ORIGINAL ARTICLE

Comparative Study of Phenytoin Sodium Versus Magnesium Sulphate in Management of PET and Eclampsia

Parikh Rana, Neelu Sharma, Kamlesh Manhas

Abstract

To compare the efficacy of magnesium sulphate with phenytoin sodium in severe PET and eclampsia. 60 patients of severe PET and eclampsia were studied by dividing them in two groups. Group-1 received phenytoin and Group-2 received magnesium sulphate. Data was compared using Chi square test. Recurrence of fits, LSCS rates, maternal morbidity & mortality, perinatal mortality was lower in patients receiving magnesium sulphate than those who received phenytoin. Conclusion - magnesium sulphate is a better anticonvulsant than phenytoin.

Key Words

PET, Eclampsia, Phenytoin sodium, Magnesium Sulphate

Introduction

Eclampsia is the third commonest cause of maternal mortality after hemorrhage and infection, and control of convulsions is important in reducing maternal morbidity & mortality. Incidence of PET varies in different parts of world and is commonly put as 5% and that of eclampsia is about 1 in 3,250 in USA & 1 in 2,000 in UK. The maternal mortality rate associated with eclampsia ranges from 100 - 6,000/100,000 and the perinatal mortality range from 150-400/1,000 in India.Various therapeutic modalities have been tried in our country for treatment and prevention of fits over past 50 years. Pritchard at Parkland Hospital has standardized parenteral magnesium sulphate therapy in PET and eclampsia. Though the specific mechanism remain unclear, the effect of magnesium sulphate in the prevention of eclampsia is likely multifactorial. Magnesium sulphate may act as vasodilator, with actions in the peripheral vasculature or the cerebro-vasculature, to decrease peripheral vascular resistance and/or relieve vasoconstriction. Additionally, magnesium sulphate may also protect blood brain barrier and limit cerebral edema formation, or it may act through a central anticonvulsant action (1). Therapy is efficacious in reducing maternal mortality rate and fit recurrence rate and in improving perinatal outcome.Phenytoin sodium is a well recognized drug for prevention and control of epileptic seizures. It acts by stabilizing neuronal membrane and exerts anti-seizure activity without causing general depression of CNS.

From the Postgraduate Department of Obs & Gyne, Government Medical College, Jammu- India
Correspondence to : Dr Parikh Rana, Lecturer, Postgraduate Department of Obg, GMC, Jammu & ASCOMS Sidhra, & J&K Health Services

Material and Methods

After approval from ethics committee this randomized controlled study was conducted on 60 patients of severe PET and eclampsia in the Department of Obstetrics & Gynaecology, SMGS Hospital, Jammu. Patients with history of seizure disorders, essential hypertension, cardiovascular disease and hypersensitivity to the drugs were excluded. Detailed history with emphasis on age, gravidity, parity was taken and patients divided in two groups for treatment. Group-1- This included 30 patients who were given phenytoin therapy. 1000mg phenytoin iv over 15-30 minutes, followed by 100 mg phenytoin 8 hourly IV or orally and the drug was continued 24 hours after delivery or last fit. Group-2 - 30 patients were given magnesium sulphate. Loading dose was given on admission; 4 Gms of 20% magnesium sulphate was given at 1 gm/minute over 3-5 minutes (8 ml of 50% magnesium sulphate + 12 ml of sterile water). This was followed by 5 Gms of 50% magnesium sulphate given deep IM in each buttock. If convulsions persisted after 15 minutes, 2 Gms magnesium sulphate was given IV as 20% solution. Maintenance was given every 4 hours as 5 Gms of 50% magnesium sulphate in alternate buttock on upper outer quadrant only after ensuring:

" Patellar reflex was present.

" Respiratory rate was more than 14/min.

" Urine output was more than 30 ml/hour or 100 ml in previous 4 hours.

Magnesium sulphate was continued for 24 hours from last fit or delivery.

Adjunctive treatment in both groups -

" Constant supervision.

" Intermittent oxygen therapy.

" Maintenance of airway.

" Prevention of injury.

" Per vaginal examination for Bishop's score.

" Antihypertensive for control of blood pressure.

" Diuretics in cases of pulmonary edema.

Mother was assessed for control of fits, mode of delivery, control of blood pressure and any complications. Failure of anticonvulsant regime was defined as fit occurring 15 minutes after initiation of treatment. Neonates were observed for effects of medications received by the mother and also for birth asphyxia, birth weight, dysmaturity, jaundice and Septicemia till the patient was discharged. Data were recorded accordingly and results were compared in two groups using Chi Square test.

Discussion

The mean age of patients in our study was 23.05 years. In the study by Roy J *et al* (2) 76% of eclampsia patients were in the age group of 16 to 25 years. Study by Morikawa *et al* (3) shows that risk of eclampsia decreases by three percent per one year increase in maternal age

Parity status in our study is comparable to 80% nulliparity as reported by Roy J *et al* (2). Morikawa M *et al* (3) has shown in their study maternal age and nulliparity to be independent risk factors for eclampsia. Madhuri and Bhardwaj (4) reported 53.8% primigravida.

90% of the patients in the study belonged to rural areas, comparable to Madhuri & Bhardwaj (4) who reported 87.7% of their cases as rural.

63.3% of our patients were more than 37 weeks of gestation. Roy J *et al* (2) reported 95% of their patients of preeclampsia and eclampsia were above 34 weeks.

Incidence of antepartum, intrapartum and postpartum eclampsia in our study was 80%, 15% and 5% respectively comparable to 57.5%, 30% and 12.5% respectively reported by Roy J *et al* (2).

In our study, none of the PET or eclampsia patients on magnesium sulphate had fit recurrence while 2 (18.2%)

Table-1: Age distribution of patients

Age (in years)	Group-1 Phenytoin		Group-2 Magnesium sulphate	
	No. of patients	Percentage	No. of patients	Percentage
< 20	07	23.3	02	06.7
21-25	15	50.0	17	63.3
26-30	06	20.0	08	20.0
>31	02	06.7	03	10.0

Table 2. Parity wise distribution of patients

Parity	Group-1 Phenytoin		Group-2 Magnesium sulphate	
	No. of patients	Percentage	No. of patients	Percentage
P0	23	76.7	21	70.0
P1	5	16.7	5	16.7
P2	2	6.6	3	10.0
P3 & Above	-	-	1	03.3

Table 3. Rural/Urban distribution of patients under study

Area	Group-1 Phenytoin		Group-2 Magnesium sulphate	
	No. of patients	Percentage	No. of patients	Percentage
Rural	28	93.3	26	86.7
Urban	02	6.7	04	13.3

Table 4. Mode of delivery in patients under study

Mode of delivery	Group-1 Phenytoin		Group-2 Magnesium sulphate	
	No. of patients	Percentage	No. of patients	Percentage
Vaginal				
1. Spontaneous	16	55.2	21	70.0
2. Assisted	06	20.7	04	13.3
LSCS	07	24.1	05	16.7

patients on phenytoin developed recurrent fits. this is comparable to 14.9% fit recurrence to phenytoin patients shown by Roy J *et al* (2) and none in magnesium sulphate patient. Lucas *et al* (5) found phenytoin failure rate of about 1%. Dommisse (6) suggested that phenytoin is not an effective anticonvulsant in eclampsia. Robson et al (7) found FRR of 20% with phenytoin. They attribute superiority of magnesium sulphate to its effects on endothelial prostacyclin, inhibition of platelet aggregation and vasodilatory effects in the cerebral circulation. More over it also acts as antiepileptic agent by means of neuronal calcium channel blockade through N-methyl-d-aspartate receptors (8). Dahiya *et al* (9) observed FRR of 33.3% with phenytoin against 6.6% with magnesium sulphate. Duley & Henderson-Smart (10) observed magnesium sulphate results in 33% reduction in relative

Table-5: Comparison of perinatal outcomes in fetuses admitted with FHS present at admission

	Group-1 Phenytoin		Group-2 Magnesium sulphate	
	No. of patients	Percentage	No. of patients	Percentage
1. Live births	27^	90	26	86.7
*APGAR score (1 min)				
<6	03	11.5	02	7.7
>6	23	88.5	24	92.3
* APGAR score (5 min)				
<6	2	7.7	01	3.8
>6	24	92.3	25	96.2
TOTAL	26		26	
2. Perinatal mortality				
*Absent FHS at admission	3	10.3	3	10
* Still births	0	0	1	3.3
* Early neonatal mortality	2	6.7	1	3.3
TOTAL	5	16.7	5	16.7

^ 1 Patient had delivered a live baby at home.

Table-6: Duration of stay in hospital.

Duration (In days)	Group-1 Phenytoin		Group-2 Magnesium sulphate	
	No. of patients	Percentage	No. of patients	Percentage
<5	19	63.3	23	76.7
6-10	11	36.7	07	23.3
>10	-	-	-	-

(p >0.05)

Table-7: Maternal morbidity.

Complications	Group-1 Phenytoin No. of patients	Group-2 Magnesium sulphate No. of patients
1. Coma	3	0
2. Temperature >39^0 C	2	3
3. Oliguria/anuria	4	0
4. RTI	3	1
5. Abruptio placentae	2	1
6. PPH	3	1
7. Shock	1	1
8. Post partum psychosis	0	0
9. Thrombophlebitis	5	2
10. Septicemia	0	0
11. DIC	0	0
12. Pain at inj. Site	0	6
13. Inj. Abscess	0	0
14. Cardiac arrest	0	0
15. CVA	1	0

risk of fit recurrence compared to phenytoin.

In Group-1 24% patients underwent LSCS and 76% had vaginal delivery. In patients on magnesium sulphate 84% had vaginal delivery and 16% underwent LSCS.

The difference was not statistically significant (p>0.05). Dahiya *et al* (9) reported 14% patients on phenytoin and 20% on magnesium sulphate required LSCS. Livingston *et al* (11) also noted that magnesium sulphate did not increase the rate of caesarean delivery. In present study no maternal death occurred in patients on magnesium sulphate while 2 (6.6%) patients of eclampsia on phenytoin died. One died of stroke and the other of the pulmonary oedema. None died due to side effects of phenytoin. Both had poor control of hypertension. Dahiya *et al* (9) reported no mortality with magnesium sulphate and 2% with phenytoin. No increase in post partum hemorrhage and respiratory depression in neonates was observed in group 2. Duley & Henderson- Smart (10) found that compared to phenytoin magnesium sulphate was associated with reduced maternal morbidity (pneumonia, ventilation and admission to ICU) though this difference was not statistically significant. In our study, perinatal mortality of 16.7% was observed similar in the two groups. Eclampsia Trial Collaborative Group (12) observed less intubation rate in babies born to women on magnesium sulphate than on phenytoin. Duley & Henderson-Smart (10) also noted that magnesium sulphate as compared to phenytoin was associated with fewer admissions to special care baby unit. Tukur J (13) has concluded in his review article that maternal mortality can be reduced by ensuring the availability and utilization of magnesium sulphate for the treatment of severe pre-eclampsia and eclampsia.

Conclusion

Magnesium sulphate is a better agent than phenytoin with regard to fit control, recurrence of fits, maternal mortality and morbidity. However there was no statistically significant difference in labour outcome and perinatal mortality.

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