

## Correlation between intrauterine growth restriction and fetal arterial carboxyhemoglobin levels

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### Objective

Intrauterine growth restriction (IUGR) is a state where the fetus is not capable to accomplish its genetically determined potential size. This condition is correlated with abnormal trophoblast invasion of spiral arteries in the decidua and myometrium, leading to a failure to establish adequate uteroplacental blood flow, which diminishes proper fetoplacental circulation. The ongoing oxidative stress causes decreased vascular reactivity, increased vascular resistance, reduced blood flow and decreased transport of oxygen and nutrients to the fetus. Heme oxygenase and carbon monoxide are known as important enzymes for normal placentation and normal placental function, thus playing an important role in the pathogenesis of IUGR. Today in the modern obstetrics it is seen as a very important fetal condition and specialists in perinatology are at a great challenge to identify these fetuses as promptly as possible and to intervene appropriately. The objective of our study was to measure carbon monoxide levels, assessed by carboxyhemoglobin levels, in samples from the umbilical cord arteries.

### Methods

This is a prospective study conducted at the University Clinic for Gynecology and Obstetrics, Skopje, Republic of Macedonia. We collected 200 clinical records from a period of one year (March, 2013- March, 2014). Patients were divided in two groups: the first group (control group) consisted of 100 normotensive pregnant women with appropriate for gestational age fetuses and the second group (referent group) consisted of 100 normotensive pregnant woman with IUGR fetuses (below 10th percentile for birth weight). We collected samples right after birth (5 to 10 minutes post partum) in special heparin impregnated capillaries and measured carboxyhemoglobin levels on a blood gas analyzer.

### Results

Maternal age ranged from 15 to 40 years, mode of delivery and gender of the infants were same in both groups. Gestational age and birth weight were significantly higher in the control, compared to the referent group. pH and COHb levels were significantly lower in the group of women who were normotensive, but pregnant with IUGR fetuses.

### Conclusion

Carboxyhemoglobin, as a substance reflecting the role of the heme oxygenase and carbon monoxide in the placenta, may have an important role in the pathogenesis of abnormal placentation and placental function, representing the probable pathogenesis of IUGR. In the future, more studies are needed to find the right cause of IUGR and to prevent fetal health disturbances.