Elevated glucose levels in early puerperium, and association with high cortisol levels during parturition

Risberg A¹, Sjöquist M², Wedenberg K³, Larsson A⁴

¹ Institution of Health Sciences ,Section of Health and Rehab, Luleå University of Technology, Luleå, Sweden. ² Swedish Centre for Animal Welfare, Swedish University of Agricultural Sciences, Uppsala, Sweden. ³ The section of womens health, Vasteras Hospital, Sweden. ⁴ Department of Medical Sciences, Uppsala University, Uppsala, Sweden

Introduction

Pregnancy and parturition is a part of life when several changes in physiology appears all to support the women and the foetus and is an example of the rhythm of life. Most of the time everything goes well during pregnancy and parturition but sometimes the demands of the womens body lead to development of disorders, for example metabolic disturbances like diabetes. Gestational diabetes is one of the most common metabolic problems associated with pregnancy and an accurate diagnosis is critical in order to give adequate care. Research has shown that pregnant women have high levels of cortisol during the last stage of parturition. As cortisol is a diabetogenic hormone causing increased glucose levels, we wanted to study the association between cortisol and glucose levels during parturition.

Materials and Methods

Glucose and cortisol were analyzed during parturition in 51 females divided according to slow (n = 11) and normal labors (n = 40). Blood samples were analyzed three times during the parturition and four times in the first day after delivery. Glucose levels were also measured once in each trimester.

Results

In the normal group, the glucose concentration increased from 6.2 (IQR 5.6-8.0) mmol/L in the latency phase to 11.6 (10.0-13.3) mmol/L at aftercare (p < 0.05). After parturition the glucose concentrations decreased gradually. There were Significant Spearman rank correlations between glucose and cortisol values. Se above.

Table I. Serum cortisol concentrations in nmol/L in normal (n=40) and slow (n=11) labors. The concentrations are presented as median values and interquartile ranges (within brackets).

Event	Normal	Slow
Arrival	975 (814-1148)	733 (685-914)
Stage 2	1447 (1269-1703)	1610 (1446-1693)
Parturition		
Aftercare	1204 (1085-1384)	1286 (1092-1431)
P+9 h	696 (547-822)	523 (415-750))
P+27 h	539 (377-651)	381 (257-756)

Table II. Spearman rank order correlations (R and p-values) between glucose and cortisol values at different sampling times. Only correlations with p < .05 are shown.

	R	p-value
Cortisol _{stage1} & glucose _{stage2}	0.69	0.00018
Cortisol _{aftercare} & glucose _{P+9h}	0.46	0.00152
Cortisol _{P+9h} & glucose _{P+9h}	0.42	0.00482
cortisol _{P+15h} & glucose _{P+15h}	0.59	0.00007

Conclusion

The demands associated with birth causes significant elevations of cortisol and glucose around parturition.

References

- 1] Bohrer J, Ehrental DB. Other adverse pregnancy outcomes and future chronic disease. Semin Perinatol 2015;39:259-63.
- 2] Casey ML, MacDonald PC, Mitchell MD. Despite a massive increase in cortisol secretion in women during parturition, there is an equally massive increase in prostaglandin synthesis. A paradox? J Clin Invest 1985;75:1852-7.
- 3] Riad M, Mogos M, Thangathurai D, Lumb PD. Steroids. Curr Opin Crit Care 2002;8:281-4.