

# Comparative Study on the Efficacy of Magnesium Sulphate and Diazepam in the Management of Eclampsia in a Peripheral Rural Medical College (A Cross Over Study of 440 Cases)

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## Summary

Eclampsia is one of the major causes of maternal mortality in developing countries. Out of 6470 deliveries in a 2 year study at N.B.M.C. Darjeeling, the incidence of Eclampsia is 2.9%. Eclampsia itself accounted for (5.5%) of maternal deaths during the said period. Efficacy of magnesium sulphate in reducing Blood pressure (B.P.), convulsion and duration of coma was compared with previous 2 years cross over study in the same number of cases with diazepam.

Magnesium sulphate was found effective in reducing the B.P., recurrency of fit and duration of coma. Significant decrease in fit recurrence from 41.8% with diazepam to 4.1% with magnesium sulphate. Maternal mortality fell from 20.45% in patients with diazepam therapy to 5.5% with magnesium sulphate regime

With Magnesium sulphate foetal salvage improved and neo-natal mortality was reduced to half (22%) with better Apgar score 5 to 7 than that of diazepam treated group.

Cerebral anoxia, brain damage and coma is the sequela of eclamptic convulsion and magnesium sulphate has proved superior to diazepam with low fit recurrence and quick recovery from coma.

## Introduction

Eclampsia is one of the most serious and potentially catastrophic complications of pregnancy and a major cause of maternal and perinatal mortality in a developing country like India.

Since the aetiology is still obscure, incidence varies on the quality of antenatal care, age and socio-economic factors. Prompt control of convulsion, B.P. and quick delivery forms the corner-stone in the management of Eclampsia.

The present longitudinal, crossover-study is to evaluate the efficacy of magnesium sulphate in reducing B.P., convulsion, duration of coma, maternal and neo-natal mortality over diazepam treated group.

## Materials and Methods

It is an analysis of 440 cases of Eclampsia of

which 220 cases out of 6,470 deliveries from 1<sup>st</sup> July 1998 to 30<sup>th</sup> June 2000, at North Bengal Medical College, Susrut Nagar, Darjeeling were treated with magnesium sulphate and nifedepine and the therapeutic response was assessed on the control of blood pressure, convulsion and urinary albumin contents and those were compared with a similar series of 220 patients of preceding 2 years (1995-1997) treated with Diazepam.

In our study incidence of Eclampsia was 2.9%. Total maternal deaths were 136 and deaths due to Eclampsia were 12 (8.8%). Whereas overall mortality in Eclampsia was 5.5%.

Eclampsia involves young primigravida and 87.6% of eclamptic patients were below 25 years of age and 9 out of 12 (75%) maternal deaths occurred in this group. 33% of the patients were primi-gravida and 3 out of 12 (25%) maternal deaths occurred in primi-gravida.

A total of 93% of the patients were unbooked

and 68% referred from P.H.C. and were admitted in the hospital after the onset of convulsion. 53.3% were ante-partum, 29.13% were of intra-partum, and 17.73% were post partum eclampsia.

## Methods

4 gm of Magnesium sulphate solution (either available in 50% strength in 2ml vial, 4 such were taken or 25% strength of 2ml vial, 8 such were taken) dissolved in 50cc of 5% Dextrose solution was given intravenously over 5 to 10 minutes. First dose was given on admission and subsequent doses intramuscularly on alternate buttocks at 4 hourly intervals till 24 hrs past delivery as per Pritchard's regime. In any case the serum concentration of magnesium sulphate was restricted within 8 to 10 ml m.eq./lit.

The dose was monitored by observation of respiratory rate more than 14 per minute, urine output greater than 30 ml per hour, presence of knee-jerk and deep reflexes. Sublingual nifedepine was administered if the D.B.P. was more than 100 mm of Hg. As the patient became stable artificial rupture of membranes was done and labour was augmented with oxytocin drip and outcome was observed.

## Result and Discussion

Magnesium sulphate causes dilatation of blood vessels with increased uterine and renal perfusion. The

diastolic blood pressure and the urinary albumin was monitored 24 to 72 hours after the initiation of therapy. In 149 out of 220 cases there was a fall in D.B.P. below 90 mm of Hg with magnesium sulphate. But it was only in 105 cases with Diazepam therapy vide table I. Pritchard et al (1984) reported a variable hypotensive effect of magnesium sulphate.

Ghosh et al (1987) noted that temporary rise of B.P. by 20 mm of systolic or 15 mm of Hg of diastolic pressure occurred in 45 (24.19%) cases with Diazepam therapy. In our study nifedepine was used in either series, when the diastolic blood pressure exceeded that of 100 mm of Hg.

Urinary albumin was absent in 140 (63.6%) cases with magnesium sulphate regime and in 106 (48.1%) with diazepam therapy 72 hrs after treatment.

Recurrence of convulsion after therapy was the most notable change. Recurrence of it was noted in 4.1% of cases with Magnesium sulphate therapy and in 41.8% cases with diazepam regime vide : (Table – II). Pritchard et al (1984) reported recurrences of convulsions in 12% patients. Mohanty et al (1990) in 9.5% and Nawani et al (1996) in 10% cases, while Sandhu et al (1993) had 0% recurrence of convulsion while treating with magnesium sulphate.

Gun et al (1982) have observed co-relation between the number of convulsions before admission

**Table I**  
Showing changes in diastolic BP and Urinary Albumin 24 to 72 hrs treatment in each 220 cases

| Signs                                 | Mag Sulph group                                     |                | Diazepam Group                                       |                |
|---------------------------------------|---|----------------|--|----------------|
|                                       | Pre-Treatment                                       | Post Treatment | Pre-Treatment  | Post Treatment |
| Diastolic B. P. Less than 90 Mm Hg.   | 43  | 149            | 45   | 105            |
| Diastolic B. P. greater than 90 mm Hg | 177<br>(9 Patients died within 24 hrs of treatment) | 62             | 175<br>(35 Patients died within 24 hrs of treatment) | 80             |
| Urinary Albumin                       | 55  | 140            | 35   | 106            |
| Present                               | 165<br>(3 Patients died within 72 hrs.)             | 77             | 185<br>(10 patients died within 72 hrs.)             | 104            |

**Table :- II**  
Showing number of fits after initiation of treatment

| Number of fits    | Mag-sulph Group | Diazepam group |
|-------------------|-----------------|----------------|
| Nil               | 211             | 128            |
| 1 to 5            | 7               | 62             |
| More than 5       | 2               | 30             |
| Recurrence of fit | 4.1%            | 41.8%          |

and ultimate maternal prognosis.

Patients remained in coma after 24 hrs of treatment in only 17.2% of cases with magnesium sulphate 29.55% cases with Diazepam therapy vide Table III.

Nagar et al (1988) in their cases treated with magnesium sulphate noted duration of coma more than 72 hrs in 99% cases.

Ghosh et al (1987) was of the opinion all patients who died remained unconscious and rest were conscious within 24 hrs of the post convulsion with diazepam therapy.

Out of 12 maternal deaths in the magnesium sulphate treated group 9 patients died within 24 hrs and 35 patients died in diazepam treated group in the said period.

Maternal deaths as reported by Mohanty et al (1990) – 7.1% with magnesium sulphate therapy and it is only (5.5%) in this series. Dutta and Biswas (1978) and Goswami and Dawn (1981) recorded 17.5% and 13.5% maternal deaths with diazepam therapy (regime). Out of 220 cases 13 patients died undelivered and 50.1% had vaginal delivery and 30% patients had forceps delivery and 14% cases had caesarean section in the magnesium sulphate treated patients. While the incidence of caesarean section was 23% and vaginal delivery 43% in diazepam treated group with 15 undelivered vide Table III and IV. In Zuspan and Ward's (1986) series 72.6% cases delivered vaginally and Sibai et al (1981) reported a Caesarean section rate of 49% using Magnesium Sulphate. Whereas Lean et al (1967) from abroad and Singh and Misra (1977) from home advocated active management of Labour and early caesarean section in Eclampsia.

Only 39% of low birth weight babies were born in Magnesium Sulphate treated group and it was 43%

**Table III**  
Table showing duration of coma in patients following treatment

| Treatment with | 0-24 hrs    | More than 24 hrs | Remained in Coma-till death | Maternal death |
|----------------|-------------|------------------|-----------------------------|----------------|
| Mag Sulph      | 170 (77.3%) | 38 (17.2%)       | 12 (5.5%)                   | 5.5%           |
| Diazepam       | 110 (50%)   | 65 (29.55%)      | 45(20.25%)                  | 20.45%         |

**Table IV**  
Showing stay in hospital before Maternal Death.

| Duration in Hours | Mag-Sulph (Group)<br>Number of Patients died | Diazepam Group<br>Number of Patients died. |
|-------------------|--|--|
| Less than 6 Hr.   | 4  | 11   |
| 7-12 Hr           | 3  | 9  |
| 12-24 Hr          | 2  | 15   |
| 25-48 Hr          | 2  | 7  |
| More than 48 Hr   | 1  | 3  |

**Table V**  
Showing Mode of Delivery, Birth-Weight, Neo-Natal Mortality and Apgar Score (Mag-Sulph Group 220 Cases)

| Mode of Delivery | No. of Patients (%) | Birth-weight and (%) of new Born | Neo-natal Mortality (%) | Apgar score and No. of new born. |
|------------------|---------------------|----------------------------------|-------------------------|----------------------------------|
| Vaginal Delivery | 110 (50.1%)         | Greater than 2.5 Kg. (61%)       | 6%                      | Greater than 7                   |
|                  | 66(30%)             | 1.5 – 2.5 Kg (32%)               | 19%                     | 5 to 7 – 52                      |
| Forcep L.S.C.S.  | 31 (14.4%)          | 0.5-1.5 Kg (7%)                  | 75%                     | Less than 5 – 70                 |
| Undelivered      | 13 (6%)             | Overall – 22%                    |                         |                                  |

Neo-Natal Mortality – 22% (Table – V)

Maternal Mortality – 5.5% (Table – III)

**Table VI**  
**Showing mode of delivery, Birth weight, neonatal mortality and Apgar score. Diazepam Group**

| Mode of Delivery | No. of Patients (%) | Birth-weight and (%) of new-born | Neo-natal mortality (%) | Apgar score and no of newborn. |
|------------------|---------------------|----------------------------------|-------------------------|--------------------------------|
| Vaginal Delivery | 95 (43%)            | More than 2.5 Kg. (57%)          | 19%                     | Greater than 7-43              |
| Forcep           | 59 (27%)            | 1.5-2.5 Kg (29%)                 | 17%                     | 5-7 - 69                       |
| L.S.C.S.         | 51 (23%)            | 0.5-1.5 Kg (14%)                 | 64%                     | Less than 5-93                 |
|                  |                     |                                  | Overall 44%             | .                              |
| Undelivered      | 15 (7%)             |                                  |                         |                                |

Neo-Natal Mortality - 44% (Table-VI)

Maternal Mortality - 20.45% (Table -III)

with diazepam treated group. Overall neonatal morbidity was 22% in Mag-Sulph treated group and it was doubled up 44% in diazepam treated group, probably because of intranatal foetal depression during treatment. Devi et al (1976) in a study of 369 cases recorded (47.35%) perinatal mortality with diazepam regime.

In 85 babies Apgar Score was more than 7 in 43 babies, probably because of respiratory depression along with the body reflexes by diazepam.

#### Conclusion

Following is the substantial outcome of the comparative study apart from decreased maternal and perinatal mortality.

1. Rapid fall in D.B.P. and Urinary albumin with magnesium sulphate than with diazepam.
2. Significant changes in the recurrence of fits only 4.1% with magnesium sulphate regime while it was 41.8% in diazepam treated group.
3. Only (17.2%) 2% remained comatose after 24 hrs. in magnesium sulphate treated patients while it was (29.55%) in diazepam treated group.
4. Maternal mortality decreased from 20.45% to 5.5% in mag-sulph treated group.
5. Significant Tocolytic effect was noted with mag-sulphate treatment as reflected by improved neonatal birth weight Apgar score and mortality rate.
6. Foetal salvage is more about 78% with better Apgar Score greater than 7 in 85 babies with mag-sulph treatment whereas in diazepam treated group Apgar was greater than 51 in 43 babies and Foetal Salvage rate 56%.

Therefore the efficiency of Magnesium Sulphate is well proved than diazepam and further study is required for consensus.

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