



## Low dose Magnesium Sulfate in Eclampsia in a tertiary care hospital

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### Abstract

*Eclampsia is a serious obstetric condition, resulting in significant morbidity and even mortality of the mother and the child. Pritchard regimen is well established anticonvulsant protocol with good result in the management of eclampsia. To reduce the MgSO<sub>4</sub> toxicity in low weight Indian women, a low dose regimen is tried. The low dose protocol is--a loading dose of 4 gm of MgSO<sub>4</sub> slow IV; followed by a maintenance dose of 2 gms of MgSO<sub>4</sub> slow IV every three hours; continued for 24 hours after delivery or 24 hours after last convulsion, whichever is later; If a convulsion occurs during treatment, an additional dose of 2 gms of MgSO<sub>4</sub> is given slow IV in addition to the regular dose.*

*During calendar years 2017, 2018, 123 women were treated for eclampsia. 69 women got admitted for eclampsia, 15 had eclampsia after admission, 39 women were referred from other hospitals for management. 60% had antenatal or antepartum eclampsia. One third had postpartum eclampsia, the remaining being intrapartum cases. 40% of women had BP less than 160/110 and 60% above 160/110 mm of Hg. Of the 81 direct admissions-- two thirds had eclampsia at or after 37 weeks; 60% had vaginal delivery unaided; 1/6 had instrumental vaginal delivery; and in 1/4th of women, the termination was done by LSCS. Of these 81 women, 13 were admitted with absent FH; 5 had intrapartum fetal death; of the 63 live births, 90% fair Apgar score; 10% with poor Apgar score at 5 minutes of delivery; there were 3 early neonatal deaths. One woman had eclampsia with 10 fits, went into coma and died. Others are well at discharge. Low dose MgSO<sub>4</sub> regimen is equally efficacious as Pritchard's regimen. Maternal and fetal morbidity and mortality were almost same in the low dose regimen when compared with Pritchard regimen.*

**Keywords:** *Eclampsia, Magnesium Sulfate, Pritchard regimen, Low dose regimen, Maternal and Fetal Morbidity and Mortality.*

### Introduction

Eclampsia is defined as the occurrence of generalized convulsion(s) and/or coma associated with signs of pre-eclampsia during pregnancy, labor or within 7 days of delivery and not caused by epilepsy or other convulsive disorders. In the absence of a high blood pressure or if the

convulsions occur after day 7 postpartum, the condition is referred to as atypical eclampsia. The incidence of eclampsia varies widely from 1 in 100 to 1 in 2000 pregnancies. It is estimated that 50,000 women die of eclampsia every year eclampsia is, most of which occur in developing countries.

The Eclampsia Trial Collaborative Group Study concluded that magnesium sulphate was safer and better than phenytoin and diazepam.

Additional advantages of magnesium sulphate therapy are lower cost, ease of administration and less sedation than diazepam and phenytoin. Magnesium sulphate also appears to selectively increase cerebral blood flow and oxygen consumption in women with eclampsia which is not true for other anticonvulsants.<sup>4</sup> The World Health Organisation has also recommended magnesium sulphate as the most effective, safe and low cost drug for the treatment of eclampsia.<sup>31</sup>

There are principally two main regimens available for the administration of MgSO<sub>4</sub>. In the Pritchard Regimen, the loading bolus dose of 4 gram of MgSO<sub>4</sub> is given slowly intravenously over 5-10 minutes and this is followed immediately by 10 gram deep intramuscular injection – half in each buttock. Maintenance dose consist of 5 gram deep intramuscular injection into alternate buttock 4 hourly.<sup>23</sup>

In Zuspan Regimen, the loading dose consists of an initial intravenous dose of 4 gram slowly over 5-10 minutes followed by a maintenance dose of 1-2 gram every hour given by an infusion pump.<sup>32</sup>

The authors have suggested that the dose of magnesium sulphate should be limited in women who are known to have lower weight. Women in India especially from rural areas or from low socio-economic strata tend to have smaller weights. Administering Pritchard regime might prove hazardous in these low weight women and there is possibility of most dreadful respiratory failure.<sup>23</sup> With this in mind, various Indian authors have used low dose of magnesium sulphate and the outcomes were comparable with high dose regimens.<sup>25,15,27</sup> We, in our study, shall be using low dose magnesium sulphate for treatment of eclampsia.

The toxicity of drug shall be monitored using clinical parameters which include knee-jerk (should be present), respiratory rate (should be more than 16 per minute) and urine output (should be more than 30 millilitre per hour). The first warning sign of toxicity is loss of knee-jerk. The

clinical parameters of toxicity remaining within normal limits, serum magnesium level monitoring is not required.<sup>29</sup>

Our present study using low dose magnesium sulphate therapy has been planned to evaluate the maternal and perinatal outcome in all patients of eclampsia admitted in our institution.

### Aims

1. To evaluate maternal outcome with low dose magnesium sulphate therapy in patients admitted with and those who develop eclampsia after admission.
2. To evaluate perinatal outcome in all the patients given magnesium sulphate low dose therapy.
3. To evaluate fit recurrence rate and failure of treatment in these patients.

### Material and Methods

The present study was conducted in the Postgraduate Department of Obstetrics and Gynaecology, Vinayaka Mission Medical College and Hospital, Karaikal, Pondicherry for a period of two calendar years of 2017 & 2018.

All the women who were admitted in Obstetrics Emergency Ward of Hospital with eclampsia and also women hospitalized for severe pre eclampsia, who had fits during antenatal, intrapartum or postpartum period.

Anti convulsant protocol for eclampsia:

Loading dose of 4 g magnesium sulfate to be given intravenously, diluted in 20 cc of 5% dextrose, slower over 15-20 minutes.

Maintenance dose of 2 g magnesium sulfate intravenously, similarly diluted to be given 3 hourly till 24 hours after delivery or after last convulsion, whichever is later.

For recurrent convulsions-If convulsion occurs half-an-hour after the loading dose, then only it is called recurrence of convulsions and in that case an additional dose of 2 g intravenously to be given and previous dose schedule of three hourly injections to be continued.

Failure of treatment would mean uncontrolled convulsions even after 2 additional doses.

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

Intravenous Labetalol was used as first line antihypertensive therapy, unless contraindicated, in patients who had systolic blood pressure  $\geq 160$  mmHg or diastolic blood pressure  $\geq 110$  mmHg to prevent cerebrovascular accidents.

Hydration is maintained by Ringer lactate solution 1000 cc over 24 hours and intravenous fluids to be restricted to prevent circulatory overload. Eclampsia patients were encouraged to take fluids orally as soon as they recover consciousness.

Termination of pregnancy was undertaken in all cases of eclampsia. Delivery was expedited in the form of induction/augmentation of labour or LSCS depending upon assessment of each case.

**Results**

During the study period, 123 women were treated for eclampsia. The findings of the study were-

**Table 1:** Age distribution of patients

Age group (in years)	Patients	
	No.	%
<20	11	8.94
21 – 25	63	51.21
26 – 30	44	35.78
>31	5	4.07
<b>Total</b>	<b>123</b>	<b>100.00</b>

Table 1 shows age distribution of patients. The youngest patient in the study was aged 19 years and the oldest was 42 years old. Majority of the patients belonged to 21 – 25 age group (63 patients i.e. 51.21%).

Of the 123 women with eclampsia, 87 (70.73%) were from rural areas and 36(29.37%) were from urban areas.

**Table 2** Distribution of cases according to parity

Parity	Patients	
	No.	%
Primigravida	55	44.71
Primipara*	32	26.01
Multigravida	26	21.13
Multipara*	10	8.1
<b>Total</b>	<b>123</b>	<b>100.00</b>

\*Had postpartum eclampsia or admitted in postpartum period

**Table 3:** Distribution of patients according to place of first fit

Place of first fit	Patients	
	No.	%
Home	69	56.10
Other Hospital	39	31.71
VMMC Hospital	15	12.19
<b>Total</b>	<b>123</b>	<b>100.00</b>

Table 3 represents the place of first fit. Maximum 69 patients (56.10%) had first fit at home, while 39 patients (31.71%) had fit at other hospitals and were referred to us. Only 15 patients (12.19%) had first fit in hospitalized women.

**Table 4:** Distribution according to type of eclampsia

Type of eclampsia	Patients	
	No.	%
Antepartum	74	60.16
Intrapartum	7	5.70
Postpartum	42	34.14
<b>Total</b>	<b>123</b>	<b>100.00</b>

Table 4 represents the distribution according to type of eclampsia. 74 (60.16%) patients had antepartum eclampsia, 7 had intrapartum eclampsia and 42(34.14%) had postpartum eclampsia

**Table 5:** Systolic blood pressure (mmHg) at admission

Systolic blood pressure (mmHg)	Patients	
	No.	%
>201	11	8.95
181 – 200	16	13.01
161 – 180	46	37.38
141 – 160	39	31.71
<140	11	8.95
<b>Total</b>	<b>123</b>	<b>100.00</b>

Out of 123 patients 8.91 % patients had systolic blood pressure more than 200mmHg at the time of admission to our hospital. 62 (50.39%) patients had SBP more than or equal to 160 mmHg but less than 200mmHg.

**Table 6:** Diastolic blood pressure at admission

Diastolic blood pressure in mm of Hg	Patients	
	No.	%
<90	4	3.25
91 – 110	44	35.78
>111	75	60.97
<b>Total</b>	<b>123</b>	<b>100.00</b>

Diastolic BP ranged from 90- 118mm of Hg.75 patients (60.97%) had diastolic pressure more than 110 mm of Hg.

**Table 7:** Distribution of patients according to number of fits

More than half of the women had one or two convulsions. Ninety percent had less than five fits. Only one had ten convulsions

No. of fits	Patients	
	No.	%
1 – 2	67	54.47
3 – 5	43	34.96
6 – 10	12	9.76
>10	1	0.81
<b>Total</b>	<b>123</b>	<b>100.00</b>

Seventy five percent of women were in labour and twenty five percent were not in labour.

**Table 8:** Distribution of patients according to GA

Gestational weeks)	Age (in weeks)	Patients	
		No.	%
<32		3	3.7
32 – 36		25	30.86
37 – 41		53	65.43
<b>Total</b>		<b>81</b>	<b>100.00</b>

**Table 9:** Treatment delivery interval (n = 81)

Duration in hours	Patients	
	No.	%
<7	64	79.01
7 – 12	12	14.81
13 – 24	5	6.17
<b>Total</b>	<b>81</b>	<b>100.00</b>

**Table 10:** Mode of delivery in patients under study (n=81)

Mode of delivery	Patients	
	No.	%
Spontaneous vaginal	49	60.49
Forceps/ vacuum	13	16.05
LSCS	19	23.46
<b>Total</b>	<b>81</b>	<b>100.00</b>

Forty nine (60.49%) of the patients had spontaneous vaginal deliveries. Thirteen (16.05%) had assisted vaginal deliveries and 19 (23.46 %) patients underwent LSCS in our hospital who were admitted as cases of antepartum/intrapartum eclampsia. 42 patients were admitted with eclampsia before, during or

after spontaneous home delivery or vaginal delivery or LSCS at other hospitals.

**Table 11:** Duration of stay in hospital

Duration of stay in hospital (in days)	Patients	
	No.	%
3	7	5.69
4 – 6	67	54.57
7 – 9	26	21.13
10 – 12	23	18.69
<b>Total</b>	<b>123</b>	<b>100.00</b>

In majority of the cases duration of hospital stay was less than 6 days. About 40 percent of the patients had hospital stay of more than 6 days.

**Table 12:** Perinatal outcomes

Absent FHS at admission: n=81	13	16.04	
Intrapartum fetal death: n=68	5	7.35	
Live births: n=68	63	92.65	
Apgar score at birth	≤6	10	15.87
	>6	53	84.13
Apgar score at 5 minutes	≤6	6	9.52
	>6	57	90.48
Admission to NICU	6	9.52	
Early neonatal mortality	3	4.76	

**Table 13:** Maternal morbidity and mortality

Complications	Patients	
	No.	%
Death	1	0.81
Coma	2	1.62
Temperature >40°C	6	4.87
RTI	8	6.50
Abruptio placenta	7	5.69
PPH	9	7.31
Tongue bite	6	4.87
Cerebral edema	4	3.25
CVA	2	1.62

### Discussion

In the present study 123 patients of eclampsia were studied. The patients were given magnesium sulphate low dose regimen and were evaluated for the control of fits, recurrence of fits, complications maternal mortality/morbidity, and perinatal mortality and morbidity.

Sixty percentage of women were less than 25 years of age, the median age being 24 years. The greater incidence in the younger age groups is reflective of the fact that the disease is more prevalent in primigravidae.

Analysis of parity status reveals that 72.36 % of the patients in this study were primigravidae and

27.64 % were multigravidae. The figure is similar to that of 75% (for primigravidae) reported by Devi et al in 1976. However, Madhuri and Bhardwaj reported that 53.8% of their cases were primigravidae.

70.73% of the patients in this study belonged to the rural areas. Madhuri and Bhardwaj (1998) reported that 87.7 % of their cases were from the rural background. On the other hand Aggarwal et al (1983) reported 65.5% cases from rural areas whereas Nagar et al (1988) found only 34.4 % of cases from rural background. Lower rural proportion in the latter study can be attributed to the fact that their study was based in Delhi.

43.09% in the present study had duration more than 36 weeks of gestation. This figure is similar to that of 43.7% reported by Nagar et al (1988). Devi et al reported 30% as far as gestational age more than 36 weeks is concerned.

In the present study 60.16% had antepartum eclampsia, 5.70 % had intrapartum eclampsia 34.14 % had postpartum eclampsia. Incidence of 64.32%, 15.07% and 25.1% was reported by Nagar et al (1988) for antepartum , intrapartum and postpartum eclampsia respectively. Incidence of antepartum, intrapartum and postpartum eclampsia has been reported as 43% , 43% and 14% respectively by Devi et al (1976).

Overall 54.47 of eclamptic patients had 1 to 2 convulsions in the present study. Only one patient (0.81 %) experienced more than 10 fits, where as in a study conducted by Dutta and Biswas (1978), 18% of the patients presented to hospital with more than 10 fits.

In the present study, 13 eclamptic patient on low dose magnesium sulphate regimen had fit recurrence. 3 people had third fit. 2 went into coma. One regained consciousness after 12 hours of treatment, one patient didn't respond and died after 2 days of coma. With magnesium sulphate fit recurrence rate of 1.3% by Bhat and Barfiwalla (1985), 1.98% by Nagar et al (1988), 9.2% by Madhuri and Bhardwaj (1998) , 10% by Crowther (1990) , 12% by Pritchard et al (1984) and 14% by Sibai (1990) have been reported.

In our study, 49 (60.49%) of the patients had spontaneous vaginal deliveries 13 (16.05%) had assisted vaginal deliveries and 19 patients (23.46 %) patients underwent LSCS in our hospital who were admitted as cases of antepartum/intrapartum eclampsia. 42 patients had spontaneous home delivery or vaginal delivery or LSCS delivery at other hospitals.

In the present study, one maternal death occurred. It was a case of antepartum eclampsia and patient died of stroke. Pritchard (1975), Sibai (1981), Sadhana et al (1988), Nagar et al (1988) and Sawhney et al (1999) have reported zero maternal mortality while Pritchard et al (1984) have reported a maternal mortality of 0.4%. 8 patients in the study developed respiratory tract infection. 6 patients had PPH.

Eclampsia is associated with high perinatal mortality. In this study of 81 women, 13 were admitted with absent FH. In the 68 women who delivered, there were 5 intrapartum deaths. 60 babies were born alive; Ten of these were born with low apgar. They were revived and three babies had early neonatal death. with low apgar. Perinatal mortality was 11.76%. Sadhna et al (1988) have noted a perinatal mortality rate of 9.57% with standard regimen of magnesium sulphate quite similar to that of 9.5% reported by Nagar et al (1988).

### Conclusions

The low dose Magnesium sulphate regimen is equally efficacious as Pritchard regimen in control of convulsions in eclampsia. The low dose regimen compares well with Pritchard regimen in terms of maternal mortality, morbidity and perinatal mortality, morbidity.

**Conflict of Interest:** Nil

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