EDITORIAL

ROLE OF MAGNESIUM SULFATE IN CEREBRAL NEUROPROTECTIO

It has been estimated that about 4 million babies die worldwide during the neonatal period annually[1]. 0nly 2% of these neonatal deaths occur in the developed countries while remaining 98% of the neonatal deaths occur in less developed countries in south Asia and Sub-Saharan Africa. Prematurity is one of the leading causes of neonatal deaths, accounting for about 24-28% of total neonatal deaths[2].The prevalence of preterm birth is increasing in Pakistan day by day. According to an estimate, 860,000 premature births are recorded each year in Pakistan of which nearly 102,000 children die due to related complications[3].

Apart from causing prematurity related complications like feeding problems, maintaining blood glucose control, jaundice, temperature instability, apnea, respiratory distress and sepsis either singly or in combination, there are other serious sequel of this condition including cerebral palsy. It is a general term describing a range of non-progressive syndromes of posture and motor impairment that result of an insult to the developing central nervous system. It is the most common cause of severe physical disability in childhood[4].

The risk of CP increases with prematurity[5]. The prevalence of CP is highest in children born at less than 28 weeks of gestation and decreases as gestational age increases.

CP results from a permanent static lesion of the cerebral motor cortex that occurs before, on or within 2 years of birth. Although the cerebral lesion itself is non-progressive, the clinical manifestations of CP in the child change as the child develops. While there are several causes or associations for CP including genetic mutations, preterm delivery is a major risk factor and accounts for approximately 35% of all cases[6].

Advances in neonatal care have improved the survival of infants born preterm, particularly those born at a very low birth weight or gestational age;3 however, despite this improved survival rate, the prevalence of neuro disability, even in high income countries is increasing. Epicure highlighted the need for improved care, with particular consideration given to survival and long-term sequel in these infants[7].

Owing to the high perinatal mortality and morbidity in preterm infants including short term and long term, various strategies have been implemented to reduce the risk of these complications. In lieu of the fact that Pakistan is facing increasing number of children with stunted growth due to nutritional deficiency, the number of children having neurological disability in the form of cerebral palsy due to prematurity can be decreased with pharmacological interventions to decrease the burden on society. Administration of Magnesium sulfate to pregnant women delivering at preterm gestation is emerging concept in obstetrics. The role of magnesium sulfate is to achieve cerebral neuro protection to prevent cerebral palsy. Owing to the immense experience in the use of magnesium sulfate in the management of eclampsia /severe pre eclampsia has led to the ease of introduction of this drug in this context as well, with excellent safety profile for the mother and neonate. It is widely recommended worldwide for the women at risk of preterm birth before 30-32 weeks of gestation for the neuroprotection of their infants based on high quality evidence of benefit[7]. In countries like Pakistan the experience of

administering magnesium sulfate in hypertensive disorders in tertiary centers can be extrapolated, as the protocol for magnesium sulfate for cerebral neuroprotection are almost the same as given in pre eclampsia and eclampsia. The narrow therapeutic index of the drug has to be taken in account while administering the drug. This will reduce the side effects of magnesium sulfate and improve the safety for mother and fetus both.

REFERENCES:

1. Magnesium sulfate for the prevention of cerebral palsy. Rouse DJ.Am J Obstet Gynecol. 2009 Jun;200(6):610-2.
2. Neuroprotective effect of long-term MgSO4 administration after cerebral hypoxia-ischemia in newborn rats is related to the severity of brain damage.Spandou E, Soubasi V, Papoutsopoulou S, Augoustides-Savvopoulou P, Loizidis T, Pazaiti A, Karkavelas G, Guiba-Tziampiri O.Reprod Sci. 2007 Oct;14(7):667-77
3. The use of antenatal magnesium sulfate for neuroprotection for infants born prematurely. Heyborne K, Bowes WA.F1000 Med Rep. 2010 Nov 11;2:78.
4. Effect of magnesium sulphate on mortality and neurologic morbidity of the very-preterm newborn (of less than 33 weeks) with two-year neurological outcome: results of the prospective PREMAG trial]. Marret S, Marpeau L, Follet-Bouhamed C, Cambonie G, Astruc D, Delaporte B, et all .Gynecol Obstet Fertil. 2008 Mar;36(3):278-88.
5. Antenatal therapies and the developing brain.Adams DF, Ment LR, VohrB.SeminNeonatol. 2001 Apr;6(2):173-83.
6. Optimization of Maternal Magnesium Sulfate Administration for Fetal Neuroprotection: Application of a Prospectively Constructed Pharmacokinetic Model to the BEAM Cohort.Brookfield KF, Elkomy M, Su F, Drover DR, Carvalho B.J ClinPharmacol. 2017 Nov;57(11):1419-1424
7. Completeness of a Maternal and Perinatal Mortality Enhanced Surveillance System in Pakistan: Evidence from Capture-Recapture Methods.Anwar J, Torvaldsen S, Sheikh M, Taylor R.Matern Child Health J. 2018 Dec;22(12):1743-1750.
8. Neurochemical Alterations in Sudden Unexplained Perinatal Deaths-A Review.Muhammad N, Sharif M, Amin J, Mehboob R, Gilani SA, Bibi N, Javed H, et al .Front Pediatr. 2018 Jan 25;6:6.

Prof. Dr. Mubashra Naz
HOD, Professor Obstetrics Gynaecology,
Madinah Teaching Hospital, University Medical & Dental College,
Faisalabad