convulsion. In 1(2.17%) patient, maintenance dose was decreased from 0.5 to 0.3gm/hrdue to decreased urine output (<30ml/hr) where knee jerk was present.

Table 3 shows mean value of serum magnesium level of all patients at three different time.

Therapeutic range of serum magnesium is expected as 4-7 meq/L.[3]

Table 3 shows that in the present study we could achieve the average serum magnesium level around 3.3-3.4 mEq/L. These were below therapeutic range for eclampsia but within the range of normal blood level. Even serum magnesium level in subtherapeutic range, 89.2%patients had not developed recurrent convulsions.

Table 4 shows that total MgSo4 dose required in therapy was less than 30 gms in 38(82.6%) of patients. Recurrent Convulsion Rate was 10.8% in the present study. There was no toxicity due to MgSo4 threapy in the present study.

After admission, all antepartum and intrapartum patients were actively managed.25(69.44%) patients were induced for labour when bishop score was less than 5 by tab misoprost25 ug pervaginally and repeated 4hrly.Augmentation of labour was done when cervix was 3-4 cm dilated byArtificial rupture of membrane andOxytocin drip (2-30 mIU/min)

Table 5 shows that 33(71.73%) patients delivered Vaginally and 13(28.26%) were delivered by LSCS. Most common indicationsfor LSCS were fetal distress in 1st stage of labour followed by severe oligohydroamniosis and failure of induction of labour.

Table 6 shows that Critical care in the form of I.C.U. admission(13.04%) and ventilator support (10.88%) wererequired in patients with Acute pulmonary edema, Dilated cardiomyopathy, Aspiration pneumonia and PRESS syndrome in our institute.

Table 7 shows that8(17%) patients had Stillbirth and 5(10.6%)patients had Neonatal deaths, therewere 4 preterm deliveries.Perinatal Mortality ratio in the present study is33.33 per 1000 live births.

Total31 (65.95%) babies out of 47 babies were <2.5 kg weight and 15.21% babies had IUGR reflecting the effect of eclampsia in fetal growth restriction as well as its role in higher incidence of preterm delivery emphasizing the importance of good antenatal care in preventing the same.

DISCUSSION

Total 46 patients were treated during the study period. The dose of MgSo4 given in first 24hrs was significantly less in present study.

Table 8 shows comparison of different studies with respect to Reduction from the standard dose.the dose of MgSo4 given in first 24hrs was significantly less in present study. The reduction from Pritchard standard dose was 58.9% which was higher than any other studies.

Achievement of maintenance serum magnesium level:- i.e. The lower limit of target plasma magnesium level as mention by Brian J. Koos[84] is about twice the physiologic concentration which is around 1.7 mEq/L .In the present study we could achieve the average magnesium level around 3.3-3.4 mEq/L.

Table 8: Total MgSo4 Dose Required in Study.

Studies	Loading dose IM/IV	IM/IV maintenance dose	Total MgSo4 Dose (gm) in first 24 hrs	Reduction from the standard dose
Pritchad et al.,[4]	4 g IV plus 5+5 g IM	5g / 4hrlyIM	39	Standard dose
Bhalla et al.,[5]	4g IV plus 4+4g IM	4g/4hrlyIM	32	18%
Zuspan et al,[6]	4g IV	1 g/hr IV	28	28.3%
Begum et al.,[7]	4g IV plus3+3g IM	2.5g/4 hrlyIM	22.5	42.3%
N. Jana et al.,[8]	3g IV plus2.5+2.5gIM	2.5g/4hrlyIM	20.5	47.4%
Sumansardesai et al.,[9]	4g IV	2g /3 hrlyIM or IV	20	48.8%
Present study	4g IV	0.5 g/hr IV	16	58.9%

Table 9: Comparison of Serum Magnesium level in mEq/L

	Present study(Mean serum mg level) mEq/l	Begum et al.,[7](Mean serum mg level) mEq/l
1stSample	3.4(within 30 mins of loading dose)	2.97 (5 mins after loading dose)
2ndSample	3.32(4 hrs after loading dose)	2.78(4 hrs after loading dose)

Table 10: Comparison of Recurrent convulsion rate and Maternal mortality with different regimes of MgSo4 therapy.

Author	Regimen	Recurrent convulsion	Maternal mortality
Pritchard et al.,[4]	Pritchard	12 %	0.4 %
SumanSardesai et al.,[9]	Low dose MgSo4	7.8 %	2.6 %
Begum et al.,[7]	Dhaka regimen	1.53 %	8.6 %
Mahajan et al.,[10]	Padhar regimen	1.05 %	-
Chowdhury etal.,[11]	Low dose maintenance	2 %	3.3-5 %
Eclampsia trial group[12]	Eclampsia trial group	5.3-13.2 %	3.8-5.2 %
Joshi et al.,[13]	Single Dose MgSo4	9.16 %	3.3 %
Ekele et al.,[14]	Ultra short regimen	7.4 %	9.9 %
Present Study	Low dose Maintenance	10.8 %	0

Table 11: Comparison of Perinatal mortality ratio

Author	Year	PMR(%)
Joshi et al., Bellary, Karnataka.[13]	2003-2007	24.9
Nousheen Aziz et al., Hyderabad.[15]	2007	45.00
Bangal V et al., Loni.[16]	2009	33.0
S Singh et al., Berhampura, Orissa.[17]	2011	47.00
Manjusha S et al., Pune, Maharastra.[18]	2011-2012	26.08
Present study	2012-2013	33.33

Table 10 shows that overall mortality was ranging from 0.4 to 9.9%. None of patient died in low maintenance therapy which was a remarkable observation.

Table 11 shows that PMR was 33.33% in the study which was comparable to other studies. And ranging 24.9 % to 47% in different studies.

CONCLUSION

At conclusion of present study , it is clear that low maintenance dose of magnesium sulphate therapy is effective for controlling convulsion in cases of eclampsia in patients weighing around 50kg (BMI 25 or less). The toxicity is reduced to nil. So drug therapy becomes very safe and the patient who got recurrent convulsion after therapy could be controlled by 2 gm (20% solution) IV loading dose followed by 1 gm IV maintenance dose. There was no maternal complication due to recurrent convulsions because patient was under close monitoring and immediately the stepping up of dose was enough. One important observation is that convulsions were under control in our patients with subtherapeutic level of magnesium. This needs further research.

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