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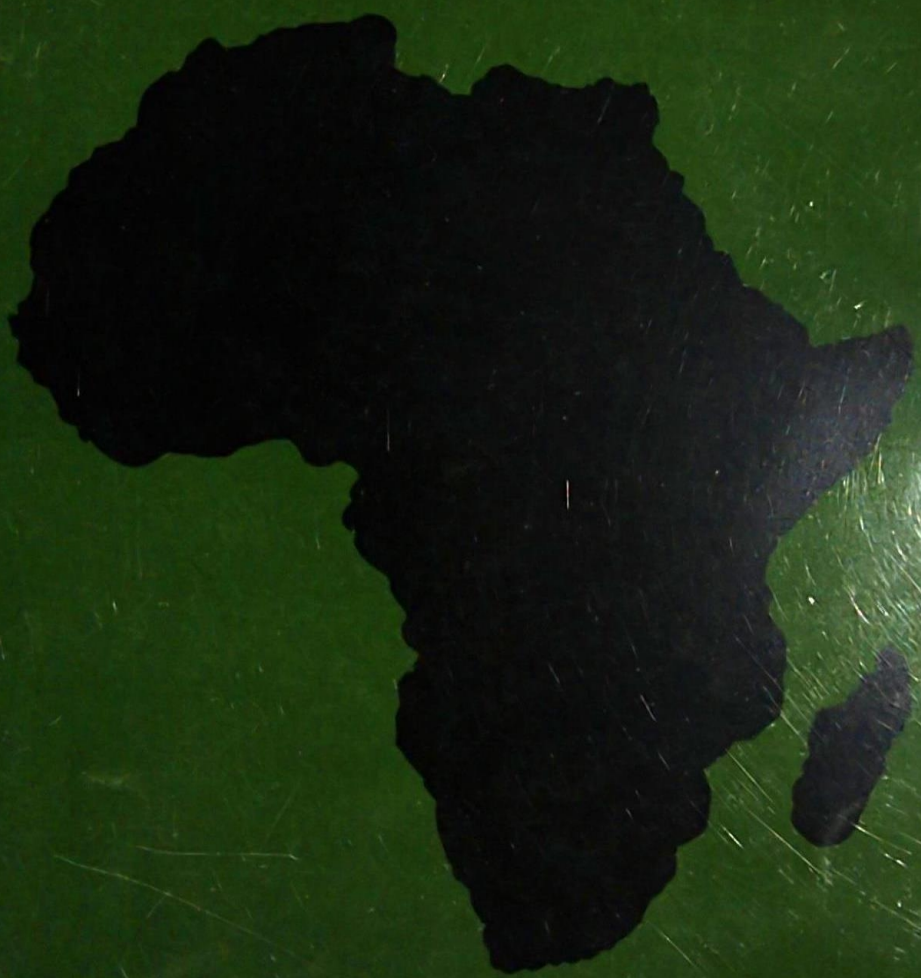

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Magnesium sulphate for treatment of eclampsia: the Nigerian experience

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Summary

The preliminary result of an ongoing study in 4 major hospitals across Nigeria on the use of magnesium sulphate ($MgSO_4$) as an anticonvulsant in the management of eclampsia is presented. All the 21 obstetric patients with eclampsia (recruited so far) were treated with Mg SO_4 as the only anticonvulsant. All the patients responded well to the treatment regime in terms of control of fit, and remained conscious thereafter. There was no incidence of severe adverse reactions to the drug. The mean number of convulsions in the patients treated was 4. The observed side effects were nausea, vomiting and dizziness in 3 patients and there were 3 perinatal deaths. The findings so far on maternal and fetal outcomes support the routine administration of MgSO4 as the drug of choice for the control of convulsion in women with eclampsia.

Keywords: *Eclampsia, magnesium sulphate, anticonvulsants, maternal mortality*

Résumé

Le resultant preliminaire d'une etude qui se poursuit dans quarte (4) hopitaux majeures au Nigeria sur l'usage du sulphate de magnesium ($MgSO_4$) anticonvulsant dans le traiteement de l'Eclampsia est presente.Tous les 21 malades obstetriques sonffrant de l'Eclampsia (recruitees jusqu'ici) ont ete traites avec Mg SO_4 comme le seul anticovulsant.Tous les mades repondent poritivement au regime de traitement en termes de control de fiabilite, et reotent conscient par la suite. Il n'ya pas eu d'indicence de reactions severes au effets recondiares du medicanent. Le nombre moyen de convulsions chez les malades traite etait de quatre. Les effets recondiares observes etaient la nansee de vomissement et la fatigue chez trois des malades, et il ya eu trois cas de mort lors d'acconchement. Les resultats jusgn'ici obtemes sur le ressort de la mere et du foetus supportent la routine de l'administration de $MgSO_4$ comme medicament de choix dans le control de conculsion chez les femmes sonffrant de l'ecompsia..

Introduction

Eclampsia remains a very significant cause of maternal mortality especially in developing countries as it accounts for 3.5-17.4 percent of maternal deaths [1-4]. One of the reasons adduced for this, is the high frequency of patients who have multiple fits before arrival at the hospital as well as the absence of an effective and safe anticonvulsant. The basic cause of the fit is unknown but is thought to be an ischaemic injury due to cerebral vasospasm. The priority in treatment is first to stop the fit, then control the blood pressure (BP), manage complications and deliver the baby.

In the past, numerous anticonvulsants were utilized in the control of fits but at the expense of some adverse effects on the mother or baby or both. Paraldehyde was used up to the 1980s, but its use was discontinued because it was found to be unstable in light, in addition to the risk of injection abscess with multiple treatment [5]. Chlormethiazole (Heminevrine) fell out of favour because of the risk of respiratory depression in mothers and neonates [6]. Lytic cocktail introduced by the Indians, became old fashioned as the major metabolite; nor- pethidine is said to have epileptogenic properties which promethazine and chlorpromazine cannot effectively counteract [7]. Phenytoin sodium when administered too quickly causes cardiovascular collapse or central nervous system depression. Electro-cardiographic (ECG) monitoring is recommended during treatment [6]. Diazepam in doses over 40 mg per litre of fluid not only depresses the maternal respiration but causes loss of swallowing reflex. Adverse effects on the neonate such as respiratory depression, hypotonia, hypothermia and neonatal jaundice have also been documented [6-7].

Although $MgSO_4$ has been in use in the United States America since 1906 [8], it is only of recent that it gained worldwide recognition and acceptance. Its mode of action is largely unknown, although it has been suggested that it cause vasodilatation with subsequent reduction of cerebral ischaemia or blockage of neuronal damage due to ischaemia. The Collaborative Eclampsia Trial (CET) of 1995 concluded that $MgSO_4$ is superior to Diazepam and Phenytoin Sodium in the management of eclampsia. Currently, there is sufficient evidence worldwide, to regard magnesium sulphate as the gold standard for the treatment of convulsion in eclampsia.

Magnesium sulphate ($MgS0_4$) is at present not widely used in Nigeria as an anticonvulsant probably because of non-availability and inadequate back-up laboratory services. There is at present no documented experience on the use of this drug in eclampsia. We introduced magnesium sulphate into our obstetric practice, following the publication of the Collaborative Eclampsia Trial and the inclusion of the drug into the World Health Organisation (WHO) drug formulary. This paper presents our preliminary experience following the introduction of $MgS0_4$ for the treatment of eclampsia in some hospitals across Nigeria (University College Hospital, Ibadan, Uthman Dan Fodio University Teaching Hospital, Sokoto, Adeoyo Maternity Hospital, Ibadan, University of Maiduguri Teaching Hospital, Maiduguri). We utilised simple clinical parameters such as urinary output > 100 ml/4hours, respiratory rate > 16/min, and presence of knee jerk reflex before the administration of the loading and maintenance doses of $MgS0_4$ for monitoring drug dosage levels as recommended by the CET.

Materials and methods

All patients admitted into the Labour Ward of the participating hospitals with eclampsia during the study period (1st June 1997 till 31st October 1998) were recruited.

Data were collected on the booking status, type of eclampsia, the number of seizures before arrival in the hospital and while in the hospital, the number of recurrence of seizures

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while on treatment, blood pressure and presence of proteinuria at presentation, maternal and fetal outcome as well as other complications.

The Zuspan regimen [9] was utilized in the management of eclamptic convulsion in all our patients. A loading dose of intravenous $MgSO_4$ 4 g was administered over 10 minutes followed by a maintenance dose of 5 g/5 hourly in 0.9% normal saline (at 100 ml/hour) for 24 hours after delivery or the last fit, whichever was longer. If further convulsion occurred after the loading dose, an additional dose of 2 g IV $MgSO_4$ was usually given. The $MgSO_4$ (50% w/v preparation) used, was prepared by the Pharmacy department of the University College Hospital, Ibadan. The respiratory rate, urinary output, and tendon reflexes were monitored regularly while on treatment. Calcium gluconate (10 ml of 1%) was made available for the management of $MgSO_4$ overdose and toxicity. Absent tendon reflexes, respiratory rate < 16/minute, or reduced urinary output were regarded as clinical evidences of overdose.

Results

The clinical profile of the 21 patients recruited so far is presented (Table 1). Eighteen (85.7%) of the patients had antepartum eclampsia. Two (9.5%) of these patients were booked. One (4.8%) patient had intrapartum eclampsia while 2 (9.5%) had postpartum eclampsia.

The mean number of convulsions in each patient prior to treatment was 4 with a range of 1-8. Repeat convulsion occurred in 1(4.8%) of the patients while on treatment with $MgSO_4$. The systolic blood pressure (B.P) before therapy ranged between 140-230mmHg with a mean of 176.36 and the diastolic B.P. was between 90-150 mmHg, with a mean of 117.09. Significant albuminuria (> 1+) was found in 28.5% (6) of the patients. Three (14.2%) patients had side effects such as nausea, vomiting and dizziness.

Complications of oliguria and respiratory distress were seen in 2 (9.5%) of the patients studied. There was one (4.8%) maternal death related to anaesthesia as well 3 (14.3%) perinatal deaths. The mean Apgar Score was 5.4 in 1 minute and 7.3 in 5 minute.

Table 1: Clinical profile of the patients on $MgSO_4$

Number of cases	21
Booking status	
Unbooked	19 (90.5%)
Booked	2 (9.5%)
Types of Eclampsia	
Antepartum	18 (85.7%)
Intrapartum	1 (4.8%)
Postpartum	2 (9.5%)
Mean Blood Pressure (before therapy)	
Systolic	176.36 (range 140-230)
Diastolic	117.09 (range 90 - 150)
Number of fits in each patient	
Mean	4
Range	1-8
Significant Proteinuria (>1+)	6 (28.5%)
Side effects (nausea/vomiting, dizziness)	3 (14.3%)
Complications	
Oliguria	1 (4.8%)
Respiratory distress	1 (4.8%)
Maternal death (Anaesthetic!)	1 (4.8%)
Perinatal deaths	3 (14.3%)

Discussion

Eclampsia occurred in only two booked patients in this study. This is in agreement with the findings of Sibai and co-workers that adequate antenatal care has contributed significantly to the prevention of this disease [10,11,12]. The exact role of antenatal care in preventing eclampsia is still debatable, more especially as there are reports on normotensive pre-eclampsia and of eclampsia with little or no proteinuria [13-15]. Yet, it is highly probable that the booked patient is likely to have a more favourable outcome, than an unbooked patient, even if she fitted.

There are more cases of intrapartum and antepartum eclampsia than postpartum eclampsia in this study. This agrees with previous observations that labour may trigger off eclamptic fit [16-17]. There was only one case of repeat fit, unlike in previous studies, prior to the introduction of Magnesium Sulphate where multiple fits were recorded [6,18].

The observed blood pressure in this series compared favourably with other reports, but at variance with the findings of Ogunbode [17] and Lawson [5] who suggested that women marry early and start pregnancy with relatively low blood pressure in this community.

An important observed clinical effect is that patients who received $MgSO_4$ were conscious. This is a marked departure from our previous experience with patients treated with diazepam who were usually well sedated or unconscious. The side effects observed were mild, mainly nausea, vomiting and dizziness. Two patients that developed complications of oliguria and respiratory distress had the $MgSO_4$ infusion stopped, and there was subsequent improvement in their clinical status. There was only one maternal death in this series due to anaesthesia and three perinatal deaths, which is significantly less than the reported perinatal and maternal mortality before the advent of $MgSO_4$ [18].

Conclusion

The preliminary report of the use of $MgSO_4$ as the sole anticonvulsant drug for the control of eclampsia is presented. The result is quite encouraging, as there is no significant maternal and perinatal morbidity and mortality, compared to the pre-$MgSO_4$ era. We did not encounter any significant side effect attributable to $MgSO_4$.

The $MgSO_4$ is produced locally in one of our hospitals (UCH, Ibadan), and this has tremendously made supply of drugs less problematic.

There is a need for widespread use of $MgSO_4$ by other centres in the country to allow for comparison of results.

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