

Effectiveness of Magnesium Sulphate as an Anti-Convulsant in the Management of Eclampsia and Severe Pre-Eclampsia

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ABSTRACT

Aim: To determine the efficacy of magnesium sulphate as an anti-convulsant in the management of eclampsia and severe pre-eclampsia.

Study design: Comparative, prospective/randomized study

Place and duration of study: Department of Obstetrics & Gynaecology, M. Islam Teaching Hospital, Gujranwala from 1st April 2020 to 30th September 2020.

Methodology: One hundred and twenty patients were presented in this study with age ranges between 20-40 years. Patients detailed demographics body mass index and gestational age were recorded after taking written consent. The patients who needed magnesium sulphate because of eclampsia or severe pre-eclampsia were included. 4 gm magnesium sulphate was given I/V (intravenous), diluted in 20cc of 5% dextrose, slowly over 15-20 minutes. 5 gm magnesium sulphate I/M was given 4 hourly till 24 hours after delivery or after last convulsion whichever was late. Within 48 hours of magnesium sulphate treatment, seizure was the main outcome.

Results: Mean age of the patients was 28.96±4.14 years with mean BMI 26.14±2.43 kg/m². Sixty seven (55.83%) patients have eclampsia and 53 (44.17%) patients have pre-eclampsia. In 67 patients of eclampsia, fits antenatal 42 (35%), 7 (5.9%) intrapartum and 18 (15%) postpartum were recorded. Twelve (10%) patients of seizures found within 48 hours after treating with magnesium sulphate, 8 (6.7%) in eclampsia and 4 (3.33%) pre-eclampsia. There were 75 (62.5%) women has vaginal deliveries and 45 (37.5%) women have lower segment cesarean sections. 18 (15%) found perinatal deaths while no maternal mortality was found.

Conclusion: The minimum use of magnesium sulphate resulted in to control seizures and it has been observed that maternal mortality rate was also decreased.

Keywords: Eclampsia, Pre-eclampsia, Magnesium sulphate (MgSO₄)

INTRODUCTION

The worry amongst obstetricians is hypertensive pregnancy disorders. It is a major cause of maternal and perinatal mortality and morbidity worldwide, especially in countries with low and middle incomes where 10-25% of maternal deaths occur. In this case, eclamptic seizure is the leading cause of maternal death.¹ Blood pressure (BP) = 140/90 mmHg, Korotkoff V tone, for diastolic blood pressure was described as hypertension by the National High Blood Pressure Education Program (NHBPEP). The same working group divided hypertensive disorders into four categories during pregnancy; (i) hypertension gestational, (ii) the disease of preeclampsia and eclampsia, (iii) chronic hypertension superimposed preeclampsia and (iv) high blood pressure.²

The existence of hypertension and proteinuria is known as preeclampsia (300 mg or more in 24 hour urine). It can be moderate or extreme once again.² On the other hand, eclampsia is the sudden onset of a great mal seizure in a pre-eclampsia woman, which cannot be attributed to any other cause. Initial stabilization, a sensible use of antihypertensives, anticonvulsants and "cure" deliberations are part of eclampsia treatment and serious pre-eclampsia. In eclampsia, anticonvulsant is necessary to prevent seizure and also to prevent eclamptic seizure in serious

pre-eclampsia. Different contraceptives used in the past, but the only resistance to the taste of time is the magnesium sulphate (MgSO₄, 7H₂O). In a multicenter randomized control trial, the superiority of MgSO₄ as an anticonvulsant in eclamptological patients was determined in contrast to diazepam and phenytoin.³ In women receiving MgSO₄, both repeated convulsions and maternal mortality were substantially lower. In comparison, use of prophylactic MgSO₄ can reduce the risk of eclamptic seizure substantially by 58 percent in relation to placebo even in extreme preeclampsia, as is demonstrated in a broad multicenter trial, namely the MAGPIE.⁴ Two subsequent studies have demonstrated both long-term protection and cost-effectiveness especially in low-gross domestic revenue (GNI) countries.^{5,6}

Magnesium sulphate may be administered according to the regime of zuspan or pritchard. While intra-venous (IV) continuous infusion (4 g of 50 percent IV loading dose followed by 20 percent 1 g/hour IV infusion solution) is used worldwide, the availability of the infusion pump, insufficient manpower and associated costs make it more difficult for Pritchard's regime to be used in developing countries on the Indian sub-Continent. The normal loading dose consists of a total of 14g; 4g of 20% IV and 10g 50% intramuscular solution (IM). The 5g 50 percent dose IM is accompanied by maintenance every 4 hours if the knee jerk is retained and the urinary performance is 30 ml/hr and the respiratory performance is above 14 per minute. It will

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be held up to 24 hours after delivery or 24 hours after the last convulsion.

This dose scheme is focused primarily on Western women, however. Indian women's average body weights are well below their western counterparts. Again, high-intensity disorders in a low-intensity country are a very common obstetric complication;⁷ primarily due to lack of proper prenatal care, insufficient access to health services, inadequate public knowledge and poor socio-economic conditions. In most institutes, however, and in tertiary hospitals, the healthcare provider's ratio to patient is not optimal. Again, MgSO₄ administration requires careful supervision, which cannot always be possible in a busy workstation, due to the related side effects of therapy. It is normal, on the other hand, for signs of magnesium toxicity or oliguria to withhold MgSO₄ after one or two doses; surprisingly, no frequent seizures occur mostly.

In Cochrane analyses four randomized controlled dose-comparison studies from India and South Africa compared the standard dose with the alternative dose of MgSO₄ and concluded that these studies were too limitable to draw a conclusion.⁸ Gordon et al⁹ examined in their systematic analysis that adjusted styles of standard Zuspan or Pritchard regimens in low and middle income countries (LMIC) were widely employed, either by reducing the dose in grams (only loading, maintenance or both) or by lowering the overall therapy period. The reasons behind the amendments on MgSO₄ toxicity (mainly due to smaller women and others), incoherently distributing medication, cost-effectiveness, lack of monitoring services and difficulties in repeated IM injections for patients, were explained.⁹ They also noted that MgSO₄ is underutilized in LMICs, thus highlighting the need for policy amendments to ensure the widespread medication availability and use.^{9,10}

We tried to analyze the efficacy of the single loading of MgSO₄ in pre-eclampsia and eclampsia in antenatal women by contrast to the normal procedure, taking all these factors into account.

MATERIALS AND METHODS

This prospective, comparative, randomized study was conducted at Department of Obstetrics & Gynaecology, M. Islam Teaching Hospital, Gujranwala from 1st April 2020 to 30th September 2020 and comprised of 120 patients. Patients detailed demographics age, body mass index and gestational age was recorded after taking written consent. Patient's gestational hypertension, already intrauterine fetal death and those were not agreed excluded. The research included patients who needed MgSO₄ because of eclampsia or serious pre-eclampsia. 4 gm magnesium sulphate was given I/V (intravenous), diluted in 20cc of 5% dextrose, slowly over 15-20 minutes. 5 gm magnesium sulphate I/M was given 4 hourly till 24 hours after delivery or after last convulsion whichever was late. 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. Within 48 hours of MgSO₄ treatment, seizure was the main outcome. Complete data was analyzed by SPSS 22.

RESULTS

Mean age of the patients was 28.96±4.14 years with mean BMI 26.14±2.43 kg/m². Sixty seven (55.83%) patients were eclampsia and 53 (44.17%) patients were pre-eclamptics. In 67 patients of eclamptics, fits antenatal 42 (35%), 7 (5.9%) intrapartum and 18 (15%) postpartum were noted. Mean gestational age was 43.41±0.34 and pre-term gestational was found 58.14±1.45. Sixty (50%) cases were primigravida, 54 (45%) were found P1-P4 and 6 (5%) were >P5 (Table 1).

Total 12 (10%) seizures found within 48 hours after treating with MgSO₄, 8 (6.7%) in eclamptics and 4 (3.33%) pre-eclamptics. Vaginal delivery was found among 75 (62.5%) cases and frequency of LSCS were 45 (37.5%). 18 (15%) found were perinatal deaths and 102 (85%) were alive discharged. No maternal mortality was found (Table 2).

Table 1: Descriptive statistics of the women (n=120)

| Variables | No. | % |
|-------------------------------|-------------|------|
| Mean age (years) | 28.96 ±4.14 | |
| Mean BMI (kg/m ²) | 26.14 ±2.43 | |
| Mean gestational age | | |
| Before | 58.14±1.45 | |
| After | 43.41±0.34 | |
| Parity | | |
| Primigravida | 60 | 50.0 |
| P1-P4 | 54 | 45.0 |
| > P5 | 6 | 5.0 |
| Eclampsia | | |
| Antenatal | 42 | 35.0 |
| Intrapartum | 7 | 5.9 |
| Postpartum | 18 | 15.0 |
| Pre-eclampsia | 53 | 44.2 |

Table 2: Outcomes of patients

| Variable | No. | % |
|----------------------------|-----|------|
| Seizures (n=12) | | |
| Eclamptics | 8 | 6.7 |
| Pre-eclamptics | 4 | 3.33 |
| Types of deliveries | | |
| Vaginal | 75 | 62.5 |
| LSCS | 45 | 37.5 |
| Perinatal outcomes | | |
| Alive | 102 | 85 |
| Deaths | 18 | 15 |
| Maternal Outcome | | |
| Alive | 120 | 100 |
| Deaths | - | - |

DISCUSSION

There is no question about the effectiveness of MgSO₄ in hypertensive disorder treatment during pregnancy; for control of convulsions in eclampsia and extreme preeclampsia prevention. The issue is what the optimal dosage should be. Owing to the high burden on medical facilities and the small number of healthcare providers, routine and frequent monitoring is not always possible of women receiving MgSO₄.

Body mass index (BMI), as shown in the analysis carried by Tudela et al¹¹, is an important factor in determination of the efficacy and toxicity of MgSO₄. Jana et al¹² found that low dose of MgSO₄ (8g loading 3g IV and 5g

IM; followed by 2.5g IM 4 hours) for women with a light weight of the eclamptic in their analysis in Burdwan, India was safe and effective.¹³ The low-dose diet was also associated with a lower incidence of seizure recurrence and lower maternal death than the collaborative eclampsia test. In our study total 120 patients were presented with mean age 28.96±4.14 years. Out of 120 cases, 67 (55.83%) were patients of eclampsia and 53 (44.17%) were pre-eclampsics, Total 12 (10%) seizures found within 48 hours after treating with MgSO₄, 8 (6.7%) in eclamptics and 4 (3.33%) pre-eclampsics, these results were comparable to the studies conducted by Bilqis.¹⁴

The research presented 75 (62.5%) cases were vaginal and 45 (37.5%) were LSCS, these results showed resemblance to the previous studies conducted by Dasgupta et al¹⁵ and Suchitra et al.¹⁶ Another research performed by Noor et al¹⁷ in eclamptics and pre-eclampsics with a single loading dose of MgSO₄ also showed very promising results. Al-Khayat et al¹⁸ in Egypt and Shoaib et al¹⁹ in Jinnah Postgraduate Medical College, Karachi, concluded that this dosage protocol is successful for preventing eclampsia in two separate studies.

In the present study, 18 (15%) found were perinatal deaths and 102 (85%) were alive discharged. No maternal mortality was found. A study conducted by Partil et al²⁰ reported that perinatal mortality found in 28.75% patients and maternal mortality reported in 2.5% eclamptic and preeclamptic women treated with magnesium sulphate. There are several studies in which short regimen are utilized both for drug quantity and length of therapy.

CONCLUSION

The minimum use of MgSO₄ resulted in to control seizures. It has been observed that maternal mortality rate was also decreased.

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