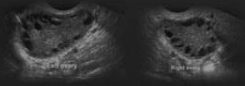



## OBJECTIVES

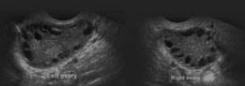
- To review the definition of PCOS
- Understand the symptoms of PCOS
- To understand how to diagnose PCOS
- Review the pathophysiology of PCOS
- Recognize the health risks associated with PCOS
- Review the treatment of PCOS
- Discuss current LECOM PCOS Study




The 'OBJECTIVES' section is contained within a dark gray rectangular box. In the top left corner of this box is a small version of the PCOS logo. The title 'OBJECTIVES' is centered at the top in a large white sans-serif font. Below the title is a list of seven bullet points, each starting with a white dot and followed by white text. In the bottom right corner of the box, there are two small, faint ultrasound images of ovaries, similar to the ones in the top image.

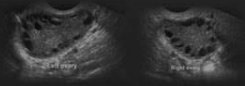
 **Lecture Outline**

- 1 INTRODUCTION – What is PCOS?
- 2 SYMPTOMS & DIAGNOSIS – How does PCOS Present?
- 3 HEALTH RISKS OF PCOS – Why it's so important?
- 4 TREATMENT – How do you deal with PCOS?



 **PCOS**

- 1 MOST COMMON CAUSE OF ENDOCRINE DISORDER IN WOMEN
- 2 Most common cause of infertility in women
- 3 Also known as Stein-Leventhal Syndrome
- 4 Affects 1 in 10 women
- 5 Affects 4-5 million women in the U.S. that are reproductive
- 6 Is a vital cause of androgen excess & menstrual irregularities in women
- 7
- 8



**PCOS**

# What is PCOS?

**It's a Syndrome!**

**Variable Clinical Presentations**

The diagram illustrates the various clinical presentations of PCOS. A central hub labeled "Oligomenorrhea Amenorrhea & Hyperandrogenism" is connected to several other symptoms: "Obesity", "Infertility", "Polycystic Ovaries", "Insulin Resistance", "Hirsutism", "Acne", and "Anxiety & Depression".

**PCOS**

## What You Need To Know: Symptoms

**HINT**

**Signs & Symptoms**

- **Oligomenorrhea (Irregular menses) or amenorrhea**
- **Obesity**
- **Hirsutism**
- **Acne**
- **Diabetes mellitus – Type 2**

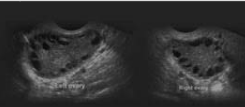
**PCOS**

## Recommended Diagnostic Schemes for Polycystic Ovary Ovary Syndrome by Varying Expert Groups (Table 1.)

2

Signs & Symptoms	National Institutes of Health Criteria 1990 (both are required for diagnosis)	Rotterdam Consensus Criteria 2003 (2 out of 3 are required for diagnosis)	Androgen Excess Society 2006 (hyperandrogenism plus 1 out of remaining 2 are required for diagnosis)
Hyperandrogenism	R	NR	R
Oligoamenorrhea or amenorrhea	R	NR	NR
Polycystic ovaries by ultrasound diagnosis		NR	NR

ACOG Practice Bulletin, Polycystic Ovarian Syndrome, Vol. 114, No.4, October 2009



**PCOS**

## PCOS Work up

SCENE

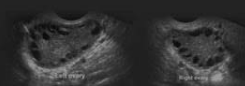
**Making the Diagnosis**

**Physical Exam**

- Blood pressure
- BMI
- Waist circumference
- Signs of hyperandrogenism & insulin resistance
  - Hirsutism
  - Acne
  - Acanthosis Nigricans
  - Androgenic Alopecia

**Laboratory Testing**

- Total testosterone & SHBG or bioavailable & free testosterone
- Exclude other endocrine disorders
  - TSH
  - Prolactin
  - 17-hydroxyprogesterone
- Evaluate for metabolic abnormalities
  - 2 hr GTT
  - Lipid panel

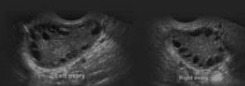


PCOS

## PCOS Work up

Making the Diagnosis SCENE

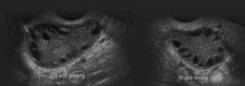
Ultrasound	Laboratory Testing - Optional
<ul style="list-style-type: none"> <li>▪ ? Polycystic ovaries</li> <li>▪ ? Increased ovarian volume</li> </ul>	<ul style="list-style-type: none"> <li>▪ Fasting Insulin</li> <li>▪ 24 hour urinary free-cortisol excretion test or low dose dexamethasone suppression test</li> </ul>



PCOS

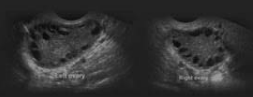
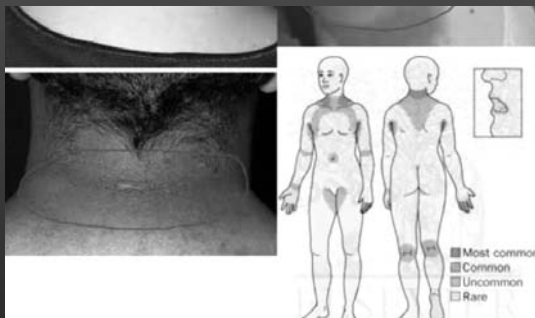
## DIFFERENTIAL DIAGNOSIS

- Thyroid disease
- Prolactin disorders
- Primary ovarian failure
- Androgen secreting tumor
- Exogenous androgens
- Cushing syndrome
- Nonclassical congenital adrenal hyperplasia
- Acromegaly
- Genetic defects in insulin action
- Primary hypothalamic amenorrhea

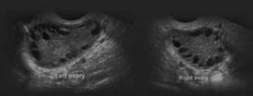




Acanthosis nigricans is a skin condition characterized by areas of dark, velvety discoloration in body folds and creases. The affected skin can become thickened. Most often, acanthosis nigricans affects your armpits, groin and neck. (*mayoclinic.org*)



Acanthosis nigricans





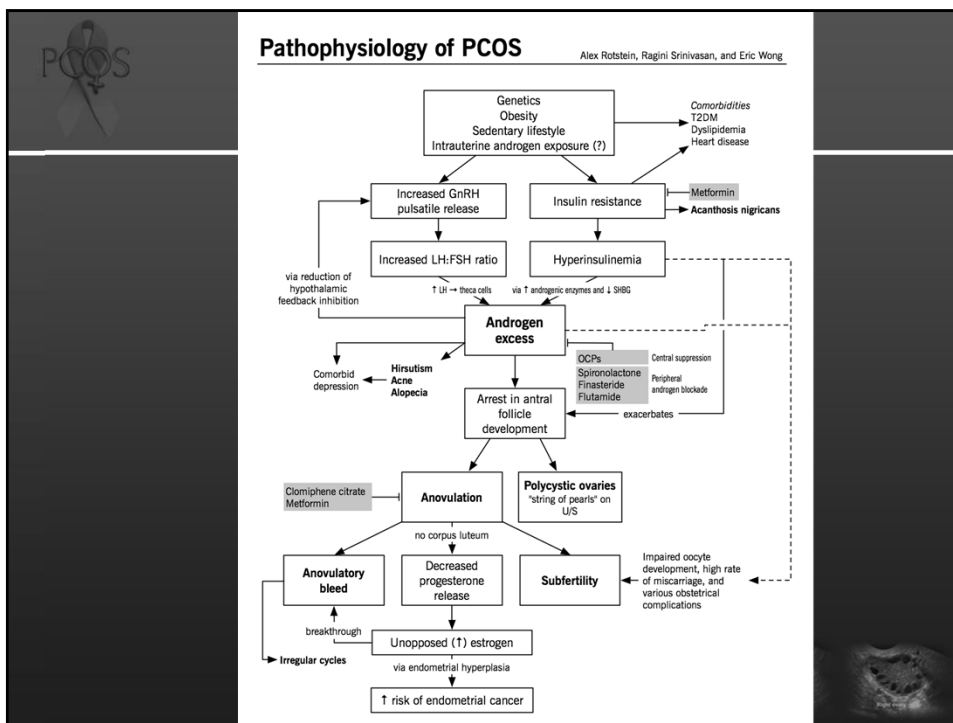
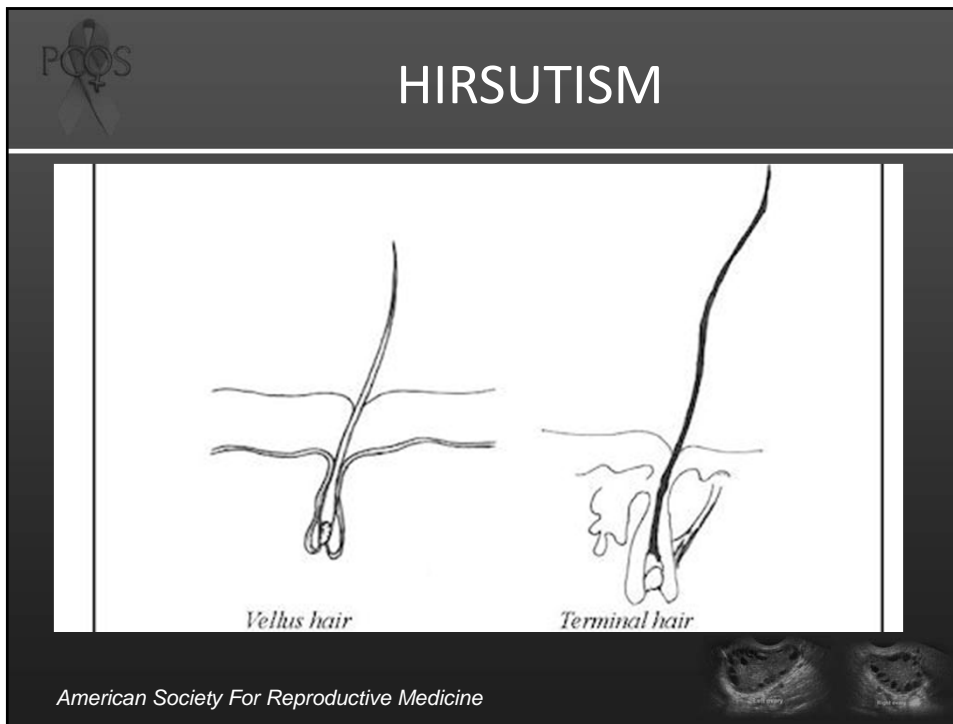
## PCOS ACNE



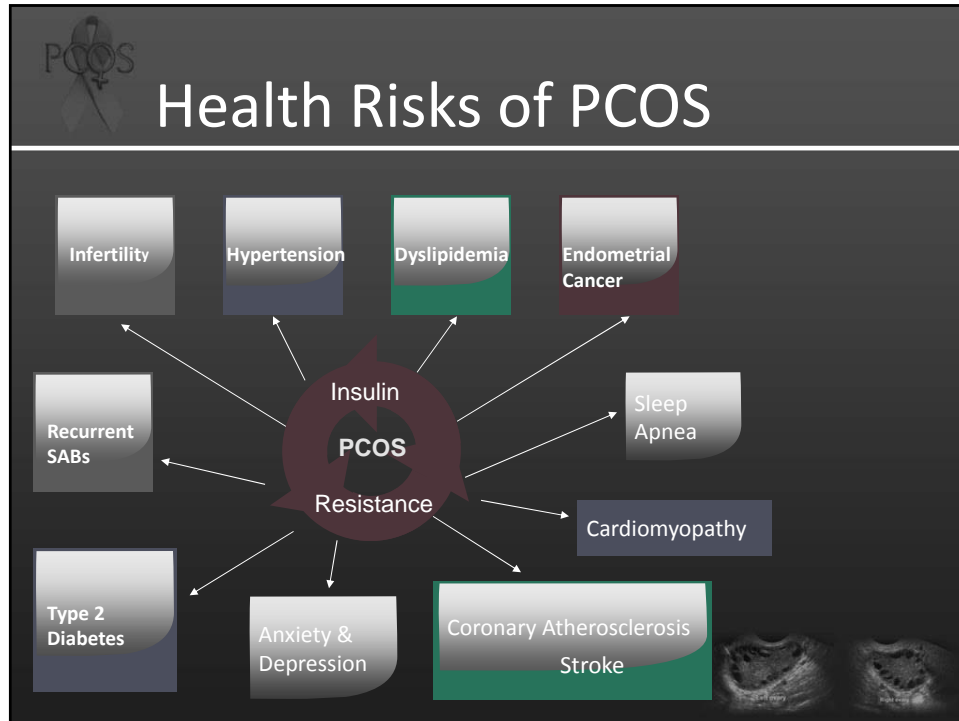
## HIRSUTISM

Hirsutism is the excessive growth of facial or body hair on women. Hirsutism can be seen as coarse, dark hair that may appear on the face, chest, lower abdomen, back, upper arms, or upper legs.









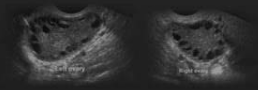
**Metabolic Syndrome**

- Women with PCOS have an 11-fold risk of developing metabolic syndrome, aka as "Syndrome X."
- Insulin resistance is the root cause of this condition.
- Definition per the National Cholesterol Education Program's Adult Treatment Panel III involves at least three of the following conditions:
  - Abdominal obesity (waist circumference >35 inches)
  - Serum triglycerides  $\geq 150$  mg/dL
  - HDL of < 50 mg/dL
  - Blood pressure  $\geq$  to 130/85
  - Serum FBG  $\geq 100$  mg/dL



## Treating PCOS

- Weight loss improves
  - rates of pregnancy, hirsutism, glucose & lipids
- Oral Contraceptive Pills
  - Suppresses LH secretion from pituitary
  - Suppresses androgen secretion from the ovaries
  - Increases SHBG

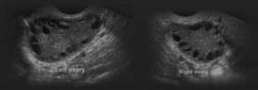


## Treating PCOS

- Insulin-Sensitizing Agents
  - Metformin (biguanides)
  - Pioglitazone & Rosiglitazone (thiazolidinediones)

Goal: improve insulin sensitivity

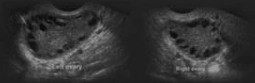
- ✓ decreases circulating androgens
- ✓ improves ovulation
- ✓ improves glucose tolerance





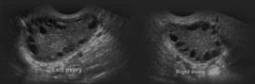
## Treating PCOS - *ovulation induction*

- Preconception counseling
  - weight loss, smoking cessation, exercise, decrease alcohol consumption
- Ovulation induction
  - Clomiphene citrate (antiestrogen)
  - Exogenous gonadotropins (2<sup>nd</sup> line)
  - Laparoscopic ovarian surgery (2<sup>nd</sup> line)
  - Letrozole & Anastrozole (Aromatase inhibitors)
  - Metformin



## Treating PCOS - *hirsutism*

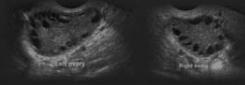
- No clear primary treatment
- Mechanical Hair removal – *shaving, waxing, plucking, creams, electrolysis, laser vaporization (1<sup>st</sup> line for many)*
- Laser therapy – *\*increasing use*
- Combined OCP's
- Antiandrogens - *\*mildly effective, poor study trials*
- Spironolactone – *diuretic & aldosterone antagonist*
  - Dose – 25-100mg BID (*may take up to 6 months to see effect*)





## Treating PCOS - *hirsutism*

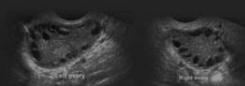
- **Flutamide** – *androgen receptor agonist (nonsteroidal antiandrogen)*
  - *Smaller study trials show effectiveness*
  - *Large risk of teratogenicity, contraception necessary*
- **Finasteride** – *inhibits both forms of the 5 alpha reductase enzyme*
  - *Large risk of teratogenicity in male infants, contraception necessary*
- **Metformin** - *\*little support regarding efficacy*
- **Eflornithine** - *inhibitor of ornithine decarboxylase enzyme*
  - *Approved by FDA for treatment of facial hirsutism in women*
  - *AAA BID to facial areas*



## WHAT YOU NEED TO KNOW: *Treatment*

### To Conceive or Not to Conceive? - That is the question!

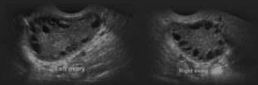
- **Weight loss**
- **To Conceive. . .**
  - Clomiphene
  - Metformin
- **Not to Conceive. . .**
  - OCP's





## Can non-pharmacologic interventions improve outcomes?

- Weight loss, improved diet help
- Yoga?
  - Preliminary studies indicate regular yoga practice improved anxiety, LH:FSH, testosterone, mFG, fasting insulin and FBG, and menstrual irregularity in a sample of adolescent Indian females w/ PCOS
- OMT?
  - Used to improve sympathetic tone in individuals w/o PCOS



## Research study on non-pharmacologic interventions

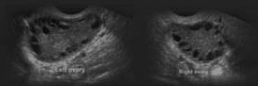
- Women 20-44 years old, confirmed Dx (Rotterdam criteria)

### Intervention groups:

- Yoga – 3x/wk for 12 wks
- OMT – 1x/wk for 12 weeks

**Results in late  
May/early June!**

- Can these interventions improve:
  - Hormone levels?
  - Metabolic profile?
  - Anxiety and depression?
  - Sympathetic tone?
  - Menstrual irregularity?





# Questions?

