EFFECTS OF WHOLE BODY COOLING AND MAGNESIUM SULFATE ON INFANTS WITH HYPOXIC-ISCHEMIC ENCEPHALOPATHY TREATMENT

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ABSTRACT:

Background: In neonates with moderate-to-severe hypoxia-ischemia encephalopathy (HIE), Therapeutic hypothermia (TH), which can be achieved by either whole-body or localized head cooling, lessens brain damage, offers neuroprotection, and lowers mortality rates, especially if initiated within the first six hours after birth. Moreover, adjuvant therapy like magnesium sulfate (MS) management offers increased neuroprotection. The goal of the interventional, randomized, controlled study was to evaluate the short-term effects of using TH alone or in conjunction for the treatment of newborn infants with MS as a neuroprotective medication with HIE.

Aim: to evaluate the effects of whole-body cooling and magnesium sulfate on infants with hypoxic-ischemic encephalopathy treatment.

Patients and methods: 39 newborns who met the HIE criteria and were born in the Neonatal Intensive Care Unit at Sohag University Hospital were enrolled in the study. They were split equally across the three groups; During the first six hours of life, Group 1 (n 13) received whole-body cooling as the only therapy; In addition to MS, Group 2 (n 13) received whole-body cooling as adjuvant therapy, while Group 3 (n 13) received supportive acute care interventions as a comparison.

Results: The TH plus MS group (group 2) had significantly better short-term outcomes when compared to other groups managed by TH (group 1) or supportive treatment, as indicated by a brief period of mechanical ventilation and respiratory support (p-value 0.001), a decrease in the incidence of convulsions (p-value 0.001), and an early start to feeding (p-value 0.001) (p-value 0.009) (group 3). Conclusion: In addition to MS, total body cooling is a safe therapy that enhances short-term clinical and radiological outcomes for the treatment of HIE infants.

In neonates with moderate-to-severe hypoxia-ischemia encephalopathy (HIE), Therapeutic hypothermia (TH), which can be achieved by either whole-body or localized head cooling, lessens brain damage, offers neuroprotection, and lowers mortality rates, especially if initiated within the first six hours after birth. Moreover, adjuvant therapy like magnesium sulfate (MS) management offers increased neuroprotection. The goal of the interventional, randomized, controlled study was to evaluate the short-term effects of using TH alone or in conjunction for the treatment of newborn infants with MS as a neuroprotective medication with HIE. Aim: to evaluate the effects of whole-body cooling and magnesium sulfate on infants with hypoxic-
ischemic encephalopathy treatment. Patients and methods: 39 newborns who met the HIE criteria and were born in the Neonatal Intensive Care Unit at Sohag University Hospital were enrolled in the study. They were split equally across the three groups; During the first six hours of life, Group 1 (n 13) received whole-body cooling as the only therapy; In addition to MS, Group 2 (n 13) received whole-body cooling as adjuvant therapy, while Group 3 (n 13) received supportive acute care interventions as a comparison. Results: The TH plus MS group (group 2) had significantly better short-term outcomes when compared to other groups managed by TH (group 1) or supportive treatment, as indicated by a brief period of mechanical ventilation and respiratory support (p-value 0.001), a decrease in the incidence of convulsions (p-value 0.001), and an early start to feeding (p-value 0.001) (p-value 0.009) (group 3). Conclusion: Magnesium sulfate and total body cooling is a safe therapy that enhances short-term clinical and radiological outcomes for the treatment of HIE infants.

Keyword: Infants with Hypoxic-Ischemic Encephalopathy, Magnesium Sulfate, Treatment, Whole Body Cooling

INTRODUCTION:

In full-term newborns, hypoxic-ischemic injury continues to be a significant contributor to perinatally acquired brain damage. The presence of neonatal encephalopathy is the best indicator of mortality and long-term outcome following perinatal injury. The probability of death is less than 10% if substantial encephalopathy is present, and up to one-third of survivors may have physical impairments. Mortality rates are higher (up to 60%) and most, if not all, survivors have disabilities with severe encephalopathy. High-quality randomized controlled trials have demonstrated the efficacy and safety of induced hypothermia in the treatment of post-asphyxial encephalopathy. Moreover, it lowers the risk of death and disability between the ages of 18 and 22 months.

Infants with moderate hypoxic-ischemic encephalopathy (HIE) or those born before 35 weeks should not be cooled, according to the available research. The acquired syndrome known as hypoxic-ischemic encephalopathy (HIE) is characterized by signs of acute brain injury in the clinical, laboratory, and radiological realms(1). In wealthier nations, Per 1,000 live babies, two suffer from perinatal asphyxia, but when maternal and infant care is subpar, it affects ten times more people in developing nations. Between 15 and 20 percent of asphyxiated newborns will pass away during the neonatal period, and about 25 percent of those who survive will have long-term neurological problems(2).

Primary and secondary energy failure are two phases of pathologic processes that go along with HIE. Primary energy failure is characterized by significant tissue acidity, decreased cerebral blood flow, and oxygen deficiency(3). In addition to excitatory brain neurotransmitters, protein synthesis, oxidative stress, inflammation, apoptosis, and other changes in growth factors, secondary energy failure comprises several pathophysiologic effects(4). Between primary and secondary energy failure, there is a latent phase that correlates to a therapeutic window for the initiation of neuroprotective therapy of approximately six hours(5).
One neuroprotective therapy that affects several processes in the circumstances leading to brain injury is hypothermia of the brain. A small dip in brain temperature (between 1 and 6°C) in infants is associated with greater energy preservation in the brain during and right after ischemia. The stability of protein synthesis, reduction of free oxygen radicals, regulation of microglial activation and cytokine production, attenuation of excitatory neurotransmitter release, and attenuation of apoptosis are some of the additional neuroprotective effects of brain hypothermia. To maximize the benefits of therapeutic hypothermia (TH), reduce infant brain damage, and create more neuroprotection, additional neuroprotective therapies should be used; numerous studies indicate the efficacy and Infusions of dopamine (5 µg/kg per minute) and magnesium sulphate (250 mg/kg per day for three days) was used as an adjuvant therapy to treat TH given postnatally after birth asphyxia are linked to good neurodevelopmental outcomes because they have anticonvulsant and plasma membrane stabilizing effects as well as actions at N-methyl D-aspartate (NAMDA) glutamate receptors that are non-competitive antagonistic. Combination therapy, such as MS and TH, enhance results and have stronger synergistic neuroprotective benefits. Hence.

AIM OF THE STUDY:

The objective of the current study was to evaluate the effects of whole-body cooling and magnesium sulfate on infants with hypoxic-ischemic encephalopathy treatment between February 2022 and July 2022 were studied as part of an intervention, randomized, controlled study at the Sohag NICU (neonatal intensive care unit) University Hospital. Infants under 36 weeks of gestation admitted to the NICU who had at least one of the following meeting the physiological criteria: A five-point Apgar score at five minutes after delivery; ten minutes after birth, the need for resuscitation as endotracheal ventilation or a mask; and Acidosis with a pH 7.1 or a base deficit 16 mmol/L 60 minutes after birth; indications of fetal distress before to delivery, such as meconium-stained amniotic fluid, tachycardia >160 bpm, or bradycardia 100 bpm. Alterations in consciousness (such as lethargy, stupor, or coma) and at least one of the following were considered neurological criteria. Clinical seizures, altered pupillary reflexes, an abnormal oculomotor reflex, a lack of sucking or a lack of the Moro reaction, hypertonia, and other symptoms. Preterm children, children with congenital defects, and children whose mothers had taken drugs like phenobarbitone or pethidine that produced neonatal depression were excluded from the study.

Study Population and Sampling Size:

All neonates admitted to the Sohag University Hospital's NICU in Egypt during the research period with moderate to severe HIE were included. Before being divided into two subgroups and randomly assigned to mild, moderate, or severe HIE, the patients were first classified into two subgroups. The researchers separated the neonates into three groups depending on the severity of HIE, the priority of admission, and the availability of NICU rooms using random number tables generated by a computer based on the inclusion and exclusion criteria. The attending neonatologists and the NICU nurses were unaware of this
randomization.

Data Collection Tools:

Complete blood counts, serum urea, creatinine, magnesium, calcium, and potassium levels, as well as blood glucose levels, were measured. Detailed maternal, obstetric, and neonatal histories were also obtained. A thorough clinical examination was also conducted, including a neurological test.

Patients:

Neonatal HIE patients treated with whole-body cooling for 72 hours starting within 6 hours of delivery made up Group 1 (n = 13). Group 2 (n = 13) had HIE newborns who received preventive three days of intravenous MS (250 mg/kg) and dopamine (5 g/kg/min) over an hour, as well as total body freezing administered within six hours of birth for 72 hours. HIE newborns were included in Group 3 (n = 13), which acted as a control group and received supportive care. Due to a shortage of resources, the availability of spaces for newborns, and the cooling device in our NICU (which relied entirely on gel mattresses and passive cooling), the standard treatment (supporting measures) was the only approach used for the management of HIE cases in the control group. In addition, despite the positive effects of TH, management of these cases used standard treatment due to there is not enough nursing assistant staff to closely monitor and follow up on these patients. With an emphasis on maintaining oxygen saturation, blood pressure, normal blood gases, fluid balance, and renal functions, as well as controlling seizures, hypoglycemia, and jaundice, all babies were thoroughly watched and treated in accordance with conventional practices. At six hours of delivery, cooling began, and it persisted for 72 hours. The target temperature for cooling during hypothermic therapy and rewarming must be 33 to 34°C; the temperature was continuously monitored and recorded every hour.

The goal was to reach the desired temperature one hour after the cooling process began. Passive cooling was utilized to start TH, but after 30 minutes Active cooling was used if the temperature did not drop below 35°C. The infant was kept naked in an open incubator at room temperature with the radiant heater turned off, while active cooling was achieved by using a cold mattress at a temperature of about 10°C. The cooling mattress or packs are removed if the baby's temperature falls below 33°C. As if that weren't enough, the radiant heater is activated at its lowest level until the temperature hits 33 °C.(14)

After 72 hours of TH, a slow rewarming to a temperature of 37°C was carried out.

Temperature increase in the patient was limited to 0.5°C each hour using a radiant heater that was temperature-controlled to achieve this. 15 Both clinical and radiological evaluations were used to evaluate the cases. The Thompson and Sarnat scoring systems were used to conduct a clinical examination. Magnetic resonance imaging (MRI)16 pictures were used to evaluate radiological evaluation on the neonates when they were stable enough to be taken safely to the MRI scanner. 17 It was noted when feeding was initiated when mechanical ventilation and respiratory assistance were used, when neurological findings were noted on an MRI, and when convulsions and neurological states were prevalent.

Ethical consideration:

The Sohag University Hospital's local ethical committee in Egypt accepted the research. Every participant's mother or a guarantee was obtained before participation and after being informed of the purpose of the study at the time of
enrollment.

Statistical Analysis

Using IBM SPSS Statistics SPSS Inc., version 25; for Windows, Microsoft ran a descriptive statistical study. To evaluate the normal value distribution, the Shapiro-Wilk test was used. The information was gathered, examined, coded, and entered. The descriptive analysis used in statistical approaches comprised the mean, standard deviation, number, and Pearson Chi-square test %. A one-way ANOVA test and the post hoc least significant difference method were used to determine the significance between groups for classified data and parametric variables, respectively. Statistical significance was set at p <0.05.

RESULTS:

Table 1 Demographic data of the studied groups

<table>
<thead>
<tr>
<th>Parameters</th>
<th>TH group(n=13)</th>
<th>TH and MS group(n=13)</th>
<th>Control group(n=13)</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>7 (53.84%)</td>
<td>5 (38.46%)</td>
<td>8 (61.54%)</td>
<td>0.43</td>
</tr>
<tr>
<td>Females</td>
<td>6 (46.16%)</td>
<td>8 (61.54%)</td>
<td>5 (38.46%)</td>
<td></td>
</tr>
<tr>
<td>Birth weight (kg)</td>
<td>3.22 0.61</td>
<td>3.33 0.53</td>
<td>3.45 0.69</td>
<td>0.414</td>
</tr>
<tr>
<td>Gestational age (weeks)</td>
<td>38.33 1.36</td>
<td>38.67 1.55</td>
<td>38.1 1.79</td>
<td>0.206</td>
</tr>
<tr>
<td>Mode of delivery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal vaginal delivery</td>
<td>5 (38.46%)</td>
<td>7 (53.84%)</td>
<td>6 (46.16%)</td>
<td>0.947</td>
</tr>
<tr>
<td>Cesarean section</td>
<td>4 (30.76%)</td>
<td>4 (30.76%)</td>
<td>4 (30.76%)</td>
<td>0.923</td>
</tr>
<tr>
<td>Forceps delivery</td>
<td>2 (15.38%)</td>
<td>—</td>
<td>1 (7.69%)</td>
<td>0.987</td>
</tr>
<tr>
<td>Ventose delivery</td>
<td>1 (7.69%)</td>
<td>1 (7.69%)</td>
<td>2 (15.38%)</td>
<td>0.786</td>
</tr>
<tr>
<td>Assisted breech</td>
<td>1 (7.69%)</td>
<td>1 (7.69%)</td>
<td>—</td>
<td>0.465</td>
</tr>
</tbody>
</table>

Table 1 displayed the demographic differences between the groups under study. In the neonates with hypothermia group, there were six (53.84%) male cases and six (46.16%) female cases, and there were seven (38.46%) male cases and five (61.54%) female cases in the hypothermia and MS group, but there was no significant difference between the groups in the control group (p 14 0.431). In the hypothermia, hypothermia with MS, and control groups, there were no appreciable differences in birth weight or gestational age (3.22 0.61 kg, 3.33 0.53 kg, and 3.45 0.69 kg, respectively, p 0.414). (38.33 1.36; 38.67 1.55; and 38.1 1.79 weeks, respectively; p 0.206). The techniques of delivery for the hypothermia; hypothermia and MS and control groups were vaginal (38.46, 53.84, and 46.16%, p 0.947), CS (30.76, 30.76, and 30.76%, p 0.913), forceps (15.38%, 7.69%, p 0.987), ventose (7.69, 7.69, and 15.38%, p 0.786) and aided breech (7.69 and 7.69 %, p 0.465).
Table 2 Risk factors for neonates with hypoxia ischemic encephalopathy during pregnancy.

<table>
<thead>
<tr>
<th>Pregnancy risk factors</th>
<th>TH group (n=13)</th>
<th>TH and MS group (n=15)</th>
<th>Control group (n=13)</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eclampsia</td>
<td>1 (7.69%)</td>
<td>1 (7.69%)</td>
<td>2 (15.38%)</td>
<td>0.766</td>
</tr>
<tr>
<td>Pre-eclampsia</td>
<td>5 (38.46%)</td>
<td>4 (30.76%)</td>
<td>1 (7.69%)</td>
<td>0.018</td>
</tr>
<tr>
<td>Previous stillbirth</td>
<td>1 (7.69%)</td>
<td>1 (7.69%)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Cord prolapse and placental insufficiency</td>
<td>1 (7.69%)</td>
<td>1 (7.69%)</td>
<td>2 (15.38%)</td>
<td>0.767</td>
</tr>
<tr>
<td>Antepartum hemorrhage</td>
<td>2 (15.38%)</td>
<td>1 (7.69%)</td>
<td>2 (15.38%)</td>
<td>0.017</td>
</tr>
<tr>
<td>Premature rupture of membrane</td>
<td>2 (15.38%)</td>
<td>2 (15.38%)</td>
<td>1 (7.69%)</td>
<td>0.813</td>
</tr>
<tr>
<td>Prolonged 2nd stage of labor</td>
<td>2 (15.38%)</td>
<td>3 (23.07%)</td>
<td>5 (38.46%)</td>
<td>0.016</td>
</tr>
</tbody>
</table>

The risk factors for newborns with HIE during pregnancy are shown in Table 2. Pre-eclampsia, antepartum hemorrhage, and protracted second stage of labor were significantly different among the groups under study (p 0.018, p 0.017, p 0.016, respectively).

The Fig. Short-term outcomes among the studied groups; *Significance versus TH group; †Significance versus TH and MS group
The MRI results and short-term outcomes for each group under study are shown in Fig. 1. There were statistically significant differences in the duration of respiratory support (p 0.022, p 0.001, and p 0.005, respectively), frequency of convulsions (p 0.005, p 0.002, and p 0.002, respectively), initiation of feeding (p 0.005, p 0.001, and p 0.007, respectively), and antiepileptic medications at discharge between the hypothermia and MS group and the hypothermia and control groups (p 0.001; p 0.006, and p 0.032, respectively). (93%) of the hypothermia group's MRI results were normal, and one case (7.69%) had grey and white matter lesions; Findings were normal in (93%) of the hypothermia with MS group and cortical in one case (7.69%), while in the control group, they were normal in (84%) of the group, cortical in (7.69%), and grey and white matter lesion (7.69%), with no statistically significant difference between the different findings (normal, cortical lesion, and grey and white matter lesion) in the different groups (p 0.306, p 0.856, and p 0.817, respectively).

DISCUSSION:

The care for neonates with HIE is hypothermia, however, since hypothermia does not completely protect the nervous system, improved results can occur by adding a pharmaceutical drug. MS is a prime example of one of these drugs used in newborns that has neuroprotective properties. This prospective intervention study's goal was to Examine the differences between whole body cooling and whole body cooling's immediate consequences of neonates with HIE admitted to the NICU of the hospital at Sohag University who met the study's inclusion criteria paired with MS as a neuroprotective agent. Across the three study groups, there was an insignificant gender difference in this study. Meanwhile, the number of males (n 14 22, 61.11%) was higher than that of females, with six (50%) of the cases in the group of neonates with hypothermia being males as well as six (50%) females, whereas in the group with MS and hypothermia, there were five (41.7%) girls and seven (58.3%) males, compared to nine (75.0%) males and three (25.0%) females in the control group. In 144 newborns with prenatal asphyxia studied by Siegel et al. in Pakistan, 68.8% of the patients were male and 31.3% were female. According to this study, the male sex has a negative impact on a newborn's prognosis in situations of prenatal hypoxia.

Caspase-dependent and -independent cell death pathways are both stimulated by cerebral ischemia. Male stroke patients experience cell death that is not dependent on caspase as a result of the release of apoptosis-inducing chemicals from the mitochondria. Infants' second stages of labor were prolonged by 25.0%, women experienced pre-eclampsia (22.22%), there were 13.89% antepartum hemorrhages, 13.89% premature membrane ruptures, and 11.11% had cord prolapse and placental insufficiency, (11.11%) had eclampsia, and (5.56%) had a history of stillbirth. Antepartum hemorrhage, the protracted second stage of labor, and preeclampsia all showed a substantial difference across the various study groups (p 0.016, p 0.017, and p 0.019).

According to Torbenson et al.20, the presence of meconium-stained amniotic fluid and risk factors for the development of HIE included the labor stage. As opposed to what we discovered, Hashim et al., study found that a significantly higher risk was connected to a protracted membrane rupture, which is a risk factor.
for fetal sepsis and connected to a decline in the fetal acid-base status. A ruptured uterus, placental abruption, moderate-to-heavy meconium-stained amniotic fluid, and cesarean birth were all identified as independent intrapartum risk factors for HIE in newborns by Peebles et al.\textsuperscript{22}. In the HIE group, 70.3% of women had an intrapartum risk factor, compared to 29.6% in the non-HIE group.

Our research found across the several delivery methods, there is no statistically significant difference among the several investigated groups of HIE, regardless of the mode of delivery. The majority of births among the HIE group involved normal vaginal delivery (n = 16, 44.44%), followed by cesarean sections (n = 11, 30.56%), ventouse births (n = 4, 11.11%), forceps births (n = 3, 8.33%), and finally aided breech births (n = 2, 5.56%).

The typical vaginal birth, as described by Hill\textsuperscript{23} and Badawi et al.,\textsuperscript{24} is linked to HIE, which is consistent with the findings of this investigation. According to Dongol et al\textsuperscript{25}, the majority of vaginal births are linked to perinatal and intrapartum hypoxia. Seyal and Hanif\textsuperscript{26}, on the other hand, noted that the majority of newborns with birth asphyxia were delivered via cesarean section. This may be explained by internal hospital protocols that favor CS or by the use of CS as the preferred method of birth following unsuccessful attempts at regular vaginal delivery.

The findings revealed In the three groups under study, there was a statistically significant difference in the incidence and frequency of clinical seizures (p 0.001), the duration of respiratory support (p 0.001), and the time at which enteral feeding was started (p 0.009), all of which were determined by the short-term outcomes among the study groups. According to our findings, the hypothermia with MS group required less mechanical ventilation and respiratory assistance than the hypothermia alone group, which was also less than the control group. Also, the group that underwent hypothermia with MS took a shorter time to begin feeding than the group that received hypothermia only. The incidence of clinically discernible seizures was significantly influenced by TH, according to a meta-analysis of five investigations on infants with HIE.\textsuperscript{27,28} The therapy when administered shortly after delivery, postnatal intravenous MS (250 mg/kg/dose,\textsuperscript{24} hours between three doses), in neonates with severe birth asphyxia, according to Sajid et al\textsuperscript{29}, improved neurological outcomes at discharge. Similar to the current investigation, Neonates with moderate to severe HIE had a lower chance of mortality, according to research by Abate et al.\textsuperscript{30}. Infants with HIE were less likely to die when whole-body and selective head cooling was used. Moreover, therapy is especially beneficial for low-income countries.

In a porcine model of term neonatal encephalopathy, The neuroprotective effects of MS for 48 hours (180 mg/kg bolus followed by 8 mg/kg/h infusion), TH for 12 hours (33.5°C), and TH alone were examined by Lingam et al.\textsuperscript{31}. They observed an increase in oligodendrocytes (p = 0.002) and a general decrease in cell death (p = 0.010) in MS + TH compared to TH alone. While this was going on, there was no improvement in the (Lac/NAA; PCr/Pi; NTP/epp) Magnetic resonance spectroscopy or amplitude-integrated electroencephalography recovery (p 0.084 or p > 0.05) at 48 hours. A trial by Prakash\textsuperscript{32} involved giving an MS infusion or a placebo within 48 hours of birth to 60-term asphyxiated neonates. A 250 mg/kg/dose (1 mL/kg/dose in 20 mL of 5% dextrose solution) MS infusion was administered within six hours after birth. A further two dosages were administered at
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24-hour intervals. According to the author, 25/36 infants in the magnesium group (69%) and 27/33 controls (82%) with moderate and severe HIE experienced clinical seizures during NICU stay. Of the 24 infants (96%) in the MS group who had seizures, only 20 (74%) in the placebo group were seizure-free (p 0.020).

When compared to the placebo group, the MS group's seizures were controlled for 36.5 hours as opposed to 55 hours earlier (p 0.020). Upon discharge, Both the MS group's two infants and the placebo group's three neonates required anticonvulsants. The survival of asphyxiated neonates and neonates with encephalopathy is increased, in accordance with Okonkwo and Okolo, by postnatal administration of MS, either by itself or in conjunction with respiratory assistance. Using full-term newborns who had severe perinatal hypoxia, Bhat et al., ten studies found that postnatal MS treatment improved neurological outcomes at discharge. Early (within 6 hours) postnatal intravenous MS infusion has been shown to improve short-term outcomes for newborns with perinatal hypoxia, according to Sreeni-Vasa et al.

The MRI patterns of brain injury fluctuate depending on the age of the brain at the time of the lesion, its severity, and how long it lasted. In neonates with encephalopathy, MRI imaging is used as an early indicator of the future appearance of neurological disorders, according to Aun et al. It is a sensitive method for recognizing various encephalopathy patterns in newborns. MRI can be used in interventional trials designed to reduce harm and enhance neuro-developmental outcomes, according to Rutherford et al. after prenatal brain injury. It is a good predictor of outcome. The findings of this study showed a relationship between the use of MS and whole-body cooling in reducing MRI-detected brain damage that is indicative of HIE. Consequently, (88.89%) of the 36 cases in the current study that had MRI scans revealed normal results even though they met the criteria for hypoxic encephalopathy. Whereas in the hypothermia group, (92.7%) had normal MRI results and (8.3%) had grey and white matter lesions. (92.7%) of the hypothermia with MS group had normal MRI results, and one case (8.3%) had a cortical lesion. Normal MRI was seen in (83.4%) of the control group, cortical lesions were seen (8.3%), and grey and white matter lesions were seen in (8.3%). This confirms our hypothesis that cooling may have reduced the severity of hypoxic brain injury, whether or not prophylactic MS was used. According to Cheong et al., neonates that received hypothermia experienced less brain damage on T1- and T2-weighted MRI scans. Regardless of the use of hypothermia therapy, abnormal MRI is predictive of long-term outcomes in moderate to severe HIE.

Conclusion:

Whole-body cooling is a simple and widely accessible strategy that has become to be the recommended course of care for newborns with HIE. It is safe, effective, and affordable. The length of the hospital stay is greatly reduced when MS is added to cooling therapy for HIE. Convulsions are also less common, feeding can begin earlier, and less anticonvulsant medication is used. To ascertain the long-term outcomes, follow-up of HIE cases treated with TH is strongly advised.

Conflict of Interest:

No Conflict of Interest
REFERENCES:


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تأتي تبريد الجسم بالكامل وكبريتات المغنيسيوم على الرضع المصابين باعتلال الدماغ بنقص التأكسج

رانيا رفعت عبد القادر عطية، منال محمد أحمد عايد، سعيدة حمدان أحمد الجدعاني

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قسم ترطيب الأطفال، كلية التمريض، جامعة سوهاج، مصر
قسم العلوم الأساسية، كلية العلوم الطبية التطبيقية، جامعة الباحة، الباحة، المملكة العربية السعودية

في حديثي الولادة المصابين باعتلال الدماغ بنقص التأكسج المتعدد إلى الشديد (HIE) - وفقًا للدراسات - (TH) - (MS) - فإن استخدام التبريد المضاعف أو تبريد الجسم بالكامل بالإضافة إلى KMS يمكن أن يحسن النتائج الطبية والشعاعية في الأطفال المصابين بـHIE. هذا الدراسة تهدف إلى تقييم تأثيرات التبريد والكربنات المغنيسيوم على الأطفال المصابين بـHIE.

أجريت الدراسة على 39 حالة، تم تقسيمهم إلى ثلاث مجموعات، كل مجموعة يتألف من 13 حالة. المجموعة الأولى: تلقت الأطفال التبريد المضاعف. المجموعة الثانية: أجريت تبريد الجسم بالكامل بالإضافة إلى KMS. المجموعة الثالثة: كجزء من علاجهم، أجريت تبريد الجسم بالكامل بالإضافة إلى KMS. تم قياس النتائج في فترة قصيرة من وضعهم الطبي، مثل معدلات التشنج، البداية المبكرة لل питة، ونسبة الوفيات.

تم تقييم النتائج في فترة قصيرة من وضعهم الطبي، حيث تم فحص النتائج في فترة قصيرة من وضعهم الطبي، مثل معدلات التشنج، البداية المبكرة لل питة، ونسبة الوفيات.

تثبت الدراسة أن التبريد المضاعف والكربنات المغنيسيوم يمكن أن يكونا فعالين في تحسين النتائج الطبية للرضع المصابين بـHIE.

المراجع: