Our Experience with Use of Magnesium Sulphate in Eclampsia

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Summary **:In developing countries, Eclampsia forms one of the major causes of maternal mortality. With 8339 hospital deliveries in year 1996 there was a 1.56% incidence of eclampsia. Eclampsia accounted for 20.15% of the maternal deaths. The efficacy of magnesium sulphate in reducing blood pressure, frequency of convulsions and duration of coma are studied and compared with older lytic cocktail regime.**

Magnesium sulphate was found effective in reducing the blood pressure, the fit recurrence rate, and duration of coma. There was a significant decrease in fit recurrence rate from 37% with use of lytic cocktail to 9.23% using magnesium sulphate. Maternal mortality fell from 29% in patients on lytic cocktail to 20.77% in patients on magnesium sulphate. Fetal salvage also improved with magnesium sulphate, 50% being born alive with better Apgar scores.

As each eclamptic convulsion results in significant cerebral anoxia and brain damage, magnesium sulphate with its low fit reccurence rate and quicker recovery from coma was deemed a better anti-convulsant.

Introduction :

"Eclampsia" is derived from a Greek word meaning to shine forth. It is the advent or association of convulsions, in a patient of preeclampsia or protineuric hypertension. In a developing country like India, eclampsia forms one of the major causes of maternal mortality. The fact that eclampsia is largely a preventable disease is established by the negligible incidence of eclampsia. with proper antenatal care and prompt treatment of preeclampsia, as seen in developed countries.

Though the exact etiology is unknown, the incidence varies with age, socio-economic status, nutritional status and quality of antenatal care in different parts of the world. Prompt control of convulsions and blood pressure along with steps to initiate delivery form the foundation stone of treatment of eclampsia. Over the years various anticonvulsants have been in use. Our study evaluates the efficacy of magnesium sulphate in reducing convulsions, duration of coma and blood pressure in eclampsia, and compares the results obtained, with the use of lytic cocktail in similar patients.

Material and Methods

The following study is an analysis of 130 patients of eclampsia admitted in the year 1996 in SZH Bhopal. These patients were treated primarily with magnesium sulphate and nifedipine. The results in the form of control of convulsions, duration of coma, blood pressure and urine - albumin levels were compared with those in patients who received lytic cocktail in earlier years.

In our study the incidence of eclampsia was 1.56%. Total maternal deaths in 1996 were 134 while deaths due to eclampsia were 27, an incidence of 20.15%. Eclampsia involves young primigravida; 84.6% of eclamptic patients were below 25 years of age and 25 of the 27 maternal deaths occurred in this age group. 53.8% patients were primigravid and 16 of 27 maternal deaths were in this group.

A total of 96% of the patients were unbooked and did not have regular antenatal care; they were admitted in the hospital after the onset of convulsions. Of these 70%

were referred from PHC'S, or district hospitals. Areawise 87.7% belonged to surrounding rural areas and accounted for 26 of the 27 maternal deaths due to eclampsia.

More than half, ie. 52.3% were cases of antepartum eclampsia while intrapartum case were 30.70% and postpartum 16.92%. One patient had a previous history of eclampsia, 2 had twin pregnancies, 1 had infective hepatitis and 11 were aggravated by anemia.

The concentration of magnesium sulphate in plasma rises slowly after IM injection, requiring 90-120 mts to attain maximal levels. It is also very painful thus most patients were kept on IV magnesium sulphate regime. Four ampoules of 50% magnesium sulphate or 8 ampoules of 25% magnesium sulphate equal to 4 gms of the drug were dissolved in 50 cc of 5% dextrose and given IV over 5-10 mts. The first dose was given on admission and later doses at 4 hrly intervals till 24 hrs post delivery; the dose was monitered by observations of respiratory rate (>14 per minute), urinary output (>30 ml per hour), and presence of deep reflexes. If the diastolic BP was >100 mmhg, nifedipine 5-10 mg sublingual was given. As soon as the patient was stablished, induction / augmentation of labour by ARM and pitocin drip was done.

Observations and Discussion

Magnesium sulphate causes dilatation of vascular beds with increased uterine and renal blood flow. The DBP (diastolic blood pressure) before and 24 hrs after initiation of therapy was monitored. Even taking into consideration the post delivery fall in BP and the fact that most patients with DBP>100 mmhg were on nifedipine, DBP in 81 out of 130 patients fell below 90 mmhg in patients on magnesium sulphate, while corresponding fall in patients on lytic cocktail was 50 out of 100 pts. (Table I) Pritchard et al (1984) reported a variable transient hypotensive effect of magnesium sulphate. Chelsey and Tepper (1957) reported a drastic fall in BP when this drug was given in combination with other hypotensive agents. In our study nifedepine was used whenever DBP exceeded 100 mmhg.

Table I
DBP Before and 24hrs after Treatment

DBP	Magsulf Regime		Lytic Cocktail Regime	
	Pre Rx	Post Rx	Pre Rx	Post Rx
<90mmHg	15	81	20	50
>90mmHg	115	29	80	36
	(20 pts died within 24 hrs.)		(14 pts died within 24 hrs.)	

The urinary albumin levels before and 72 hrs after initiation of therapy were monitored. Urine albumin was absent in 84.6% patients on magnesium sulphate while 51.35% on lytic cocktail did not show presence of albumin 72 hrs post therapy. (Table II).

Table II
Urine Albumin Levels Before and 72 hrs after Treatment

U. Albumin	Magsulf Regime		Lytic Cocktail Regime	
	Pre Rx	Post Rx	Pre Rx	Post Rx
Nil	03	38	07	38
Present	127	16	93	36
	(26 pts died within 72 hrs.)		(26 pts died within 72 hrs.)	

Table III
Number of Convulsions after initiation of Therapy

No. of Convulsions	Magsulf Regime	Lytic Cocktail Regime
Nil	118	63
1-5	09	26
>5	03	11
Fit recurrence rate	9.23%	37%

Probably the most notable change was in the number of convulsions post-therapy. Fit recurrence was observed in 9.23% patients on magnesium sulphate regime, while patients on lytic cocktail had a recurrence of convulsions in 37% cases. (Table III). Menon (1961), Lahiri (1970) Devi et al (1976) using lytic cocktail reported a fit recurrence rate of 15%, 48% and 30% respectively. Bhat &

Barfiwala (1985) using lytic cocktail reported recurrence rate of 28%, Nagar etal (1988) reported 61.85% and Mohanty et al (1990) 86%. On magsulf regime, Pritchard et al (1984) reported recurrence of convulsions in 12% patients. Bhat & Bharfiwala (1985) observed a fit recurrence of 1.3%, Nagar et al (1988) 1.98%, Mohanty et al (1990) 9.5%, and Nawani et al (1996) 10%, with magnesium sulphate. Dubey et al (1993) and Sandhu et al (1993) had 0% recurrence of convulsions using magnesium sulphate.

Table IV
Duration of Coma in Patients After Therapy

Coma in Hours	Magsulf Regime	LyticCocktail Regime
0-24 hrs	92 (70.77%)	56 (56%)
>24 hrs	11 (8.46%)	15 (15%)
Remained in coma till death	27 (20.70%)	29 (29%)
Maternal deaths	20.70%	29%

Stay in Hospital in Cases of Maternal Deaths

Duration	Total Pts.
<6 hrs	7 patients
7-12 hrs	6 patients
13-24 hrs	7 patients
25-48 hrs	3 patients
>48 hrs	4 patients

Table V
Treatment Delivery Interval

TDI	Magsulf Regime	Lytic Cocktail Regime
< 6 hrs	22 (*4)	43
6-12 hrs	36 (*6)	
12-24 hrs	33 (*1)	31
> 24 hrs	08 (*0)	03
Undelivered	09 (*8)	06
PNC	22 (*8)	17
Delivered within 24 hrs.	91/99 (91.91%)	74/77 (96.1%)

* indicates maternal deaths.

In only 8.46% cases on magnesium sulphate regime did the duration of coma last >24 hrs while in15% patients on lytic cocktail regime the duration of coma was >24 hrs. (Table IV). Nagar et al (1988) in their cases treated with magnesium sulphate found duration of coma lasting over 72hrs in 0.99% patients compared to 6.12% patients with lytic cocktail.

The maternal mortality did not show significant improvement, it was 20.77% with magnesium sulphate regime and 29% with patients treated with lytic cocktail. However factors such as late admissions, referal from distant rural areas and no antenatal care are to be taken into consideration. Of the 27 deaths in 1996, 20 occured within 24 hrs of admission (7 within 6 hrs, 6 in 6 - 12 hrs, 7 in12-24hrs). (Table IV). Maternal deaths reported by various authors using magnesium sulphate range from 2-15%. (Zuspan and Ward(1964) 3.4%, Pritchard et al ((1984) - 0.4%, Mohanty et al (1990) - 7.1% and Pal et al (1997) - 7.1%)

Using lytic cocktail Menon (1961), Lopez (1970), Nagar et al (1988), Pal et al (1997) reported maternal deaths of 2.2%, 11.7%, 8.16% and 12% respectively.

Rapid IV administration of magnesium sulphate is believed to cause fetal heart rate variability and decrease in uterine contractions; however this effect is mild and transient and of no significance in established labour. Ninety one of the 99 patients with eclampsia on magnesium sulphate regime delivered within 24 hrs of admission; 9 patients died undelivered of which 1 underwent postmortum CS. Twenty two had postpartum eclampsia. (Table V). 56.56% cases required induction / augmentation with pitocin while 23.23% had prophylactic forceps application and 6 underwent LSCS. In Zuspan and Ward's (1966) series 72.6% cases delivered vaginally. (Table VI). Pritchard et al (1984) reported 75% vaginal deliveries in 209 women with antepartum eclampsia. They reported that serious morbidity was less common in puerperium among women delivered vaginally. Sibai et al (1981) using magnesium sulphate for eclampsia reported a caeserean section rate of 49%.

Table VI

Mode of Delivery

	Magsulf Regime		Lytic Cocktail Regime	
	Total Pts	%	Total Pts	%
Vaginal				
Spontaneous	14 (*2)	14.14	08	10.39
Induced	56 (*4)	56.56	39	50.65
Assisted	23 (*3)	23.23	17	22.08
LSCS	06 (*2)	06.60	13	16.88

*indicates maternal deaths.

Of the 99 deliveries in patients on magnesium sulphate, the fetal salvage was 50/99 or nearly 50%, while in patients on lytic cocktail only 34% were born alive. The total fetal loss in patients on magnesium sulphate was, SB - 45, ND - 4, maternal deaths in undelivered patients - 8, giving a PNMR of 4.9/1000 total births. In patients on lytic cocktail fetal heart were absent in 12 cases on admission, intrapartum fetal loss was 21, ND were 10, and 6 patients died undelivered, with a PNMR of 5.58%/ 1000 total births. (Table VII)). Nawani et al (1996) reported 4.7% intrapartum fetal death with lytic cocktail, and 3.7% on magnesium sulphate regime. Perinatal mortality in eclampsia between 13.3 - 21.5% has been reported by different authors.

Table VII

Fetal Outcome on Different Regimes

Outcome	Magsulf Regime Total Births	Lytic Cocktail Regime Total Births
Gestational age		
28-37 wks	39 (*3)	30
>37 wks	60 (*8)	47
Total deliveries	99 (3 pair of twins)	77
Live born	50 (*2)	34
Apgar >7	34 (*2)	
5-7	12	
<5	04	
Stillbirth		
FH absent on adm.	25 (*9)	12
Intrapartum loss	20	21
Neonatal death	04	10
PNMR	4.9/1000 total births	5.58/1000total births

* indicates maternal deaths.

Conclusions

1. Patients on Magnesium Sulphate therapy had a quicker fall in DBP and urinary albumin levels as compared with patients on lytic cocktail regime.
2. There was a significant fall in convulsion recurrence rate from 37% in patients on lytic cocktail to 9.23% in patients on magnesium sulphate regime.
3. The duration of coma was less in patients on magnesium sulphate, with 92/130 (70.77%) regaining conciousness in 24 hours as compared with 56/100 on lytic cocktail regime.
4. The maternal mortality has also decreased from 29% in patients on lytic cocktail to 20.77% in patients with magnesium sulphate. The majority of deaths in patients on magnesium sulphate therapy occured within 24 hours of admission (20 out of 27 maternal deaths.)
5. There does not appear to be any significant tocolytic effect of magnesium sulphate, once labour is established as 91/99 patients delivered within 24 hours of admission and treatment. However the incidence of induced labour of 56/97 and assisted labour of 23/99 is high, though the mode of delivery does not show any significant change when compared with lytic cocktail regime.
6. The fetal salvage is better with magnesium sulphate regime with 50 live births in 99 deliveries while babies had a better Apgar score, Apgar > 7 in 34 patients, 5-7 in 12 patients and < 5 in only 4 patients as compared to only 34% live births in patients on lytic cocktail regime.

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