PCOS
Polycystic Ovarian Syndrome

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Definition

PC•O•S *polycystic ovarian syndrome* 1 a common endocrine system disorder for women of reproductive age 2 may or may not have enlarged ovaries with multiple small cysts seen on an ultrasound exam 3 symptoms vary from woman to woman
Symptoms

- Irregular Menses
  - Scant
  - Prolonged, heavy
  - Absent

- Excess Androgen
  - Facial + Body hair
  - Acne
  - Greasy skin
More Symptoms
*(Indirect)*

- Abnormal insulin
- Abnormal blood sugar
- Large waist circumference
- Abnormal cholesterol and lipoproteins
- Infertility
- Sleep apnea
- Depression and anxiety
Stein–Leventhal Syndrome

- Syndrome first described in 1935 by 2 gynecologists, Irving Stein and Michael Leventhal
- Associated the presence of multiple ovarian cysts in patients with anovulation

For a long time, that is where the focus of treatment was...

- wedge resection
- laparoscopic drilling of ovaries
Causes

Exact cause is *unknown*!

Genetics
- Often patients have a mother or a sister with PCOS

Hormone Imbalance
- Elevated androgens
- Harder for ovaries to release a mature egg

Insulin resistance
- A change in how the cells of the body react to insulin

Inflammation...The final frontier

This is Reversible!
Insulin resistance and the polycystic ovary syndrome: mechanism and implications for pathogenesis

It is now clear that PCOS is often associated with profound insulin resistance as well as with defects in insulin secretion.


Why is this important?

- Understand the cause
- Realize what implication diet has
- How nutrient deficiencies can exacerbate condition
- We can reverse this naturally, without OCPs
Where does energy go?

- **BRAIN**
  - Stored Glycogen
  - Adipose to store for times of famine

- **MUSCLE FIBER**
  - Perform physical activity

- **LIVER**
  - Stored Glycogen

George Gilson, MD PhD.
How do we process sugar and modulate energy?

- **GLUCOSE** → **ACETYL CoA**
- **INSULIN**
- **KREBS CYCLE**
- **CHOLESTEROL**
  - **ENERGY**
  - **HORMONES**
  - **FIGHT INFLAMMATION**
    - *Antioxidant*
  - **BRAIN**
Insulin Resistant Adipose Tissue: “Metastatic Fat”

- Increased Cholesterol Synthesis
- Increased Liver Enzymes
- Muscle no longer burns fat well - “marbling”
- Increased serum triglycerides/free fatty acids

- George Gilson, MD PhD.
What causes insulin resistance?

- Sugar
- Too Many Carbohydrates – Simple Worse than Dense
- Low Muscle Mass
- Inflammation
- Too much adipose tissue
- Too many trans fats
- Nutrient deficiency – Chromium, Zinc, Selenium
- Chronic High Cortisol – Dysregulation
- High Fructose Corn Syrup
- Lack of Sleep
The Skinny on Fat

- Not just a storage depot!

- When the fat to lean muscle ratio becomes too large, fat becomes an inflammatory agent.
  - Enlarged fat cells
  - Recruits macrophages
  - Increases secretion of TNFα
  - Leaks fatty acids

High Cholesterol – Good!

- In 2005, Boston University researchers found a link between high total cholesterol and cognitive performance.
  - 789 men, 1005 women
  - Free of dementia and stroke
  - Followed for 16–18 years
  - Cognitive tests ever 4–6 years
High Cholesterol – Good!

- Results – Significant positive linear association between total cholesterol and measures of verbal fluency, attention/concentration, abstract reasoning, and a composite score measuring multiple cognitive domains.

- Penelope K. Elias, et al., Psychosomatic Medicine 67, no. 1 (2005); 24-30
Cholesterol is not the problem!
Energy Balance

Glucose molecules

Palmitate

Indicates increased energy production

Down regulates

HNF4

↑ SHBG

↑ Free

Testosterone
Hypothesis

What if chronic daily inflammation created by a toxic, 24/7 high stress, sugar dysregulated, high cortisol lifestyle could cause PCOS?


Steroidal Hormone Principle Pathways
Understanding pregnenolone steal, the preferential pathway under chronic stress.
Adrenal gland → DHEA → Fatty tissue → Increased fatty tissue → Increased androgens → Androstenedione → Testosterone → Estradiol

Why do PCOS patients have high estradiol?

Upregulation of aromatization

Estrone
Progesterone and Insulin

- Progesterone acts on the pancreatic beta cells to decrease insulin production.

- Patients in Helene Leonetti’s study of progesterone cream and vasomotor symptoms who had high triglycerides (TG) at inception, had lower TG after one year of Pg cream, 20 mg qd

- There are widespread, but anecdotal reports of improvement in PCOS with topical progesterone (lower androgens, resumption of regular menses)

**Bottom line:** Progesterone appears to ameliorate problems associated with increased insulin. In reasonable doses, there is no evidence that progesterone causes or worsens insulin resistance.
Lab Tests

**Serum**
- Cardio Metabolic Panel
- FSH
- Fasting Insulin
- HbA₁C
- SHBG
- Free Testosterone
- Total Testosterone

**Salivary**
- Estradiol
- Estrone
- Estriol
- Progesterone
- Testosterone
How can we reverse PCOS?

- Pharmacological aids
- Diet – Nutrition
- Exercise
- Supplements
Pharmacological Aids

1. OCP
2. Metformin
3. Progesterone
4. Clomiphene Citrate
5. Spironolactone
Our PCOS Protocol

✓ NUTRITION
✓ EXERCISE
✓ SUPPLEMENTATION
Nutrition

- Stabilize Blood Sugar
  - Anti-inflammatory/Real Food Diet
  - Sugar Elimination Diet
- 12 Hour Fast, 5 pm – 5 am 4 days a week
  - Biosphere studies
- Minimize Fast Food
- Minimize Eating Out
  - 500 more calories are consumed
  - More bad carbohydrates are consumed
Exercise

85% of blood sugar goes to Skeletal muscle

- Resistance training
- High Intensity Interval Exercise
  - Peak 8
  - More After-Burn
Supplements

Designs For Health

- Ovaben
- Metabolic Synergy
- Chromium Synergy
- Ultimate Antiox

To aid in diet transition...

- Paleo Cleanse Plus Detox
Conclusion

- PCOS is a disease of...
  - Insulin resistance
  - Blood sugar dysregulation
  - Nutrient deficiencies
  - Heredity
  - Inflammation