

# Is Loading dose of Magnesium sulphate enough to control convulsions in eclampsia?

**Dr Naimah Masood**

GP Trainee in Calderdale & Huddersfield NHS Trust, Yorkshire & Humber Deanery  
Ex Assistant Professor in O&G in Bangladesh Medical College & Hospital, Bangladesh

**Setting:**

Eclampsia unit, Dhaka Medical College Hospital

**Objective:**

To determine whether only loading dose of magnesium sulphate is effective in controlling convulsions in eclampsia.

**Design:**

This prospective comparative randomised controlled study was conducted from a period of July to December 2007 in Eclampsia unit of Dhaka Medical College And Hospital, Bangladesh.

**Method:**

A sample size of 100 eclamptic patients who are eligible for magnesium sulphate therapy were randomly assigned by lottery to receive either only 10 gm loading dose (study group n=50)or the standard regime of magnesium sulphate ( control group n=50) for the control of convulsions.

Control group: n= 50 patients received loading ( 10 gm) with maintenance dose (2.5 gm) of magnesium sulphate 4 hourly for 24 hours after the last convulsion or delivery.

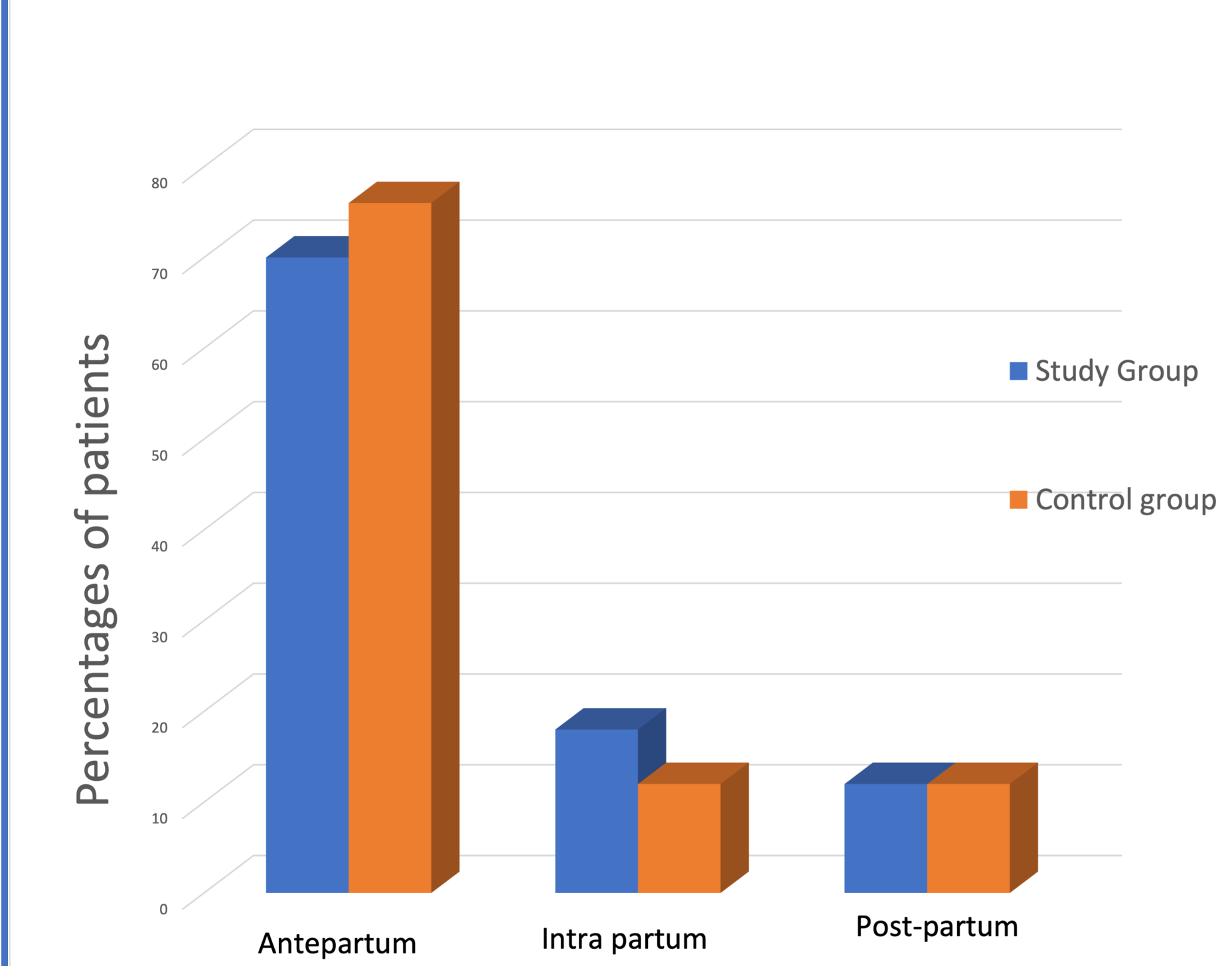
**Selection criteria:**

Eclamptic patients beyond 28 weeks gestational period and those with good prognosis having no complications like unconsciousness, cerebrovascular accidents, DIC, heart failure were included. Exclusion criteria includes gestational period less than 28 weeks, eclamptic patients in whom magnesium sulphate therapy is contraindicated ( oliguria, renal failure, absent deep tendon reflex), comatose patients, eclamptic patients with different complications and those patients who have received magnesium sulphate from outside.

Besides the anticonvulsant, patients of both the groups were managed by same protocol for eclampsia management prepared by Eclampsia Working Group, Bangladesh. Efficacy of both the regimes were assessed by measuring the rate of recurrent convulsion. Results were expressed as mean +/-SD and a proportion. Statistical analysis was done using unpaired t-test and chi-square test as appropriate. A P-value of <0.05 was considered significant.

**Results:** At the time of randomization, there were no statistically significant differences between the study vs control groups in terms of mean age( 22.96±4.26 vs 25.24±6.95 years), parity ( 76% vs 72% primi), type of eclampsia( 70% vs 76% antepartum), mean gestational age ( 36.22±2.10 vs 36.12±2.53), number of(145.30±17.16 vs 150.00±21.95 mmHg), diastolic blood pressure( 100.20±15.18 vs 102.40±16.73 mmHg) ,proteinuria and level of consciousness . There were also no differences between two groups in mean fit and treatment interval ( 5.20±3.85 vs 5.09±2.82 h), fit and delivery ( 10.57±5.04 vs 11.35±5.76 h), recurrent convulsion rate ( 10% vs 20%), morbidity rate ( 34% vs 28%). (P>0.05). convulsions(4.30±3.33 vs 4.44±3.39 times),systolic blood pressure

Types of eclampsia on admission



Fetal outcome

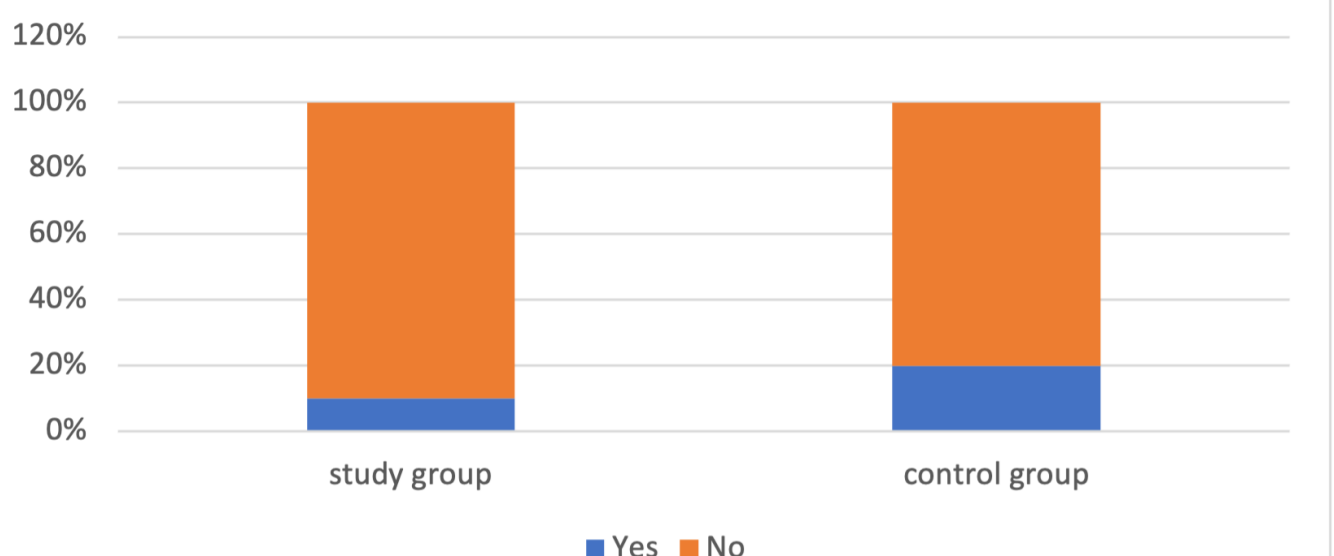
| Parameters             | Study group<br>No. (%) | Control group<br>No. (%) | P value             |
|------------------------|------------------------|--------------------------|---------------------|
| Fetal outcome          | (n=50)                 | (n=50)                   | >0.50 <sup>ns</sup> |
| Livebirth              | 41 (82.0)              | 40 (80.0)                |                     |
| Stillbirth             | 9 (18.0)               | 10 (20.0)                |                     |
| Condition of baby      | (n=41)                 | (n=40)                   | >0.05 <sup>ns</sup> |
| Healthy                | 29 (70.0)              | 20 (50.0)                |                     |
| Asphyxiated            | 12 (29.3)              | 20 (50.0)                |                     |
| Birth weight           | (n=41)                 | (n=40)                   | >0.05 <sup>ns</sup> |
| LBW                    | 6 (14.6)               | 8 (20.0)                 |                     |
| Average                | 35 (85.4)              | 32 (80.0)                |                     |
| Final neonatal outcome | (n=50)                 | (n=50)                   | >0.10 <sup>ns</sup> |
| Alive                  | 39 (78.0)              | 40 (80.0)                |                     |
| Stillbirth             | 9 (18.0)               | 10 (20.0)                |                     |
| Neonatal death         | 2 (4.0)                | 0                        |                     |

Chi-square test

ns = Not significant

This table compares the fetal outcome in both the groups. There were 41 (82%) livebirths in the study group and 40 (80%) in the control group. There was no statistically significant difference in fetal outcome, condition of baby, birth weight and final neonatal outcome between the two groups.

Recurrence of Convulsions after initiation of treatment



Recurrence of convulsion after initiation of treatment

| Parameters               | Study group<br>(n=50) | Control group<br>(n=50) | P value             |
|--------------------------|-----------------------|-------------------------|---------------------|
| Recurrence of convulsion |                       |                         | >0.10 <sup>ns</sup> |
| Yes                      | 5                     | 10 (20.0)               |                     |
| No                       | 45                    | 40 (80.0)               |                     |
| Number of convulsion     |                       |                         | >0.50 <sup>ns</sup> |
|                          |                       | (n=5)                   | (n=10)              |
| 1                        | 1                     | 4 (40.0)                |                     |
| 2                        | 2                     | 2 (20.0)                |                     |
| 3-5                      | 2                     | 4 (40.0)                |                     |

Mode of delivery

| Parameters                       | Study group<br>(n=50)<br>No. (%) | Control group<br>(n=50)<br>No. (%) | P value             |
|----------------------------------|----------------------------------|------------------------------------|---------------------|
| Mode of delivery                 |                                  |                                    | >0.10 <sup>ns</sup> |
| Normal                           | 25 (50.2)                        | 18 (36.0)                          |                     |
| Ventouse                         | 0                                | 2 (4.0)                            |                     |
| LUCS                             | 25 (50.0)                        | 30 (60.0)                          |                     |
| Indications for LUCS             | (n=25)                           | (n=30)                             |                     |
| Unfavorable cervix               | 7 (28.0)                         | 8 (26.7)                           |                     |
| CPD                              | 4 (16.0)                         | 4 (13.3)                           |                     |
| Fetal distress                   | 3 (12.0)                         | 4 (13.3)                           |                     |
| Obstructed labour                | 4 (16.0)                         | 2 (6.7)                            |                     |
| Unsatisfactory progress of labor | 4 (16.0)                         | 2 (6.7)                            |                     |
| Others                           | 3 (12.0)                         | 10 (33.3)                          |                     |

Chi-square test

ns = Not significant

This table demonstrates modes of delivery as well as indications for LUCS (Lower uterine caesarean section) between the two groups. Nearly 25 (50%) of the study group and 30 (60%) of the control group were delivered by LUCS. The commonest indication for LUCS in both groups was unfavorable cervix. No statistically significant difference can be shown in the modes of delivery between the two groups.

Maternal outcome

| Parameters         | Study group<br>(n=50)<br>No. (%) | Control group<br>(n=50)<br>No. (%) | P value             |
|--------------------|----------------------------------|------------------------------------|---------------------|
| Morbidity          |                                  |                                    | >0.50 <sup>ns</sup> |
| Yes                | 17 (34.0)                        | 14 (28.0)                          |                     |
| No                 | 33 (66.0)                        | 36 (72.0)                          |                     |
| Types of morbidity | (n=17)                           | (n=14)                             |                     |
| Pulmonary oedema   | 7 (41.2)                         | 4 (28.6)                           |                     |
| CVA                | 4 (23.5)                         | 4 (28.6)                           |                     |
| PPH                | 2 (11.8)                         | 4 (28.6)                           |                     |
| Renal failure      | 2 (11.8)                         | 2 (14.3)                           |                     |
| Others             | 2 (11.8)                         | 0                                  |                     |
| Mortality          |                                  |                                    | >0.10 <sup>ns</sup> |
| Yes                | 0                                | 2 (4.0)                            |                     |
| No                 | 50 (100.0)                       | 48 (96.0)                          |                     |
| Cause              | (n=0)                            | (n=2)                              |                     |
| Pulmonary oedema   |                                  | 1 (50.0)                           |                     |
| Cardiac arrest     |                                  | 1 (50.0)                           |                     |

Chi-square test

ns = not significant

This table compare the maternal outcome in both groups. One patient from the control group died 2 hours after recurrent convulsion. She was a case of obstructed labor and died on the table during anesthetic induction due to cardiac arrest. There was otherwise no statistically significant difference between the morbidity and mortality of the two groups. Another patient from the control group died of pulmonary oedema. She was admitted with very high blood pressure (190/120 mmHg) and developed pulmonary oedema in the postoperative period due to excessive administration of intravenous fluids.

Monitoring of the patients to detect toxicity of MgSO<sub>4</sub>

| Parameters                  | 1 <sup>st</sup> hour of<br>treatment<br>No. (%) | 2 <sup>nd</sup> hour of<br>treatment<br>No. (%) | 3 <sup>rd</sup> hour of<br>treatment<br>No. (%) | 24 <sup>th</sup> hour of<br>treatment<br>No. (%) |
|-----------------------------|-------------------------------------------------|-------------------------------------------------|-------------------------------------------------|--------------------------------------------------|
| <b>Study group (n=50)</b>   |                                                 |                                                 |                                                 |                                                  |
| Respiratory rate            |                                                 |                                                 |                                                 |                                                  |
| 17-20/min                   | 13(26.00)                                       | 14 (28.00%)                                     | 14 (28.00%)                                     | 14 (28.00%)                                      |
| >20/min                     | 37(74.00)                                       | 36 (72.00%)                                     | 36 (72.00%)                                     | 36 (72.00%)                                      |
| Urine                       |                                                 |                                                 |                                                 |                                                  |
| Normal                      | 47 (94.00)                                      | 48 (96.00%)                                     | 50 (100.00%)                                    | 50 (100.00%)                                     |
| Oliguria                    | 3 (6.00)                                        | 2 (4.00%)                                       | 0                                               | 0                                                |
| Knee jerks                  |                                                 |                                                 |                                                 |                                                  |
| Normal                      | 48 (96.00)                                      | 48 (96.00%)                                     | 48 (96.00%)                                     | 50 (100.00%)                                     |
| Exaggerated                 | 2 (4.00)                                        | 2 (4.00%)                                       | 2 (4.00%)                                       | 0                                                |
| Absent                      | 0                                               | 0                                               | 0                                               | 0                                                |
| <b>Control group (n=50)</b> |                                                 |                                                 |                                                 |                                                  |
| Respiratory                 |                                                 |                                                 |                                                 |                                                  |
| 17-20/min                   | 21 (42.00)                                      | 22 (44.00%)                                     | 20 (40.00%)                                     | 19 (38.00%)                                      |
| >20/min                     | 29 (58.00)                                      | 28 (56.00%)                                     | 30 (60.00%)                                     | 29 (58.00%)                                      |
| Urine                       |                                                 |                                                 |                                                 |                                                  |
| Normal                      | 47 (94.00)                                      | 48 (96.00%)                                     | 49 (98.00%)                                     | 48 (98.00%)                                      |
| Oliguria                    | 3(6.00)                                         | 2 (4.00%)                                       | 1 (2.00%)                                       | 0                                                |
| Knee jerks                  |                                                 |                                                 |                                                 |                                                  |
| Normal                      | 46 (92.00)                                      | 48 (96.00%)                                     | 48 (96.00%)                                     | 48 (96.00%)                                      |
| Exaggerated                 | 4 (8.00)                                        | 2 (4.00%)                                       | 2 (4.00%)                                       | 0                                                |
| Absent                      | 0                                               | 0                                               | 0                                               | 0                                                |

This table shows monitoring of the patients to detect the toxicity of MgSO<sub>4</sub> in both groups at 1st to 3rd hours and 24 hours after the initiation of treatment. No toxicity developed in any group assessed by the parameters like respiratory rate, urine volume and knee jerks.

As the serum. magnesium level estimation is a very costly test in Bangladesh, we did not do this test and we had to depend on clinical monitoring to detect MgSO<sub>4</sub> toxicity.

**Conclusion:** Only loading dose of magnesium sulphate can control convulsion in eclampsia and it is effective as standard regime. Single dose is cost-effective and safe therapy in developing countries with low average body weight and limited resources.