Original Article

Efficacy of Magnesium Sulphate In Prevension Of Fits In Severe Pre-Eclampsia

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Abstract

Objective: To evaluate the efficacy of magnesium sulphate as prophylactic agent in prevention of fits in severe pre-eclampsia. **Study Design:** Interventional Quasi experimental study. **Setting:** Department of Obstetrics and Gynaecology, Punjab Medical College and affiliated hospitals, Faisalabad. **Subject:** Sixty patients of severe pre-eclampsia fulfilling the inclusion and exclusion criteria. **Main Outcome Measures:** Occurrence of fit in case and control group, side effects of the drug like flushing, diminishing of reflexes, respiratory depression and hypotension in the case group.

Method: Sixty patients with severe pre-eclampsia were divided into two groups: Group A was taken as case and treated with $MgSO_4$, group B was taken as control and was not given $MgSO_4$. **Results:** Out of the 30 patients treated with $MgSo_4$ none (0%) had eclampsia in group A. In group B 4 (13.3%) patients developed eclampsia. Side effects of the drug were looked for in group A. Flushing was seen in 6 (20%) patients diminishing of reflexes was deserved in 1 (3.3%) patient. **Conclusion:** $MgSO_4$ is an effective drug for prevention of fits in patient of severe pre-eclampsia. **Key Words:** Pre-eclampsia, prevention of fits, $MgSO_4$.

INTRODUCTION

Hypertensive disorders complicate approximately 12-22% of all pregnancies and are directly responsible for 17.6% of maternal deaths in United States. Pre-eclampsia is one of the most integral part of hypertensive disorders and constitutes 5 – 8%[1]. It is a major cause of maternal and perinatal morbidity & mortality worldwide causing 15% of all maternal deaths in India.[2]

Severe pre-eclampsia is defined by presence of:

- Severe hypertension (Systolic BP 170 and/or diastolic BP 110 mm of Hg) in association with proteinuria or
- Hypertension with severe proteinuria (>/5gm/24 hrs) or
- If there is multiorgan involvement such as pulmonary edema, oliguria, thrombocy-topenia (<100,000/mm^3), raised liver enzymes with persistent epigastric or right upper quadrant pain, or persistent severe CNS symptoms (altered mental status, headaches, blurred vision, or blindness)[1].

Aetiology of pre-eclampsia remains unknown but it is widely accepted that the disorder is placental in origin[3]. Pre-eclampsia increases morbidity of mothers by eclampsia, cerebro vascular accidents, pulmonary edema, acute renal failure, liver failure, disseminated intravascular coagulation, and retinal detachment[4]. $MgSO_4$ prophylaxis is being considered in all patients of severe pre-eclampsia who are at risk of developing eclampsia and where delivery has been decided[5]. Use of $MgSO_4$ has been seen to reduce the risk of progression to eclampsia by more than half[6]. The mechanism of action of $MgSO_4$ is not completely understood and may be multifactorial. It is thought to cause vasodilatation of cerebral vessels thus reducing cerebral ischemia it also blocks calcium receptors in the brain[7]. It also causes peripheral arteriolar dilation thus reducing blood pressure[8]. It may also protect blood brain barrier and limit cerebral edema formation or it may act through a central anticonvulsant action.

People are afraid of its use as prophylactic agent in severe pre-eclampsia because of its potential hazards like muscular paralysis, respiratory arrest and cardiac arrest and because of the narrow margin between the therapeutic and toxic doses. However when used in appropriate dosage and monitored clinically the risks

are minimal, as proven in Magpie trial[16]. Risk benefit ratio has to be judged before routine administration of this drug in all women with preeclampsia. It is recommended that individual units determine their own protocols and monitor outcome [9]. Rationale of the study is to determine efficacy of $MgSO_4$ for prevention of fits in severe pre-eclampsia. Purported significance of the study is that it will help build confidence in the use of $MgSO_4$ which is a cheap easily available drug to reduce the grave consequence of eclampsia and its associated morbidity & mortality.

MATERIAL & METHODS

Over a period of six months from 15.04.2007 to 30.09.2007, 60 consecutive patients admitted in the labour ward with severe pre-eclampsia, between 28 to 34 weeks, showing signs & symptoms of imminent eclampsia and in whom delivery had been decided were included in the study. Patients with oliguria (urinary output < 30 ml/hr) and deranged renal function were excluded as the drug is excreted through kidneys. Risks i.e. side effects of drug like flushing, hypotension, depressed tendon reflexes, respiratory depression and benefits like significant reduction in occurrence of fits were explained to the patients and informed consent was taken. Approval from hospital ethical committee was also taken. All patients included in the study were thoroughly evaluated by taking history and detailed clinical examination. Investigations were sent. Mode of delivery was decided and if indicated benefit of steroids for fetal lung maturity was given. Group A was assessed for intact patellar reflexes, urinary output > 30ml/hr and respiratory rate > 16 / min as a baseline to clinically monitor toxicity of $MgSo_4$. Bolus dose of $MgSo_4$ i.e. 14 g was given (8ml of 50% $MgSo_4$ diluted in 12 ml of normal saline making a 20 ml solution of 20%) I/V in 20cc syringe over 10-15 minutes, immediately followed by 10g (20 ml of 50%) intramuscularly in each buttock. $MgSo_4$ was then continued till 24 hours after delivery in maintenance dose of 5g (10 ml of 50%) intramuscular every 4 hour, on alternate buttocks.

Magnesium toxicity was monitored by patellar reflex, urine flow > 30 ml /hr and respiratory rate > 16 min every 15 min for 1st two hrs and then every 30 min till the dose was completed. If any parameter for monitoring of toxicity was disturbed $MgSO_4$, was withheld and its antidote 1gm of 10% calcium gluconate was given 1gm I/V in 10min. Group B (Controls) consisted of patients having severe pre-eclampsia between 28-34 weeks in whom delivery had been decided. $MgSO_4$ was not given but rest of the fetomaternal management was the same. Both groups were monitored for the occurrence of fits. Data collected was recorded on a proforma. Data was analyzed using SPSS (version 10).

RESULTS

Out of 30 patients in group A none developed eclampsia. Group B the control group 4 patients (13.3%) had eclampsia (P value 0.03) that was significant. Regarding the side effects of the drug the most common side effect was flushing seen in 6 (20%) patients treated with $MgSO_4$. The P value was 0.010 that is significant. Regarding toxicity diminishing reflexes was noted in 1(3.3% patient). P value 0.313 that is not significant. Respiratory depression seen in 1(3.3%) P value 0.313 not statistically significant and hypotension occurred in none of the patients. The drug did not have to be discontinued in any patient.

Table-1
Frequency of Outcome in 60 Patients

Patient remained fit free	Group A n=30	Group B n=30
Yes	30 (100%)	26 (86.7 %)
No	0 (%)	4 (13.30%)

Test Statistics
Chi-Square value 4.29 df 1 p-Value 0.30

Table-2
Frequency of Side Effects of $MgSO_4$

Side Effects	Group A (n=30)
Flushing	6 (20%)
Diminishing of Reflexes	1 (3.3%)
Respiratory Depression	1 (3.3%)
Hypotension	0 (0%)

DISCUSSION

The study was carried out to evaluate the efficacy of $MgSo_4$ in prevention of eclampsia in patients suffering from severe pre-eclampsia. It was carried out in Allied Hospital, Faisalabad affiliated with Punjab Medical College for a duration of 6 months from 15.04.2007 to 30.09.2007. Magnesium Sulphate has been used for treatment of eclampsia for many years, but its efficacy in prevention of eclampsia in cases of severe pre-

eclampsia is not well studied. The aim of the study is to prove its efficacy as prophylactic agent against eclampsia and to evaluate its side effects. Sixty patients with severe pre-eclampsia who were between 28-34 weeks were selected for the study after fulfilling the inclusion criteria. Group A (30 patients) was the cases given $MgSo_4$ and Group B (30 patients) were control not give the drug. The result of the study showed that none of the patients in group A suffered from eclampsia. The results of the study are favoured with the work of Bhatacharya in Manglore India[10], Singh J and colleagues in Rotunda Hospital Ireland [11]. Similar results are seen in a work by Sibai at University of Cincinnati[12], out of 510 women treated with $MgSo_4$ only 2 developed eclampsia, that may also be due to large sample size. Another study by Yuen Tannirandorn done at University of Chulalong Korn[13], study of Coetzel EJ et al at University of Cape Town South Africa [14] Alexander and colleagues in University of Taxas[15], the work of Altman D and colleagues[16,] and Ritusharma and colleagues [17] all have consistent results. Group B i.e. control group in which patients were not given $MgSo_4$ 4(13.3%) developed eclampsia. This result is not comparable with the work done to evaluate the efficacy of $MgSo_4$ in pre-eclampsia by Yuen Tannirandorn[11] Study of Sibai [10] and Coetzel[12]. The difference is probably due to some local problems. Most patients were unbooked and came in serious condition therefore had a higher risk of progressing to eclampsia. Regarding the side effects of $MgSo_4$ studied in group A 20% (n=6) had flushing which is the most common side effect agreed with the work of Yuen Tannnirandorn[13] and Sibai[12]. Other side effects was diminishing of reflexes that was seen in 3.3% (n=1) comparable to work of Yuen Tannnirandorn[13] and Sibai[12]. Respiratory depression was observed in 3.3% (n=1) comparable to study of Sibai[12]. Hypotension was not seen in any patient.

CONCLUSION

Incidence of eclampsia is alarming in developing countries leading to high maternal & perinatal morbidity and mortality. The current study shows that MgSo4 is a very effective drug for prevention of eclampsia in patients suffering from severe pre-eclampsia. In countries like ours MgSo4 is particularly attractive as it is very cheap and toxicity can be adequately monitored clinically. However it would be reassuring to have more of such studies on large scale to confirm these finding further and to develop confidence on this drug.

REFERENCES

1. Dekkar G, Hypertension. In James DK, Weiner CP, Steer PJ, Gonik B, editors. High risk pregnancy: management options. 4th edition: Elsevier 2011; 599-626.
2. Confidential enquiry into maternal deaths. Why mothers die 2000-2002. The sixth report of confidential enquiries into maternal deaths in United Kingdom. London; Royal College of Obstetricians and Gynaecologists Press; 2004.
3. Ayuk PT, Matijevic R. Placental ischemia is a consequence rather than a cause of pre-eclampsia. Med Hypothesis 2006; 67:792-5.
4. Shaheen B, Hassan L, Obaid M. Eclampsia, a major cause of maternal and perinatal mortality: a prospective analysis at a tertiary care hospital of Peshawar. J Pak Med Assoc 2003; 53:346-50.
5. Rozenberg P. Magnesium sulphate for management of pre-eclampsia. Gynaecol Obstet Fertil 2006; 34:54-9.
6. Khan K, S. Magnesium sulphate and other anticonvulsants for the treatment of severe preeclampsia. Inc: The reproductive Health library, Issue 10, 2007. Oxford: update software Ltd.
7. Sadeh M. Action of Magnesium sulphate in the treatment of preeclampsia and eclampsia. Stroke 1989; 20:1273-5.
8. Vigorito, Giodano A, Ferraro P. Haemodynamic effects of magnesium sulphate on normal human heart. Am J cardiology 1990; 65:709-12.
9. Lowe SA, Brown MA, Dekkar GA et al. Guidelines for management of hypertensive disorders of pregnancy 2008. Australian and Newzealand Journal of Obstetrics and Gynaecology 2009; 49:242-246.
10. Bhattacharya, Sohini Naskar, Animesh and Mandal, Sukanta and samanta, Ajanta and pati, Shayama Pada. Should magnesium prophylaxis be used in all cases of severe preeclampsia? On line Journal of Health and Allied Sciences 2010; 9.
11. Singh J, O' Donoran M, Coulter Smith SD, Geary M. An audit of the use of magnesium sulphate in severe pre-eclampsia and eclampsia. J Obstet Gynaecol 2005; 25:15-7.

12. Sibai BM. Magnesium Sulphate prophylaxis in pre-eclampsia. Evidence from randomized trials. Clin Obstet Gynecol 2005; 48:478-88.
13. Tannirandorn Y. Is magnesium sulphate for prevention or only therapeutic in pre-eclampsia? J Med Assoc Thai 2005; 88:1003-10.
14. Coetzel EJ, Dormisse J, Anthony J. A randomized controlled trial of intravenous magnesium sulphate versus placebo in management of women with severe pre-eclampsia. Br J Obstet Gynaecol 1998; 105:300-3.
15. Alexander JM, McIntire DD, Leveno KJ, Cunningham FG. Selective magnesium sulfate prophylaxis for prevention of eclampsia in women with gestational hypertension. Obstet Gynecol 2006; 108:826-32.
16. Altman D, Carroli G, Duley L, Farrel B, Moodley J, Neilson J, et al. Do women with preeclampsia and their babies benefit from magnesium sulphate? The Magpie trial: a randomized placebo controlled trial. Lancet 2002: 359: 1877-90.
17. Ritusharma, Mir S, Rizvi M, Akhtar S. Efficacy of Magnesium sulphate versus Phenytoin in seizure prophylaxis in patients of eclampsia and severe preeclampsia. JK Science. 2008; 10:181-185.

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