Impact of Hormones on Milk Supply: Polycystic Ovarian Syndrome, Insulin Resistance, And Hyperandrogenism

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Disclosures

• Co-Founder of the mama ‘hood
Objectives

• Describe the effect of insulin on milk supply
• List 3 symptoms of Polycystic Ovarian Syndrome
• Describe the effect of hyper-androgenism on milk supply
Where is the Milk?

• Good breastfeeding Management 1st
• Is this a baby issue or a mom issue?
• Pre-Glandular reasons for low milk supply:
  • Retained placenta
  • Hypo or hyper thyroid
Normal Hormonal Cascade

- Estrogen and progesterone present through pregnancy
- Prolactin levels are very high right before birth. Body makes colostrum-like food until the placenta is birthed and progesterone falls
- Prolactin is high and surges with suckling
- Insulin is the switch that tells the breast to transition to a biofactory that manufactures massive amounts of proteins, fats and carbohydrates for nourishing the newborn baby.

Glandular reasons for Low Milk Supply

- Breast surgery
- Hypoplasia
- Insufficient Glandular Tissue
- Differently shaped breasts can make plenty of breastmilk.
- Remember! Breast shape and spacing are a poor way to diagnose breast function.
Poor Glandular Development

Diana Cassar-Uhl, IBCLC

• In some cases, a girl’s breasts may grow during puberty, but perhaps that growth is asymmetrical (uneven) or the breasts are large and appear normal, but only fatty tissue developed, not glandular tissue. This could be the result of hormonal irregularities that occur with some endocrine conditions, such as PCOS or uncontrolled thyroid or insulin-related conditions (Marasco, Marmet, & Shell, 2000).
Different presentations of Insufficient Glandular Tissue
IGT Presentation

- Widely spaced breasts
- Breast asymmetry
- Presence of stretch marks on the breasts, in absence of breast growth, either during puberty or in pregnancy
- Tubular breast shape
- Bulbous areolae
- Absence of breast changes in pregnancy, postpartum, or both
Breastfeeding Management and Milk Supply

• Post-glandular: Breastfeeding “gets off to a bad start”
• A baby who isn't removing milk well: tethered oral tissues, prematurity, birth trauma, sleepiness from elevated bilirubin levels
• Separation of mom and baby
• Scheduling feedings or limiting baby’s access to the breast
• Look for horses before zebras
Chicken or egg?

- (Pre-) Diabetes
- Mammary Hypoplasia
- PCOS
Pre-diabetes, Insulin Resistance, Metabolic Syndrome, Gestational Diabetes, Diabetes Type 2

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Estimates of Diabetes and Its Burden in the United States

Background
The National Diabetes Statistics Report is a periodic publication of the Centers for Disease Control and Prevention (CDC) that provides updated statistics about diabetes in the United States for a scientific audience. It includes information on prevalence and incidence of diabetes, prediabetes, risk factors for complications, acute and long-term complications, deaths, and costs. These data can help focus efforts to prevent and control diabetes across the United States. This report was previously known as the National Diabetes Fact Sheet.

Methods
The estimates in this document (unless otherwise noted) were derived from various data systems of CDC, the Indian Health Service (IHS), the Agency for Healthcare Research and Quality (AHRQ), the U.S. Census Bureau, and published studies. The estimated percentages and the total number of people with diabetes and prediabetes were derived from the National Health and Nutrition Examination Survey (NHANES), National Health Interview Survey (NHIS), IHS National Data Warehouse (NDW), Behavioral Risk Factor Surveillance System (BRFSS), United States Diabetes Surveillance System (USDDS), and U.S. resident population estimates.

Numbers and rates for acute and long-term complications of diabetes were derived from the National Inpatient Sample (NIS) and National Emergency Department Sample (NEDS), as well as NHIS. Diagnosed diabetes was determined by self-report among survey respondents and by diagnostic codes for American Indians and Alaska Natives who accessed IHS, tribal, or Urban Indian health facilities that submitted data to the IHS NDW.

Both fasting glucose and hemoglobin A1C (A1C) levels were used to derive estimates for undiagnosed diabetes and prediabetes. An alpha level of 0.05 was used when assessing statistical differences between groups.

Most estimates of diabetes in this report do not differentiate between type 1 and type 2 diabetes. However, because type 2 diabetes accounts for 90% to 95% of all diabetes cases, the data presented are likely to be more characteristic of type 2 diabetes. More detailed information about data sources and methods is available in the Appendix.
PCOS: Symptoms and Diagnosis

• A diagnosis requires 2 or more symptoms of infrequent or irregular periods, high levels of androgens, and cysts on the ovaries

• Other symptoms may include: weight gain around the waist, hard time losing weight, extra unwanted hair, thinning scalp hair, acne along the jaw line, pelvic pain, and depression

• Women who exercise frequently and eat a low glycemic diet may present with subtle symptoms
IGT vs Insulin Resistance Definition

• IGT, Impaired Glucose Tolerance, once called "borderline diabetes," or "subclinical" diabetes, means your numbers are still short of the diabetic threshold, but exhibit abnormalities in the processing of blood sugar.

• If a person has insulin resistance, the body is not able to correctly utilize its normal (endogenous) insulin supply, even though that insulin is present in sufficient volume.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2646025/
Impaired Glucose Tolerance and Insulin Resistance Treatment Options

• Diet: Low-glycemic, gluten free, low dairy
• Exercise
• Metformin - in PCOS and Type II diabetic women, Metformin treatment has resulted in increased milk production (Gabbay, 2003)
• If a mother is able to breastfeed, she decreases her risk of Diabetes Type 2 and decreases her baby’s risk of diabetes.
• Myo-Inositol a natural occurring in food that improves receptor function
Insulin has a direct role in Breast development; Lactogenesis I & II

- Direct action on the mammary gland during breast development
- Vital to production and secretion of colostrum
- Cells in the breast must remain insulin sensitive
- This genetic expression suggests a relationship between insulin resistance and insufficient milk supply (Lemay, Ballard, Hughes, Morrow, Horseman, & Nommsen-Rivers, 2013).
Study done for Fertility

- Myo-inositol, a naturally occurring substance that our bodies produce, that is also available in foods (a member of the B-complex vitamin group) like beans, fruits, and nuts, has been shown to have an effect on how our insulin receptors work. Gerli, Papaleo, Ferrari, and DiRenzo (2007) found that myo-inositol helped women with PCOS who were not ovulating to begin ovulating again (in women with a BMI under 37). The study also noted weight loss among those who were taking the myo-inositol (the experimental dose was 4 grams per day, which is 8 500mg capsules), but weight gain among the placebo group.
Failing Glucose Tolerance Test in Pregnancy

- Failing the 1 hour glucose tolerance test may be a clue if milk supply is low

Ravi Retnakaran, MD; Bernard Zinman, MD; Philip W. Connelly, MD; Mathew Sermer, MD; Anthony J.G. Hanley, MD. Impaired Glucose Tolerance of Pregnancy Is a Heterogeneous Metabolic Disorder as Defined by the Glycemic Response to the Oral Glucose Tolerance Test. Diabetes Care. 2006 Jan;29(1):57-62.
Elevated amniotic fluid insulin

• Impaired glucose tolerance (IGT) is found in 36% of ODM and is also associated with elevated amniotic fluid insulin in utero.

• Excessive insulin secretion in utero, as assessed by AFI concentration, is a predictor of both obesity and IGT in adolescence.

Chicken or egg?
Flip the language!

• A mother with insulin resistance or poor glucose tolerance is less likely to make a full milk supply and to be successful breastfeeding which increases her risk of diabetes.

• This same mother, because of elevated AFI amniotic fluid insulin levels has potentially increased her baby’s risk of poor glandular development and impaired glucose tolerance and low milk supply.
2013 Diagnosed Diabetes Prevalence

Data source: United States Diabetes Surveillance System.
Stop Blaming Women

- Women who struggle with Impaired glucose tolerance (IGT) or insulin resistance (IR) know that life-style changes and diet will help them.
- These same women have found that even when they eat cleanly and exercise, they are unable to lose weight.
- Many women with a high BMI have perfectly normal glucose tolerance and insulin utilization.
- Not all people with IGT and IR are overweight.
Factors Cause Your PCOS

Unknowingly you are creating a perfect environment for PCOS
But the good news is that you can reverse it by appropriate lifestyle changes...

- **Weakened Immune System**
  - Nutritious diet and supplements boost immunity
  - Just Do It

- **Accumulation of Toxins**
  - Stop eating junk foods
  - Just Do It

- **Insulin Resistance and Obesity**
  - Enjoy meditation and exercise
  - Just Do It

- **Bad Dietary Choices**
  - Switch to natural & organic foods
  - Just Do It

- **Genetic Tendency**
  - Be joyful always to alter it
  - Just Do It

PCOS

The Mama’s Hood
Hyperandrogenism Symptoms: Presentation

• Glandular Impact: High androgen levels can interfere with prolactin reaching their receptors, fewer prolactin receptors develop during pregnancy = less milk

• Hirsutism - male-pattern hair growth, Alopecia - balding, Masculine appearance, Hidradenitis suppurativa, Polycystic ovarian syndrome, Oligomenorrhea - menstrual irregularities, Acne, Obesity.
Hyperandrogenism Symptoms: Treatment

- Metformin induces a prompt decrease in LH-stimulated testosterone response in women with PCOS independent of its insulin-sensitizing effects
- Treatment: Metformin decreases serum androgens

Provider Questionnaire

Questions to ask Clients in the 3\textsuperscript{rd} Trimester of pregnancy:

• Have you ever had concerns about your ability to breastfeed?
• Did you have fertility challenges?
• What is the interval between your periods when you are not taking birth control pills?
• Have you ever been told you have cysts on your ovaries?
Questionnaire continued

• Do you have any of the symptoms of PCOS with or without a prior diagnosis? Symptoms can include:
  • facial hair or hair growing in places you would not expect
  • unexplained weight gain
  • hormone imbalance such as too little estrogen and/or too much testosterone
  • acne along the jaw line
  • a diagnosis of prediabetes or diabetes
Questionnaire continued

• Do you have a breast/ nipple shape that you are concerned will present feeding challenges?

• Insulin resistance (possibly failing your 1-hour glucose challenge test that is done between 24-28 weeks gestation) even if you pass the second glucose test?

• Diagnosis of Gestational Diabetes?
More information

- https://dianaibclc.com/2014/05/06/insulin-resistance-and-lactation-insufficiency-faq/
- https://www.sciencedaily.com/releases/2013/07/130705212228.htm