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TREATMENT OF ECLAMPSIA BY MAGNESIUM SULPHATE

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ABSTRACT

Objective: To evaluate the effectiveness of low dose magnesium sulphate in control of convulsions in eclampsia and to assess the magnesium related toxicity and pregnancy outcome.

Material and Methods: This prospective study was carried out in the Department of Obstetrics and Gynaecology B Labour Room, Khyber Teaching Hospital, Peshawar from April 2013 to December 2013. Fifty cases of eclampsia were randomly selected for inclusion in the study to find out the efficacy of low dose magnesium sulphate regime to control eclamptic convulsions. Patients were excluded from the study if there were doubts about the diagnosis because the accompanying relatives did not witness the seizure or who has received magnesium sulphate or diazepam as anticonvulsant prior to admission to the hospital. Those patients who presented with complications like cerebrovascular accidents, renal failure, aspiration pneumonitis and Hellp syndrome were also excluded from the study. The loading dose of magnesium sulphate was 9 gm. Following this 2.5 gm was given intramuscularly every four hour for 24 hours. Patients were monitored hourly by observing their respiratory rate, knee jerk and urine output. Maternal and perinatal outcome and magnesium toxicity were analyzed. Standard principles of management of eclampsia was followed.

Results: With low dose magnesium sulphate regime, convulsions were controlled in 100 percent cases. No single case got recurrence or shifting to Pritchard regime.

Conclusion: Low dose magnesium sulphate regime is safe and effective for treatment of eclamptic fits.

Key Words: Eclampsia, Pritchard regime, Magnesium sulphate.

INTRODUCTION

Over half a million women die each year from pregnancy related causes and 99 percent of these deaths occur in low and middle income countries. Hypertensive disorders of pregnancy that is pre eclampsia and eclampsia are significant contributors to maternal and perinatal mortality and morbidity worldwide particularly in the developing countries[1]. It is estimated that every year eclampsia is associated with about 50 thousand maternal deaths, most of which occurs in developing countries. The incidence of eclampsia in our country varies from 0.5 to 1.8 percent. For the management of these disorders it is equally important to prevent and or control the seizures. Various drugs have been tried in the last centuries for this purpose[2].

The major breakthrough in the management of eclampsia came when Dr J. A. Pritchard published his standardized Magnesium sulphate treatment regime in 1984[3]. Flower et al adjusted doses of $MgSo_4$ according to body weight, plasma level and urinary excretion of Magnesium Sulphate[4].

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The collaborative eclampsia trial which was a large multicenter trial in 27 centres in 9 developing countries, found magnesium sulphate to be a better anticonvulsant in the management of eclamptic seizures when compared to phenytoin and diazepam[5]. There has been a constant discussion in literature regarding dose of magnesium sulphate and therapeutic serum magnesium levels. JA Pritchard commented that if a woman is known to be or appear to be small, the dose should probably be modified. Winit Phauapradit et al commented that it is appropriate to take into account body weight when considering the dosage of magnesium sulphate for Asian women[6]. Sardesai Suman et al used low dose magnesium sulphate regime in eclampsia in Indian women and found it to be very effective and safe[7]. Low dose magnesium sulphate has also been used in Bangladesh by the name of Dhaka regime and found effective and safe. Various low dose rgimes exist and have been practiced in different developing countries.

The mechanism of action of magnesium sulphate is not completely understood. It is thought to cause dilatation of cerebral blood vessels thus reducing cerebral ischemia. Magnesium also produces peripheral vasodilatation thus reducing blood pressure. It also acts competitively in blocking the entry of calcium into synaptic endings thus altering neuromucular transmission[15]. Because of the narrow therapeutic index and greater toxicity associated with magnesium sulphate, it needs to be administered in the intensive

Table 1: Comparison of total dose of magnesium sulphate in different regimes

Name of regime	Pritchard regime	Low dose Padhar regime	Low dose Dhaka regime	Body friendly low dose magso 4 regime
Loading dose mgso4 20% iv	4gm	3gm	4	4
Loading dose mgso4 (50%) IM	10gm = 14gm in total	5gm = 8gm in total	6 = 10gm in total	5 =9gm in total
Maintenance dose(50%)IM	5gm 4 hourly	2.5gm 4 hourly	2.5 gm 4 hourly	2.5 gm 4 hourly
Total dose	44gm	23gm	25gm	24gm

Table: 2. Results of low dose magnesium sulphate regime

No.	Outcome measures	Results
1	Control of convulsions	100%
2	Recurrence rate.	nil
3	Cases requiring shift to Standard Pritchard regime.	no
4	Signs of drug toxicity.	0%
5	Perinatal mortality.	30%
6	Maternal mortality	Nil

Table: 3. Obstetrical data of women with eclampsia

Age	Years	No. of women	Percentage
	20-24 years	10	20%
	25-30 years	34	68%
	31-35 years	4	8%
	36-40 years	2	4%
Parity	Primigravida	32	64%
	Multigravida	18	36%
Gestation	Preterm	27	55%
	Term	23	45%
Twin / Single Term	Single Term Pregnancy	42	84%
	Multiple pregnancy	8	16%
Booking Status	Booked	1	2%
	Unbooked	49	98%
Fits	Antepartum	38	75%
	Intrapartum	3	7%
	Postpartum	9	18%
Mode of delivery	NVD after induction	40	80%
	Instrumental delivery to shorten 2nd stage	9	18%
	C. Section	1	2%

care unit with frequent and close monitoring by sufficient trained staff. In resource poor countries where intensive care facilities are not available and frequent monitoring of patient by trained staff is not possible due to different reasons, low dose regime has been introduced. The aim of the present study was to evaluate the effectiveness and safety of low dose magnesium sulphate in the treatment of eclamptic fits particularly in low built women or women with body weight of less than 70kg. Also to assess the magnesium related toxicity and pregnancy outcome.

MATERIAL AND METHODS

This prospective study was carried over a period of 9 months in the Department of Obstetrics and Gynaecology B Labour Room, Khyber Teaching Hospital, Peshawar from April 2013 to December 2013. Fifty cases of eclampsia were randamly selected for inclusion in the study to find out the efficacy of low dose magnesium sulphate regime to control eclamptic convulsions. Patients were excluded from the study if there were doubts about the diagnosis because the accompanying relatives did not witness the seizures or who has received magnesium sulphate or diazepam as anticonvulsant prior to admission to the hospital.

Table: 4. Foetal outcome data

	No. of Foetuses	Percentage
Alive	35	70
Still birth	5	10
Neonatal death	10	20

Those patients who presented with complications like cerebrovascular accidents, renal failure, aspiration pneumonitis and Hellp syndrome were also excluded from the study. Standard principles of management of eclampsia was followed.

In contrast to Pritchard regime where 4gm of magnesium sulphate intravenously plus 5gm intramuscularly in each buttock as loading dose and 5 gm on alternate buttocks 4 hourly for 24 hours after the last fit or after delivery whichever comes later was used, the protocol for low dose regime was as follows:

4gm magnesium sulphate (20% sol) intravenously over 5 minutes time with 2.5gm intramuscularly in each buttock making a total loading dose of 9gm instead of 14gm of Pritchard regime. 2.5gm intramuscularly in each buttock alternatively every 4 hour making total of maintenance dose of 15gm instead of 30gm of maintenance dose in Pritchard regime.

If there was recurrence of convulsions after 30 minutes of initial IV dose, additional 2 gm of 20% magnesium sulphate solution was given. If convulsions were not controlled after repeating such additional two doses then the case would be shifted to standard Pritchard regime and was labelled as failure of low dose regimen. Efficacy of low dose regime was assessed by control of convulsions with low dose protocol and by noting the total quantity of magnesium sulphate required for control of convulsions.

Monitoring during the administration of magnesium sulphate in this trial was clinical and was based on ensuring that respiration was not depressed, patellar reflexes was present and renal output was adequate. The rationale for clinical monitoring is that loss of patellar reflex precedes respiratory depression and respiratory arrest. There was no monitoring of serum magnesium levels taking into consideration the cost of this lab investigation. Monitoring includes urine output hourly, respiration and patellar reflexes were checked every 15 minutes after loading dose for at least 2 hours. For intramuscular regime (maintenance dose) respiration and patellar reflex were checked before giving next dose. If any toxicity were observed, next dose of magnesium sulphate was withheld and the toxicity was managed by giving intravenous calcium gluconate 10 ml 10% over 10 minutes. After stabilization of the patient labour was induced or augmented. Cesarean section was performed for obstetric indication. Baby was managed by pediatrician following delivery till discharge. Relevant information in every case was recorded in study proforma.

RESULTS

During the study period 150 cases of preeclampsia and eclampsia were noted among the 3081deliveries. Among these 50 cases with eclampsia were included in the study. Most of the patients had not taken antenatal care. The patients were from 20 to 37 years with a mean age of 28 years. Sixty-four percent cases were primigravida while 36 percent were multigravida. 55% cases were preterm while 45% were fullterm. 16 percent cases were of twin gestation while the rest were singleton. 75% presented as antepartum eclampsia while the rest as intra partum or postpartum fits. Almost all cases given low dose were less than 70kg. 80% delivered normally. 18% required instrumental delivery to shorten 2nd stage. Only 2% under gone C-section for failed induction. Low dose magnesium sulphate was enough to control fits in 100% cases. The total dose of magnesium sulphate required for control of convulsions is 54.5% less than the standard Pritchard regime. There was no evidence of magnesium related toxicity. There was no maternal mortality due to eclampsia or its complication in the present study.

DISCUSSION

The incidence of eclampsia in the study was 2 percent which underscores the magnitude of the disease. Other factors found associated with eclampsia in this study were young maternal age, primigravidity and lack of prenatal care which are similar to what have been reported by other workers[8,9].

Early antenatal registration plays an important role in the good pregnancy outcome. In the present study it was observed that 98 percent of eclampsia cases were unbooked or unregistered. Helmin[10] in 1952 stated that eclampsia will be a clinical rarity if effective antenatal care is made available. Mudliar and Menon[11], and Dawn[12] reported that 75% of eclampsia cases were primigravida. Similar observations were made in the present study.

In this study it was also observed that the majority of cases belonged to rural area and were from middle and low socioeconomic group, with body weight much lower than women from higher socioeconomic group. 70% of the women had bodyweight of less than 60kg while 25%had body weight of between 60 and 70 kg. Only 5% had body weight above 70kg.

Time tested Pritchard regime with its dose schedule was standardized for western women having total bodymass index much higher than women from developing countries. In the present study convulsions were controlled 100% with total dose 54.5% less than standardized regime in women with bodyweight less than 70kg. Also the intramuscular dose in the present study is reduced to 2.5 gm 4 hourly. This didn't affect the

efficacy of the regime as evidenced clinically by having no recurrence of fits. However this significantly reduces incidence of pain at injection site, tissue necrosis and abcess formation. Sardesai Suman et al[7] in her large study on use of low dose magnesium sulphate reported that eclamptic convulsions were controlled in 90% of cases, while Rashida Begumet[13] al in their modified Dhaka regime reported 98% control of convulsions. The results of the present study were comparable with above mentioned studies regarding efficacy of low dose for control of convulsions. Begum MR et al[14] suggested a small body mass index to be the main reason for effectiveness of low dose regime in women in developing countries.

Perinatal mortality in the present study was 30 percent Majority of deaths were still birth and neonatal deaths. Prematurity, placental abruption and growth restriction were common causes of perinatal deaths. Sardesai Sumanet al[7] reprted 33.9% perinatal mortality. There was no maternal mortality in the present study. Maternal mortality reported by Sardesai Suman in her low dose regime was 2.63% whereas the maternal mortality reported by collaborative eclampsia trial[5] with Pritchard regime was 3.8% and 5.2%.

Keeping the above results in view low dose regime significantly improves the safety. Moreover, low dose magnesium sulphate might be used in cases with mild renal impairment which is usually present in these patients.

CONCLUSION

Associated with similar efficacy in controlling convulsions and potentially more favourable toxicity and complication rates, the use of low dose magnesium sulphate protocols is a viable alternative to standard dose therapy particularly in women with a low BMI. The dose required for control of convulsions with the low dose magnesium sulphate regime was less than half of the standard Pritchard regime making it a body friendly regime.

Recommendations

However multicenter randomized control trials are recommended to test this proposed regime to support routine clinical use of low dose protocols which suits Asian women, having relatively low body mass index as compared to their western counterparts.

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