

Magnesium sulphate therapy in eclampsia and pre-eclampsia

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Received: 21 May 2018

Accepted: 26 June 2018

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ABSTRACT

Background: Maternal and perinatal mortality and morbidity remains high during pregnancy in the presence of eclampsia, it can have severe adverse effects on mother and the fetus. So, its management should be a top priority. The objective of the present research was to study the effect of magnesium sulphate in control of imminent eclampsia and eclampsia.

Methods: 19 cases of eclampsia and 185 cases of imminent eclampsia were treated with standardized magnesium sulphate. The outcome measures in terms of recurrence of convulsions, maternal and neonatal outcome, etc. were seen.

Results: Most common age group in both the groups were 21-30 years (i.e. 78.9% with eclampsia and 75.7% with imminent eclampsia). In both the groups, majority of the women were primigravidae. In eclampsia group, 9 (47.4%) women had 1 episode of convulsion, 8 (42.1%) women had two episodes of convulsions, 1 (5.3%) women each had 3 and 4 episodes of convulsions, while there were no convulsions in imminent eclampsia women ('t' value = 28.558, df=202, p=0.000). Vomiting and headache (94.7%) were the most common premonitory symptoms in eclampsia group, followed by edema in 68.4% women, while in imminent eclampsia 64.9% women had headache, 57.8% women had edema and 43.2% had vomiting. Recurrence of convulsions were seen in 4 (21.1%) women of the eclampsia group even after giving maintenance dose and additional dose of magnesium sulphate. 1 (5.3%) death was seen in eclampsia group and none in the imminent eclampsia group. Neonatal mortality in eclampsia group (47.4%) was higher than imminent eclampsia group (11.7%), which was statistically significant (Z value = 3.05, p=0.002).

Conclusions: Magnesium sulphate regimen was effective in control of convulsions in eclampsia and as prophylaxis in imminent eclampsia.

Keywords: Convulsions during pregnancy, Eclampsia, Hypertension, Imminent eclampsia, Magnesium sulphate regimen

INTRODUCTION

Pre-eclampsia is a disorder of pregnancy in which there is high blood pressure and presence of large amounts of protein in the urine or other organ dysfunction.^{1,2} Eclampsia is the onset of seizures (convulsions) in a woman with pre-eclampsia. Onset may be before, during, or after delivery. Complications include aspiration pneumonia, cerebral hemorrhage, kidney failure, and cardiac arrest. Pre-eclampsia and eclampsia are a part of a

larger group of conditions known as hypertensive disorders of pregnancy. Pre-eclampsia affects about 5% of deliveries while eclampsia affects about 1.4% of deliveries.³ Hypertensive disorders of pregnancy are one of the most common causes of death in pregnancy.⁴

Recommendations for prevention include calcium supplementation, treatment of prior hypertension with medications.^{5,6} The use of intravenous or intramuscular magnesium sulfate improves outcomes in those with

eclampsia and is generally safe.^{7,8} Other treatments may include blood pressure medications such as hydralazine and emergency delivery of the baby either vaginally or by caesarean section.

Pritchard had popularized the use of magnesium sulphate therapy for eclampsia and preeclampsia. Commonest adverse effect seen was respiratory depression caused by magnesium sulphate. Hence, a lower dose of magnesium sulphate had also been tried and tested by various authors to see the effectiveness in the Indian context.⁹

The standard Pritchard regimen dose of magnesium sulphate is 4 gm of 20% MgSO₄ IV followed by 10gm of 50% MgSO₄ IM (5gm in each buttocks)

The present study was undertaken to find out the outcome in terms of recurrence of convulsions in eclamptic women and to see if any convulsions occurred in imminent eclamptic women when magnesium sulphate was given prophylactically at studied institution.

The aim of the present research was to study the effect of MgSO₄ in eclampsia and imminent eclampsia. Objectives of present study was to evaluate the efficacy of loading dose MgSO₄ for control of convulsion in eclampsia and as a prophylaxis for convulsion in imminent eclampsia, to study the recurrence rate of convulsions in eclampsia and to study the neonatal outcome in both the cases.

METHODS

The present prospective, study was carried out at Department of Obstetrics and Gynaecology, Sri Aurobindo Medical College and Postgraduate Institute, Indore (M.P.) from December 2016 to January 2018. 19 women with eclampsia and 185 women with imminent eclampsia presenting to our institution during the study period were included in the study.

Inclusion criteria

- Period of gestation of more than 20weeks
- No associated obstetric and medical complications.

Exclusion criteria

- Chronic hypertension
- History and examination suggestive of evidences of any medical disorders like chronic renal diseases, coarctation of aorta or essential hypertension
- Not willing for participating in the study.

Treatment regimen for eclamptic women

Loading dose

4 gm magnesium sulphate was given I/V (intravenous), diluted in 20cc of 5% dextrose, slowly over 15-20 minutes.

Maintenance dose

5 gm magnesium sulphate I/M was given 4 hourly till 24 hours after delivery or after last convulsion whichever was later.^{2,3}

For recurrence of convulsions

If convulsions occurred half-an-hour after the loading dose, only then it was called recurrence of convulsions and in that case an additional dose of 2 gm I/V or I/M was given, and previous dose scheduled of 4 hourly was continued as planned.

Protocol for seizure prophylaxis in imminent eclampsia

5 gm magnesium sulphate I/M was given 4 hourly and continued till premonitory symptoms and signs disappeared.

All the women were monitored on clinical criteria. Before each dose of magnesium sulphate toxicity in the form of deep tendon reflexes, urine output and respiratory rate was assessed.

Anti-hypertensives were given either sublingually or orally as an adjuvant therapy in patients who had systolic blood pressure >160 mm Hg or diastolic blood pressure >110 mm Hg to prevent cerebrovascular accidents.

Hydration was maintained with IV fluids without causing circulatory overload. Eclampsia women were encouraged to take fluids orally as soon as they recovered consciousness.

In all women of eclampsia and imminent eclampsia, routine investigations like CBC, Urine routine and microscopy, kidney function tests, liver function tests and platelet count, ultrasonography with colour Dopple r(to find out the salvageability of the fetus), fundoscopy, etc. were done.

Termination of pregnancy was undertaken in all cases of eclampsia. Delivery was expelled in the form of induction / augmentation of labor. Decision regarding termination of pregnancy in cases of imminent eclampsia depended on severity of disease and maturity of the fetus. In patients of imminent eclampsia who were far from term, if symptoms and signs of imminent eclampsia disappeared after magnesium sulphate prophylaxis, the pregnancy was continued till 37 weeks wherever possible. Decision for termination was taken, if premonitory symptoms persisted or pregnancy was 37 weeks for more.

Outcome measures

Maternal outcome, neonatal outcome, recurrence of convulsions, death, etc.

Statistical analysis

The mean comparison between the groups was done using Unpaired 't' test. Association between non-parametric variables were done using Pearson Chi-square test, proportional comparisons were done using Z test for two sample proportion. A p value of < 0.05 was taken as statistically significant.

After obtaining the approval from the Ethics Committee of Sri Aurobindo Medical College and Postgraduate Institute, Indore, the study was initiated. Also prior to enrollment of each woman a written voluntary informed consent was obtained from woman and/or her legally acceptable representative.

All the women were treated according to the standard protocol for the management of eclampsia and imminent eclampsia as mentioned above. All the treatment costs were borne by the woman herself. No additional procedure/test was conducted for the specific requirement of the study. Hence, there were no additional financial burden on the woman or on the institution. All the costs related to the conduct of the study were borne by the investigator.

RESULTS

In all 204 women were included, of them 19 (9.3%) women with eclampsia and 185 (90.7%) women with imminent eclampsia were included in our series. Majority of the women belonged to the age group 21-30 years (i.e. 78.9% with eclampsia and 75.7% with imminent eclampsia).

Table 1: Total number of convulsions in eclampsia.

Number of convulsions	Eclampsia		Imminent eclampsia		Total	
	No.	%	No.	%	No.	%
None	0	0.0	185	100.0	185	90.7
1	9	47.4	0	0.0	9	4.4
2	8	42.1	0	0.0	8	3.9
3	1	5.3	0	0.0	1	0.5
4	1	5.3	0	0.0	1	0.5
Total	19	100.0	185	100.0	204	100.0
Mean±SD	1.68±0.82		0.00±0.00			
t value	28.558, df=202					
P value	0.000*					

In eclampsia group, majority of the women were primigravida 11 (57.9%), followed by gravida 2-3 i.e. 7 (36.8%) and there was only 1 (5.3%) woman with gravida >3. In the imminent eclampsia group, majority of the women, 84 (45.4%) were primigravida, followed by gravida 2-3 i.e. 78 (42.2%) and there was only 23 (12.4%) woman with gravida >3. In both the groups, majority of the women were primigravidae.

In the eclampsia group, 9 (47.4%) women had 1 episode of convulsion, 8 (42.1%) women had two episodes of convulsions, 1 (5.3%) each woman had 3 and 4 episodes of convulsions (Table 1).

In the eclampsia group, 10 (52.6%) women had blurring of vision, 18 (94.7%) women each had vomiting and headache and 13 (68.4%) women had edema. In the imminent eclampsia group, 2 (1.1%) women had no premonitory symptoms, 7 (3.8%) women had hyperreflexia, 22 (11.9%) had blurring of vision, 80 (43.2%) women had vomiting, 107 (57.8%) women had edema and 120 (64.9%) women had headache. Premonitory symptoms were more prevalent in the eclampsia group in comparison to the imminent eclampsia group (Table 2).

Table 2: Distribution of women according to premonitory symptoms in eclampsia and imminent eclampsia (N=204).

Premonitory symptoms	Eclampsia		Imminent eclampsia		Total	
	No.	%	No.	%	No.	%
None	0	0.0	2	1.1	2	1.0
Hyperreflexia	0	0.0	7	3.8	7	3.4
Blurring of vision	10	52.6	22	11.9	32	15.7
Vomiting	18	94.7	80	43.2	98	48.0
Edema	13	68.4	107	57.8	120	58.8
Headache	18	94.7	120	64.9	138	67.6

The mean number of convulsions in the eclampsia group was 1.68±0.82, while in the imminent eclampsia group it was 0.00±0.00. The difference was found to be statistically significant ('t' value = 28.558, df=202, p=0.000). After the first loading dose of low dose magnesium sulphate 15/19 (78.9%) women had control of convulsions in the eclampsia group, while 4 (21.1%) women still had convulsions.

In the eclampsia group, all 19 (100.0%) women were given maintenance dose, while in the imminent eclampsia group 168 (90.8%) women were given maintenance dose. Of the 19 women in the eclampsia group after the maintenance dose, 15 (78.9%) women were convulsion free, while 4 (21.1%) women still had convulsions.

Additional maintenance dose was given in 15 (78.9%) women with eclampsia, while no woman with imminent eclampsia received any additional dose of maintenance dose.

In eclampsia group, 13 (68.4%) were admitted in ICU, 1 (5.3%) woman had partial HELLP syndrome, in 4 (21.1%) women, the outcome was good and 1 (5.3%) woman expired; while in the imminent eclampsia group, 10 (5.4%) women were admitted to ICU, 3 (1.6%) women had sequel and 172 (93.0%) women had good outcome (Table 3).

Table 3: Distribution of women according to maternal outcome in eclampsia and imminent eclampsia (N=187).

Maternal Outcome	Eclampsia		Imminent eclampsia		Total	
	No.	%	No.	%	No.	%
Death	1	5.3	0	0.0	1	0.5
Good	4	21.1	172	93.0	176	86.3
ICU admission	13	68.4	10	5.4	23	11.3
Partial HELLP syndrome	1	5.3	0	0.0	1	0.5
Sequele	0	0.0	3	1.6	3	1.5
Total	19	100.0	185	100.0	204	100.0

There were total 19 deliveries in the eclampsia group and 188 deliveries in imminent eclampsia group. Of the 19 deliveries in the eclampsia group, 7 (36.8%) neonates were discharged in well condition, 4 (21.1%) were intrauterine deaths, 3 (15.8%) required NICU stay, 4 (21.1%) were still born and there was 1 (5.3%) death. Total neonatal mortality in the eclampsia group was 9 (47.4%) (Table 4).

Table 4: Distribution of women according to neonatal outcome in eclampsia and imminent eclampsia (N=187).

Neonatal outcome	Eclampsia (n=19)		Imminent eclampsia (n=188)		Total	
	No.	%	No.	%	No.	%
Death	1	5.3	7	3.7	8	3.9
Discharged	7	36.8	153	81.4	160	77.3
IUD	4	21.1	7	3.7	11	5.3
Macerated	0	0.0	1	0.5	1	0.5
NICU stay	3	15.8	13	6.9	16	7.7
Stillborn	4	21.1	7	3.7	11	5.3

While in the imminent eclampsia group, out of the 188 deliveries, 153 (81.4%) neonates were discharged in well condition, 7 (3.7%) neonates were late intrauterine deaths, 13 (6.9%) neonates required NICU stay, 7 (3.7%) neonates were stillborn, 1 (0.5%) neonate was macerated and there were 7 (3.7%) deaths post-delivery. Overall there were 22 (11.7%) neonatal deaths in imminent eclampsia group (Table 4).

Table 5: Comparison of neonatal outcome in eclampsia and imminent eclampsia (N=187).

Neonatal outcome	Eclampsia (n=19)		Imminent eclampsia (n=188)	
	No.	%	No.	%
Death	9	47.4	22	11.7

Z test for two sample proportion applied; Z value = 3.05, P value = 0.002*, significant

There was a higher proportion of neonatal deaths in the eclampsia group women in comparison imminent eclampsia women group (Z value = 3.05, p=0.002), which was statistically significant (Table 5).

DISCUSSION

The present study was undertaken to compare the effect of low dose MgSO₄ in eclampsia and imminent eclampsia. In the present study, in 15 (78.9%) women convulsions were controlled in the eclampsia group and when given as prophylaxis in the imminent eclampsia group, none of the women of this group had any episode of convulsion. The recurrence rate of convulsions in our study was 21.1%.

Study done by Nath et al also found a 94% control of eclampsia in their study group.¹⁰ They also reported no magnesium toxicity. Sardesai et al reported control of eclamptic fits in 90% women with low dose MgSO₄.⁹ Begum et al reported 98% control of eclamptic fits in their series.¹¹

In present study there was 1 (5.3%) maternal mortality in the eclampsia group, while Nath et al reported no maternal mortality in their study.¹⁰ Sardesai et al reported 2.63% maternal mortality in their series.⁹

In present study perinatal outcome was 47.4% in the eclampsia group and 11.7% in the imminent eclampsia group. Overall IUDs were 5.3%, macerated still births were 0.5%, still births were 5.3%, and deaths were 3.9%. Nath et al reported an overall perinatal mortality of 33%.¹⁰ With 80% still births and 20% neonatal deaths. Sardesai et al reported 33.90% perinatal mortality in their study.⁹

Overall the magnesium sulphate was effective in control of convulsions in women with eclampsia and as a prophylaxis in women with imminent eclampsia.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Sagar S, Natu N, Chandwaskar N. Magnesium sulphate therapy in eclampsia and pre-eclampsia. *Int J Reprod Contracept Obstet Gynecol* 2018;7:3189-93.