The role of Magnesium Sulphate with corticosteriods for women at risk of preterm birth for neuroprotection of the newborn

Thesis

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List of Abbreviations

AF	**:**	Anterior fontanel
BTM	**:**	Betamethasone
CBF	**:**	Cerebral blood flow
CNS	**:**	Central nervous system
Co_2	**:**	Carbon dioxide
CP	**:**	Cerebral palsy
CPAP	**:**	Continuous positive air way pressure
CSF	**:**	Cerebro-spinal fluid
CT	**:**	Computerized tomography
CUS	**:**	Cranial ultrasonography
D	**:**	Diastole
DXM	**:**	Dexamethasone
ENaC	**:**	Epithelial sodium channel
EPO	**:**	Erythropoietin
ETT	**:**	Endotracheal tube
GA	**:**	Gestational age
GBS	**:**	Group B Streptococcus
GM	**:**	Germinal matrix
ICH	**:**	Intracranial hemorrhage
IMV	**:**	Intermittent mandatory ventilation
IPE	**:**	Intra-parenchymal echodensity
IV	**:**	Intravenous
IVH	**:**	Intraventricular hemorrhage
MF	**:**	Mastoid fontanel

MgSO4	**:**	Magnesium sulfate
MRI	**:**	Magnetic resonant image
NEC	**:**	Necrotizing enterocolitis
NICU	**:**	Neonatal intensive care unit.
PCA	**:**	Post conceptional age
PDA	**:**	Patent ductus arteriosus
PF	**:**	Posterior fontanel
PPV	**:**	Positive pressure ventilation
PVH	**:**	Periventricular hemorrhage
PVL	**:**	Periventricular leucomalacia
RDS	**:**	Respiratory distress syndrome
RI	**:**	Resistive index
ROP	**:**	Retinopathy of prematurity
S	**:**	Systole
TCD	**:**	Triphasic colored Doppler
TW	**:**	Temporal window
U/S	**:**	Ultrasound
Vm	**:**	Mean velocity
WML	**:**	White matter lesion

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Introduction

Most pregnancies last around 40 weeks. Babies born between 37 and 42 completed weeks of pregnancy are called full term. Babies born before 37 completed weeks of pregnancy are called premature ***(Martin et al., 2008).***

Premature birth, commonly used as a synonym for preterm birth, refers to the birth of a baby before its organs mature enough to allow normal postnatal survival, and growth and development as a child. Premature infants are at greater risk for short and long term complications **(*Goldenberg et al., 2008*).**

Premature babies also face an increased risk of lasting disabilities, such as mental retardation, learning and behavioral problems, cerebral palsy, lung problems, vision and hearing loss ***(Limperopoulos et al., 2008).***

Significant progress has been made in the care of premature infants, but not in reducing the prevalence of preterm birth ***(Goldenberg et al., 2008).***

Severely premature infants may have underdeveloped lungs, because they are not yet producing their own surfactant. This can lead directly to respiratory distress syndrome, also called hyaline membrane disease, in the neonate. To try to reduce the risk of this outcome, pregnant mothers with threatened premature delivery prior to 34 weeks are often administered at least one course of glucocorticoids, a steroid

that crosses the placental barrier and stimulates the production of surfactant in the lungs of the fetus **(*Roberts and Dalziel, 2006).***

Antenatal magnesium sulfate therapy given to women at risk of preterm birth is neuroprotective against motor disorders in childhood for the preterm fetus ***(Doyle et al., 2009.b).***

Intraventricular hemorrhage (IVH) is a known risk factor for the later development of cerebral palsy **(*Kuban, 1994*)** with the risk of IVH and periventricular leucomalacia increasing, the earlier the gestational age at birth ***(Vermeulen et al., 2001).***

In women who are at risk of preterm birth, the available evidence shows that giving antenatal magnesium sulphate therapy substantially improves their unborn baby's chance of survival, free of cerebral palsy ***(Crowther et al., 2003).***

Prevention of perinatal white matter injury with or without severe intraventricular hemorrhage (IVH) is critical to reduce cerebral palsy (CP) in premature infants. Antenatal therapies that may afford neuroprotection include glucocorticolds, which are associated with a significant reduction in severe IVH, and magnesium, which is associated with reduced CP ***(Jeffrey, 1998).***

Few studies have investigated the antenatal consumption of a combination of corticosteroids and magnesium sulfate together and the neonatal outcome.