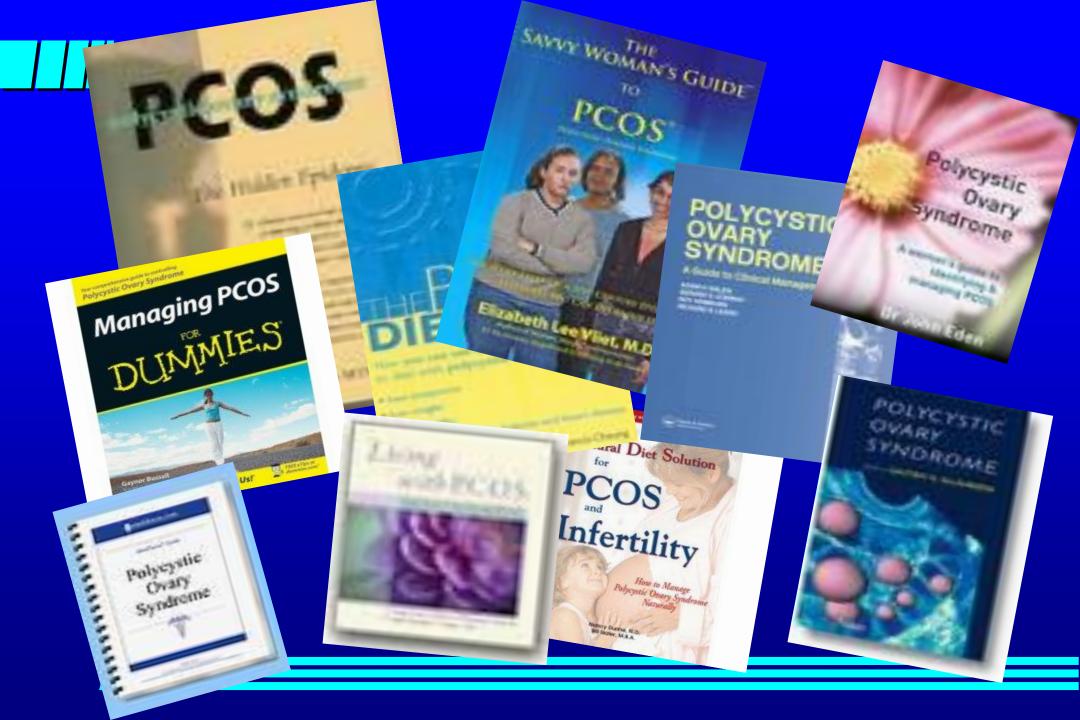




Dr. Mahboubeh Valiani Assistant Professor in IUMS



Definition of PCOS:

- □ ACOG and NIH (1990):
- hyperandrogenism and chronic anovulation excluding other causes
- Stein and Levanthal (1935): association of amenorrhea with polycystic ovaries and variably: hirsutism and/or obesity



Stein-Leventhal Syndrome 1935

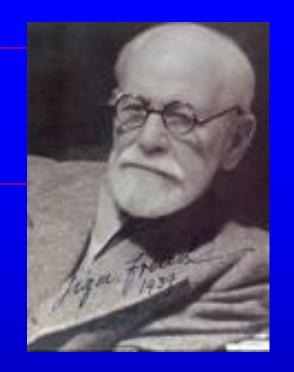
- Amenorrhea associated with bilateral polycystic
 OVaries Stein I.F. and Leventhal M.L. (1935). Am. J. Obstet. Gynecol. 29:181\(^{1}-89\).
- Wedge Resection restored normal menses





Stein-Leventhal Syndrome

- Stein-Leventhal Syndrome: The Triad
 - Amenorrhea
 - Obesity
 - Hirsutism
- Many cases do not conform to the classic description.
- □ The polycystic ovaries are not the primary cause but one of the manifestation of the underlying endocrine disorder which results in anovulation.



سندرم تخمدان پلی کیستیک

□ شایعترین اختلالات غدد درون ریز (آندوکرینوپاتی) در زنان

9

□ شایعترین علت نازایی ناشی از عدم تخمک گذاری میباشد.

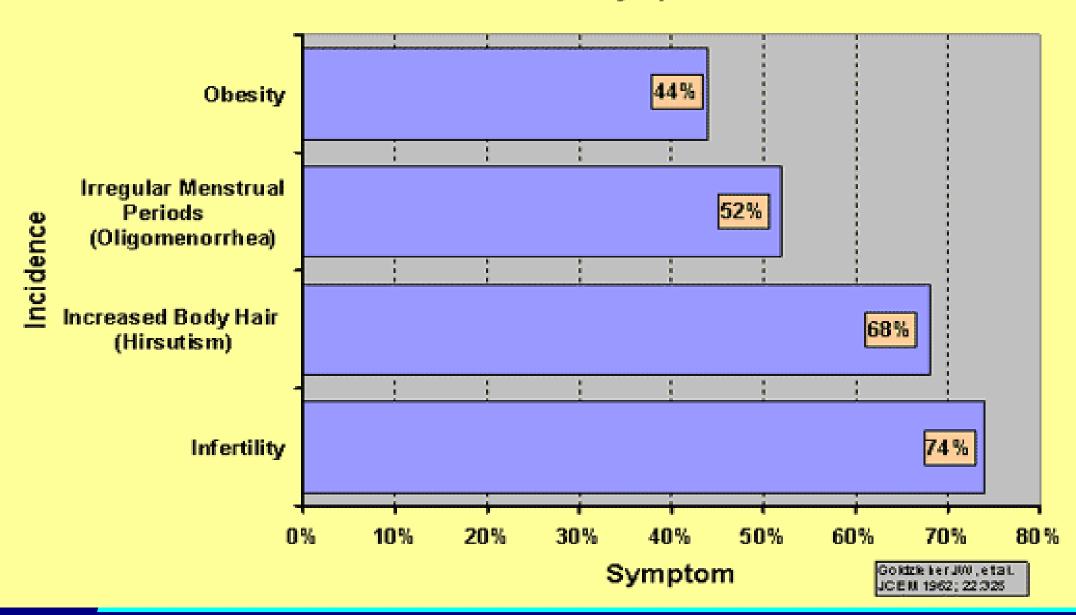
PCOS

- □ 25% of females with amenorrhoea
- □ 90% of females with oligomenorrhoea
- □ 90% of females with idiopathic hirsutism
- □ 33% of females with infertility

PCO Epidemiology

- □ Prevalence: 4-6% females (Isfahan more)
 - Probably same world wide
- No difference between blacks and whites
- □ 75% of women with irregularity or infertility

Incidence of PCOS Symptoms



PCOS: Prevalence

- □ Affects 6%-10% of women in childbearing age (4-5 million women).
- □ Most common cause of anovulatory infertility (50%-60%).
- Most common endocrine disorder in young women.
- It is one of the major and unrecognized public health problems in many countries

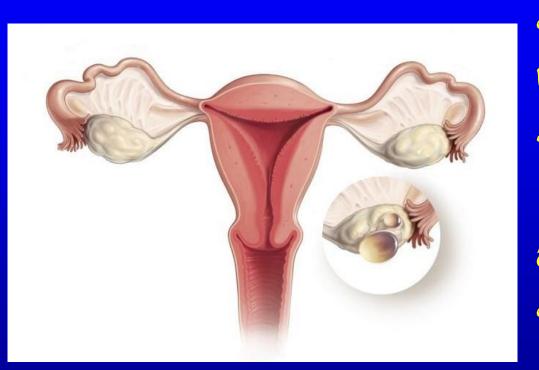


SYMPTOMS

- Menstrual irregularity
- Infertility
- Hirsutism, acne, etc
- Obesity or no

SIGNS

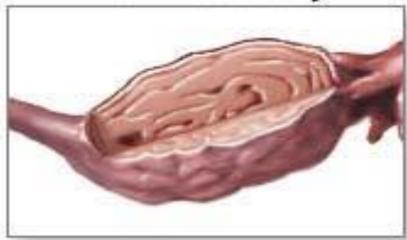
- □ Hirsutism, acne
- Obesity
- Ovarian enlargement
- Acanthosis nigricans



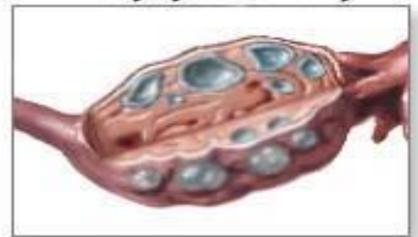
شواهد سونوگرافی تخمدان یلی کیستیک شامل: افزایش حجم تخمدان به بیش از ۹ میلیلیتر، وجود کیستهای ۲ تا ۸ میلیمتری به تعداد ۱۰ یا بیشتر در هر تخمدان و افزایش دانسیته استرومای رحم یا هیپرپلازی آندومتر می باشد. اختلالات متابولیکی از جمله افزایش سطح سرمی هورمونهای تستوسترون، پرولاکتین، LH، انسولین و مقاومت به انسولین در این بیماری شایع است.



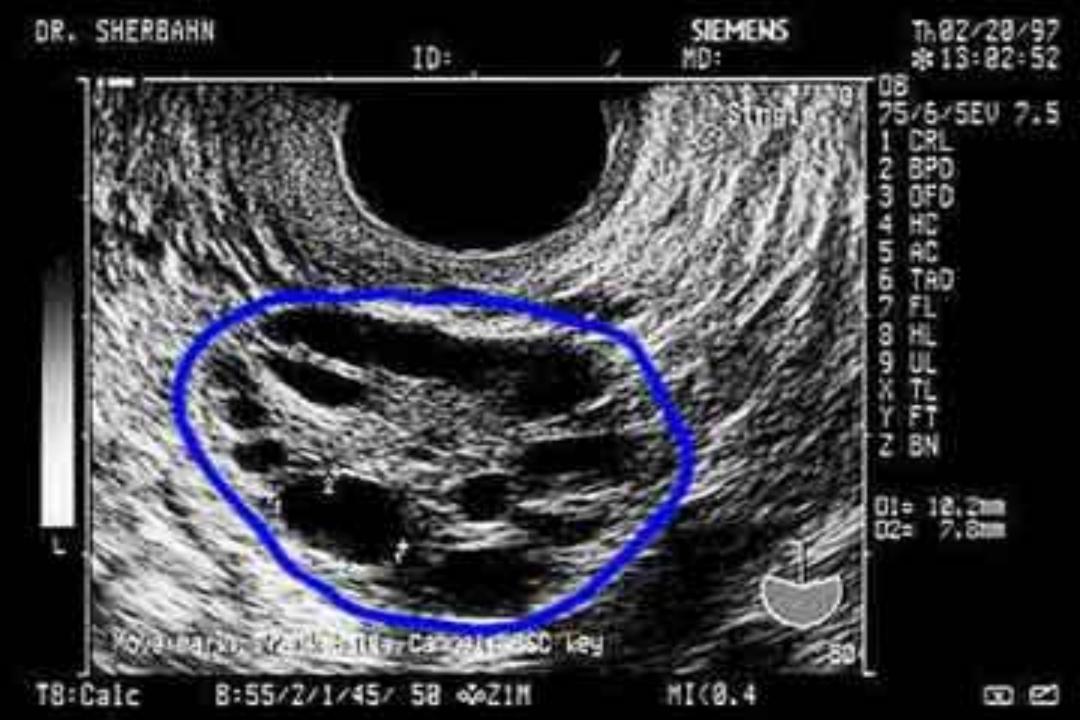
Normal ovary



Polycystic ovary







PCOS: Imaging and Pathology





Acanthosis nigricans

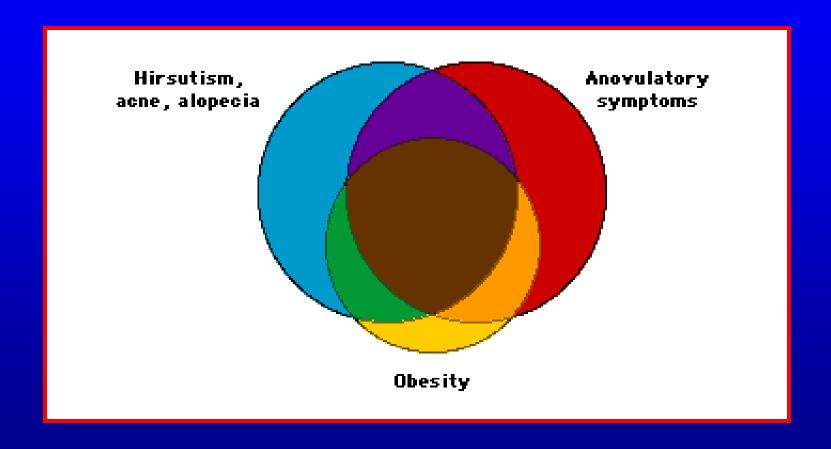
- Acanthosis nigricans is a brown to black, poorly defined, velvety hyperpigmentation of the skin. It is usually found in body folds, such as the posterior and lateral folds of the neck, the axilla, groin, umbilicus, forehead, and other areas.
- It typically occurs in individuals younger than age 40, may be genetically inherited, and is associated with obesity or endocrinopathies, such as hypothyroidism or hypothyroidism or hypothyroidism, acromegaly, polycystic ovary disease, insulin-resistant diabetes, or Cushingis.com/ disease.



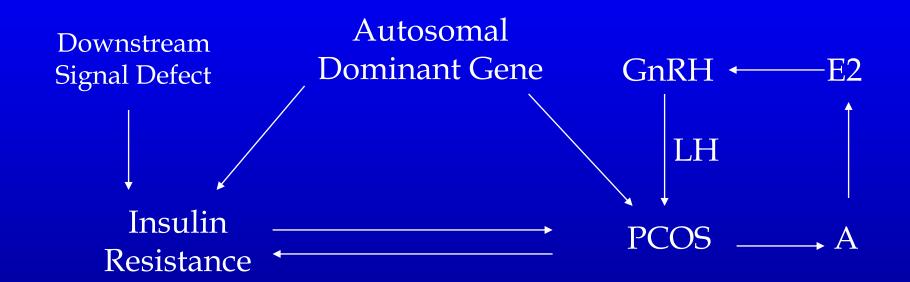




PCOS: Signs and Symptoms II



PCOS: Current theories of pathophysiology



A=androgens E2=estradiol

PCO is not PCOS.

- PCO found in 20% of randomly selected women of reproductive age.
- While most of these women are cycling normally this group are significantly more likely to have <u>infertility</u>, <u>irregular bleeding</u>, hirsuitism and elevated testosterone.

PCOS: Pathophysiology

- □ "Vicious cycle" چرخه معیوب
- Abnormal gonadotropin secretion
 - Excess LH and low, tonic FSH
- Hypersecretion of androgens
 - Disrupts follicle maturation
 - Substrate for peripheral aromatization
- Negative feedback on pituitary
 - Decreased FSH secreation
- Insulin resistance, Elevated insulin levels

Clinical Features

Menstrual disorder Amenorrhoea
Oligomenorrhoea
Irregular Bleeding
Metrorrhagia

- Obesity
- Androgenisation ← → Hirsuitism
 Acne
 Oily Skin
- Infertility

Anatomy of PCOS







Definition Clinical Features of PCOS

In the:

1. USA - Endocrine Profile

2. UK & Europe - Ultrasound Signs

Endocrine Features

- Acyclic increase in pulsatile LH levels
- Raised LH to FSH ratio(test in early follicular phase)
- Raised androgens
- □ Reduced sex hormone binding globulin

Ultrasound Features

■ Increased stomal echo

□ 10 or more follicles in one plain

□ Follicles 2-10mm in diameter

Increased ovarian volume

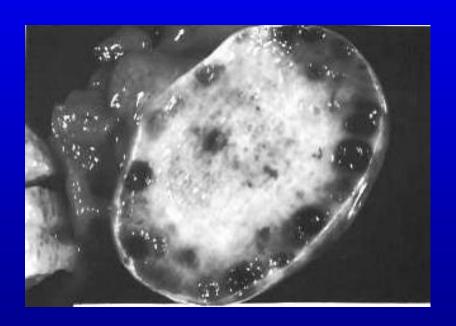
I PCOM

- □ PCOM (polycystic ovarian morphology)
 - > 12 follicles at 2 9 mm in at least 1 ovary
 - Volume > 10cc
 - If a follicle is >10mm, repeat scan next cycle.

» 2003 Rotterdam ESHRE/ASRM Consensus. Fertil Steril 81:19, 2004

PCOM

PCOM (polycystic ovarian morphology)

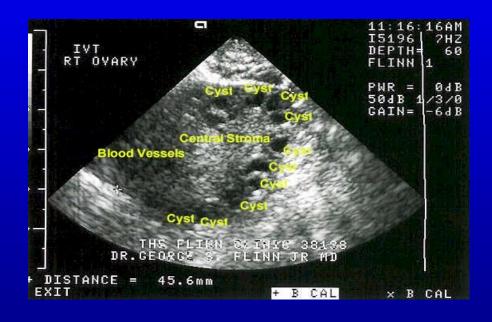




PCOM

PCOM (polycystic ovarian morphology)





PCOM vs. Follicles

PCOM (polycystic ovarian morphology) vs. Pre- ovulatory Follicles





Investigations

- Ultrasound transvaginal ultrasound is best
- LH/FSH.
- ☐ Free testosterone
- □ SHBG (sex hormone binding globulin)

Histological Features of PCO

- Increased volume
- Same number of primordial follicles
- □ 2 x ripening or atretic follicles
- Increased collagenization of tunica
- Increased cortical stroma thickness
- Increased subcortical stroma

Prognosis

- People with acanthosis nigricans should be screened for diabetes and, although rare, cancer.
- Controlling <u>blood glucose levels</u> through exercise and diet often improves symptoms. Acanthosis nigricans maligna may resolve if the causative tumor is successfully removed.
- Acanthosis nigricans often fades if the underlying cause can be determined and treated appropriately



3 major hypothesis

1. Familial - Strong family history

Autosomal dominant but > 50% occurrence Epigenetic factors (related to male pattern premature baldness and NIDDM)

2. Ovarian & adrenal steroidogenesis disorder

An abnormality of the gene controlling the cytochrome P450 mixed function oxidase system complex.

Increased activity of 17 x hydroxylase, 17, 20 lyase enzyme results in increased androgen production.

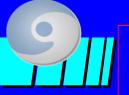
3. Hyperinsulinaemia occurs much more commonly in PCOS.

Insulin resistance does not affect the ovary and exagerated androgen response occurs to LH.

Other Causes

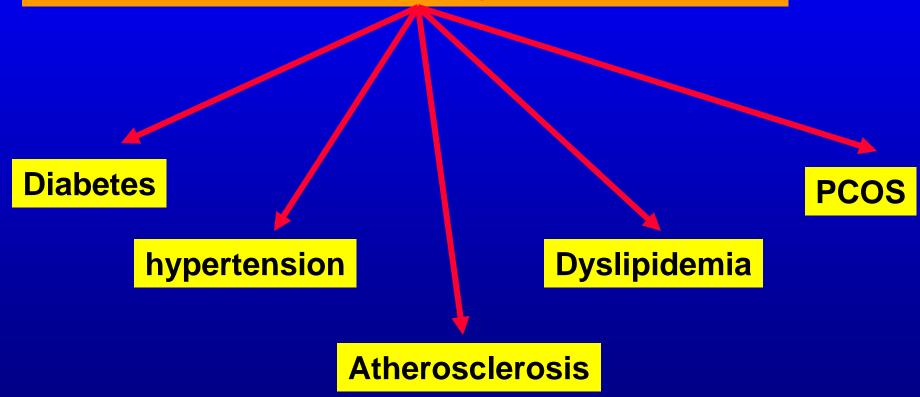
- High androgens & LH causes granulosa cells to fail perpetuating anovulation
- □ Intra-ovarian endocrine & paracrine disorder
- Exogenous or excess endogenous androgens will produce PCOS

(in utero, at puberty or in adult life)

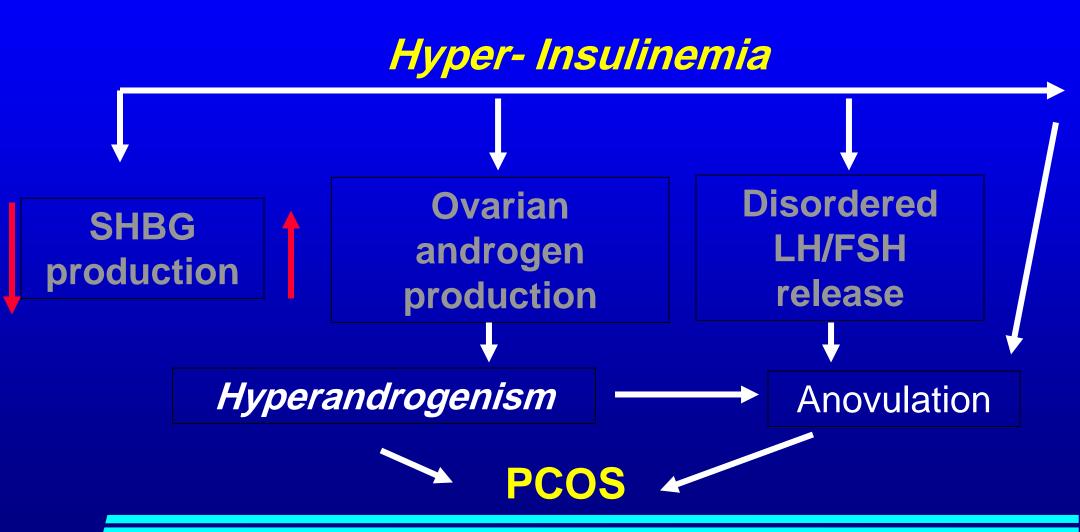


Metabolic Impact of PCOS: Syndrome X

Insulin Resistance and Hyper-insulinemia



Hyperinsulinemia and Hyperandrogenism



Insulin Resistance in Women with PCOS

Insulin Sensitivity decreases



Insulin release and circulating levels increase



Normal glucose tolerance



Compensatory Hyperinsulinemic Insulin Resistance

OTHER INVESTIGATIONS

- □ 17 hydroxy progesterone
- □ ACTH
- □ 24 hour urinary cortisol
- Dexamethasone suppression test
- Biopsy
- □ CT,MRI

Differential Diagnosis

Late onset congenital adrenal hyperplasia
 DHEAS > 18mmol/l
 17 OH Prog > 6 mmol/l

- Ovarian + adrenal androgen secreting tumours
 V. high teslosterone > 6mmol/1
- Cushings Syndrome
 - Dexamethsone suppression test
 - 24 hours urinary cortisol
 - DHEAS > 13 mmol/1

Differential Diagnosis Continued

Ovarian hyperthecosis

Iatrogenic and illegal androgen ingestion

Hypothyroidusm

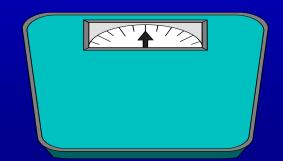
Multicycstic ovaries

Treatment

Weight Loss

PCOS: 90% of anovulatory women restored to full ovulation despite relatively small amounts of weight loss following exercise and change of diet BMI of 21 is ideal but the patient often respond to much less stringent body mass index

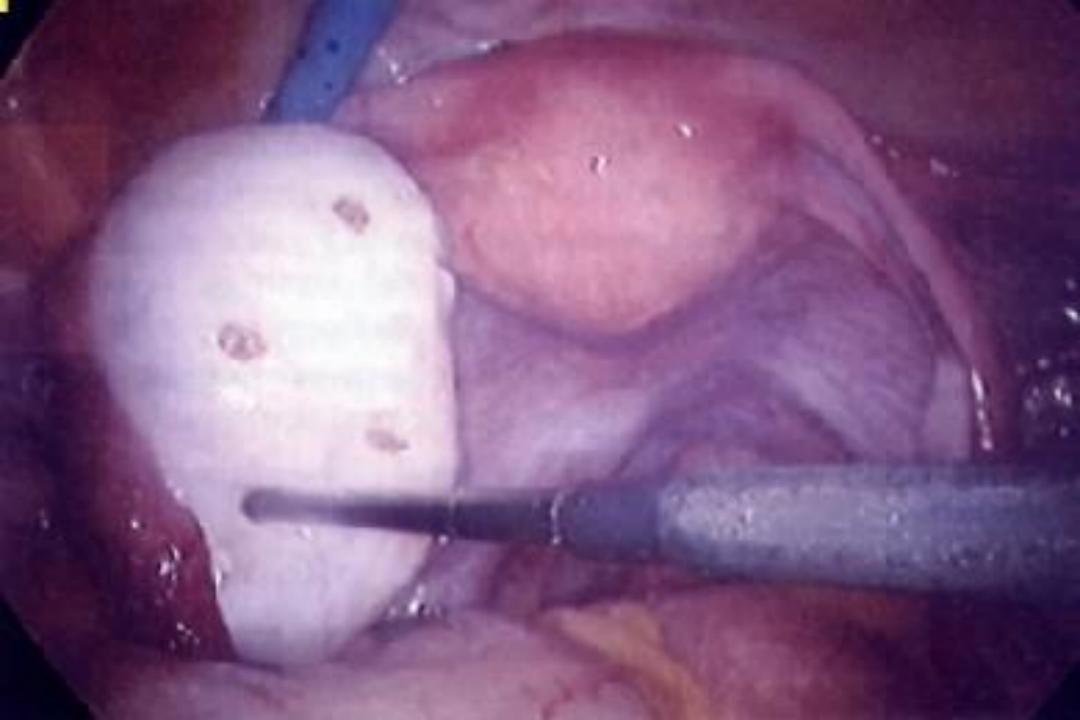
BMI = Wt Kg
Height squared
in (metres)



PCOS: Surgical Therapy

- Wedge resection
- Ovarian drilling
- Bariatric surgery





PCOS Clinic Fitness

- Individual assessment and recommendations
- Group education and instruction



PCO & Modern Medicine & CAM

Hirsuitism and Acne

- Weight loss and exercise
- □ OCP e.g. Diane 35
- Cyproterone acetate 50-100mg first 10 days with OCP
- □ Spironolactone 100-200mg daily
- □ Dexamethasone 0.25 0.5mg nocte
- Ovarian wedge resection or laparoscopic drilling

Infertility

- Weight loss/exercise
- □ Clomiphence citrate 50-100mg QD +/-
- □ Gonadotrophins plus/minus GnRH analogues
- □ Dexamethasone 0.25 0.5mg daily
- □ Metformin 500mg bid
- Wedge resection
- Laparoscopic drilling



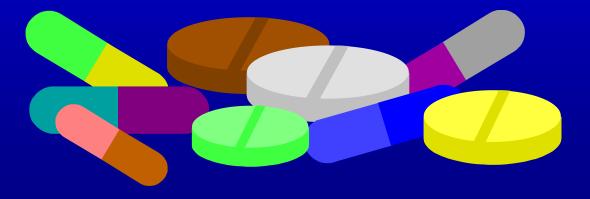
METFORMIN

- INCREASES OVARIAN RESPONSE TO OVULATION INDUCTION
- MAY HAVE A FUTURE WITH WEIGHT CONTROL
- TREATMENT OF HERSUITES
- NO LONG TERM STUDIES YET
- MAY BE BEST UTILIZED IN RESEARCH PROTOCOLS UNTIL FURTHER DATA

Oligo/Amenorrhoea

OCP

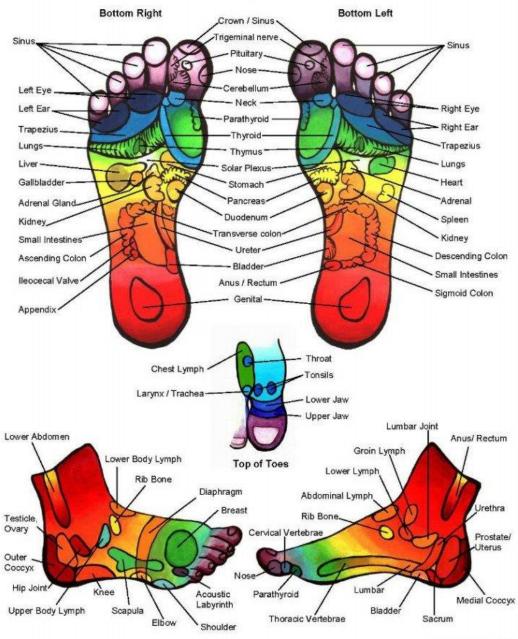
Cyclic provera or norethisterone



CAM & PCO

- □ Reflexotherpy
- Auriculotherapy
- Acupressure
- Acupuncture
- Massage
- Exercise and Movement
- Homeopathy

Foot Reflex Chart



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