Obesity in an adolescent female... when is it PCOS?

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I have nothing to disclose
In your office is an... 13 year old overweight female

- Patient presents for evaluation of irregular menses. Per mom, patient started to gain weight about 2-3 years ago. Since that time, she has gained about 20 lbs. She started menses about 1 year ago and has had 3 menstrual cycles. Mom has read online that women with weight gain and irregular menses have PCOS. She would like treatment so her daughter loses weight.
In your office is a…
13 year old overweight female

- Lifestyle: played soccer in fall and spring until 2 years ago
- Pubertal Hx:
  - Pubic hair – 10.5 years of age
  - Breast development – 10 years of age
  - Menses – 12 years of age
In your office is a…
13 year old overweight female

- Vitals
  HR – 68
  BP – 117/85
  Ht – 152.4 cm (25%)
  Wt – 63.5 kg (93%)
  BMI – 75%

- Exam:
  - Healthy, overweight appearing female. Normal exam with following noted. Early Tanner 4 breast development. Tanner 4 pubic hair. No increased hair on face, chest or back. Thyroid not enlarged.
What to do next???
Menstrual Irregularities

- Variable presentation in adolescents
  - Oligomenorrhea
  - Primary amenorrhea
  - Secondary amenorrhea
  - Dysfunctional uterine bleeding
Causes of menstrual irregularities

- Normal Puberty
- Pregnancy
- PCOS
- Hypothyroidism
- Ovarian tumor
- Pituitary tumor

- CAH
- Female Athlete Triad (hypothalamic amenorrhea)
- Turner Syndrome
- Testicular feminization
Normal Puberty

Adolescent girls can have anovulatory menstrual cycles, higher androgen levels and polycystic ovaries

Menstrual irregularity can be seen in the first 2-3 years after first menarche
Polycystic Ovary Syndrome

A complex disorder composed of chronic anovulation and clinical and biochemical features of hyperandrogenism

anovulatory menstrual cycles, higher androgen levels and polycystic ovaries

sounds familiar?????
What can mimic PCOS?

- Screened for by blood work
  - Thyroid dysfunction
  - Hyperprolactinemia
  - Non-classical CAH (21-hydroxylase deficiency)
  - Cushing’s Syndrome

- Screened for by ultrasound
  - Ovarian tumor
  - Adrenal tumor
## Diagnostic Criteria for PCOS

<table>
<thead>
<tr>
<th>NIH Consensus 1990 (all required)</th>
<th>Rotterdam Consensus 2003 (two out of three required)</th>
<th>AEPCOS definition 2006 (androgen excess and one other criterion)</th>
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</thead>
<tbody>
<tr>
<td>Clinical and/or biochemical hyperandrogenism</td>
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Exclusion of other androgen excess disorders: NC-CAH, Cushing’s syndrome, androgen secreting tumors, hyperprolactinemia, thyroid diseases, drug-induced androgen excess. Other causes for anovulation should also been excluded.
History & Physical Examination

- **History**
  - Family history
  - Birth history
  - Age at:
    - Pubarche
    - Thelarche
    - Menarche
  - Lifestyle / Activity

- **Physical Exam**
  - Height / weight / BMI
  - Skin exam
    - Presence of hirsutism
    - Presence of acanthosis nigricans
    - Presence of striae
  - General exam
Hirsutism

- A feature of androgen excess
- Found in about 2/3 of cases of PCOS
- Graded according to the Ferriman-Gallwey system
- < 8 is NORMAL
Ferriman-Gallwey Scale
Hirsutism equivalents

• Not all hyperandrogenemia presents as hirsutism – there may be other cutaneous signs
  • Acne
  • Seborrhea
  • Alopecia
  • hyperhidrosis
Laboratory testing

• For PCOS
  – Free testosterone
  – Total testosterone
  – SHBG
  – LH/FSH
  – IGF-1 (secondary)
  – AMH (secondary)

• Other causes
  – TSH
  – Prolactin

• Other causes with virilization
  – 17OHP
  – DHEAS
  – Cortisol (salivary or 24 hour urine)

• Metabolic syndrome
  – CMP
  – HgbA1c and/or OGTT
  – Lipid panel
Pathophysiology of PCOS

- Exact mechanism is still unknown
- Believed to be a complex etiology requiring “2 hits”
  - One congenital and one postnatal
- Believed to be adrenal and ovarian in origin
- Strong relation with hyperinsulinemia.
Pathophysiology of PCOS

• Insulin (like LH) can stimulate ovarian theca cells and cause increased androgen production
  – affects regulation of GnRH secretion which causes hypersecretion of LH
• Insulin resistance occurs in both obese and lean patients
  – Obese patients will have more severe hyperandrogenemia

• Increased LH levels in relation to FSH
• Insufficient FSH levels cause anovulation and menstrual irregularities

Results in irregular menses and clinical signs of hyperandrogenemia
PCOS diagnosis in adolescents

No set criteria but many pediatric endocrine providers use following

Menstrual irregularities

Moderate to severe hirsutism or acne

Elevated level of serum androgens (total and free testosterone)
PCOS diagnosis in adolescents

• History
  – Low birth weight
  – Premature pubarche
  – Timing of menarche (early and late)
  – SGA

• Possible markers
  – IGF-1 levels (low)
  – LH/FSH ratio
  – AMH levels (high)
Rationale for treatment

- Chronic anovulation is associated with increased risk of developing endometrial hyperplasia and carcinoma
Management of PCOS

• Should be symptom-directed

• Combined oral contraceptives
  – Restore endometrial cycling
  – Suppress androgen levels

• Metformin
  – Regulate menstrual cycles and decrease androgen levels by improving insulin sensitivity
Management of PCOS

- Anti-androgens
  - Spironolactone
  - Decrease androgen levels
  - Must ensure contraception

- Weight reduction
  - Has been effective in regulating menstrual cycles
  - Should be focus in addition to all other treatments as this will decrease insulin resistance
Additional risks

• Consider screening for:
  • Sleep-disordered breathing
  • Anxiety disorders and depression
  • Diabetes
  • Eating disorders
Is treatment needed indefinitely?

• Typically recommend continuing treatment (OCP) until:
  – patient is gynecologically mature (5 years post menarchal)
  – Patient has lost a substantial amount of weight
Back to the patient…

- Patient presents for evaluation of irregular menses. Per mom patient started to gain weight about 2-3 years ago. Since that time she has gained about 20 lbs. She started menses about 1 year ago and has had 3 menstrual cycles. Mom has read online that women with weight gain and irregular menses have PCOS. She would like treatment so her daughter loses weight.
Thank you