Original Research Article

Role of magnesium sulphate in preterm labour

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Abstract

Introduction: Magnesium sulphate has been the drug of choice for the prophylaxis of convulsions in women with preeclampsia for many years. The use of this drug for the treatment of preterm labour originated in the observation that it causes a decrease in frequency and intensity of contractions in preeclampsia women in labour. The present study is conducted to study the effectiveness of intravenous magnesium sulphate in arrest of preterm labour.

Materials and methods: The present study was conducted among 50 patients admitted in labor wards of obstetrics and gynecology department. Study was conducted at Gayatri Vidya Parishad Institute of Healthcare and Medical Technology, Visakhapatnam. Study duration was from February 2016 to March 2017. Fifty patients with a diagnosis of preterm labor between 28 to 36 weeks period of gestation were included. A loading dose of intravenous magnesium sulfate 4 gm bolus over 20mins followed by 2g/hour infusion was administered until uterine quiescence was achieved.

Results: The mean time taken for uterine quiescence was 74 mins after starting treatment. The magnesium sulfate dosage requirement for uterine quiescence was 1-2 gm/hour in 87.5% cases. Majority of the mothers experienced mild side effects but none were as serious as to discontinue the drug. Toxicity features were observed in 4% of cases, which need to discontinue the drug.

Conclusion: Intravenous magnesium sulphate is effective in postponement of preterm labour at least for 48 hours. This is the minimum time considered sufficient to allow benefit if corticosteroids are administered to decrease the possibility of respiratory distress syndrome in premature infants. Thus magnesium sulphate plays a vital role in preterm labour.

Key words

Magnesium Sulphate, Preterm labour, Tocolytic.

Introduction

Preterm birth is a condition that occurs in 6.0-15% of all deliveries and is the most frequent cause of fetal and neonatal death and morbidity. The incidence of preterm births ranges between 10 and 15% and 75% of all perinatal deaths occur in preterm infants. The incidence of PNMR in India varies from 40 to 150 per 1000 births in contrast to 10-20 in the developed countries [1].

Despite advances in perinatal medicine in recent decades, problem of preterm delivery continues to frustrate satisfactory reproductive outcome, with little progress having been made in reducing frequency of preterm births. Problem of neurological handicap in groups below thirty four weeks has decreased considerably in western countries. Same cannot be said of developing countries. Therefore solution lies in improving antenatal care and preventing preterm labour. Magnesium sulphate has been used by obstetricians for more than 25 years to treat preterm labour. Magnesium sulphate is effective in delaying delivery for at least 48 hours in patients with preterm labour when used in higher dosages [2].

The use of this drug for the treatment of preterm labor originated in the observation that it causes a decrease in frequency and intensity of contractions in preeclamptic women in labour [3]. Over the past decade there have been remarkable advances in management of preterm infants but the sequelae of preterm labor are still responsible for a significant amount of perinatal morbidity and mortality. It is better to suppress preterm labor especially in units without ready access to neonatal intensive care facilities. The present study is conducted to study the effectiveness of intravenous magnesium sulphate in arrest of preterm labour.

Materials and methods

The present study was conducted at Gayatri Vidya Parishad Institute of Healthcare and Medical Technology, Visakhapatnam from February 2016 to March 2017. Fifty patients admitted in labor wards of obstetrics and gynecology department with a diagnosis of preterm labor between 28 to 36 weeks period of gestation were included.

After admission each patient was assessed clinically and ultrasonically for period of gestation. After excluding congenital anomalies, uterine contraction, cervical effacement and dilatation were assessed.

Inclusion criteria

- Uterine contractions occurring at least twice in every 10 minutes regularly synchronizing with pain.
- Dilatation of cervix varying from 1-4 cms and cervical effacement 50% or more.
- Women were considered suitable for inclusion if they had pregnancies with intact membranes between 28-36 weeks gestation.
- No evidence of infection (Cases of urinary tract infections were treated with antibiotics).

Exclusion criteria

- Cervical dilatation > 4 cm
- Women with polyhydramnios, ruptured membranes, chorioamnionitis, twin pregnancies, abruption placenta and placenta previa.
- Irregularity of fetal heart rate- indicating fetal distress, fetal malformation, IUGR, IUFD.
- Maternal medical condition like PIH, cardiac disease, diabetes, myasthenia gravis.

Mode of administration

A loading dose of intravenous magnesium sulfate 4 gm bolus over 20 min followed by 2g/hour infusion, until uterine quiescence was achieved. Drip was maintained for 12 hours if uterine contractions were abolished within 2 hrs. Those patients who continued to have uterine contraction with progressive cervical dilation even after 2 hours after commencement of Rx were allowed to progress. Patients were Catheterized and Mg So_4 Chart was maintained including level of consciousness, PR, RR, BP, Lung sounds, DTR, Urine output, uterine contractions. All patients were given 2 doses of 12 mg of betamethasone IM 24 hours apart. Patients were kept in hospital for a week after completion of therapy and then discharged. At the time of discharge general condition of patient was checked regarding Pulse Rate, Blood Pressure, and Fetal Heart Rate. Success of Tocolysis was considered successful if there was no recurrence of uterine contractions and no cervical dilatation and pregnancy was prolonged for more than forty eight hours.

Results

A total of 50 cases were taken up for evaluation of magnesium sulphate in the management of preterm labour of them, 2 cases did not come for follow-up and treatment was curtailed in 2 cases due to toxicity features. Patients selected for this study were within the age group of 16-25years. 68% are in 20-23 years, also to note that teenage pregnancies are also common (30%<20 years). Most of the patients were nulliparous (88%).

Most of the patients were between 32-34 weeks period of gestation. 66% of patients in this study belong to gestational age >32 weeks (**Table – 1**).

Risk factors for preterm in current pregnancy

In the present study, history of cervical encirclage was seen in 2 cases out of which one has an indication of uterine anomaly (Bicornuate uterus). Majority cases had warning symptoms of PTL. Almost all cases had cervical effacement >50%. Therefore in patients with history of PTL, antenatal examination of cervix - PV/ultrasound can be a predictor of PTL. Out of 50 cases studied, 32 (64%) were with cervical dilatation in the range of 1-2cms and 30% has cervical dilation 2-3 cm.

Table – 1: Period of gestation.

Period of gestation at admission (weeks)	No. of patients	%
28-30	12	24%
30-32	10	20%
32-34	16	32%
34-36	12	24%

Most of the patients in this study required $MgSo_4$ maintenance dose at 1-2 gm/hour – 42 (87.5%) and none required dose >3gm/hour (**Table – 2**).

Table – 2: $Mgso_4$ dose requirement for uterine contractions to subside.

$MgSo_4$ Maintenance dose (gm/hour)	No. of patients	%
1-2 gm/hour	42	87.5%
2-3 gm/hour	6	12.5%
3-4 gm/hour	0	0%

Treatment was stopped in 2 cases due to toxicity features. Out of remaining 48 cases, 32 (66.67%) cases took 1-2 hours for uterine contractions to subside after commencing treatment (**Table – 3**).

Table – 3: Time taken for uterine contractions to subside.

Time	No. of patients	%
30 minutes	2	4.17%
30min.-1hour	14	29.17%
1-2 hours	32	66.67%

Hot flushes was the common complaint from most of the patients studied – 23 (46%), followed by Nausea and Vomiting – 14 (28%). All the patients in the study experienced side effects which were minor and patient should be informed about theses possible side effects before starting treatment (**Table – 4**).

Table – 4: Side effects to magnesium sulphate treatment.

Side effects	No. of patients	%
Nausea and vomiting	14	28%
Hot flushes	23	46%
Light headedness	6	12%
Blurred vision	1	2%
Muscular weakness	6	12%

Regarding toxicity, treatment was stopped in 2 cases due to decreased urine output and absent knee jerk and labor was allowed to progress. None of the patients had altered consciousness and respiratory depression. In present study labor was deferred for 48 hrs in 43 patients (89.58%) which was considered to be success rate. Out of remaining 5 (10.42%), which comes under failure, 3 delivered within 2 hours of starting treatment and the other 2 cases delivered within 8 hours of starting treatment. All failure cases belong to gestational age <32 weeks and with cervical effacement >80% and cervical dilation ≥3cm.

Mode of delivery

84.78% of patients had normal vaginal deliveries. The other two were emergency LSCS for PROM and meconium stained liquor.

Out of 46 cases studied most of the cases in success group had birth weight between 2.6 ± 0.56 kg with a minimum of 1.3 kg and Maximum of 3.5 kg. Neonatal deaths were seen in 7 cases (15.22%), out of which 5 (100%) were from treatment failure group (within 24-48 hours) due to preterm birth and 2 (4.87%) were from success group. Those cases which prolonged for at least two weeks after the treatment did not have any mortality/morbidity (**Table – 5**).

Discussion

In the present study, pregnancy continued for greater than 2 days in 43 cases (89.58%) out of 48 cases. These 2 days are important as this is the minimum time interval considered sufficient to allow benefit if corticosteroids are administered to decrease the possibility of respiratory distress syndrome developing in premature infants. The mean treatment delivery interval in success group was 33 days with a maximum prolongation of pregnancy up to 64 days.

Table – 5: Birth weight of babies.

Birth Weight	No. of patients	%
1-1.5 kg	5	10.87%
1.6-2 kg	7	15.22%
2.1-2.5 kg	8	17.39%
2.6-3 kg	24	52.17%
3.1-3.5 kg	2	4.35%

Sakhavar, et al. observed the most common side effect of magnesium sulfate were hyperthermia and thirst [10]. In the present study hot flushes was the common complaint from most of the patients studied – 23 (46%), followed by Nausea and Vomiting – 14(28%).

In the present study, 32 cases (66.67%) took 1-2 hours for uterine quiescence after starting treatment. The mean time taken for uterine contractions to subside was 74 minutes with minimum time taken being 30 minutes after starting treatment. In a study conducted by Kawagoe et al showed that after magnesium sulfate infusion, 90% patients prolonged their pregnancy for >48 hours [11]. In a prospective trial by Stephen J. Schorr gestational age <32 weeks with preterm labor received magnesium sulphate and time taken for uterine quiescence was 6.22 hours compared to 74 minutes in the present study where 66% were of gestational age > 32 weeks [12] as per **Table - 6**.

Shamsi Abasalizadeh, et al. in their study concluded that Magnesium Sulphate caused delayed delivery of more than 24 and 48 hours in 32% and 60% of patients [13]. The analysis of Amon and colleagues showed that intravenous magnesium sulfate could delay the delivery about 24 to 48 hours, in 60% of women [14] as per **Table - 7**.

Conclusion

Intravenous magnesium sulphate is effective in postponement of preterm labor at least for 48 hours. This is the minimum time considered sufficient to allow benefit if corticosteroids were administered to decrease the possibility of respiratory distress syndrome in premature infants. Thus magnesium sulphate plays a vital role in preterm labour with mild side effects to the mother, foetus and the neonates. It is more effective drug in gestational age >32 weeks and is less effective to arrest preterm labor in gestational age <32 weeks.

Table – 6: Prolongation of pregnancy >48 hours compared with other studies.

Studies	Prolongation of pregnancy > 48 hours
Morales W.J [4]	85%
Lyell, Deirdre J.M.D [5]	87%
Mahajan &Marwah [8]	82%
Teimoori, et al. [12]	89%
Alina Shirazi [10]	89.01%
Present study	89.58%

Table – 7: Prolongation of pregnancy >48 hours compared with other tocolytics.

Drug	Prolongation of pregnancy >48 hours
Nifedipine (Lyell, et al. [5])	72%
Indomethacin (Madhav H., et al. [6])	90%
Isoxsuprine (Mahajan &Marwah [8])	66%
Progesterone (Teimoori, et al. [12])	79%
Present study	89.58%

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