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Original Research Article

A Study of Role of Prophylactic Magnesium Sulphate in Severe Preeclampsia in Preventing Eclampsia and Neonatal Outcome

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Abstract

The study included more of booked cases compared to unbooked. In booked cases most of them belonged to group to whom magnesium sulphate was not given (70% not given vs 59% given) and while in unbooked cases most of them were in group who received magnesium indicating poor control of blood pressure in unbooked cases. This confirms the high incidence of pre eclampsia in primigravida (69%given and 66% not given), more common in young women. The inclusion of more of preterm pregnancies represents the fact that termination of pregnancy is definitive treatment of pre eclampsia. Among the vaginal deliveries the instrumental delivery was significantly more in magnesium sulphate given group representing the tocolytic effect of magnesium sulphate. The complications of severe preeclampsia like eclampsia, pulmonary oedema and renal failure occurred more in group not given magnesium sulphate (2%,1%,1% given vs 11%, 3%, 4% not given) respectively and incidence of abruption and DIC in is almost similar in both groups (4% and 1% Vs 3%and 1%). Eclampsia is a grave complication of severe preeclampsia occurred more in the group not given magnesium sulphate compared to group given magnesium sulphate (11% vs 2%) indicating that intervention with magnesium sulphate has better maternal out come when given to women with severe pre eclampsia. The symptoms of toxicity like loss of deep tendon reflexes, oliguria and other side effects like nausea, head ache, flushing and vomiting had higher incidence in magnesium sulphate administered group. Nearly 40%-50% of new borns from both groups had good Apgar of 7-10 (40% given and 46% not given) respectively. Women with 3-6 Apgar were more in magnesium sulphate administered group (32% vs 10%) respectively in given and not given groups. Both groups had equal NICU admissions. When new born of more than 32 weeks, the salvageable neonates admitted to NICU were considered, the outcome was better in group given magnesium sulphate with no deaths pointing towards role of magnesium sulphate in improving fetal survival.

Keywords: Eclampsia, Magnesium sulphate, Pregnancy, Outcome, Complications, Neonatal outcome.

INTRODUCTION

Hypertensive disorders complicate 5 to 10% of the pregnancies, among which preeclampsia and eclampsia are important causes of maternal morbidity and mortality [1]. Pre-eclampsia complicates 5 to 7 % of all the pregnancies out of which 3.3% develop severe preeclampsia [2] and less than 1% land into eclampsia [3] which is the second most common cause of maternal and perinatal morbidity in under privileged population [4]. In eclampsia maternal mortality is 10% and fetal mortality is 20 to 30 % [5]. In developed countries eclampsia is rare, affecting around 1 in 2000 deliveries [6] while in developing countries estimates varies from 1 in 100 to 1 in 1700 [7, 8]. Worldwide an estimated 600,000 women die each year of pregnancy related causes [9], with 99% of these deaths occurring in developing countries. Preeclampsia and eclampsia account for about 50,000 maternal deaths a year [10]. Hence early identification and interventions are mandatory to overcome these complications of preeclampsia. In 1927 Alton and Lincoln [11] used Magnesium sulphate intrathecally, since then it was used in the treatment of eclampsia.

The present study is cross sectional interventional study conducted to determine the role or efficacy of magnesium sulphate as a prophylactic agent in all cases of severe preeclampsia in preventing

eclampsia .In many institutes, routine protocol is to administer magnesium sulphate after the onset of imminent signs or convulsions. The goal is to prevent seizures and its complications on mother and fetus by early detection and intervention before onset of imminent signs and symptoms of eclampsia.

MATERIAS & METHODS

The study was undertaken from January to December 2018 in Department of obstetrics and gynaecology at Kakatiya medical college, warangal which is a teaching hospital and a tertiary referral centre as well. The study is a cross sectional interventional type of study.

Inclusion Criteria

All antenatal women both primi and multi gravid satisfying the diagnostic criteria of severe pre eclampsia, were included. These women were either in labour or those in whom termination has been decided and free of any imminent signs of eclampsia. As appearance of imminent sign is a surest indication for administration of magnesium sulphate in our institution, women with imminent signs requiring magnesium sulphate were excluded from study.

Criteria for Severe Preeclampsia

- Severe hypertension, BP > 160/110 mm of Hg or more.
- Proteinuria > 5gm/24 hr or 2+ or more in random urine samples.
- Elevated serum creatinine levels > 0.8mg/dl.
- Pulmonary oedema.
- Oliguria < 500 ml/24 hrs.
- Micro angiopathic haemolysis.
- Thrombocytopenia with platelets < 1 lakh/cu mm3.
- Elevated ALT and AST.> 40 IU/L.
- Pain in the epigastrium or right upper quadrant.
- Symptoms of end organ involvement like headache, visual complaints or epigastric pain.

Exclusion Criteria

Cases of severe preeclampsia with symptoms of imminent eclampsia, Cases of chronic hypertension with no superimposed pre eclampsia, Hypertension due to other causes, epilepsy conductive cardiac failure, myasthenia gravis or other neuromuscular disorders.

Method

About 100 women with severe pre eclampsia either in labour or in whom decision for termination has been taken were selected and history noted according to proforma and followed up till discharge. These women who received magnesium sulphate were compared with100 women who were similarly followed and did not receive magnesium sulphate. The new born of both groups were observed till discharge. In present study Pritchard's regimen was used, to administer magnesium sulphate as it is widely accepted and has been proven to be more effective and attain a good therapeutic serum values compared to other regimens and it's simpler to administer in a set up like ours.

Pritchard's regimen is administration of a loading dose of 4 gms of 20% magnesium sulphate intravenously into accessible peripheral vein generally cubital vein over 15-20 minutes followed by 10 gms of 50% magnesium sulphate deep intramuscular one half in each buttock. Followed by maintenance dose of magnesium sulphate 5gms of 50% solution of magnesium sulphate every fourth hourly for 24 hours from the start of first dose under strict monitoring for toxicity. Magnesium sulphate toxicity was monitored by clinical signs of loss of tendon reflexes, drowsiness, oliguria and respiratory distress. Serum magnesium levels were not monitored due to poor affordability of women in study. Magnesium sulphate was discontinued once toxic signs appeared. And calcium gluconate antidote was kept available. In group not given magnesium sulphate with severe pre eclampsia if women had convulsions or developed symptoms of imminent eclampsia like headache, epigastric pain, blurred vision the trail was stopped and was given magnesium sulphate and monitored.

RESULTS

This study was conducted at Kakatiya medical college, warangal, to know the efficacy of magnesium sulphate as a prophylactic agent in all cases of severe preeclampsia in preventing eclampsia and its effects on neonates. The results were expressed in tables given below.

Table-1: Distribution of total cases -booked and unbooked

	Mgso4 – given		Mgso4- not given		Total
Booked	59	(59%)	70	(70%)	129
Un booked	41	(41%)	30	(30%)	71
Total	100	(100%)	100	(100%)	200

Table-2: Age wise distribution

AGE	Mgso4 -given		Mgso4-notgiven		Total
<21yrs	52	(52%)	23	(23%)	75
21-25yrs	46	(46%)	65	(65%)	111
>25yrs	2	(2%)	12	(12%)	14
Total	100	(100%)	100	(100%)	200

Table-3: Case distribution among primigravida and multigravida

	Mgso4 –given		Mgso4-not given		Total
Primi gravida	69	(69%)	66	(66%)	135
Gravida 2	25	(25%)	17	(17%)	42
Gravida 3 and more	6	(6%)	17	(17%)	23
Total	100	(100%)	100	(100%)	200

Table-4: Case distribution according to gestational age at delivery

	Mgso4 –given		Mgso4-not given		Total
Term gestation	48	(48%)	60	(60%)	108
33-36 weeks	37	(37%)	38	(38%)	75
28-32 weeks	15	(15%)	2	(2%)	17
Total	100	(100%)	100	(100%)	200

Table-5: Comparison of onset of labour in vaginal deliveries

	Mgso4-given		Mgso4 –not given	
Spontaneous onset of labour	8	(16%)	7	(13.46%)
Induced labour	42	(84%)	45	(86.53%)
Total	50	(100%)	52	(100%)

Table-6: Comparison of mode of delivery

	Mgso4-given	Mgso4-not given	TOTAL
SPVD	35 (35%)	48 (48%)	83
INS	15 (15%)	4 (4%)	19
CS	50 (50%)	48 (48%)	98
TOTAL	100 (100%)	100 (100%)	200

Table-7: Comparison of indications for cesarean section

	Mgso4-given	Mgso4-not given	Total
Previous section	15 (30%)	13 (27.08%)	28
Fetal distress	19 (38%)	19 (39.58%)	38
Dystocia	13 (26%)	13 (27.08%)	26
UHTN	3 (6%)	3 (6.2%)	6
Total	50 (100%)	48 (100%)	98

Table-8: maternal out come with respect to complications of severe pre eclampsia

	Mgso4 –given	Mgso4-not given	Total
Eclampsia	2 (2%)	11 (11%)	13
Abruption	4 (4%)	3 (3%)	7
Renal failure	1 (1%)	3 (3%)	4
Pulmonary oedema	1 (1%)	4 (4%)	5
DIC	1 (9%)	1 (1%)	2
HELLP/MM	-	-	-

Table-9: Comparison of incidence of eclampsia

	Mgso4 –given	Mgso4 –not given	Total
Eclampsia	2 (2%)	11 (1SS1%)	13
Eclampsia free	98 (98%)	89 (89%)	187
Total	100 (100%)	100 (100%)	200

Table-10: Comparison of side effects with magnesium sulphate

	Mgso4 –given	Mgso4-not given	Total
LDTR	22	-	22
Oliguria	24	12	36
RD	2	4	6
PPH	-	-	-
Other complaints N/V/F	20	6	26

Table-11: Comparison of neonatal out come in both gruops

Apgar score at birth	Mgso4 –given	Mgso4-not given	Total
7-10	40 (40%)	46 (46%)	86
3-6	32 (32%)	10 (10%)	42
<3	24 (24%)	40 (40%)	64
Still birth	4 (4%)	4 (4%)	8
Total	100 (100%)	100 (100%)	200

Table -12: Distribution of nicu admissions according to gestational age at delivery

Gestational age of newborn	Mgso4-given	Mgso4 not given
32weeks and less	16 (45.71%)	29 (5.55%)
More than 32 weeks	19 (54.28%)	34 (94.44%)
Total	35 (100%)	36 (100%)

Table-13: Outcome of total nicu admissions –>32wks and 32 and less gestational age newborn

	Mgso4 –given	Mgso4 – not given
Discharged	30(85.71%)	31(86.11%)
Dead	5(15.625%)	5(13.8%)
TOTAL	35 (100%)	36 (100%)

Table-14: NICU out come in newborn more than 32 weeks

	Mgso4 –given	Mgso4-not given
Discharged	19 (100%)	31 (91.18%)
Dead	0	3 (8.82%)
Total	19 (100%)	34 (100%)

DISCUSSION

Eclampsia remains a complex and partially understood disease and its prophylaxis is the area of greatest controversy. Although magnesium sulphate is a proven anticonvulsant eclampsia, its role in prophylaxis is less certain. The present study included more number of booked cases compared to unbooked, as pre eclampsia being high risk pregnancy; women had regular antenatal visits and were referred early in pregnancy. And major part of booked cases formed a part of group not given magnesium sulphate, as their blood pressures were under control with good antenatal visits. Unbooked cases referred directly with high uncontrollable blood pressures constituted major part of magnesium sulphate administered group.

The women in the present study were mostly of age group less than 25years compared to above 25years age group respectively. Primigravida formed the major part of study in both groups. preeclampsia is known to occur more commonly in primigravida, where as in a study conducted by Omu *et al*., [12] in the year 2007 Women in the age group of 31–40years were more likely to have severe preeclampsia compared with younger and older counterparts. In Altman Magpie trail 2004 [13] number of primigravida effected more compared to multi gravida. Women with severe preeclampsia required early termination of pregnancy. The term and preterm pregnancies were (48% and 60% vs 52% and 40%) in group given magnesium sulphate and not given respectively. This is comparable to studies conducted by the Magpie trail 2002 [14], Sohini Bhattacharya study [15].

As pre eclampsia being a high risk pregnancy, most of the women were terminated before onset of spontaneous labour. (91.3% in given and 88.8% in not given, required induction vs 8.6% in given and 11.11% in not given set into spontaneous labour) respectively in both groups. Administration of Magnesium sulphate did not affect the outcome of labour like rate of Cesarean section. This conforms to the previous studies. We had a Cesarean delivery rate of 50% in the group receiving magnesium sulphate. Indications being mostly fetal distress (19%), followed by previous cesarean section (17%) and dystocia (13%) and very few with uncontrolled blood pressure (3%). Results were similar in group not given magnesium sulphate. Similar to study by Sohini Bhattacharya [15] of 50% of cesarean section rate in group receiving magnesium sulphate mostly done in view of uncontrolled hypertension 42.8%.

Instrumental vaginal delivery rate was higher in magnesium sulphate group with 15% compared to other group 4% with a difference of 11% which is significant statistically indicating that magnesium sulphate has got a tocolytic effect on uterine activity which led to instrumental delivery. This is similar to results obtained in study by Sohini Bhattacharya [15] with more instrumental deliveries in group given magnesium sulphate (20% vs 4.2%).

In present study we had a much higher incidence of eclampsia in the severely preeclamptic mothers not receiving magnesium sulphate than the

group receiving it (11% versus 2%). The difference of 9% has been calculated to be statistically significant. This is comparable with the four large randomized trials discussed by Sibai BM showing a lower rate of eclampsia in those assigned to magnesium sulphate (0.6% versus 2.0%). Thus the number of women needed to treat or prevent one case of eclampsia is 71. In present study, the incidence of other complications of severe preeclampsia like HELLP, DIC(1% in both the groups,) and abruption (4% vs 3%), had almost equal incidence indicating prophylactic magnesium sulphate has no significant effect in controlling these complication of severe pre eclampsia .

In study by Altman 2004 [17] a quarter of women allocated magnesium sulphate had few unwanted side-effects, compared with 5% allocated placebo. The present study also had higher incidence of toxic side effects of magnesium sulphate like loss of deep tendon reflexes (20%), oliguria (24%) and other side effects like vomiting, flushing sensation (20%) in group given magnesium sulphate.

Maternal respiratory depression has been a serious concern in many studies which occurred more commonly in magnesium sulphate, administered women [17]. But in present study slightly higher rate was observed in those who were not administered magnesium sulphate (4% vs 2%).

Once magnesium sulphate crosses the placental barrier, there has been concern about its safety for the neonates. Sibai BM [18] states that prophylactic magnesium sulphate has no significant benefit in perinatal outcome when it is given to pregnant women. the confounding factors in Omu *et al*., [12] study such as primigravidity (52%), preterm delivery (56% and 53%) in preeclamptic and eclamptic women, respectively, and intrauterine growth restriction among 30.2% of the women contributed to adverse neonatal out come.

In the present study, overall neonatal outcome was better in group given magnesium sulphate as regards the APGAR scores, NICU admission however there were many confounding factors like pre term delivery, IUGR babies, and low birth weight to assign the effect directly to magnesium sulphate. The group given magnesium sulphate had more number of new borns of less than 32 weeks of age who were admitted to NICU (42.42% vs 5.55%s) and group not given magnesium sulphate had more of new born of gestational age more than32 weeks (94.44% vs 57.55%). When new born of more than 32 weeks alone were considered, the death rate was comparatively low in magnesium sulphate administered group (0 vs 8.8%) which is statistically significant. However, these deaths occurred remote from the time of exposure to magnesium sulphate. Hence cannot be directly attributed to be the effect of magnesium sulphate. NICU admission rate was 21.7%, which was much higher in the control group not receiving magnesium sulphate. This high rate is comparable to that reported by Greenberg *et al*., [19]. Similar results were found by the same authors in two different study cohorts also [20, 21].

CONCLUSION

The study has revealed that women with severe preeclampsia, when given prophylactic magnesium sulphate before onset of imminent signs, had less chances of landing up in eclampsia and its complications, compared to the one not given. Hence administration of prophylactic magnesium sulphate to prevent eclampsia, in all cases of severe preeclampsia, even before the onset of imminent signs is justified.

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