



Dr Fatemeh Yari
Polycystic Ovarian Syndrome

19November 2020

Case

- F 22 yrs old lady, unmarried,
- c/o irregular period since 2 yrs.
- Her period comes every 2-3 months.
normal flow , no inter-menstrual bleeding
- She gained 20kg in the past 18 months.

Case:

- O/E:
- Obese lady, BMI 30
- BP: 125/80 . HR: 75

- Grade II acne over her face.
- Mild fine hair growth , face .
- Thyroid: normal.
- Systemic examination normal.

INTRODUCTION

- The polycystic ovary syndrome is the most common metabolic abnormality in young women today of reproductive age.
- Most common cause of infertility in women
- Studies of PCOS in India reported a prevalence of 3.7% to 22.5%, upto 36% prevalence in adolescents

Rice triggers polycystic ovary in young women

Disease More Common In East India Due To Food Habits

Priyanka Mitra
@timesgroup.com

Kolkata: Polycystic ovary syndrome (PCOS) — arguably the most common gynaecological disorder that triggers hormonal imbalance and often leads to infertility among women — affects more women in east India than the rest of the country, says a study.

In Kolkata, almost 30% women in the age group of 15-30 years are believed to be suffering from PCOS, which may well be a result of the combination of dietary habits and genetic patterns.

SURVEY RINGS ALARM BELLS

- The symptoms of PCOS include facial hair, acne, thinning of scalp and irregular periods
- It is one of the major causes of infertility
- If not diagnosed early, PCOS can lead to uterine cancer, cardiac problems and type-II diabetes
- About 50% women in the age group of 15-30 in Kolkata are suffering from PCOS
- The disease is more

Zone	PCOS patients
East India	25.88
West India	19.88
North India	18.62
South India	18

Source: *World Journal of Pharmacy* (WJP), 2014, 3(1), 1-6
 ➤ prevalent in east India than other parts of the country
 ➤ Doctors attribute the prevalence of PCOS in this

Diagnosis: Testosterone test and a host of other tests (blood sugar, insulin, FSH, LH, 17OHP, DHEAS) are carried out to ascertain PCOS

region to a combination of dietary habits & genetic patterns

- Rice, carbohydrate-rich foods and junk foods trigger PCOS
- Early detection is the key to managing the disease, say doctors

Etiology

- A large number of genomic variants has been associated with PCOS and many of these associations have not been replicated in different populations.
- It is believed that the picture is of a multigenic etiology in which non-genetic factors such as diet and exercise have strong influence on the development of the disorder

PCOS

Syndrome characterized by

- *Oligoammmenorhoea / amenorrhoea*

Laboratory criteria of

- *Hyperandrogenemia*
- *Hyperinsulinemia*
- *Polycystic ovaries on USG*



Diagnostic criteria

- *Classic syndrome originally described by Stein and Levantthal (1935)*

- *Hyperandrogenism*
- *Menstrual irregularity*
- *Polycystic ovaries*
- *Central adiposity*



- *Few of these original features are now considered consistent findings in PCOS*

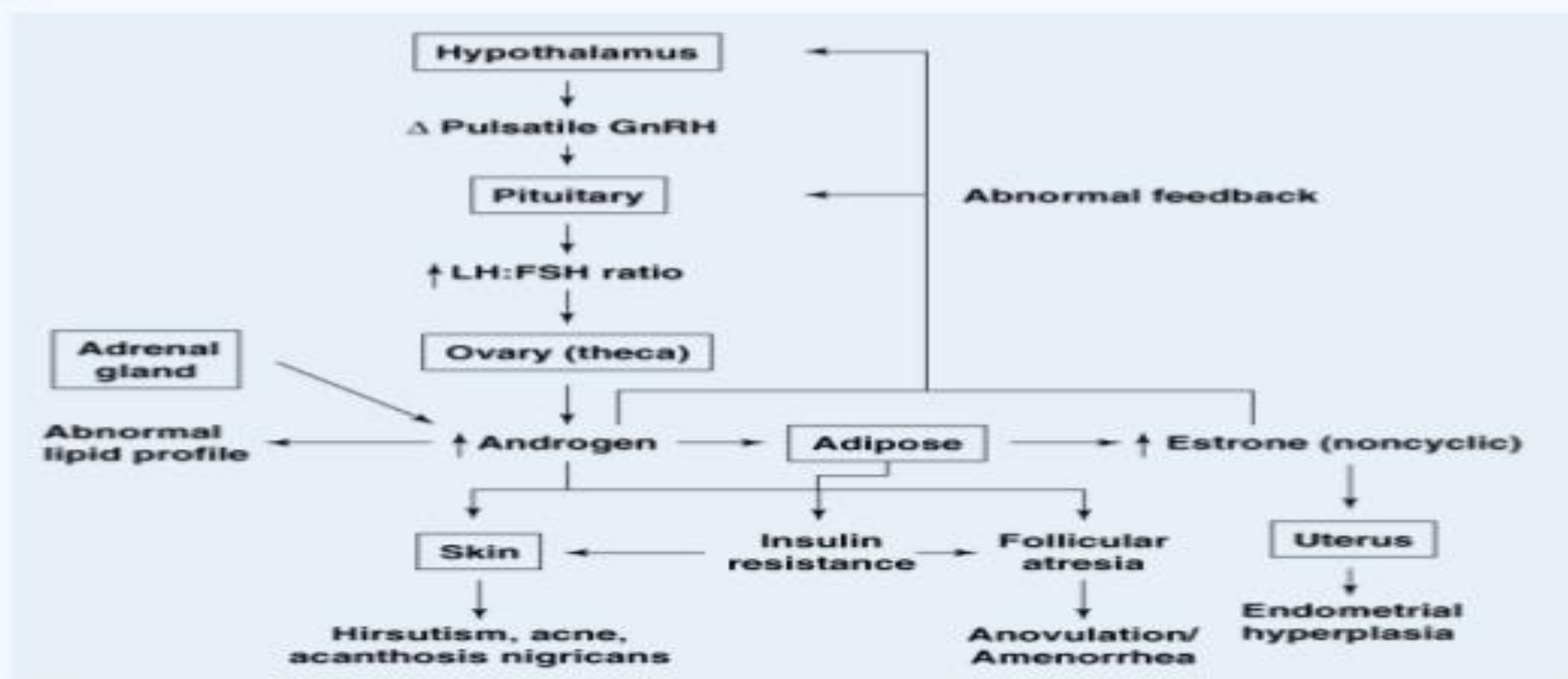
ROTTERDAM CRITERIA (2003)

- 2 out of 3
 - Polycystic ovaries (>12 peripheral follicles or increased ovarian volume >10cm³)
 - Oligo- or anovulation
 - Clinical and/or biochemical signs of hyperandrogenism
 - And exclusion of other etiologies such as hypothyroidism, hyperprolactinemia, congenital adrenal hyperplasia, cushing syndrome, androgen secreting tumors



pathogenesis

Pituitary - ovarian - Adrenal Inter action



Abnormal Pituitary Function— Altered Negative Feedback Loop

- Increased GnRH from hypothalamus
- Excessive LH secretion relative to FSH by pituitary gland
- Ineffective suppression of the LH pulse frequency by estradiol and progesterone

- LH stimulated excessive androgen production
- Intraovarian androgen excess results in excessive growth of small ovarian follicles
- Inhibition of follicular maturation
- Thecal and stromal hyperplasia

Pathogenesis: Hyperandrogenism

- *Reduced sex-hormone-binding globulin (SHBG) → more free testosterone*
- *Insulin insensitivity*
- *Lipid abnormalities*
- *Abdominal obesity*
- *Symptoms of androgen excess*

HYPERANDROGENISM

- *50-90% patients have elevated serum androgen levels*
- *Causes hirsutism, acne, male pattern balding, alopecia*
- *Deepening voice, clitoromegaly*

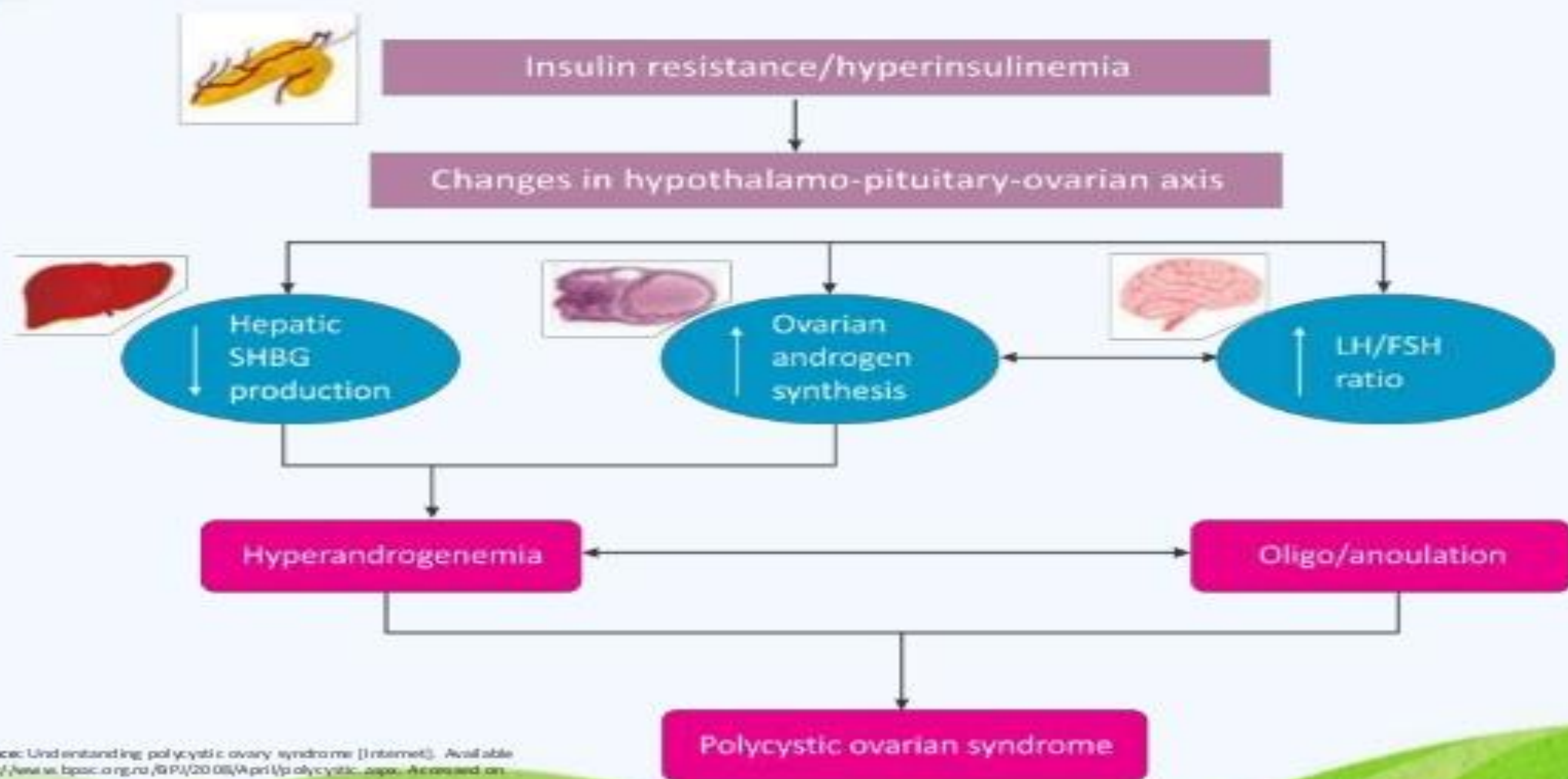
Insulin resistance in PCOS:

- *Insulin resistance in PCOS is independent of obesity*
 - *Increased risk for impaired glucose tolerance and type 2 DM in PCOS women*
 - *Obese women with PCOS tend to be more insulin resistant than normal-weight counterparts.*
 - *30-40% prevalence of glucose intolerance*
 - *7-10% prevalence of type 2 DM in PCOS women*
 - *Insulin resistance worsens over time*

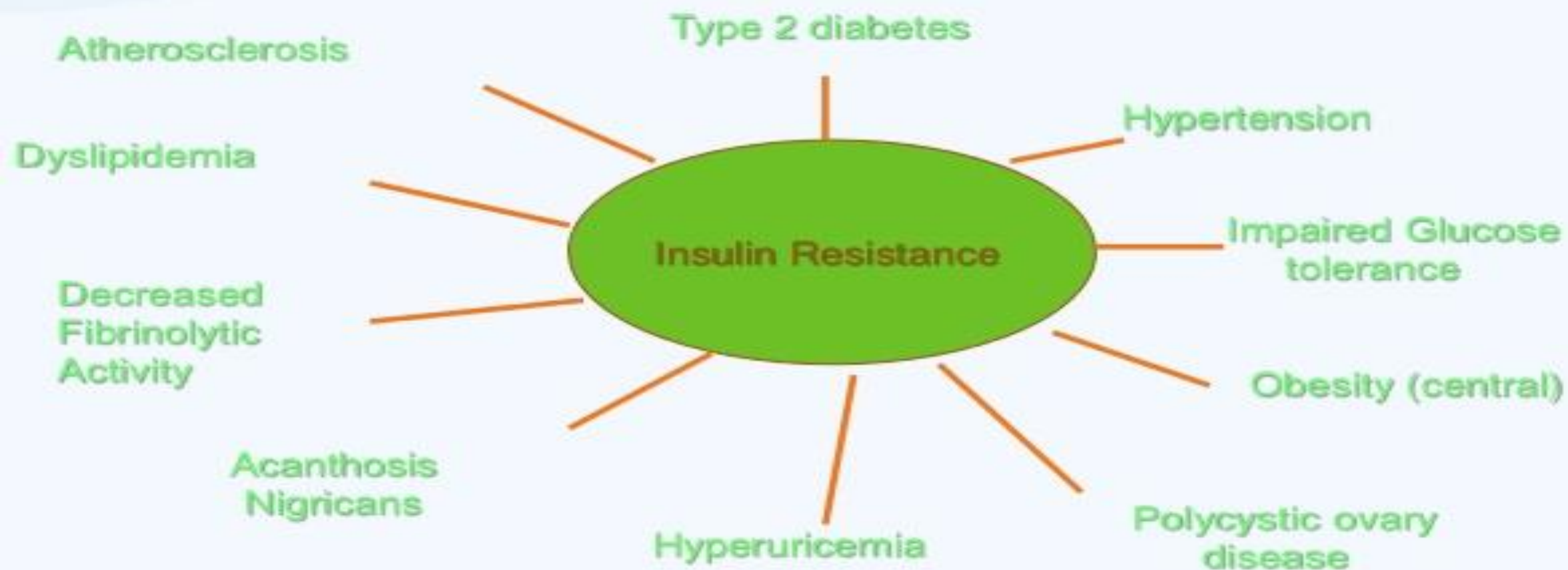
Pathogenesis: Insulin resistance

- Excess insulin production and insulin resistance
- Favors anovulation, reduced SHBG, IGF-1 BP and androgen excess
- Metabolic syndrome
- Abdominal obesity

IR influencing Hypothalamic-Pituitary-Ovary Axis



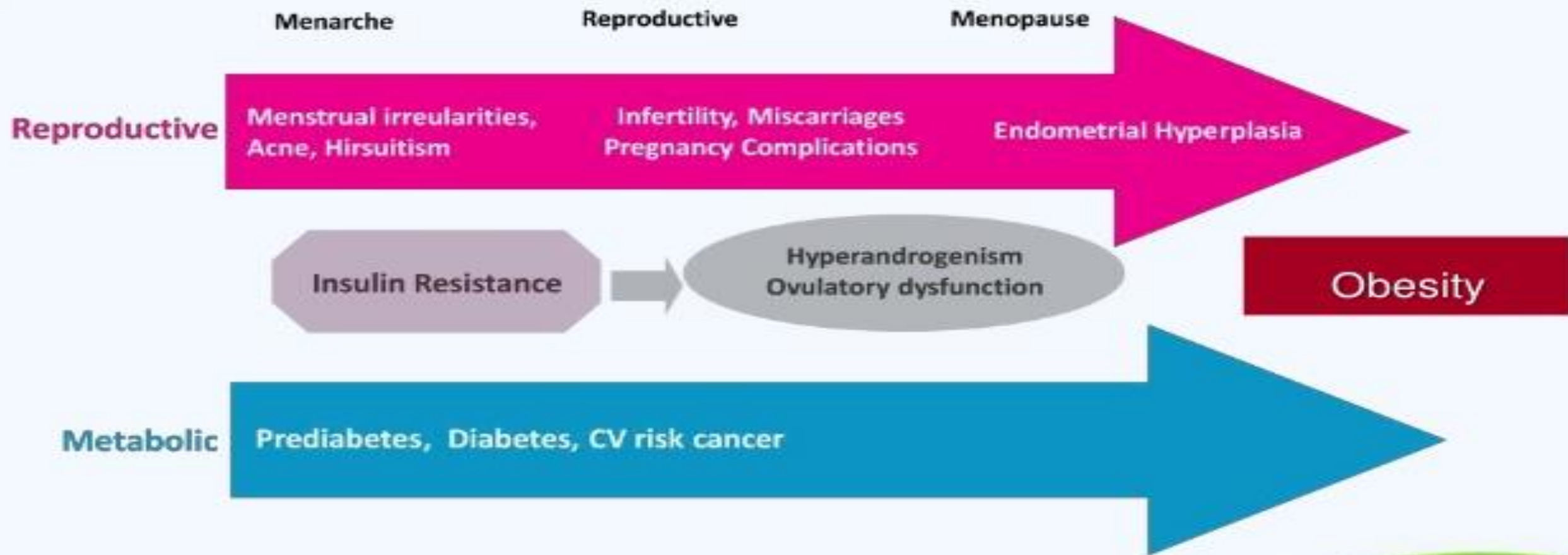
Insulin Resistance: Associated Conditions



A stylized landscape illustration. In the foreground, there are rolling green hills. On the left, a purple and pink flower with a dark stem and small leaves grows from a green hill. The background consists of layered, wavy bands of light blue and white, suggesting a sky or distant hills. The text 'Clinical presentation' is written in a black, cursive font in the center-right area.

*Clinical
presentation*

Clinical Presentation of Women with PCOS



Diagnosis:

- Diagnosis can generally be accomplished with a careful history, physical examination, and basic laboratory testing, without the need for ultrasonography or other imaging.

[AAFP]

Common Comorbidities

- PCOS is associated with metabolic syndrome.
- About one-half of women with PCOS are obese.
- Increase risk of cardiovascular disease.
- Fourfold increase in the risk of T2DM.
- Increased prevalence of nonalcoholic fatty liver disease, sleep apnea, and dyslipidemia in patients with PCOS, even when BMI is controlled.
- Increased risk of mood disorders among patients with PCOS

PCOS

- the American College of Obstetricians and Gynecologists recommend that clinicians evaluate:
 - blood pressure at every visit,
 - lipid levels at the time of diagnosis,
 - screen for T2DM with GTT regardless of a patient's BMI.
- Patients should have repeat diabetes screening every 3-5 years, or more often if other indications for screening are present.

Remember:

- There is no need to order laboratory testing for these conditions if the patient does not have suggestive physical findings.

LH/FSH ratio ?

- Not necessary
- A ratio >2 generally indicates PCOS, but there are no exact cutoff values because many different assays are used. The FSH level is more helpful in ruling out ovarian failure.

Adolescent and PCOS

- Anovulation is common after menarche, so it is reasonable to delay workup for PCOS in adolescents until they have been oligomenorrheic for at least two years.
- If an adolescent is evaluated for PCOS, it has been suggested that she meet all three of the Rotterdam criteria before being diagnosed with the condition.

HIRSUTISM



Acne & baldness



Male Type Hair Growth



Ferriman Gallwey score

- Extent of terminal (coarse pigmented) hair growth at each of the following **11** hormonally sensitive sites
 - Upper lip
 - Sideburn area
 - Chin
 - Jaw & Neck
 - Upper back
 - Lower back
 - Chest
 - Upper abdomen
 - Lower abdomen
 - Upper arms
 - Thighs
- Score of **6 or above** used to define clinical hyperandrogenemia

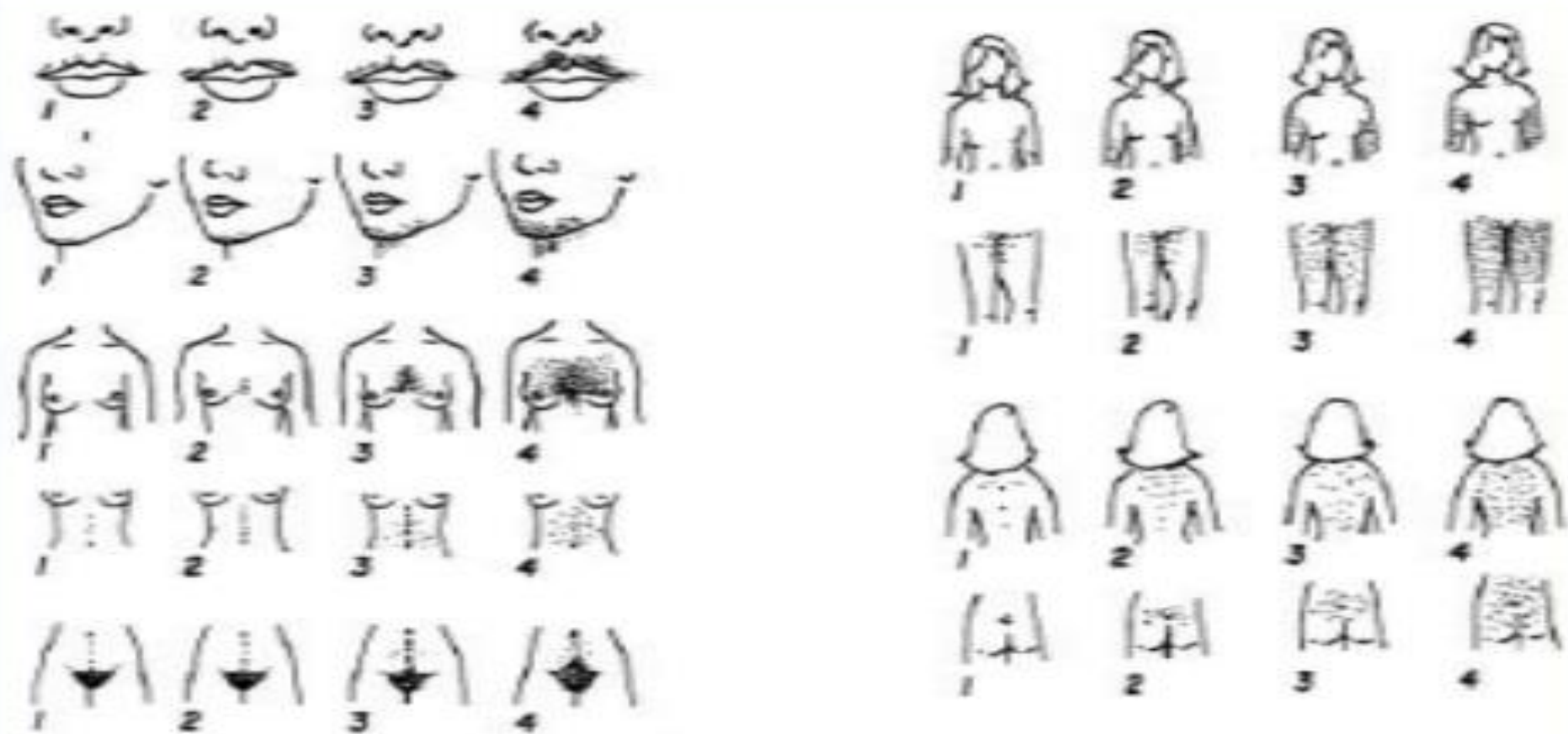
Modified Ferriman Gallwey score

9 areas

- Score 1-4*
- 0-absence of terminal hair*
- 4-extensive terminal hair growth*

>8 - hirsutism

Modified Ferriman Gallwey score



Metabolic Syndrome

- Personal or family history of DM
- Obesity
- Hyperinsulinemia
- Hypertension
- Atherogenic Dyslipidemia
- Atherosclerosis
- Hyperglycemia
- The AACE have already included PCOS as an important risk factor for diabetes and have recommended screening for DM by age 30 in all patients with PCOS.





*Laboratory
investigations*

Hyperandrogenism

- *Laboratory features*
 - *Elevated total testosterone*
 - *Most values in PCOS <150 ng/dl (if >200 ng/dl, consider ovarian or adrenal tumor)*
 - *Free testosterone assays not reliable yet*
 - *Free androgen index > 4.5 (FAI= total testosterone x 100 /SHBG). Considered a better indicator*

- **DHEA-S**
 - Most normal or slightly high in PCOS
 - If >800 mcg/dl, consider adrenal tumor
- **LH/FSH ratio**
 - Levels vary over menstrual cycle, released in pulsatile fashion, affected by OCPs
 - LH/FSH ratio >2 has little diagnostic sensitivity and need not be documented

Hyperinsulinemia

- Fasting glucose level of 110-125 mg/dL
- Glucose level of 140-199 mg/dL after 75 gm glucose challenge test
- Stimulated testing with OGTT may be more sensitive than fasting measurements
- Fasting glucose/insulin ratio (G/I) . A ratio < 4.5 has in general been shown to be $> 90\%$ sensitive

DIFFERENTIAL DIAGNOSIS

1. *Hyperprolactinemia/ hypothyroidism*
 - *Prominent menstrual dysfunction*
 - *mild hyperandrogenism*
2. *Congenital Adrenal Hyperplasia*
 - *morning serum 17-hydroxyprogesterone concentration greater than 200 ng/dL in the early follicular phase strongly suggests the diagnosis*

3. Ovarian and adrenal tumors

- serum testosterone concentrations are always higher than 150 ng/dL
- adrenal tumors: serum DHEA-S concentrations higher than 800 mcg/dL
- LOW serum LH concentrations

4. Cushing's syndrome

5. Drugs: danazol; OCPs with high androgenicity

Polycystic Ovaries - USG

- *Criteria by ultrasound*
 - *Increased ovarian area ($>5.5 \text{ cm}^2$) or volume ($>11 \text{ ml}$) w/ presence of >12 follicles measuring 2-9 mm in diameter*
- *Polycystic ovaries not specific for PCOS*
- *$> 20\%$ normal women have incidental polycystic ovaries*

Polycystic VS. Multicystic Ovaries

- Polycystic ovaries

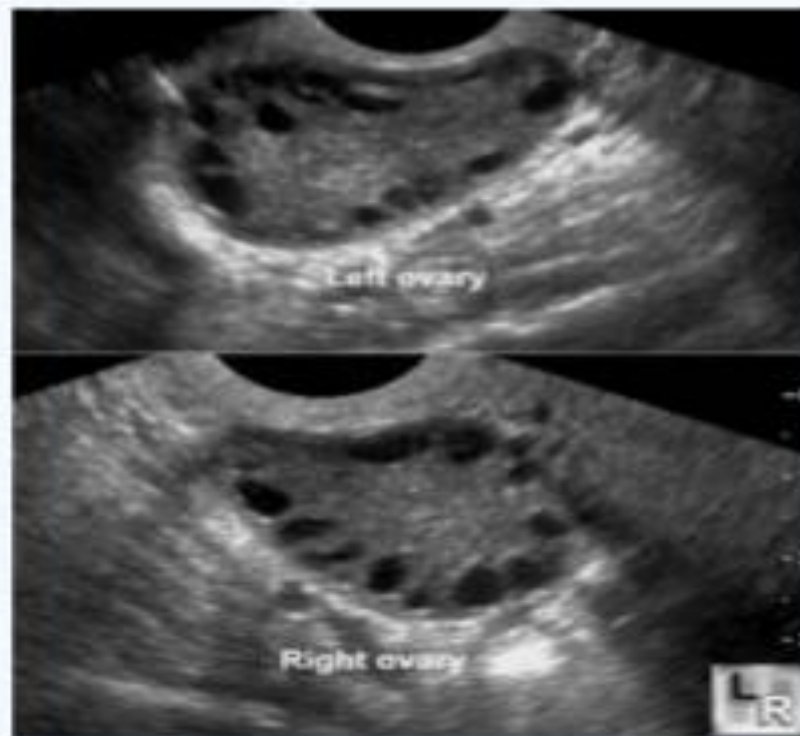
- Bilateral
- At least 12 follicles
- Follicular diameter 2 - 9 mm
- Stroma increased

- Multicystic ovaries

- Bilateral
- Multiple cysts
- Cyst diameter usually > 10 mm
- Stroma not increased

OVARIAN ABNORMALITIES

- *Thickened sclerotic cortex*
- *Multiple follicles in peripheral location*
- *80% of women with PCOS have classic cysts*



laparoscopy



PEARLY WHITE SMOOTH ENLARGED AND THICK WALLED
OVARY ON LAPAROSCOPY

Take home messages:

- All women diagnosed with PCOS should be screened for metabolic abnormalities (T2DM, dyslipidemia, hypertension), regardless of BMI.
- All women with suspected PCOS should be screened for thyroid disease, hyperprolactinemia, and nonclassical congenital adrenal hyperplasia.



PCOS AWARENESS MONTH 2019



September is Polycystic Ovary Syndrome (PCOS) Awareness Month

Thank You