UNDERSTANDING PCOS AND ITS DIAGNOSIS

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YEAR OF THE PATIENT

Polycystic Ovary Syndrome Center
Penn Fertility Care
Penn Medicine
Do you think you have PCOS?

or

Do you have a diagnosis of PCOS?

• Why do you think you have PCOS?

or

• Why do you have a diagnosis of PCOS?
Do you think you have PCOS because....

- You gain weight mostly in the abdomen
- Have cysts on your ovaries
- Irregular periods as a teenager
- Excess hair on your face, abdomen
- You are unable to lose weight easily
- Hair loss
- Went to the ER because a cyst in your ovary ruptured
STEIN-LEVENTHAL SYNDROME

- Case series of 7 women
- Obese, excessive hair, irregular menses, difficulty getting pregnant
ROTTERDAM CRITERIA FOR PCOS

- Irregular menses
- Increased hair growth or high male hormones
- Polycystic appearing ovaries

Most common endocrine disorder in reproductive age
10-15%
IRREGULAR MENSES

- Less than 6-9 menses per year

- Blood tests
- Thyroid problem
- Prolactin problem
- Low progesterone levels

PCOS is the most common cause for no ovulation
INCREASED HAIR GROWTH
FG score used to quantify hair growth
# Score Changes by Ethnicity

<table>
<thead>
<tr>
<th>Author</th>
<th>Country</th>
<th>Ethnicity</th>
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<tbody>
<tr>
<td>Api, 2009</td>
<td>Turkey</td>
<td>Middle Eastern</td>
<td>≥ 11</td>
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<td>Noorbala, 2010</td>
<td>Iran</td>
<td>Middle Eastern</td>
<td>≥ 10</td>
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<td>Moran, 2010</td>
<td>Mexico</td>
<td>Hispanic</td>
<td>≥ 10</td>
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<tr>
<td>Gambineri, 2011</td>
<td>Italy</td>
<td>Mediterranean</td>
<td>≥ 9</td>
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<td>Asuncion, 2000</td>
<td>Spain</td>
<td>Mediterranean</td>
<td>≥ 8</td>
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<td>DeUgarte, 2006</td>
<td>USA</td>
<td>Caucasian/Hispanic</td>
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<td></td>
<td></td>
<td>African-American</td>
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<tr>
<td>Tellez, 1995</td>
<td>Chile</td>
<td>Hispanic</td>
<td>≥ 6</td>
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<td>Kim, 2011</td>
<td>Korea</td>
<td>Chinese</td>
<td>≥ 6</td>
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<td>Cheewadhanarakas, 2004</td>
<td>Thailand</td>
<td>Thai &amp; Chinese</td>
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<td>Zhao, 2007</td>
<td>China</td>
<td>Chinese Han</td>
<td>≥ 2</td>
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</table>
Female Pattern Balding
High Testosterone Levels

- Total testosterone
- Free testosterone (most commonly elevated)
Ultrasound Evaluation of Ovaries

- follicle number and ovarian volume
Polycystic Ovaries

Polycystic Ovary

Cyst

Normal Ovary

Developing Egg

Polycystic Ovary Syndrome Center
PENN Fertility Care
Penn Medicine
WHAT IS AN OVARIAN CYST?
SURGERY FOR PCOS
Are there different types of PCOS?

- Testosterone: 75%
- Ovaries: 75%
- Menses: 60-80%

All: common characteristics of PCOS
### Table 2. Potential Phenotypes of PCOS by NIH 1990, Rotterdam 2003, and AE-PCOS 2006

<table>
<thead>
<tr>
<th>Panel Terminology</th>
<th>Diagnostic Criteria</th>
<th>NIH</th>
<th>AE-PCOS/ Rotterdam 1</th>
<th>Rotterdam 2</th>
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<tbody>
<tr>
<td>Androgen Excess</td>
<td>Hyperandrogenemia</td>
<td>+</td>
<td>-</td>
<td>+</td>
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<tr>
<td></td>
<td>Hyperandrogenism*</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Ovulatory Dysfunction</td>
<td>Oligo-anovulation</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Polycystic Ovarian Morphology</td>
<td>Polycystic Ovaries</td>
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<table>
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<tr>
<th>NIH 1990 Criteria</th>
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<tr>
<td>Rotterdam 2003 Criteria</td>
<td>X</td>
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<tr>
<td>AE-PCOS 2006 Criteria</td>
<td>X</td>
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</tbody>
</table>
# Change in PCOS with Age

<table>
<thead>
<tr>
<th>Age years</th>
<th>&lt;20</th>
<th>21-30</th>
<th>31-39</th>
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<tbody>
<tr>
<td>Number of subjects</td>
<td>364</td>
<td>675</td>
<td>173</td>
</tr>
<tr>
<td>Follicle number (per ovary)</td>
<td>11.5 ± 4.9</td>
<td>11.3 ± 4.8</td>
<td>9.6 ± 4.7**</td>
</tr>
<tr>
<td>Testosterone (ng/dl)</td>
<td>77 ± 30</td>
<td>78 ± 31</td>
<td>69 ± 33*</td>
</tr>
<tr>
<td>Free Androgen Index</td>
<td>9.9 ± 7.8</td>
<td>8.6 ± 7.1</td>
<td>7.1 ± 6.4</td>
</tr>
</tbody>
</table>

* P<0.025, ** P<0.001 vs. younger ages
## ETHNIC DIFFERENCES IN PCOS PHENOTYPE

<table>
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<tr>
<th></th>
<th>Controls</th>
<th>Iceland PCOS</th>
<th>US PCOS</th>
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<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td>C</td>
<td>C</td>
<td>AA</td>
<td>H</td>
<td>A</td>
</tr>
<tr>
<td><strong>n</strong></td>
<td>32</td>
<td>105</td>
<td>172</td>
<td>44</td>
<td>25</td>
<td>21</td>
</tr>
<tr>
<td><strong>Testosterone (ng/dl)</strong></td>
<td></td>
<td>35.6 ± 17.0</td>
<td>54.0 ± 25.7</td>
<td>66.2 ± 35.6</td>
<td>73.9 ± 41.8</td>
<td>77.4 ± 53.1</td>
</tr>
<tr>
<td><strong>Free testosterone (ng/dl)</strong></td>
<td></td>
<td>0.6 ± 0.3</td>
<td>1.1 ± 0.6</td>
<td>1.3 ± 0.8</td>
<td>1.7 ± 1.1</td>
<td>1.8 ± 1.4</td>
</tr>
<tr>
<td><strong>BMI (kg/m²)</strong></td>
<td></td>
<td>30.2 ± 7.5</td>
<td>31.5 ± 7.7</td>
<td>30.7 ± 9.2</td>
<td>36.3 ± 7.9</td>
<td>32.3 ± 10.3</td>
</tr>
<tr>
<td><strong>PCO morphology</strong></td>
<td></td>
<td>31%</td>
<td>92.5%</td>
<td>99.3%</td>
<td>97.4%</td>
<td>95%</td>
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</tbody>
</table>

Welt et al, 2006 JCEM
DIAGNOSIS IN ADOLESCENTS

- Defining excessive hair growth/abnormal male hormone levels
- Irregular menses
- Multi-follicular ovary

- Over diagnosis – labeling
- Missed diagnosis – opportunity to intervene
Diagnosis of PCOS

What about insulin resistance?
What about LH/FSH ratio?
What about obesity?
Acanthosis Nigricans

- Raised, velvety, hyperpigmentation of skin
- Axilla, neck, intertrigenous areas
- Marker of insulin resistance
- Associated with PCOS
TAKE HOME MESSAGE

- Do you think you have PCOS?
  or
- Have you been told you have PCOS?

PCOS is a diagnosis that should be made by your doctor

- Why do you think you have PCOS?
  or
- Why were you told you have PCOS?

You should know which criteria for PCOS you have
PENN PCOS CENTER

• Reproductive Endocrinologist
• Nurse Practitioner
• Nutritionist
• Research Coordinator
• Dermatologist
• Psychiatrist/ Clinical Psychologist
• Weight management

Polycystic Ovary Syndrome Center
Penn Fertility Care
Penn Medicine
Living with PCOS?
Trying to lose weight?

The Penn PCOS Center at the University of Pennsylvania is conducting a research study to determine the most effective intervention for women who suffer from polycystic ovary syndrome (PCOS), excess weight, and symptoms of depression.