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Maternal outcomes analysis in women with low dose of magnesium sulphate

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Abstract
Background: Eclampsia affects 1 in 2000 to 1 in 3448 individuals in developed countries. Eclampsia affects 0.9 to 1.8% of Indians. In India, the maternal mortality rate is 212 per 1 lakh, with hypertensive disorders accounting for 5% of maternal mortality.
Objectives: To study the Maternal outcomes analysis in women with low dose of magnesium sulphate (Dhaka regime)
Methods: A total of 100 cases were selected and divided into 2 groups of 50 patients each. Dhaka regime was used in 1 group and Pritchard regime was used in another. Complete history was obtained from close relatives as well as the patient if she is conscious, including age, parity, gestational age, number of convulsions, persistence of symptoms of pregnancy-induced hypertension, and H/o impending signs. Any previous history of hypertension (or) renal illness (or) eclampsia (or) eclampsia in a previous pregnancy was elicited.
Results: In the Dhaka regime group, Overall maternal complications was reported in 26% of the cases. In 8% of the cases each, HELLP syndrome and abruption was reported, DIC in 6% of the cases, PPH and CVA in 2% of the cases each. Eclampsia accounted for 6% of maternal mortality.
Conclusion: This study concludes that low-dose magnesium sulphate was equally effective and safer than the Pritchard regime.

Keywords: eclampsia, preeclampsia, PPH, CVA, HELLP

Introduction

Eclampsia is a Greek word that literally means "shining forth." It's a serious situation. Maternal and perinatal morbidity and mortality are related to obstetric emergencies [1]. Eclampsia can be prevented, but it is still one of the leading causes of maternal mortality.

Eclampsia affects 1 in 2000 to 1 in 3448 individuals in developed countries. Eclampsia affects 0.9 to 1.8% of Indians. In India, the maternal mortality rate is 212 per 1 lakh, with hypertensive disorders accounting for 5% of maternal mortality [2]. Perinatal mortality has ranged from 59/1000 to 214/1000, with a 56 percent morbidity rate [3]. A serious complication affects about 35% of the women who are affected. Placental abruption (10%), neurological deficit (7%), pulmonary edoema (5%), cardiopulmonary arrest (4%), acute renal failure (4%), and maternal death (1%) are the most common maternal complications. Prematurity, foetal asphyxia, and acidosis are the most common causes of foetal mortality [4].

Imminent eclampsia is a severe form of pre-eclampsia with prodromal symptoms. Headache, epigastric pain, nausea, vomiting, and blurred vision are all prodromal symptoms. Eclampsia is a seizure or coma that occurs in pre-eclamptic women. Eclampsia can strike at any time during pregnancy, including the antepartum, intrapartum, and postpartum periods. Antepartum eclampsia is more common than postpartum eclampsia. Hypertension and proteinuria are two of the most common symptoms of pre-eclampsia. Atypical pre-eclampsia/eclampsia is a type of pre-eclampsia/eclampsia that occurs without the classic symptoms [5].

In eclampsia, there are numerous factors that influence the maternal and perinatal outcome. Eclampsia is more prevalent in antenatal mothers who have not had a comprehensive antenatal assessment. Eclampsia is common in low-income families, and a variety of epidemiological factors influence maternal and perinatal outcomes [6]. Eclampsia is common in primigravida, with the last trimester being the most common. Maternal and perinatal outcomes are also influenced by the nature of fits, as well as the speed with which patients receive treatment and the quality of that treatment. Eclampsia is usually preceded by a symptom that is about to occur.

Eclampsia and its complications can be reduced with proper antenatal care, early detection of pre-eclampsia, and prompt management.

Materials and Methods

Department: Department of Obstetrics and Gynaecology, Shadan Institute of medical Sciences, Hyderabad were studied.

Duration of study: 6 months

Sample size: 100 patients in 2 groups of 50 each

Inclusion Criteria:

- All patients diagnosed with Eclampsia

Exclusion Criteria

- Myasthenia gravis
- Hepatic coma with risk of renal failure
- Hypersensitivity to Magnesium

Management of Eclampsia

1) Low dose/Dhaka regimen of Magnesium Sulphate

- 4gm magnesium sulphate in a 20% solution given intravenously over 15 minutes as a loading dose.
- 3gm MgSo4 50% solution, injected intramuscularly in each buttock

Maintenance Dose

- 2.5gm intramuscularly in alternate buttocks every 4 hours until 24 hours after delivery.
- Urine output, knee jerks, and respiratory rate were all monitored.

2) Pritchard regimen

- 4gm Magnesium sulphate (Mgso4, 7H2o, USP) in a 20% solution, given intravenously at a rate of no more than 1gm/min. 5gm deep IM in each buttock with 10gm of 50% Magnesium sulphate solution.
- For the next 24 hours after delivery, 5gm of 50% magnesium sulphate solution was given every 4 hours.

a) The patellar reflex is present
b) Respiratory Rate > 12/min
c) Urine Output >30ml in the previous 1hr

A complete history was obtained from close relatives as well as the patient if she is conscious, including age, parity, gestational age, number of convulsions, persistence of symptoms of pregnancy-induced hypertension, and H/o impending signs. Any previous history of hypertension (or) renal illness (or) eclampsia (or) eclampsia in a previous pregnancy was elicited. Patients with at least three prenatal consultations, one in each trimester, and two doses of TT injection were considered scheduled cases.

A thorough general and obstetric examination was done. Conscious level, degree of oedema, anaemia, blood pressure pulse rate, temperature, respiration rate, cardiovascular system, respiratory system, and fundus examination were all performed during the general examination. Blood and urine were collected for all eclampsia-related studies, such as Renal function tests, Liver functions, and so on.

All patients had haematological investigations. The Regimen was set, and a life line was established. An indwelling catheter was used to assess urine output every hour. Half-hourly pulse, temperature, and respiration rate were recorded, as well as two-hourly blood pressure.

T. Nifidipine 10mg thrice daily was used to control hypertension. Once the BP was managed, the dosage was decreased to 5mg thrice day after 48 hours, and amlodipine 5mg was added OD.

Following the patient's stabilisation, a thorough obstetric examination was performed. The mode of termination was determined by the gestational age, viability of the foetus, and cervical score.

Patients were stimulated with prostaglandin E2 gel/Misoprostol and then accelerated with ARM and Oxytocin infusions. Cesarean section was performed due to obstetric reasons (or) unsuccessful inductions.

After childbirth, the patient was closely monitored in the labour and post-operative wards for 48 to 72 hours and was followed up on till the patient was discharged.

In both regimens, the primary outcome measure is the recurrence of convulsions after commencing therapy.

Ethical Approval: The consent was obtained from the Institutional Ethics Committee prior to the commencement of the study.

Statistical analysis: The SPSS 22 software was used for statistical analysis. The data was presented in the form of tables with mean and percentages. A p-value of 0.005 was considered statistically significant.

Observation and Results

Table 1: Distribution based on various maternal parameters

Maternal Parameters	Dhaka regime	Pritchard regime	Chi-square	p-value
<20 yrs	5(10%)	8(16%)	0.798	0.670
21 to 30 yrs	44(88%)	41(82%)		
>30 yrs	1(2%)	1(2%)		
Parity				
Nulli	32(64%)	31(62%)	0.042	0.835
Primi	18(36%)	19(38%)		
BMI				
Underweight	14(28%)	13(26%)	0.080	0.960
Normal	25(50%)	25(50%)		
Overweight	11(22%)	12(24%)		
Type of eclampsia				
Antepartum	39(78%)	44(88%)	1.771	0.183
Post-partum	11(22%)	6(12%)		
No. of convulsions				
<3	14(28%)	15(30%)	1.119	0.571
4 to 6	32(64%)	28(56%)		
7 to 10	4(8%)	7(14%)		
Gestational age				
<28 weeks	5(10%)	6(12%)	0.488	0.921
29-32 weeks	12(24%)	12(24%)		
33-36 weeks	18(36%)	15(30%)		
37-40 weeks	15(30%)	17(34%)		
Labour duration				
<2 hours	8(16%)	9(18%)	0.808	0.667
2-12 hours	34(68%)	36(72%)		
13-24 hours	8(16%)	5(10%)		
Mode of delivery				
Vaginal	33(66%)	34(68%)	0.157	0.924
Instrumental	4(8%)	3(6%)		
LSCS	13(26%)	13(26%)		
Total	50	50		

Dhaka regimen: Majority of the patients belonged to the age group of 21 to 30 yrs with 88% Around 64% were nulliparous and 34% were multiparous. Around 28% were underweight and 22% were overweight. Antepartum eclampsia was reported in 78% of the cases and post-partum eclampsia was reported in 32% of the cases. In majority of the cases around 64% had 4 to 6 convulsions, 28% of the cases had <3 convulsions and 8% of the cases had 7 to 10 convulsions. Around 70% of the cases were preterm and 30% were having full term gestation. Labour duration was 2 to 12 hrs in 68% of the cases, 13 to 24 hrs and <2 hrs in 16% of the cases each. Vaginal delivery was done in 66% of the cases, LSCS was done in 26% of the cases and instrumental delivery was done in 8% of the cases.

Pritchard regimen: Majority of the patients belonged to the age group of 21 to 30 yrs with 82% Around 62% were nulliparous and 39% were multiparous. Around 26% were underweight and 24% were overweight. Antepartum eclampsia was reported in 88% of the cases and post-partum eclampsia was reported in 12% of the cases.
In majority of the cases around 56% had 4 to 6 convulsions, 30% of the cases had <3 convulsions and 14% of the cases had 7 to 10 convulsions. Around 66% of the cases were preterm and 34% were having full term gestation. Labour duration was 2 to 12 hrs in 72% of the cases, <2 hrs in 18% of the cases and 13 to 24 hrs in 10% of the cases. Vaginal delivery was done in 68% of the cases, LSCS was done in 26% of the cases and instrumental delivery was done in 6% of the cases.

Table 2: Distribution based on Recurrence of convulsions

Recurrence of Convulsion	Dhaka regime	Pritchard regime
Without Recurrence	45(90%)	48(96%)
With one recurrence	1(2%)	1(2%)
With two recurrences	2(4%)	1(2%)
More than 2 recurrences	2(4%)	0(0%)

Dhaka regime: In 90% of the cases there was no recurrence, In 4% of the cases each there was 2 recurrences and >2 recurrences. In 2% of the cases there was only 1 recurrence.

Pritchard regime: In 96% of the cases there was no recurrence, In 2% of the cases each there was 1 and 2 instance of recurrences.

Table 3: Distribution based on side effects of magnesium sulphate

Side effects of Magnesium sulphate	Dhaka regime	Pritchard regime
Flushing	8(16%)	14(28%)
Hypotension	2(4%)	4(8%)
Respiratory depression	0	1(2%)
Absent reflex	0	1(2%)
Injection Abscess formation	1(2%)	2(4%)
Total	11(22%)	22(44%)

Dhaka regime: Overall side effects was reported in 22% of the cases. In 16% of the cases flushing was reported, hypotension in 4% of the cases and Injection abscess formation in 2% of the cases was reported.

Pritchard regime: Overall side effects was reported in 44% of the cases. In 28% of the cases flushing was reported, hypotension in 8% of the cases Injection abscess formation in 4% of the cases, Respiratory distress and absent reflex was reported 2% of the cases each.

Table 4: Distribution based on maternal complications of eclampsia

Maternal Complications	Dhaka regime	Pritchard regime
CVA	1(2%)	1(2%)
Renal failure	0	2(4%)
HELLP Syndrome	4(8%)	4(8%)
Abruption	4(8%)	5(10%)
DIC	3(6%)	4(8%)
PPH	1(2%)	2(4%)
Total	13(26%)	18(36%)

Dhaka regime: Overall maternal complications was reported in 26% of the cases. In 8% of the cases each, HELLP syndrome and abruption was reported, DIC in 6% of the cases, PPH and CVA in 2% of the cases each.

Pritchard regime: Overall maternal complications was reported in 36% of the cases. Abruption was reported in 10% of the cases, HELLP syndrome and DIC was reported in 8% of the cases each, Renal failure and PPH was reported in 4% of the cases each, and CVA was reported in 2% of the cases.

Table 5: Distribution based on cause of maternal mortality

Maternal mortality cause	Dhaka regime	Pritchard regime
Acute renal failure	0	2(4%)
Pulmonary oedema	1(2%)	1(2%)
CVA	1(2%)	1(2%)
DIC	1(2%)	2(4%)
Total	3(6%)	6(12%)

Dhaka regime: Overall maternal mortality was 6%. CVA, DIC and Pulmonary oedema was the cause of mortality in 2% of the cases each.

Pritchard regime: Overall maternal mortality was 12%. DIC and Acute renal failure was the cause of maternal mortality in 4% of the cases each and Pulmonary oedema and CVA was the cause of mortality in 2% of the cases each.

Discussion

In eclampsia, preventing recurrent seizures is linked to a lower risk of complications. Magnesium is an appropriate medicine since it has a quick beginning of action, has no sedative effect on the mother or the infant, has a broad safety margin, and has an antidote in the form of calcium gluconate. The Collaborative Eclampsia Trial shown that magnesium lowers the likelihood of recurrent seizures when compared to diazepam and phenytoin, two other conventional medicines [7]. Furthermore, the usage of magnesium sulphate does not appear to have any negative consequences for the neonate.
Computed tomography and magnetic resonance angiographic investigations show that cerebral vasospasm and ischemia are involved in the development of eclampsia. The consequences of cerebral ischemia appear to be reversed and ameliorated by magnesium. Magnesium antagonises the excitatory glutamate N-methyl aspartate receptor, which may have a modest inhibitory influence on cortical discharge [8].
According to a research conducted at the N.W.M. Hospital in Bombay, 40.5% of the patients were under the age of 20, 56.8% were between the ages of 21 and 29, and 2.7% were above the age of 30.[9] In their study, Ranjana *et al*. reported that 87% of the patients were in the age of 21 to 30 yrs [10].

Katz *et al*. found that the mean age of eclampsia in the United States was 22 years [11]. which is similar to this study where the majority of the patients were in between 21 to 30 yrs age group.
According to Mudhaliar, more than 75% were primis [12]. In this study, the majority of patients in both the Dhaka regimen group and the Pritchard regimen group were primis.
In the Collaborative Eclampsia Trial Group research, 39.5 percent of cases were reported before the age of 34 weeks, 25.5 percent were presented between the ages of 34 and 36 weeks, and 33 percent were presented at term. In the current study, the mean gestational age in the Dhaka regimen group was 32.93 weeks and 33.39 weeks in the Pritchard regimen group.
Convulsions recurred at a rate of 0% in Dommisse *et al*. study [13]. 5.7% in the Collaborative Eclampsia Trial Group research, and 8.1% in PGI Chandigarh after commencing the regimen [14]. In the current study, 10% of patients in the Dhaka regimen group experienced recurring convulsions, whereas 4% of patients in the Pritchard regimen group had recurrent convulsions.
Overall maternal complications was reported in 26% of the cases. In 8% of the cases each, HELLP syndrome and abruption was reported, DIC in 6% of the cases, PPH and CVA in 2% of the cases each. Eclampsia accounted for 6% of maternal mortality in the United States. Maternal mortality was 3.8% in the Collaborative Eclampsia Trial Group with magnesium sulphate. The maternal mortality rate in the Dhaka regime was 6% in this research.

Conclusion

In terms of maternal complications and maternal mortality, there was no significant difference between the two groups. For Indian women with a lower BMI than their Western counterparts, a low-dose regime may be recommended. As a result, this study concludes that low-dose magnesium sulphate was equally effective and safer than the Pritchard regime.

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