Original Article

Is the Prophylactic Use of Magnesium Sulphate in Pregnant Women with Severe Pre-Eclampsia Associated with Reduced Incidence of Eclampsia?

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Abstract

Objective: To determine whether administrating magnesium sulphate prophylactically routinely in all cases of severe preeclampsia was associated with reduced frequency of eclampsia in our unit and better maternal and fetal outcome.

Methodology: It is a retrospective cohort included 87 patients from October 2015–October 2017. We included all patients who received MgSO4 before or after delivery for 24 hours. The loading dose of 4gm was given intravenously and followed by 2gm per hour. Data collection from the medical record in the labour ward and operation theatre using a computer system. The data was fed to SPSS version 23.0 and statistically analyzed.

Results: The total number of patients studied was 87. The number of patients who had no fits were 82 and those have fitted were 5 who were excluded. No side effects of MgSO4 was seen as the blood levels were between 0.08-2.4mmols/L. Most of the patients had no complications due to MgSO4 and almost all babies except one was born with a good Apgar score.

Conclusion: This study strengthened the observation that prophylactic use of MgSO4 can prevent not only eclampsia but a good maternal and fetal outcome.

Keywords: Eclampsia, Magnesium sulphate, Seizures and proteinuria.

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Introduction

Eclampsia, the occurrence of a seizure in association with pre-eclampsia, remains an important cause of maternal mortality. Women with eclampsia are at increased risk of morbidity and mortality as well as poor fetal outcome. Hence early diagnosis and management of disease must be carried out to avoid poor maternal and fetal outcome.

Worldwide Hypertensive disorders affect 10% of pregnant women and are responsible for 1/10 of maternal deaths in Asia and Africa.[1] These deaths can be avoided by providing effective and timely care to these women. Although it is standard practice to use an anticonvulsant for the management of eclampsia,

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historically there have been a few different views regarding the timing and indication of the use of magnesium sulphate in women with preeclampsia. Whereas some prefer to use it only in cases of eclampsia, many preferred to use it prophylactically in cases with severe preeclampsia. Some studies have also been done to see its efficacy in cases of mild preeclampsia but with no established recommendation as of date.[2]

Magnesium Sulphate is considered to be the agent of choice for the control of eclamptic seizures in pregnant women.[1, 3-6] Our objectives were to determine whether administrating magnesium sulphate prophylactically routinely in all cases of severe preeclampsia was associated with reduced frequency of eclampsia in our unit. MgSO4 not only prevents the fits but also helps in controlling the blood pressure. It also acts as a diuretic. The admission to ICU is reduced as well as fetal outcome is good.[7-11] In premature fetuses, it prevents encephalopathy. MgSO4 is a safer drug as compared to other anticonvulsants as long as it is monitored by blood levels or clinically by reflexes, respiratory rate and urinary output.MgSO4 acts in different ways to prevent eclampsia. It acts as a vasodilator in peripheral as well as cerebral vessels. It reduces cerebral oedema and has anti-convulsant effect on brain. MgSO4 also reduces blood pressure.

According to WHO only 40% of deliveries take place in health facilities. Good antenatal care and delivery in a supervised health facility are the means to detect pre-eclampsia earlier and prevent morbidity or mortality due to eclampsia.[12-16] Mgso4 was introduced in 1925 for control of convulsions and Mg pie trial was conducted in 1995 where 10,000 women were inducted in four different countries where MgSO4 was compared with other drugs for the control of fits and was found to be 50-67% more effective. Low dose Mgso4for prevention of eclampsia being used in low resourced countries and low-cost power syringe was used to deliver.[17-19] The women should be screened for risk factors in antenatal care, which will help midwives and health care professionals in early diagnosis and prophylaxis.[20,21] MgSO4 in combination with other agents like Labetalol, Hydralazine, and Nifedipine helps in controlling the high blood pressure.[20,21] To avoid MgSO4 toxicity in the treatments of eclampsia the blood levels should be in the following range 3.5 to 7 mEq/L.[20, 21] The normal concentration of Mg2+ are 1.5 to 2.5 mEg/L (1.8 to 3.0 mg/dL). We in our study just used MgSO4 in all patients with pre-eclampsia showing high blood pressure progressively deteriorating blood levels, symptoms or signs pre-delivery and post-delivery. The result of this was that 100% of our cases who had prophylactic MgSO4 per-protocol did not have seizures. I feel that apart from use Mgso4proper and continuous care, patient and staff education with risk management session plays a key role in the good outcome of such patients.

Dose & Toxicity

The 50% MgSO4 in 1 ml contains 0.5gms and 20% preparation contains in 1 ml 0.2 gms. It should be monitored and protocols are there for each hospital to keep it safe. The Mgso4 should be continued for 24 hours after delivery or the last fit.

The toxicity of the drug can be monitored using clinical parameters as kneejerk, respiratory rate and urine output. The first sign of toxicity appears at 3.5-5 mmols/l. In our study, the levels were safe, and with these levels between 0.8-2.5 mmols/l we did not experience any complication. In case of toxicity 10%, calcium gluconate which is an antidote should be given intravenously over 10 minutes.

We practice clinical protocols for guiding health workers. Refresher courses are conducted on the use of MgSO4 and its monitoring. The health ministry in Bahrain had developed a protocol for the management of eclampsia for use and monitoring of Mgso4. It is distributed to health care workers all over the country for awareness and similar policy. The stakeholders all over the world should make sure the availability and use of MgSO4 per policy as it can contribute to a marked reduction in deaths due to eclampsia in developing countries.

Methodology

It is a retrospective cohort study conducted at KHUH Bahrain. The data was collected from antenatal, labour and postnatal ward. The study included all the women with severe preeclampsia who delivered in KHUH. The study was conducted over 24 months from Oct 2015-Oct 2017.The total number of patients studied were 87, 82 received the prophylaxis of MgSO4, and 5 did not receive prophylaxis so they were excluded.

This study was approved by the Research and Education department at King Hamad University Hospital. A well designed Performa was used to collect the data. Performa's were filled and statistical analysis

was performed using excel sheets. The data was fed to SPSS version 23.0 for statistical analysis.

All the women whose blood pressure >150/100 with proteinuria>+3 with or without symptoms or blood pressure >140/90, with proteinuria or without symptoms were included in the study. Woman admitted with fits or woman who had fits without receiving MgSO4 were excluded.

We included all patients who received MgSO4 before or after delivery for 24 hours. The loading dose of4gm was used intravenously and followed by 2gm per hour. All the patients were monitored for blood pressure every 30 minutes to 60 minutes and urine output, reflexes, respiratory rate every hour. The blood test was done 6 hourly depending on the situation. The approach was multidisciplinary, anesthetist; hematologist and intensive care physicians were involved.

Results

The total no of deliveries from October 2015 –October 2017 was 3420. The total numbers of patient studied were 87. The number of patients with no fits were 82. MgSO4 was given before delivery in 70 and after delivery in 12 patients. No side effects of MgSO4 were seen as the blood levels were between 0.8-2.4mmmol/L. About 42 patients delivered within 4 hrs of starting MgSO4 and 24 delivered in 4-8 hrs. Most of the patients had no complications. Most of babies were born with good Apgar score. The number of patients delivered by c-section were 51 (62%) and 31(37%) delivered vaginally. Regarding age 70 (85.6%) were less than 35 yrs and 12 (14.6%) were above35 yrs. The booked patients were 36 (43.9%) and 46 (56%) were un-booked. Most of patients were local Bahrainis 34 (41.4%) followed by Pakistanis 24 (25.6%). The BMI was less than 30 in 17 (20.7%) and greater than 30 in (23.1%). There was a history of previous PET 17(20.7%) and 65(79.26%) with no history.

The Table I showing 33 patients (40.2%) BP greater than 150, 24 patients (29%) BP > 140, and 25 Patients (30%) Bp between 110-139.

Blood Pressure at Presentation			
Blood Pressure (mmHg)	**Greater Than 150**	**Greater Than 140**	**110-139**
Number	33 (40.20%)	24 (29%)	25 (30.40%)

The proteinuria was +3 in 34 patients (41.4%) +2 in 26 (31.7%) and +1 and nil in 13(15.8%) and 9(10.9%) respectively as shown in Figure 1.

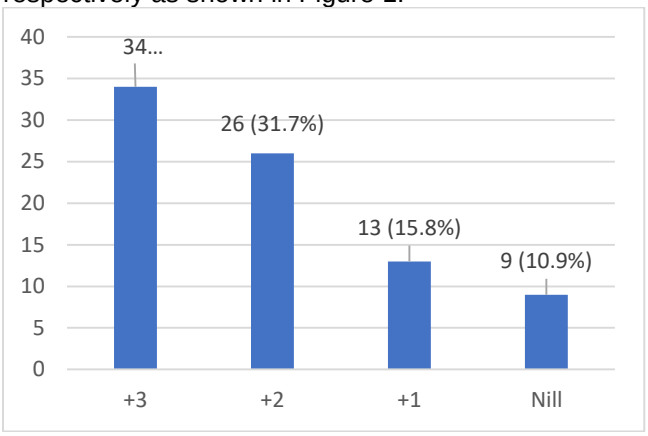

Figure 1. Proteinuria

The BP at delivery was greater than 160 in 8 (9.7%), 141-160 in 40 (48.7%) and 110-140 in 34 (39%) patients. MgSO4 was used prophylactically in 82 (100%) patients and antihypertensive were used in 73 (89%) patients. The MgSO4 level was checked in 76(92.6%) patients.

Table II showing blood pressure after 24 hrs in 32 (39%), 100-125/60-80 and 50 (60.09%) showing 120-140/80-90. MgSO4 was given in 70(87.8%) before and 12 (14.6%) after delivery.

Blood Pressure after 24 HR		
Blood Pressure (mmHg)	**100-125/60-80**	**120-140/80-90**
Number	32 (39.02%)	50 (60.97%)

The blood level was less than 1mmol in 5 (6.09%), 1.2-1.9 mmol/l in 67(81.79%) and greater than 1.9mmols in 10 (12.1%). Figure 2 shows fetal Apgar score > 5 in79 (96.3%), 5 in 2 (2.4%) and < 5 in 1 (1.2%) baby.

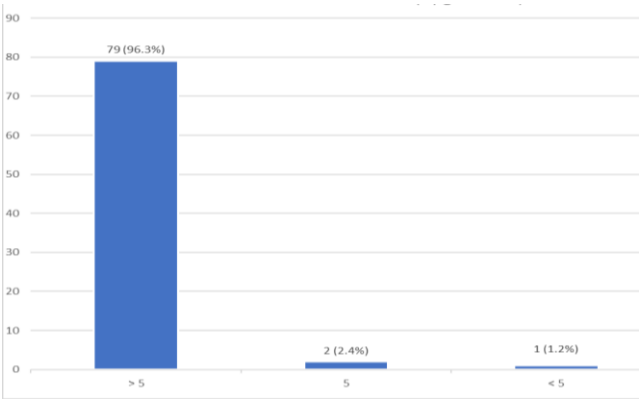

Figure 2. Fetal Outcome (Apgar Score)

Discussion

The patients who presented with Pre-eclampsia were in the younger age group and were mostly primigravida's.[20] The patient who came with Preeclampsia were un-booked so it's stressed that antenatal care should be 100% to reduce the morbidity and mortality.[21] The statistics showed that the disease was more in Bahrainis followed by Asians. The patients represented with very high systolic pressure which should not be ignored and should be compared with booking blood pressure. Some of the patients can present with the normal blood pressure but the presence of other features like oedema of anterior abdominal wall, feet, legs and symptoms of headache, or blurring of vision. Most of the patients show proteinuria but some present with no proteinuria but after 8-10 hrs. Protein appeared these are known as atypical picture of preeclampsia and that what is stressed that one should see the previous obstetrical history, parity, family history difference between booking and presenting blood pressure, symptoms and laboratory findings to manage the patients. By observing these patients, the physician can see whether the disease is progressing, and repeating labs after six hours can help the obstetrician to decide to start MgSO4 in time. By starting Mgs0 4 timely it can prevent eclampsia and complications of eclampsia. Along with MgSO4 antihypertensive agents like labetalol is also used to control blood pressure and to avoid intracranial haemorrhage and cardiac problems. The magnesium levels were checked and, in this study, using Zuspan regimen we did not experience any complications related to the MgSO4. The range was from 0.8-1.9mmols/l but in all cases the treatment was effective and we did not need any additional medications. There were no maternal complications due to MgSO4. The complications seen were secondary to severe preeclampsia. The treatment of preeclampsia apart from stabilizing the patient is to deliver the patients. In this study, most of the patients were delivered between 1-2hrs. In some patient's time was taken for dexamethasone to act for fetal lung maturity and some patients were stabilized and induced to give chance for vaginal delivery. The rate of c-section was higher due to prematurity, previous c-sections and fetal distress. Most of the babies were born with good Apgar score as after stabilizing the patients with Mgso4 and anti-hypertensives, dexamethasone was given to all patients with pregnancy less than 34 weeks for lung maturity. The Mgso4 has good effect on premature fetuses as there was no report of encephalopathy in premature babies.[22] The continuous fetal monitoring was done in all cases and those showing deviations were delivered in time. The blood pressure after 24 hrs in majority cases was under control.

Conclusion

Prophylactic use of MgSO4 should be used in all cases of preeclampsia showing symptoms raised blood pressure, with or without proteinuria. Pre-eclampsia has many faces. It can present typically and atypically. It can happen before delivery and some patients are affected after delivery. This study proved that prophylactic use of MgSO4 can prevent not only eclampsia but help in having good maternal and fetal outcome.

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