

Magnesium Sulphate in Eclampsia: A Safe, Efficient and Cost-Effective Approach

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Summary

One hundred fifty patients of eclampsia were studied. Of these 50 were treated with diazepam regime and 100 with magnesium sulphate regime.

Overall results showed better control of seizures with magnesium sulphate as compared with diazepam. Recurrence of fits occurred with only 2% patients with magnesium sulphate compared to 16% with diazepam. Only 2% of patients under magnesium sulphate required ventilatory support compared to 8% with diazepam.

Maternal Mortality was also much less with magnesium sulphate than with diazepam (1% vs 6%). Hospital stay of patients under magnesium sulphate was 8 days as compared to 10.18 under diazepam. Fetal outcome was also much better with magnesium sulphate therapy. Only 14% babies had an Apgar < 6 with magnesium sulphate compared to 38% with diazepam. The incidence of Caesarean section was also lower in patients under magnesium sulphate regime.

Introduction

Eclampsia, though on the decline, is still a major obstetric problem today in developing countries. It is an important contributory factor to maternal and fetal mortality rates.

The present study was undertaken to assess and compare the safety, efficacy and cost effectiveness of magnesium sulphate in the control of seizures. Fetal and maternal outcome in patients of eclampsia treated with magnesium sulphate and diazepam were also studied.

Material and Methods

One hundred fifty patients of eclampsia admitted to the labour ward unit of Tata Main Hospital between January 1996 to January 2000, selected at

random, were taken up for study. Of these 50 patients were treated with diazepam regime and 100 with magnesium sulphate regime. Prior to 1996, magnesium sulphate was not used in our hospital for treatment of eclampsia. Diazepam was the only drug used for these patients. After mid 1996, we started using magnesium sulphate for eclamptic patients. Diazepam being reserved for those patients with absent deep tendon reflexes and compromised respiration.

The magnesium sulphate regime followed was that proposed by Pritchard in 1955. This consists of a loading dose of magnesium sulphate 4gm slow i.v. over 5-10 minutes (i.e. 20ml of 20% solution). This was followed immediately by 10 gm deep Im injection – half in each buttock (i.e. 10ml of 50% solution). Maintenance dose consists of 5gm deep Im into alternate buttock 4 hourly after ascertaining an urine output of at least 25ml/

hr or 100ml in the last 4 hours, presence of knee jerk reflex and a respiratory rate of > 16/min.

The diazepam regime used is one that has been evolved in our hospital over the years, it consists of a loading dose 5-10mg slow i.v. This is followed by 5mg slow i.v. every half an hour for six doses. The diazepam is then tapered to 5mg, two hourly for 6 more doses. Then it is further tapered to 5 mg, 4 to 6 hourly depending upon the level of consciousness, respiratory status and control of convulsions.

Antihypertensive used in our patients was nifedipine, given if the diastolic pressure was >100mmHg. If more than 10mg 6 hourly was required for control of hypertension, an additional hypertensive of the nature of methyl dopa was used.

After detailed history, thorough general, physical and local examination routine investigations like complete blood count, peripheral smear for malaria parasite, blood urea, serum creatinine, blood sugar, serum uric acid, liver function tests, urine for albumin etc. were done.

Augmentation / induction of labour was done if convulsions were controlled with initial therapy and if cervix was favourable. Otherwise, the patient was put up for Caesarean section.

Observation

Table-I shows that majority of patients (66%) were young primigravid in the age group of 16 to 19 years.

73.3% patients were unbooked, 10.7% were booked in our hospital and 16% were booked with the private practitioners.

Five maternal morbidity parameters were studied. Fifty Eight Percent of patients treated with magnesium sulphate and 56% of patients treated with diazepam were unconscious on admission. Seventy Five

percent of patients under magnesium sulphate regime regained consciousness within 6 hours while 24% took 6 to 12 hours to regain consciousness. On the contrary, 78% patients under Diazepam regime regained consciousness between 12 to 24 hours and 22% patients took more than 24 hours to regain consciousness. Only 2% patients under magnesium sulphate required ventilatory support compared to 8% under diazepam regime. Control of fits was better with magnesium sulphate. Two percent patients under magnesium sulphate regime had recurrence of fits compared to 16% under diazepam. Average hospital stay was 8 days in patients under magnesium sulphate and 10.18 days under diazepam regime. Maternal mortality was 1% in magnesium sulphate group compared to 6% in diazepam group (Table – II).

Mode of delivery was also studied in these two groups and 38% patients in the diazepam group and 45% in magnesium Sulphate group had vaginal delivery. Caesarean section rate was 62% in diazepam group and 55% in magnesium sulphate group.

Perinatal outcome was also studied in these two groups, 6% of the babies in diazepam group and 2% in magnesium sulphate group were fresh still born whereas 4% and 3% babies in the two groups respectively were macerated still born. Thirty eight percent babies in diazepam group and 14% in magnesium sulphate group had an Apgar score <6. Neonatal death rate was 20% in diazepam group and 10% in magnesium sulphate group. The overall perinatal mortality rate was 30% in diazepam group and 15% in magnesium sulphate group (Table – III).

Discussion

Magnesium sulphate was first used in the treatment of puerperal eclampsia in 1925 (Lazard, 1925). Pritchard published his initial experience with it in 1955. Then followed several large studies and reviews on magnesium sulphate use in eclampsia.

In June 1995, the results of Eclampsia Trial

Table – I
The Patient Profile in Terms of Age and Parity

Age in Years	Gravidity			
	G-1	G-2	G-3	G-4
16-19 Yrs.	66 (44%)	-	-	-
20-23 Yrs.	47 (31.3%)	-	-	-
24-27 Yrs.	16 (10.6%)	7 (4.6%)	-	-
28-31 Yrs.	2 (1.3%)	3 (2%)	1 (0.6%)	1 (0.6%)
32-36 Yrs.	2 (1.3%)	3 (2%)	1 (0.6%)	1 (0.6%)

Table – II
Maternal Morbidity and Mortality Parameters

Parameters	MgSo ₄		Diazepam		P-Value
	No. of Patients	(%)	No.	(%)	
Unconscious at Admission	58.	58%	28	56	-
Time Taken to Regain Consciousness.					
6 Hrs.	75	75.	-	-	-
6 – 12 Hrs	24.	24.	-	-	-
12 – 24 Hrs.	1.	1.	39.	78.	-
24 Hrs	0.	0.	11.	22.	-
Requirement of Ventilatory Support	2.	2.	4.	8.	< 0.001%
Recurrence of Fits	2.	2.	8.	16.	< 0.001%
Maternal Mortality	1.	1.	3.	6.	< 0.001%
Hospital Stay.	8 Days		10.18 Days		

Table III: Fate of Fetuses.

Fate	Diazepam		Mag. Sulphate		P-Value
	No.	Percent.	No.	Percent	
Still Birth					
Fresh	3	6	2	2	-
Macerated	2	4	3	3	-
Apgar Score					
6.	19	38	14	14	-
NND.	10	20	10	10	-
P.M.R.	-	30	-	15	<0.001

Collaborative Group (1995) was reported in the Lancet which provided compelling evidence in favour of magnesium sulphate.

The results from our study suggest that magnesium sulphate is significantly more effective than diazepam in preventing the recurrence of seizures. ETCG (1995) trial showed a recurrence rate of 5.7% with magnesium sulphate and 27.9% with diazepam. But Crowther (1990) reported a higher rate of 20.8% with magnesium sulphate and 25.9% with diazepam use. Our results are closer to those of the ETCG trial (1995) i.e. 2% with magnesium sulphate and 16% with diazepam use and the results were statistically significant. Bhalla et al (1994) reported a recurrence rate of 2.2% with Magnesium Sulphate use which is similar to our results.

The Caesarean section rate was significantly higher in the diazepam group. Our results show a 62% Caesarean section rate in diazepam group compared to 55% in the magnesium sulphate group (P-Value <0.001). We compared our results with those of other workers.

The ETCG (1995) reported 66.2% Caesarean rate in magnesium sulphate group and 64.3% in the diazepam group. The difference between our results and those of the ETCG (1995) could possibly be due to their early intervention and large sample size (n=309 vs. 100 in magnesium sulphate and 308 vs 50 in the diazepam group). Dommissie (1990) reported a Caesarean rate of 63.6% with magnesium sulphate use which is closer to our results.

The perinatal outcome was significantly better in the magnesium sulphate group in our study, 38% of neonates to the diazepam group had an Apgar < 6 at birth compared to 14% in the magnesium sulphate group. The neonatal death rate was also significantly more in the diazepam group (20% vs 10%). Perinatal deaths expressed in percentage were 30% in diazepam group compared to only 15% in magnesium sulphate group. Dommissie (1990) reported 18.2% perinatal deaths with magnesium sulphate use which is close to our results. The ETCG trial (1995) gave a perinatal death rate of 25.0% with magnesium sulphate use and 23% with diazepam

use. The difference could be possibly due to the sample size. Crowther (1990), reported a perinatal death rate of 7.4% with magnesium sulphate use and 10.0% with diazepam use. Bhalla et al (1994) reported a 12.9% perinatal death rate with magnesium sulphate use. Our results with magnesium sulphate are similar to these studies but our perinatal death rate with diazepam is slightly higher.

Maternal deaths reported by ETCG trial (1995) was 5.1% with magnesium sulphate vs. 4.2% with diazepam use. Bhalla et al. (1994) reported maternal death with magnesium sulphate use and 4.4% with diazepam use. Our results are similar – 1% in magnesium sulphate group and 6% in diazepam group.

Two other criteria have been studied by our group which have not been studied in the aforementioned trials. The first is the requirement of ventilatory support in these patients. The second is their duration of hospital stay. Two percent of patients with magnesium sulphate required ventilatory support compared to 8% with diazepam. On an average, patients on magnesium sulphate stayed in the hospital for 8 days compared to 10, 18 days for those on the diazepam. These

two factors led to reduction in the total cost of therapy when magnesium sulphate was used.

Conclusion

Magnesium sulphate is a superior drug than diazepam in reducing the recurrence of fits in eclampsia and in reducing the requirement of ventilatory support in these patients. The maternal and fetal outcome is better with magnesium sulphate. There is definitely a place for trial of labour in patients with magnesium sulphate use. The total costs to the patients and hospital may also be less with magnesium sulphate use.

Reference

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