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Original Research Article

## A comparative study of low dose magnesium sulphate therapy with Pritchard's regime in management of Eclampsia

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### ABSTRACT

**Background:** Eclampsia is one of the most common causes of maternal and perinatal mortality and morbidity in India. Amongst the principles of management of eclampsia, the first is the control of convulsions. Magnesium sulphate is the main stay of treatment in eclampsia and imminent eclampsia. Average weight of Indian women is less than the western women due to which lower dose of magnesium sulphate can be used. The aim of the study was to compare the efficacy of low dose magnesium sulphate regimen with standard Pritchard regimen in control of eclampsia.

**Methods:** The study was carried out at emergency labour room, GMERS Sola Civil Hospital Ahmedabad. 120 patients of eclampsia were divided randomly into study group (n=60) receiving low dose MgSO<sub>4</sub> and control group (n=60) receiving Pritchard regimen. The recurrence of convulsion, toxicity of MgSO<sub>4</sub> and maternal and fetal outcome was studied.

**Results:** It was observed that with low dose MgSO<sub>4</sub> regime, convulsions were controlled in 91.7% of the cases. With standard Pritchard's regime convulsions were controlled in 95% of patients. The maternal and perinatal mortality and morbidity were comparable in both groups.

**Conclusions:** Low dose magnesium sulphate therapy is as effective as Pritchard's regime for controlling convulsions in eclampsia and can be safely given in Indian women.

**Keywords:** Eclampsia, Low dose, Magnesium sulphate, Pritchard's regime

### INTRODUCTION

Eclampsia is one of the most common causes of maternal and perinatal mortality and morbidity in developing countries like India. Eclampsia is an extremely severe form of preeclampsia. It is characterized by sudden onset of generalized tonic-clonic convulsion or coma in pregnancy or postpartum, unrelated to other cerebral conditions, in patients with signs and symptoms of preeclampsia.<sup>1</sup>

Pregnancy is a state of hypomagnesaemia. The total and ionized serum magnesium (Mg<sup>2+</sup>) levels are not only significantly lower compared to non-pregnant women, but also tend to fall with advancing gestation, with further decrease in those who develop PES (preeclampsia-eclampsia syndrome).<sup>2,3</sup> Mg<sup>2+</sup> affects contractility and tone of blood vessels thereby regulating blood pressure (BP). So, it is obvious that Mg<sup>2+</sup> depletion may be one of the aetiologies for PES. Eclampsia is rare in developed countries with incidence of 1:1500 and 1:3500 deliveries.<sup>4</sup>

But in developing countries like India, particularly in rural areas where eclampsia may present for treatment after having had many fits at home. Incidence of eclampsia ranges from 1:150 to 1:1600 deliveries. The principle in management of eclampsia is to control convulsions and to terminate the pregnancy. Jack A. Pritchard popularized magnesium sulphate therapy in eclampsia in modern obstetrics since 1975. Pritchard regime was formulated for woman weighing average 70kg. But Indian woman has an average weight of  $49.4 \pm 7.18$ kg.<sup>5</sup> An adjustment of dose according to patient's body mass index is needed.<sup>6</sup>

The aim of the study was to compare the efficacy of low dose magnesium sulphate regime with Pritchard's regime for control of convulsions in Indian women and to compare the toxicity of MgSO<sub>4</sub> with standard Pritchard's regime and low dose MgSO<sub>4</sub> regime.

## METHODS

This randomized case control study was carried out at GMERS Sola Civil Hospital, Ahmedabad from August 2017 to August 2018. All eclampsia patients, antepartum, intrapartum and postpartum admitted in emergency labour room.

### Inclusion criteria

- The diagnosed case of eclampsia.

### Exclusion criteria

- Known case of epilepsy
- Intracranial tumour or SOL
- Meningitis and encephalitis
- Patients who have received anticonvulsant treatment before admission.

Informed consent was taken from relatives. Detailed clinical examination was carried out in all patients along with investigation which include complete hemogram, RFT, LFT, coagulation profile, fundus examination and urine analysis.

Group A: 60 cases of eclampsia who were treated with low dose MgSO<sub>4</sub> therapy (study group).

Group B: 60 cases of eclampsia that were treated with Pritchard's regime (control group).

### Protocol for low dose MgSO<sub>4</sub> therapy

#### Loading dose

4gm (20%) of MgSO<sub>4</sub> i.v. diluted in 20cc of distilled water slowly over a period of 15-20 minutes.

#### Maintenance dose

2gm (50%) of MgSO<sub>4</sub> has given intramuscularly every 3 hourly into alternate buttocks till 24 hours after delivery or after last convulsion whichever was later.

#### For recurrence of convulsion

If convulsions occurred half an hour after the loading dose, it was called the recurrence of convulsion. Additional dose of 2gm (20%) i.m. was given.

Before giving each dose of MgSO<sub>4</sub>, following parameters were checked

- Knee jerk
- Urine output - more than 30ml/hour or more than 100ml in 4 hour
- Respiratory rate - more than 16/min

#### Antihypertensive therapy

Nifedipine 10mg was given if systolic BP >160 mmHg or diastolic BP >110mmHg. Hydration was maintained by ringer lactate solution 1000ml over 24 hours.

When the patient was stabilized obstetric management was carried out according to bishop score, gestational age and age of viability. LSCS was done if there was any obstetric indication, uncontrolled convulsion or impending renal failure.

If convulsion occurs  $\geq 3$  times in Group A (low dose MgSO<sub>4</sub> group) after loading dose then patient will be given full dose of MgSO<sub>4</sub> according to Group B (Pritchard's regime) and it will be failure of low dose MgSO<sub>4</sub> regime.

#### Outcome measures

- Recurrence of convulsion
- Toxicity profile
- Maternal mortality & morbidity
- HELLP
- DIC (disseminated intravascular coagulation)
- Pulmonary edema
- Intra cranial haemorrhage
- Postpartum haemorrhage
- Still birth
- Low birth weight
- Neonatal death.

## RESULTS

Antepartum convulsions are more common.

In this study in Group A, 37% of the patients had antepartum, 18% of the patients had intrapartum, while 5% had postpartum eclampsia.

**Table 1: Type of eclampsia.**

Type of eclampsia	Group A	Group B
Antepartum	37 (61.7%)	39 (65%)
Intrapartum	18 (30%)	16 (26.7%)
Postpartum	5 (8.3%)	5 (8.3%)

In Group B also 39% of the patients had antepartum, 16% of the patients had intrapartum while 5% had postpartum eclampsia.

**Table 2: Number of convulsions.**

Number of convulsions	Group A	Group B
1-5	50 (83.3%)	45 (75%)
>6	10 (16.7%)	15 (25%)

In the present study, 50% of patients in Group A and 45% of patients in Group B had 1-5 convulsions while 10% in Group A and 15% in Group B had more than 6 convulsions.

**Table 3: Recurrence of convulsion.**

Recurrence of convulsion	Group A	Group B
None	55 (91.7%)	57 (95%)
One	3 (5%)	2 (3.3%)
Two	2 (3.3%)	1 (1.7%)
Three /more	-	-

In Group A, the convulsions were controlled with loading dose itself in 55 cases i.e. 91.7% of patients, while 3 patients i.e., 5% had recurrence of one convulsion 6 and 4 hours after administration of loading dose and 2 patients i.e., 3.3% had recurrence of two convulsions 8, 7 and 4 hours after administration of loading dose which were effectively controlled with an additional dose of magnesium sulphate of 2gm-IM.

In Group B, the convulsions were controlled with loading dose in 57 cases i.e., 95% of patients, while 2 patients i.e., 3.3% had one recurrent convulsion and 1 patient i.e., 1.7% had recurrence of two convulsions.

So the present study showed a recurrence rate of 5% with low dose magnesium sulphate therapy and 3% with Pritchard's regime.

**Table 4: Toxicity profile of magnesium sulphate.**

	Group A	Group B
Absent DTR	7 (11.7%)	14 (23.3%)
Respiratory depression	0	1 (1.7%)
Coma	0	0
Total	7	15

DTR: deep tendon reflex.

Difference in toxicity was statistically significant. There were 7 patients i.e., 11.7% of group A and 14 patients

i.e., 23.3% of group B with absent DTR. One patient in control group developed respiratory depression needing assisted ventilation and calcium gluconate supplement.

**Table 5: Maternal complication.**

	Group A	Group B
Mortality	2 (3.3%)	2 (3.3%)
DIC	4 (6.7%)	2 (3.3%)
Pulmonary edema	1 (1.7%)	1 (1.7%)
APH	0	1 (1.7%)
HELLP	1 (1.7%)	2 (3.3%)
Intracranial haemorrhage	1 (1.7%)	0
LVF	0	0

DIC: Disseminated intravascular coagulation, APH: Antepartum haemorrhage, LVF: Left ventricular failure.

Mortality was equal in both group 3.3%. It was due to complication of eclampsia.

In study group 7 patients and 6 patients in control group developed complication. 4 cases in study group and 2 in control developed DIC.

**Table 6: Perinatal outcome.**

Preterm/ term	Group A	Group B
Live birth	51 (85%)	48 (80%)
Preterm	10	8
Term	41	40
Still birth	6 (10%)	8 (13.3%)
Preterm	5	6
Term	1	2
Neonatal death	3 (5%)	4 (6.7%)
Preterm	2	2
Term	1	2
Perinatal mortality	9 (15%)	12 (20%)

51 (85%) out of 60 in study group and 48 (80%) out of 60 in control group had live birth.

Perinatal mortality in study group was 9 (15%). There were 6 Stillbirths, out of these 5 were preterm and 1 was term. Neonatal death in study group was 3 (5%).

In the control group perinatal mortality was 12 (20%). There were 8 stillbirths out of them 6 were preterm and 2 were term. Neonatal death in control group was 4 (6.7%).

Cause of death in most of the neonates was prematurity.

## DISCUSSION

Eclampsia is one of the most serious complications of pregnancy and still remains the second most common cause of maternal and perinatal mortality and morbidity in developing countries like India. Magnesium sulphate has been recommended by WHO as the effective and safe

drug for prevention and control of convulsions in eclampsia Sardesai S et al proved low dose MgSO<sub>4</sub> regimen was as effective as Pritchard regimen in control of convulsions in Indian women weighing average 48.4±6.7 kg.<sup>7,8</sup>

In the present study the average weight of patients in both groups was 47±6kg and all other parameters were comparable. There was no statistically significant difference. In this study convulsions were controlled in 91.7% of cases with loading dose of 4gm only, instead of 14gm as prescribed in Pritchard's regime. Recurrence rate of convulsion with low dose MgSO<sub>4</sub> therapy was 8.3%. With Pritchard's regime in 95% of cases convulsions were controlled and the recurrence rate is 5%. Several studies showed a recurrence rate of 4-6% with low dose magnesium sulphate therapy.<sup>9-11</sup>

The recurrence rate with standard protocol reported in collaborative eclamptic trial, the largest multicentre randomized controlled trial ranged between 5.7% and 13.2%. Suman et al and Begum R, of Dhaka have concluded that the low dose magnesium sulphate therapy is as effective as standard Pritchard's regime in the Asian group.<sup>8,12</sup> Magnesium has narrow therapeutic index (4-7 meq/L). A higher number of patients lost DTR with Pritchard's regime than low dose regime in this study. Respiratory depression is a major threat while using MgSO<sub>4</sub>. One patient of Pritchard's regime developed respiratory depression while none developed respiratory depression with low dose regime in present study.

Maternal mortality ranges from 0.4-1.4%. In present study maternal mortality was similar in study and control group. Perinatal mortality in study and control group was 15% and 20% respectively.

## CONCLUSION

To conclude, low dose magnesium sulphate therapy is as effective as Pritchard's regime for controlling convulsions in eclampsia. The risk of developing MgSO<sub>4</sub> toxicity is low with low dose MgSO<sub>4</sub> therapy when compared to Pritchard's regime in Indian women.

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