

MAGNESIUM SULFATE EFFECT ON FETAL CEREBROPLACENTAL DOPPLER INDICES IN CASES OF THREATENED PRETERM LABOUR

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INTRODUCTION

Preterm labor is one of the commonest clinical events where traditional pregnancy can turn into a high risk situation for the mother as well as the fetus. Magnesium sulfate ($MgSO_4$), which is a calcium antagonist, has been used for over 30 years as short-term treatment (less than 48 h) for acute preterm labor. It acts by inhibiting voltage independent calcium channels in the myometrial cell surface. Extracellular magnesium suppresses calcium influx across cell membranes, whereas intracellular magnesium competes with calcium, there by inhibiting myosin light-chain kinase activity.

AIM OF THE WORK

The aim of the study was to evaluate the effect of magnesium sulfate administration on cerebroplacental ratio (CPR) assessed by Doppler ultrasound in cases of threatened preterm labor.

PATIENTS AND METHODS

The study included one hundred ten pregnant women. All patients (n=110) underwent complete history taking, clinical examination, ultrasound examination for fetal biometry, mean gestational age and Doppler examination. Transabdominal color Doppler ultrasound was performed during fetal quiescence before magnesium sulfate administration. At least five reproducible waveforms were analyzed for each fetus at each examination.

For both the UA and MCA values, an average of three consecutive automated measurements were recorded for each of the indices. Cerebroplacental ratio (CPR) was calculated before magnesium sulfate administration as the ratio of middle cerebral artery (MCA) to umbilical artery (UA) pulsatility index (PI) values, a ratio more than one is considered normal. Administration of magnesium sulfate by the standard dose used in El Shatby Hospital to prevent preterm labor (PTL). Umbilical and cerebral artery Doppler were assessed and CPR was calculated 24 hours after magnesium sulfate administration.

RESULTS

Table: Comparison between Cerebroplacental ratio before Mg sulfate treatment and after Mg sulfate treatment.

CPR	Before Mg sulfate treatment	After Mg sulfate treatment	Paired Sample t-test		
			MD	t-test	p-value
Range	0.79-2.25	0.8-2.38	0.12	11.818	<0.001**
Mean±SD	1.37±0.43	1.49±0.50			

**Highly statistical significant differences ($p < 0.001$).
MD: Mean Difference

This table shows statistically significant increase mean value of CPR after Mg sulfate treatment than before Mg sulfate treatment with mean difference 0.12, with p-value ($p < 0.001$).

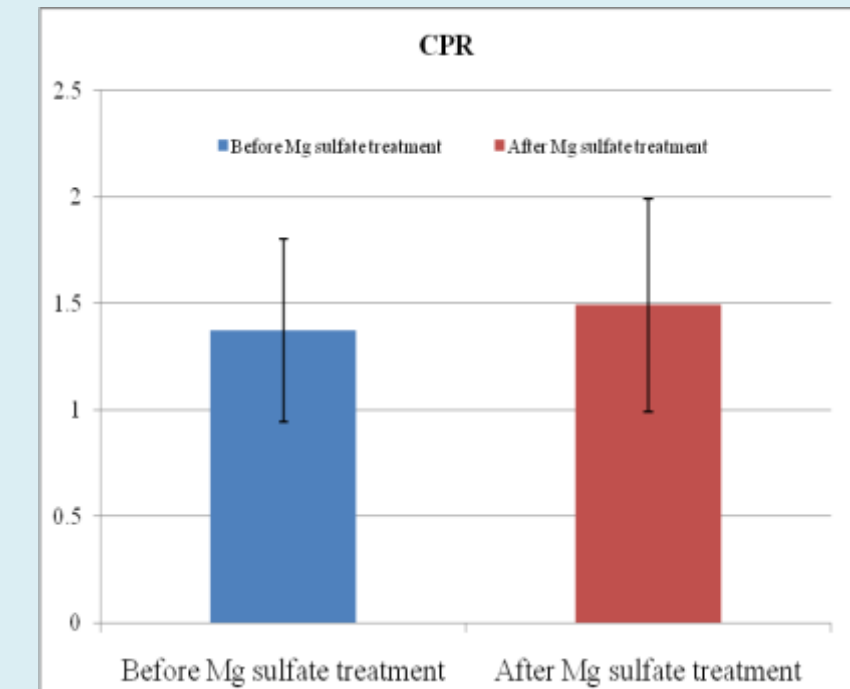


Figure:

Comparison between CPR before mg sulfate treatment and after mg sulfate treatment.

CONCLUSION

CPR offers the advantage of detecting the redistribution of blood flow due to two potential mechanisms. Firstly, the centralisation that may be observed with elevated placental blood flow resistance and, secondly, the decreasing cerebral blood flow resistance due to brain sparing mechanism, the improvement in CPR after magnesium sulfate therapy in preterm labour as proven in our study means that fetal circulation is improved in addition to the well known benefit of mgso4 for being safe tocolytic and neuroprotective, more studies with larger cohorts are needed to support these results.