Use of a Cord Blood F-Dex Monocyte Binding Assay to Study the Glucocorticoid Sensitivity in Preterm Neonates

Adaora Madubuko MD[1], Michael Giuliano MD[2], Abdulla Al-Khan MD[3], Manuel Alvarez MD[3], Jesus Alvarez-Perez MD[3], Sarah Balboul[4], and Steven Ghanny MD[4]

1. Neonatology, Robert Wood Johnson University Hospital, New Brunswick, NJ
2. Neonatology, Hackensack University Medical Center, Hackensack, NJ,
3. Maternal Fetal Medicine, Hackensack University Medical Center, Hackensack, NJ,
4 Pediatric Endocrinology, Hackensack University Medical Center, Hackensack, NJ

Abstract

Background:
Glucocorticoids play an important role in the developing fetus; the most important of which is lung maturation by increasing surfactant production and release. Glucocorticoid receptor (GR) functioning changes throughout the fetal period, especially during the transition to extrauterine life. Given the importance of glucocorticoids in lung development and functioning, studying glucocorticoid sensitivity (GS) in this population would be helpful, especially in the preterm population, to determine optimal steroid treatment for better lung outcomes. Few groups have characterized the glucocorticoid receptor and its sensitivity using cord blood monocytes. Our pilot studies looking at term neonates born to mother without complications demonstrated that cord blood monocytes could be used as a non-invasive way to measure glucocorticoid sensitivity using a Fluorescein labelled dexamethasone (F-Dex) monocyte binding assay in this population.

Objective and hypotheses:
We propose to use cord blood monocytes to characterize glucocorticoid sensitivity in preterm neonates using a Fluorescein labelled dexamethasone (F-Dex) monocyte binding assay. We also propose to determine what factors can effect GS in neonates.

Method:
30 cord samples were collected from the following groups of mothers: gestational DM, pregestational DM, prenatal steroid exposure, chronic HTN, cholestasis, PIH/Pre-eclampsia, PPROM, oligohydraminos and HELLP/ placental previa. We compared F-Dex binding of these groups to 25 term healthy neonates born without any complications that served as controls.

Results:
Preliminary results so far show that the F-Dex binding in these cohorts were similar to that in the control neonate populations.

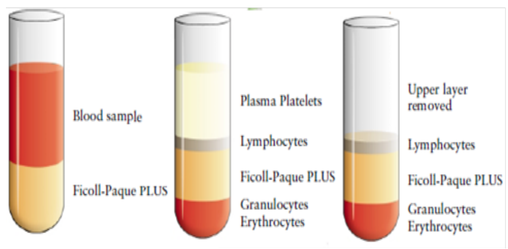
Conclusion:
Our preliminary results show that the factors of gestational DM, pregestational DM, prenatal steroid exposure, chronic HTN, cholestasis, PIH/Pre-eclampsia, PPROM, oligohydraminos and HELLP/ placental previa does not effect F-Dex binding in neonate cord blood monocytes. We will need to collect more sample to examine these factors and others further.

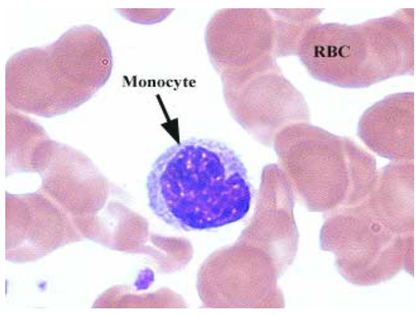
Objective

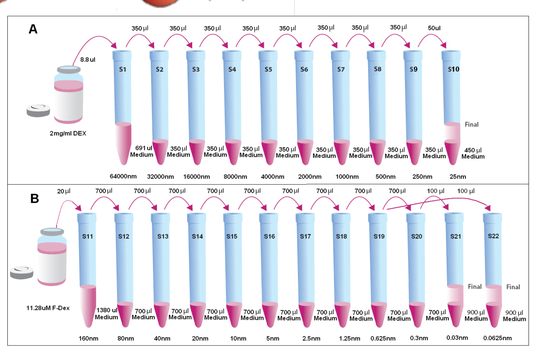
We propose to use cord blood monocytes to characterize glucocorticoid sensitivity in preterm neonates using a Fluorescein labelled dexamethasone (F-Dex) monocyte binding assay. We also propose to determine what factors can effect GS in neonates.

Methods

30 cord samples were collected from the following groups of mothers: gestational DM, pregestational DM, prenatal steroid exposure, chronic HTN, cholestasis, PIH/Pre-eclampsia, PPROM, oligohydraminos, HELLP/ placental previa, We compared F-Dex binding of these groups to 25 term healthy neonates born without any complications that served as controls.

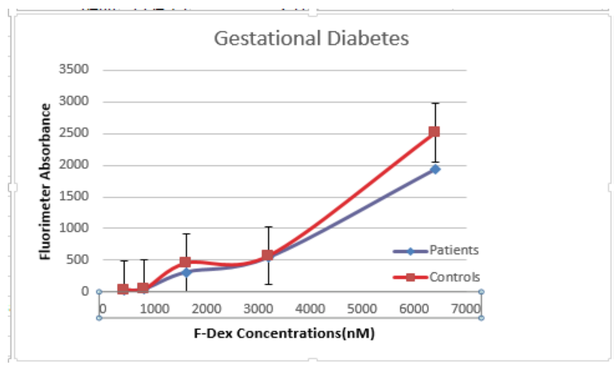


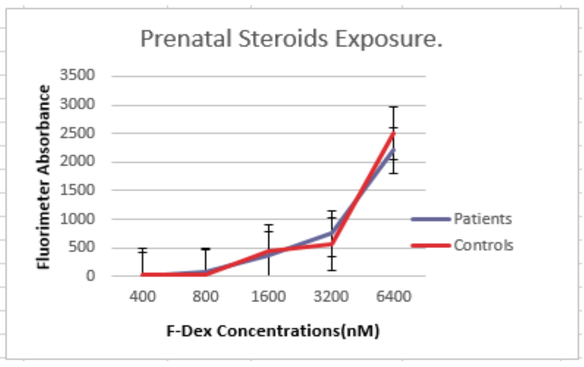


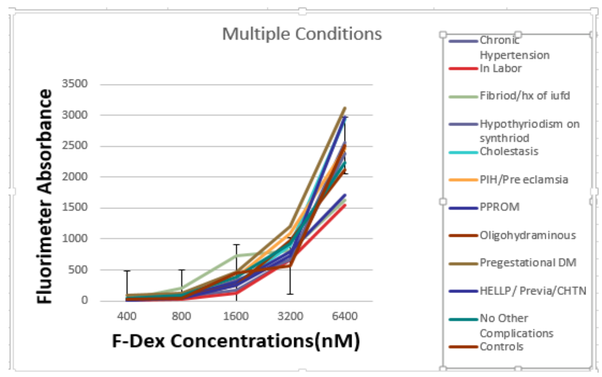


Results

Preliminary results so far show that the F-Dex binding in these cohorts were similar to that in the control neonate populations.

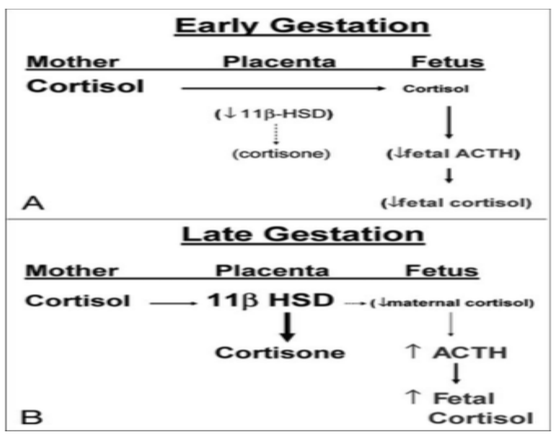






Background

Glucocorticoids play an important role in the developing fetus; the most important of which is lung maturation by increasing surfactant production and release. Glucocorticoid receptor (GR) functioning changes throughout the fetal period, especially during the transition to extrauterine life. Given the importance of glucocorticoids in lung development and functioning, studying glucocorticoid sensitivity (GS) in this population would be helpful, especially in the preterm population, to determine optimal steroid treatment for better lung outcomes. Few groups have characterized the glucocorticoid receptor and its sensitivity using cord blood monocytes. Our pilot studies looking at term neonates born to mother without complications demonstrated that cord blood monocytes could be used as a non-invasive way to measure glucocorticoid sensitivity using a Fluorescein labelled dexamethasone (F-Dex) monocyte binding assay in this population.



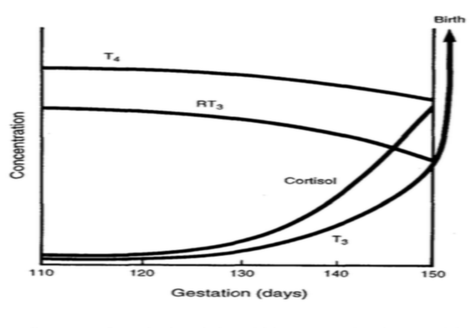


Fig. 3. Patterns of cortisol and thyroid hormones in plasma of fetal sheep in late pregnancy. T_3, tri-iodothyronine; T_4, thyroxin; RT_3, reverse T_3.

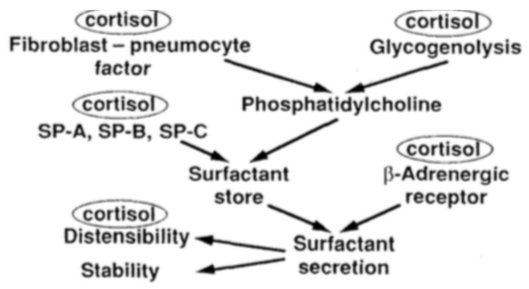


Fig. 5. Diagram illustrating multiple points of action of cortisol on the biosynthetic pathway of pulmonary surfactant.

Discussion

Our preliminary results show that the factors of gestational DM, pregestational DM, prenatal steroid exposure, chronic HTN, cholestasis, PIH/Pre-eclampsia, PPROM, Oligohydraminos, HELLP/ placental previa, does not effect F-Dex binding in neonate cord blood monocytes. We will need to collect more sample to examine these factors and others further.

References

1.Kajantie E, Dunkel L, Turpeinen U, Placental 11Beta-hydroxysteriod dehydrogenase-2 and fetal cortisol/cortisone shuttle in small preterm infants. J Clin Endocrinol Metab. 2003;88:492-500

2.LigginEconomides DL, Nicolaides KH, Linton EA, Plasma cortisol and adrenocorticotropin in appropriate and small for gestational age fetuses. Fetal There. 1988, 3:158-164

3.s G.C., The Role of Cortisol in Preparing the Fetus for Birth. Reprod. Fertile. Deve., 1994, 6, 141-50

4.Murphy VE, Smith R, Giles WB, Endocrine regulation of human fetal growth: the mother, placenta, and fetus. Endocrine Rev. 2006/ 27:141-169 Regnault TRH, Limesand SW, Hay WW, Jr. Factors influencing fetal growth. Neoreviews 2001;2:e119-e128

Disclosures: The authors have no disclosures for this study

55ESPE 574--P2

Perinatal Endocrinology

Steven Ghanny

DOI: 10.3252/pso.eu.55ESPE.2016

Poster presented at: ESPE 2016 PARIS

PosterSessionOnline.com