

Ovulatory Dysfunction

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Learning objectives:

By the end of this lecture you need to:

- Define ovulatory dysfunction.
- Identify ovulation symptoms.
- Know the causes of anovulation.
- Diagnose ovulatory dysfunction.
- Discuss the common causes of ovulatory dysfunction.



A woman with dark hair pulled back, wearing a blue collared shirt, is shown from the chest up. She has a thoughtful expression, looking upwards and to the right, with her right index finger pointing to her chin. To her left is a large, white, cloud-shaped thought bubble with a dashed black outline. Inside the bubble, the text "What is Ovulatory Dysfunction?" is written in a blue, sans-serif font. Below the main bubble are two smaller, dashed circles, one larger than the other, suggesting a trail of thought.

What is
Ovulatory
Dysfunction?

DEFINITIONS:

- Ovulatory Dysfunction is irregular, abnormal, or absent ovulation. The most common symptom noted in women with ovulatory dysfunction is irregular or absent menstrual cycles.

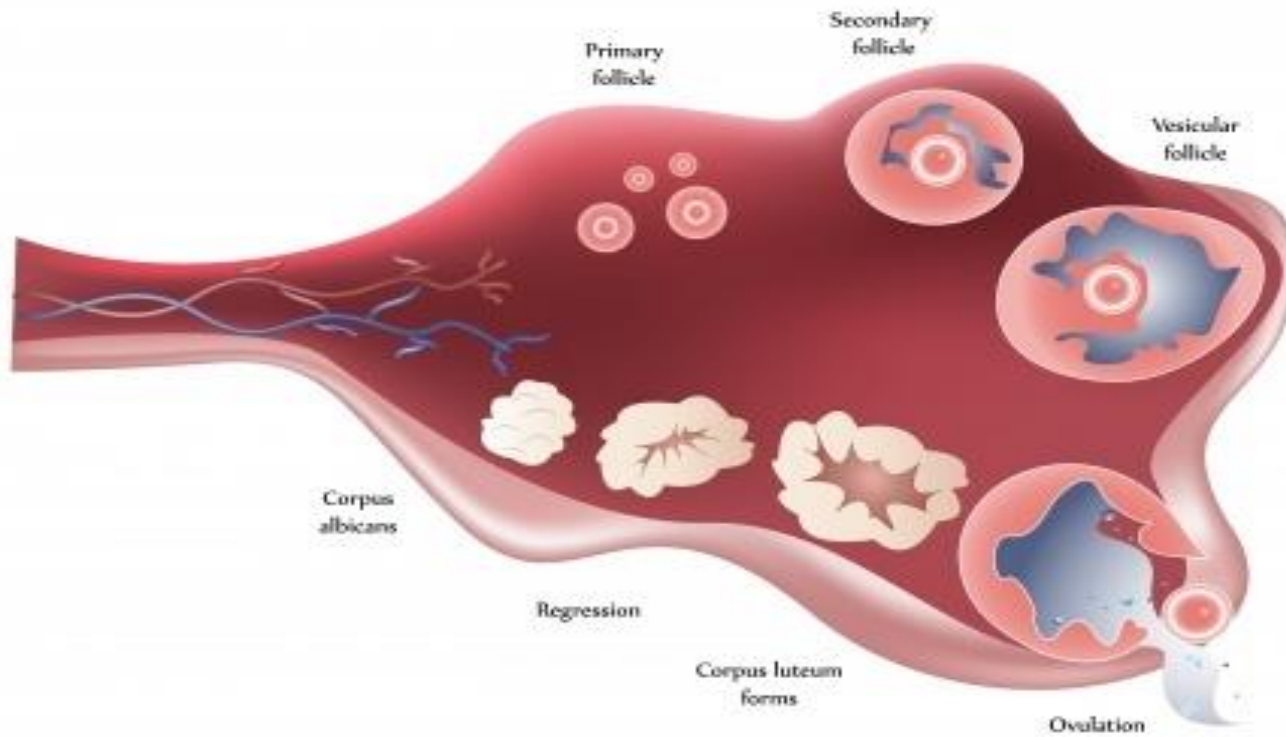


- A common cause of infertility, ovulatory dysfunction accounts for about 40 percent of female infertility cases.
- If ovulation is irregular, but not completely absent, this is called oligovulation.
- Anovulation means lack of ovulation, or absent ovulation.
- Both anovulation and oligovulation are kinds of ovulatory dysfunction.



- Women with ovulatory dysfunction typically have cycles that are shorter than 21 days or longer than 35 days. Often, the length of their cycles varies greatly from one month to the next, and many report none of the common symptoms of an impending menstrual cycle.





OVULATION SYMPTOMS:

- Ovulation Pain (or Mittelschmerz):
- Basal Body Temperature:
- Cervical Mucus
- Cervical Position
- Breast tenderness.
- Increased libido.
- Increased energy level.
- Heightened sense of vision, smell and taste.
- Water retention.
- Spotting –



OVULATION SYMPTOMS



NAUSEA



ABDOMINAL PAIN
BLOATING



INCREASE LIBIDO



INCREASED VAGINAL
DISCHARGE



CHANGE IN SMELL



CERVICAL CHANGE



SENSITIVE
BREAST



MINOR
BLEEDING



THE CHANGE
IN BASAL TEMPERATURE

SYMPTOMS OF OVULATION



DRY PHASE (not fertile)

Days 1 - 3 after period



dry or a hint of moisture
dry is a *relative* term

STICKY PHASE (not fertile)

Days 4 - 6



white or cloudy in color
forms small sticky globs

CREAMY PHASE (semi fertile)

Days 7 - 9



creamy or cloudy in color
abundant and thick

CLEAR PHASE (fertility magic!)

Days 10 - 14

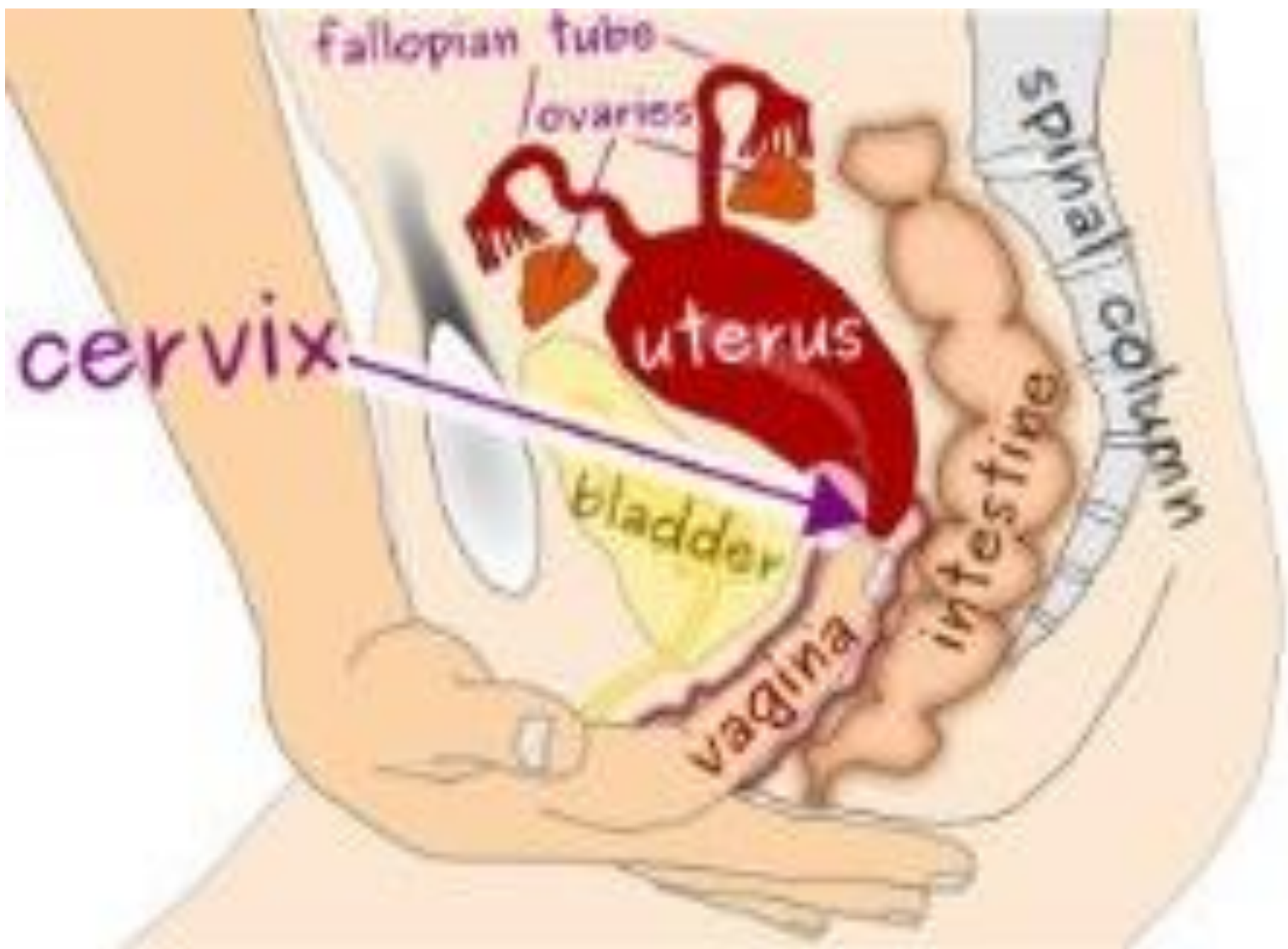


like raw eggwhite
stretchy and slippery



rising quality until ovulation





HOW DOES ANOVULATION AND OVULATORY DYSFUNCTION CAUSE INFERTILITY?

- For a couple without infertility, the chances of conception are about 25% each month. So even when ovulation happens, a couple isn't guaranteed to conceive.
- When a woman is anovulatory, she can't get pregnant because there is no egg to be fertilized. If a woman has irregular ovulation, she has fewer chances to conceive, since she ovulates less frequently. Plus, it seems that late ovulation doesn't produce the best quality eggs, which may also make fertilization less likely.



- Also, it's important to remember that irregular ovulation means the hormones in the woman's body aren't quite right. These hormonal irregularities can sometimes lead to other issues, like lack of fertile cervical mucus, thinner or over thickening of the endometrium (where the fertilized egg needs to implant), abnormally low levels of progesterone, and a shorter luteal phase.



WHAT CAUSES ANOVULATION?

- The most common cause of ovulatory dysfunction is polycystic ovarian syndrome, PCOS.
- obesity
- Too low body weight.
- anorexia nervosa
- Excessive exercise.
- Hyperprolactinemia
- Premature ovarian failure.
- Perimenopause, or low ovarian reserves.
- Thyroid dysfunction (either hyperthyroidism or hypothyroidism)
- Extremely high levels of stress.
- pituitary dysfunction
- Hypothalamic dysfunction (eg, hypothalamic amenorrhea)



SYMPTOMS:

- Ovulatory dysfunction is suspected if menses are absent, irregular, or not preceded by symptoms, such as breast tenderness, lower abdominal bloating, or moodiness.
- Infertility.



DIAGNOSIS:

- Menstrual history.
- Sometimes basal body temperature monitoring.
- Measurement of urinary or serum hormones.
- Ultrasonography.



- **Home testing kits**, which detect an increase in urinary luteinizing hormone (LH) excretion 24 to 36 h before ovulation (requiring daily testing for several days around midcycle, usually beginning about or after cycle day 9)
- **Pelvic ultrasonography**, which is used to monitor ovarian follicle diameter and rupture (and should also begin in the late follicular phase). The ultrasound will check out the shape and size of uterus and ovaries, and also look to see if the ovaries are polycystic.



- **Measurement of serum progesterone and pregnanediol glucuronide** (a urinary metabolite of progesterone)
- A day 21 progesterone blood test. After ovulation, progesterone levels rise.

Serum progesterone levels of ≥ 3 ng/mL (≥ 9.75 nmol/L) or elevated levels of pregnanediol glucuronide (measured, if possible, 1 wk before onset of the next menstrual period) indicate that ovulation has occurred.



POLYCYSTIC OVARIAN SYNDROME (PCOS):

- It is one of the most common endocrine disorders, although its aetiology remains unknown. It is a familial condition. It is found in 20% of normal adult women. Obesity may be important in the pathogenesis of PCOS as obesity leads to hyperinsulinism, causes hyperandrogenaemia.



Hypothalamus

Pituitary gland

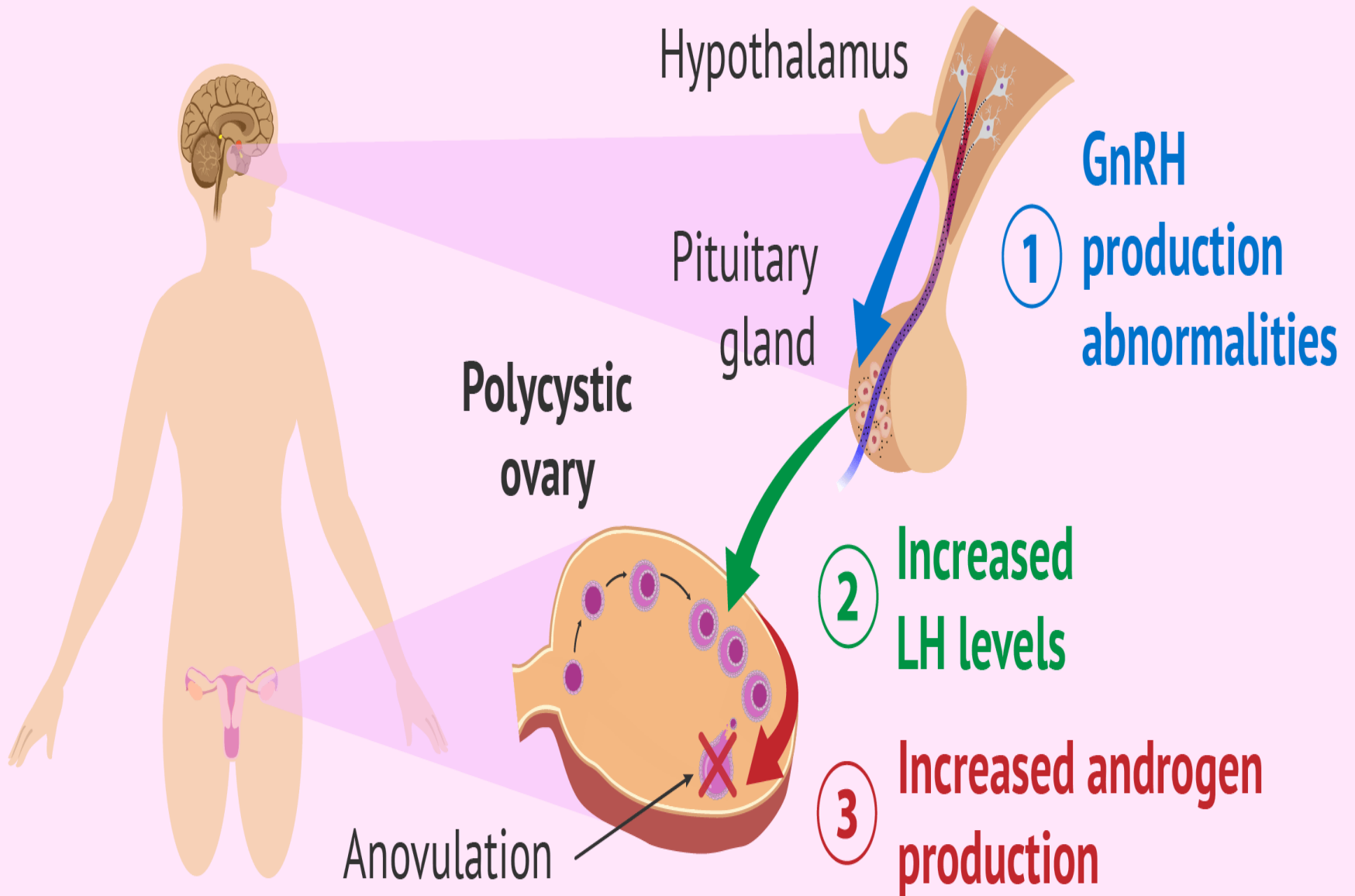
Polycystic ovary

Anovulation

GnRH
① production abnormalities

② Increased LH levels

③ Increased androgen production



10 Signs & Symptoms of POLYCYSTIC OVARY SYNDROME (PCOS)

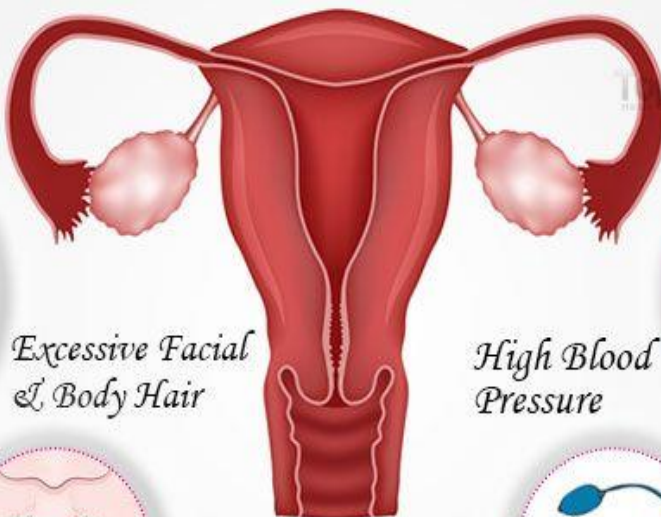
Irregular Periods



Acne



*Absence of
Menstruation*



*Excessive Facial
& Body Hair*

*High Blood
Pressure*

Weight Gain



*Hair Thinning
& Loss*



Depression



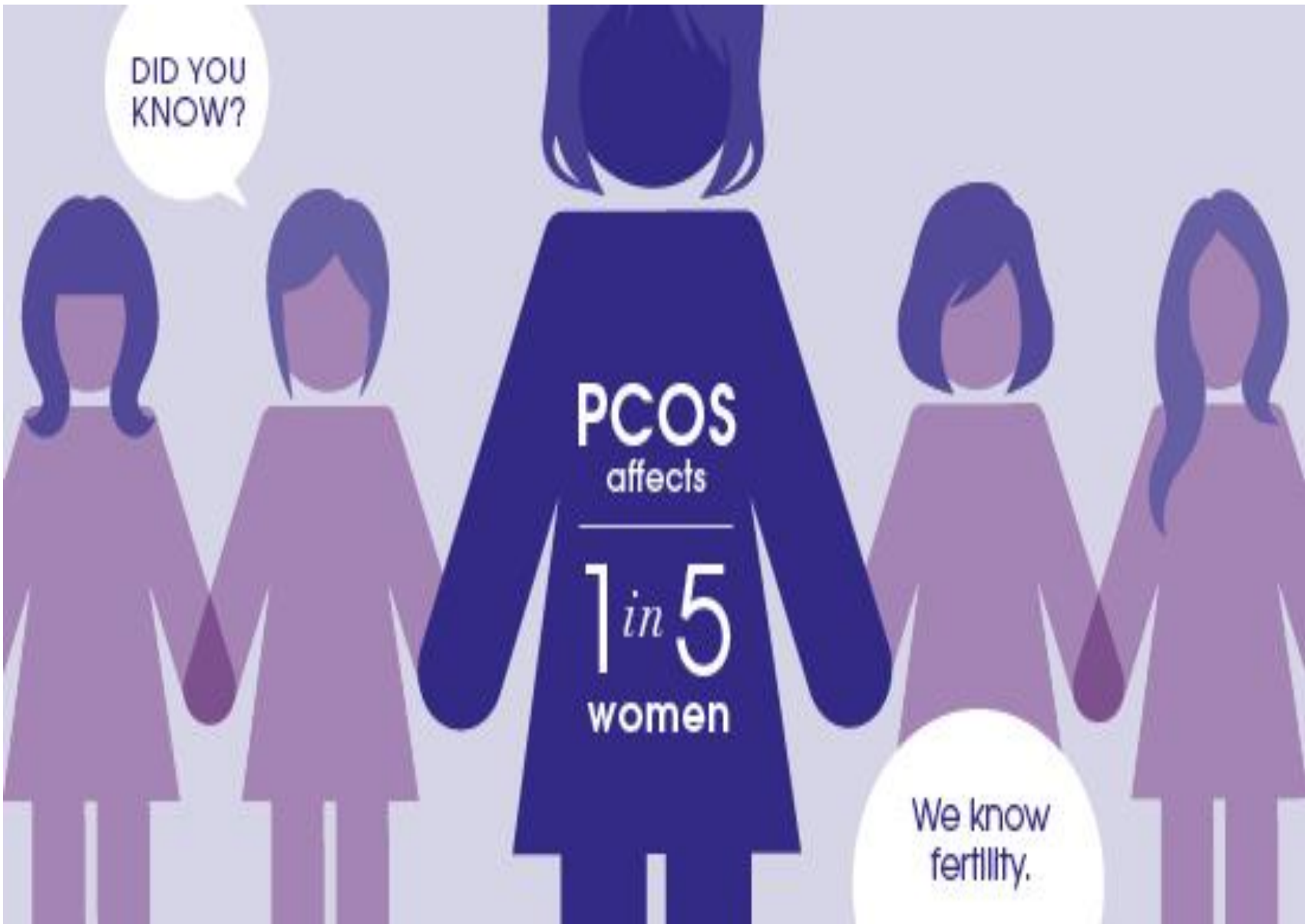
Abnormal Skin Discoloration



Stress

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DID YOU KNOW?

PCOS
affects

1 *in* 5
women

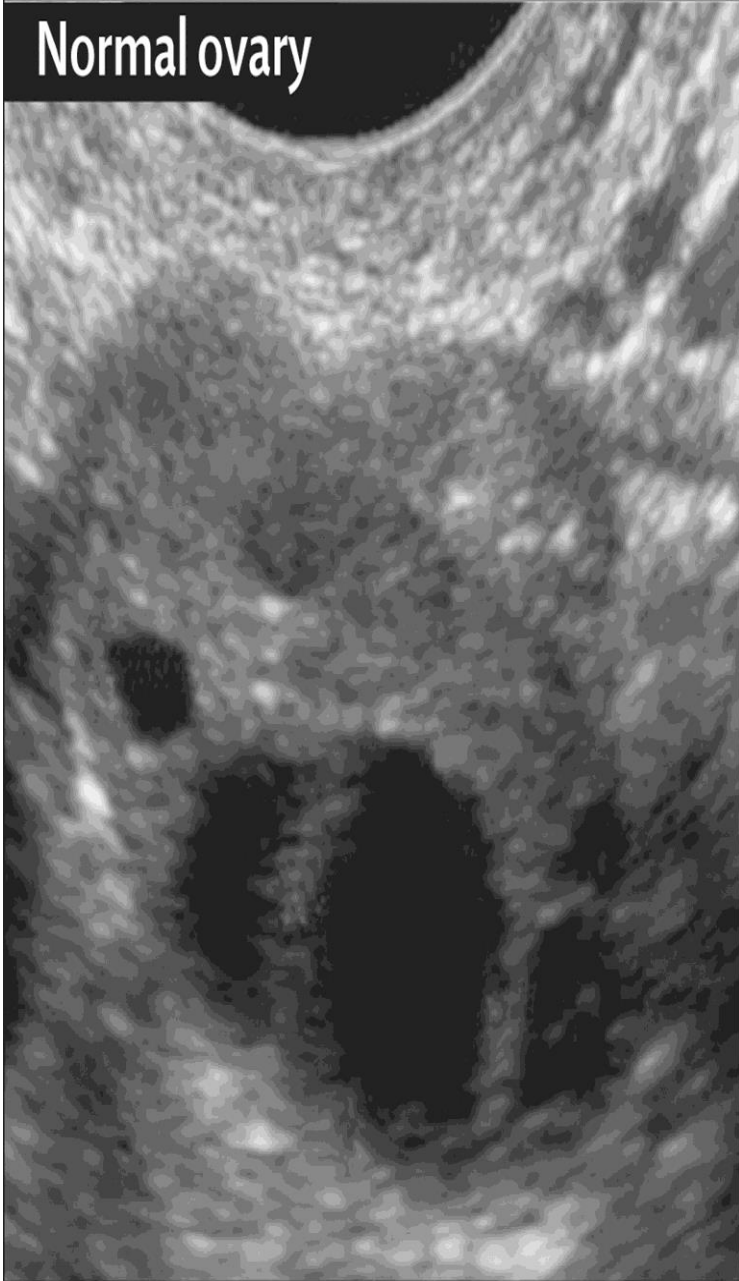
We know
fertility.

- By U/S: 10 or more cysts, 2-8 mm in diameter arranged around an echo - dense stroma.
- Symptoms: asymptomatic, obesity, infertility, menstrual disturbances (50% oligomenorrhoea, 20% amenorrhoea), hyperandrogenism (hirsutism).
- Ix: U/S, ↑ LH, ↑ LH/FSH ratio, ↑ androgens (testosterone & androstenedione), ↑ fasting insulin, ↑ prolactin, ↑ oestradiol, ↑ oestrone, ↓ sex hormone binding globulin.





Normal ovary



Polycystic ovary

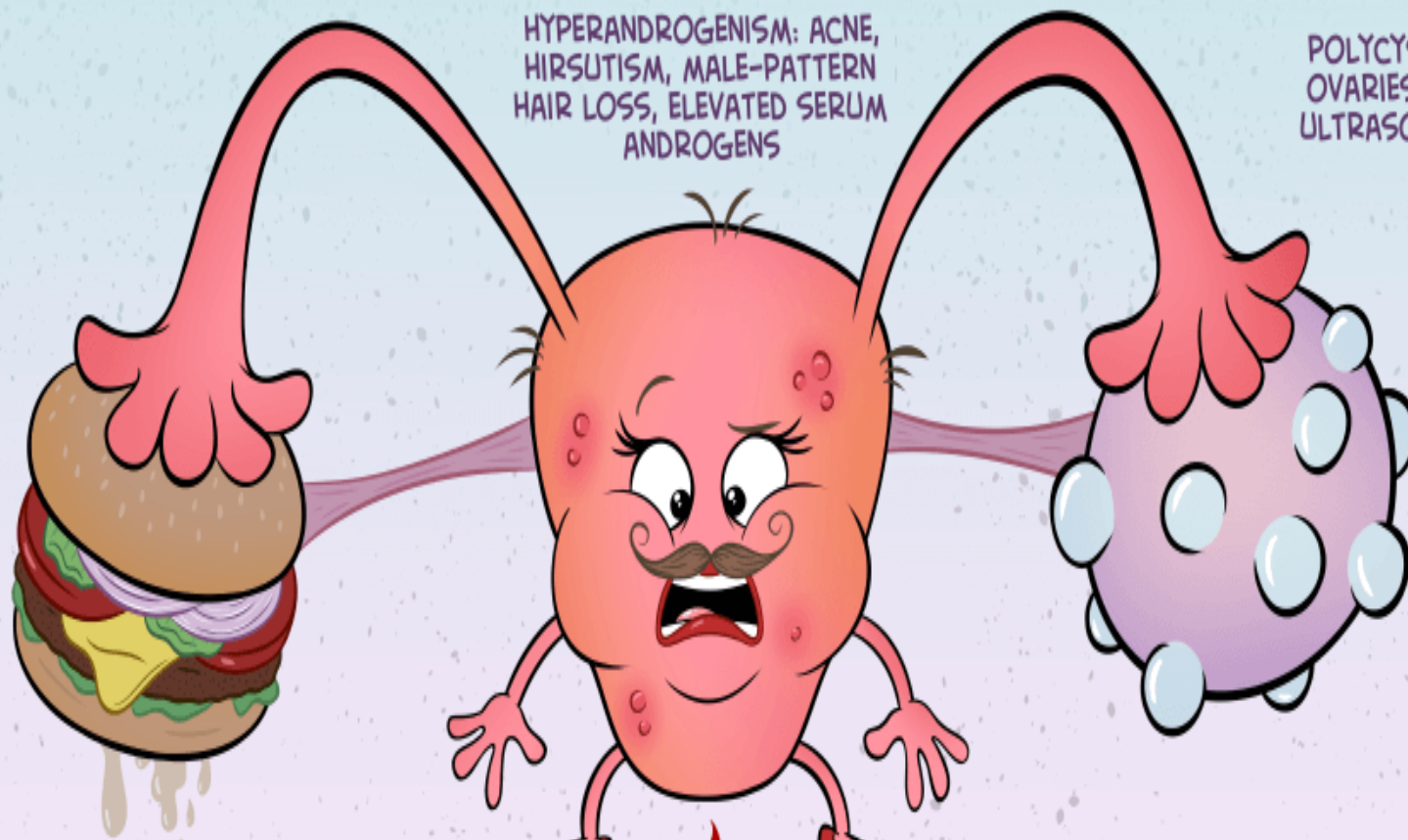


Possible late sequelae:

- D.M.,
- dyslipidaemia,
- hypertension,
- cardiovascular disease,
- endometrial carcinoma.



POLYCYSTIC OVARIAN SYNDROME



HYPERANDROGENISM: ACNE,
HIRSUTISM, MALE-PATTERN
HAIR LOSS, ELEVATED SERUM
ANDROGENS

POLYCYSTIC
OVARIES ON
ULTRASOUND

ASSOCIATED WITH
OBESITY AND INSULIN
RESISTANCE

MENSTRUAL
DYSFUNCTION:
OLIGOMENORRHEA
OR AMENORRHEA

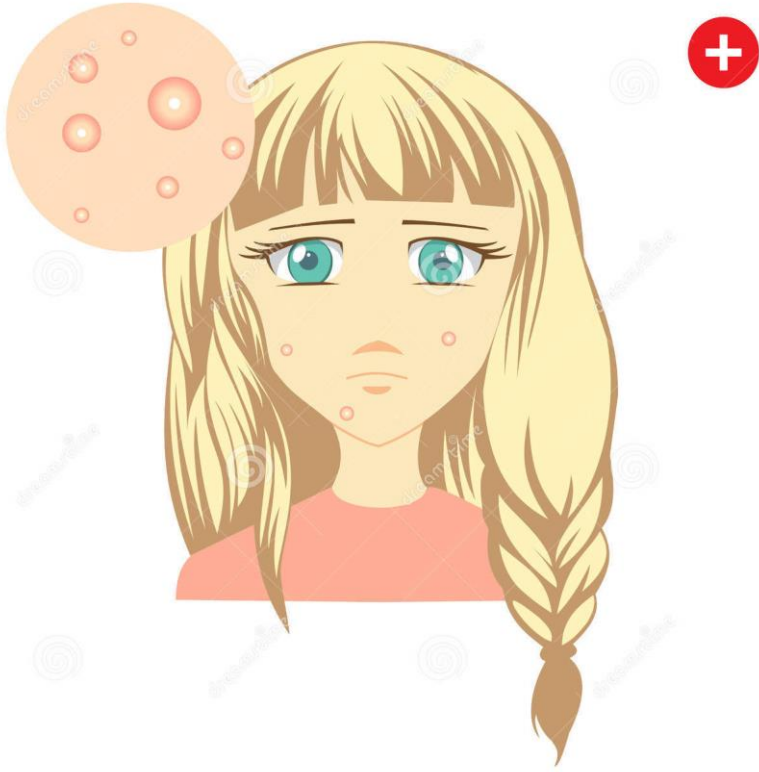
TREATMENT OPTIONS:
WEIGHT LOSS, ORAL
CONTRACEPTIVES,
SPIRONOLACTONE

MANAGEMENT:



- the clinical management of a woman with PCOS should be focused on her individual problems.
- So obese woman ($BMI > 30 \text{ kg/m}^2$) should be encouraged to lose weight.
- Insulin resistance \rightarrow metformin tab. (\downarrow production of hepatic glucose \rightarrow \downarrow insulin secretion \rightarrow \downarrow androgen).
- Menstrual irregularity: a low dose combined oral contraceptive pills, progestogens.
- Infertility: drugs for ovulation induction.
- Hirsutism: combined oral contraceptive pills, dianette, spironolactone.





DIMINISHED OVARIAN RESERVE:

- Diminished ovarian reserve is a term that is used when the ovary does not contain as many eggs, or oocytes, as expected at a given age. As a woman gets older, the ovarian reserve or egg supply gradually decreases. A woman is born with all the oocytes that she will ever have, and only about 400 oocytes are released during the reproductive years of a woman's life.



- Several measures exist for testing a woman's ovarian reserve. A Cycle Day Three lab to evaluate the serum FSH (Follicle Stimulating Hormone) and Estradiol levels. These hormones can predict ovarian reserves when tested together on day three of a woman's menstrual cycle. Estradiol should be less than 50pg/mL and FSH should be less than 10mIU/mL to be considered within normal limits. If the FSH and/or Estradiol are elevated, these results could indicate decreased ovarian reserve.



- Another way to evaluate ovarian reserve is to do a basal follicle count within the first few days of the menstrual cycle. For this test, an ultrasound is performed, allowing the physician to determine the number of follicles (which contain the oocytes) the patient has present at the beginning of the cycle. If a woman has at least eight follicles present at this ultrasound, doctors anticipate that she will have normal ovarian reserve.



PREMATURE OVARIAN FAILURE (POF):

- It is the loss of normal ovarian function before the age of 40. At the beginning of a woman's menstrual cycle, the pituitary gland secretes FSH, which causes the follicles to begin to mature and produce estrogen. The rising estrogen levels give the pituitary gland the signal that FSH is no longer needed at this time. If follicle maturation does not occur, a woman does not release ample quantities of estrogen, which causes the follicle stimulating hormone to continue to increase.



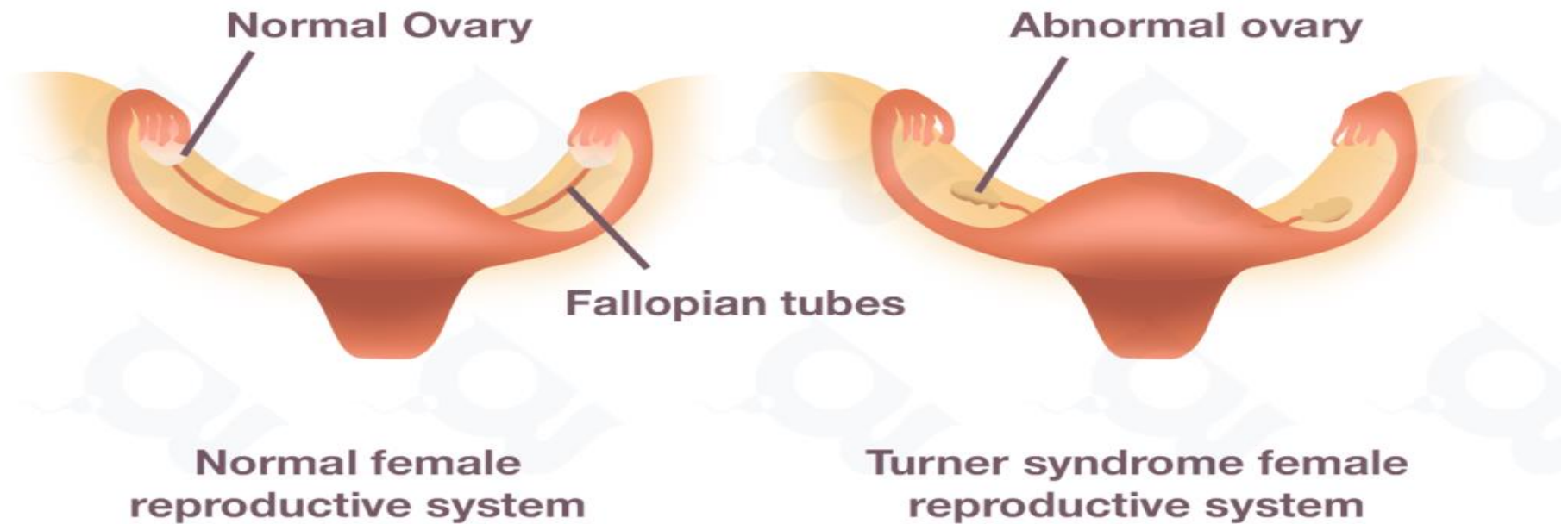
- This is typically why a woman with POF has higher levels of FSH on evaluation. Common symptoms noted with POF include absence of a menstrual cycle or irregular menstrual cycles, hot flashes or night sweats, vaginal dryness, decreased sexual desire, difficulty concentrating, and irritability.



- Although it seems that POF is familial and a genetically predetermined condition, a few other factors can increase the risk of POF. The most obvious being age. Chromosomal defects can also contribute to the onset of POF such as Turner's syndrome (where a woman has only one X chromosome instead of the two X chromosomes) and Fragile-X syndrome.



Turner Syndrome



- Exposure to toxins can induce ovarian failure as well. The most common causes of toxin-related ovarian failure are due to women who have had radiation or chemotherapy as these treatments can damage the genetic material in the oocyte. Environmental toxins such as cigarette smoke, chemicals and pesticides may also accelerate ovarian failure.



- Infertility is commonly associated with POF. Although doctors don't have a treatment to improve fertility in patients with this condition, IVF with donor eggs is a viable option for many couples trying to achieve a pregnancy.



- Women with POF may develop osteoporosis due to the lack of estrogen. Replacing this estrogen can help prevent osteoporosis and relieve many of the symptoms that arise from estrogen deficiency such as hot flashes, mood changes, and vaginal dryness. Progesterone can be given as well as estrogen to prevent the lining of the uterus from developing precancerous changes. When a woman is on long-term estrogen therapy, issues arise about the association with breast cancer and cardiovascular health. In a young woman with POF, the benefits of hormone replacement usually outweigh the risks.



STRESS:

- Physical or mental stress can result in ovulatory problems. It is not unusual for college or professional school students to stop ovulating. Extreme weight loss, exercise training can all result in ovulatory problems. In many cases, these problems are temporary and normal cycling returns when the stressor is no longer present. For women with extreme weight loss an internist, reproductive endocrinologist and psychologist or psychiatrist are often all needed to help correct the problem.



THYROID:

- If a woman has either an underactive or over active thyroid (Hypo or Hyperthyroidism) ovulatory problems may occur. Proper treatment of the thyroid abnormality will often restore ovulation.



PITUITARY CAUSES:

- **Hyperprolactinaemia:**
- Prolactin level is mildly elevated by stress, recent physical or breast examination, venous puncture, hypothyroidism, PCOS, drugs.
- Symptoms: Discharge of milk(galactorrhoea) and loss of menstruation(amenorrhoea) are the major symptoms associated with this condition, or cycles become irregular, sometimes visual field defects. Women with high levels of prolactin ($>1000\text{miu/l}$) need to have a CT scan or MRI and skull X-ray to make sure their pituitary is normal. Although in the past these cases sometimes required pituitary surgery, today excess prolactin production can almost always be effectively treated with medication.



- **Sheehan`s syndrome:** which results from a major obstetric haemorrhage → profound and prolonged hypotension which will affect the sensitive pituitary gland → hypogonadotropic hypogonadism.
- Symptoms: amenorrhoea, weakness, failure of lactation, hypothyroidism, ↓adrenal function.
- Management: assess the pituitary function → replacement therapy (oestrogen, thyroid H., adrenal H.), and to induce ovulation → parenteral gonadotrophin therapy.



HYPOTHALAMIC CAUSES (HYPOGONADOTROPHIC HYPOGONADISM):

- Which is usually due to:
- 1. Weight loss.
- 2. Exercise.
- 3. Chronic illness.
- 4. Psychological distress.
- 5. Idiopathic.
- 6. Tumours.
- 7. Cranial irradiation.
- 8. Head injuries.
- 9. Sarcoidosis.
- 10. Tuberculosis.



- Ix.: H. assay, CT scan, MRI.
- Treatment: → replacement therapy (oestrogen, thyroid H., adrenal H.), and to induce ovulation → parenteral gonadotrophin therapy.



Thank you

