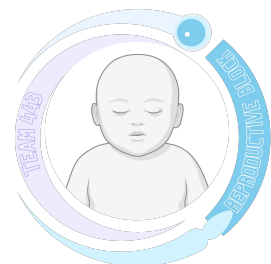
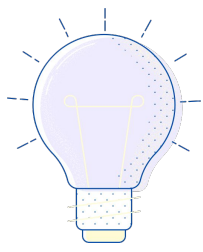
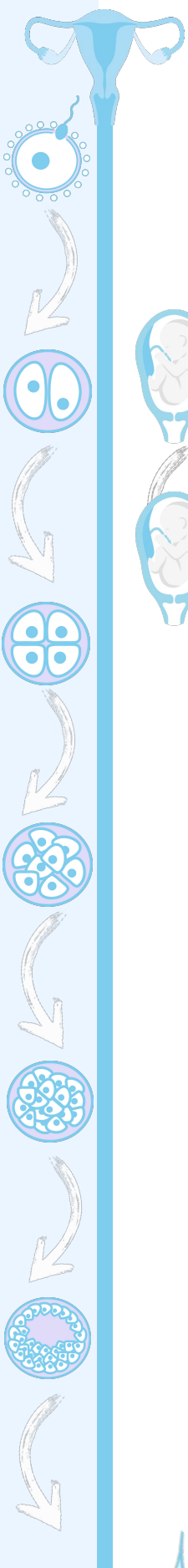




Polycystic Ovarian Disease & Endometriosis





Objectives



Know the clinicopathologic features of endometriosis with special emphasis on: definition, typical sites and theories behind its pathogenesis.



Understand the clinical manifestations and pathologic features of polycystic ovarian disease.

THIS LECTURE WAS PRESENTED BY DR.MARIA ARAFAH & DR.HAMADA AL JAEDI



IF YOU WANT TO READ THE LECTURE FROM [ROBBINS](#)



IF YOU WANT TO READ THE LECTURE FROM [FIRST AID](#)



IF YOU WANT TO READ [OSMOSIS SUMMARY](#)



IF YOU WANT TO WATCH [OSMOSIS VIDEO](#)

Editing File

Color index :

Main text (black)

Female Slides (Pink)

Male Slides (Blue)

Important (Red)

Dr's note (Green)

Extra Info (Grey)

Polycystic Ovarian Disease

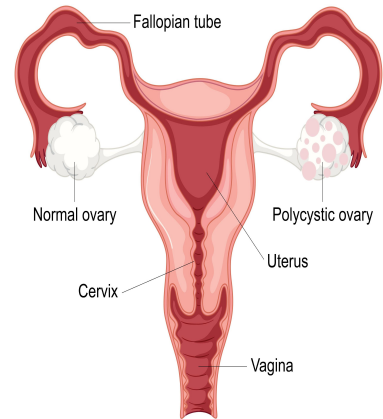
Introduction

Radiological features: It is characterized by bilateral enlargement of ovaries with multiple small cysts.

Clinical features: chronic anovulation.

clinical manifestations secondary to **excessive production of estrogens and androgens, mainly androgens.**

Other names for this disease include polycystic ovarian syndrome and **Stein-Leventhal syndrome.**



Pathogenesis

IMPORTANT

The initial abnormality resulting in the syndrome is not known but is believed to be related to **hypothalamus-pituitary dysfunction leading to over secretion of luteinizing hormone (LH).**

1

LH in turn stimulates the ovary to produce excess **androgens.**

2

The secretion of follicle stimulating hormone (**FSH**) is inhibited

3

leading to **suppression of ovulation and formation of cystic follicles in the ovary.**

4

Patients have:



high levels of LH



low FSH



High testosterone



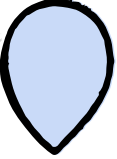
High estrogen

Polycystic Ovarian Disease

Clinical Presentation

IMPORTANT


It usually affects young women (between 15 and 30 years) and they present with:



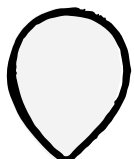
secondary amenorrhea with anovulation.



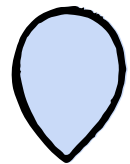
oligomenorrhea or irregular menses.



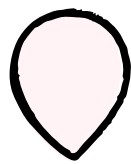
infertility.



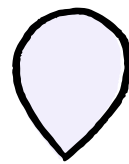
hirsutism.



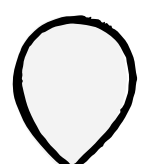
obesity.



virilism due to increased androgenic (masculinizing) hormones.



acne.



In some cases severe pain during menstruation

Associated Risks

01

Endometrial hyperplasia & cancer.

02

Insulin resistance → Type II diabetes.

03

Depression, Anxiety.

04

Metabolic syndrome: Dyslipidemia, weight gain, hypertension, CVD, strokes.

05

Autoimmune thyroiditis.

06

Miscarriage

07

Acanthosis nigricans: patches of darkened skin under the arms, in the groin area and on the back of the neck.

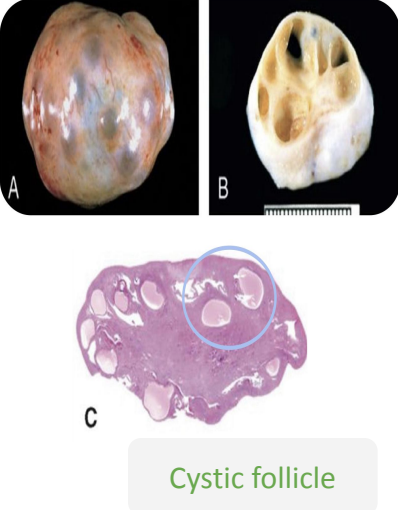

08

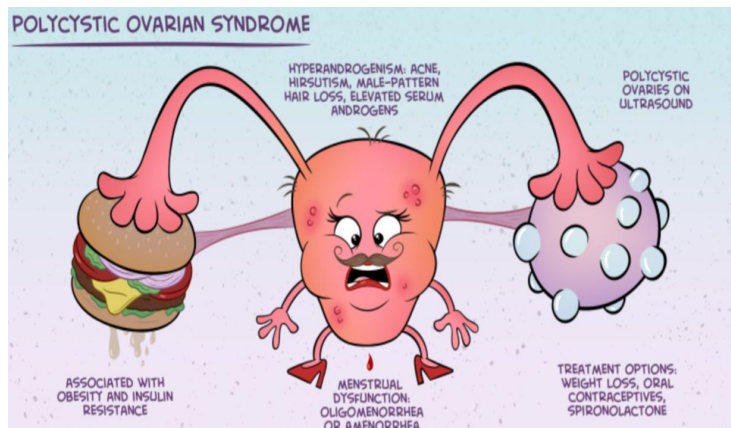
Fertility



Polycystic Ovarian Disease

Morphology

Gross	Microscopic	
	Ovaries	Endometrium
<ul style="list-style-type: none"> A: The ovarian surface reveals numerous nodular elevations of clear cysts. B: The cut section shows several subcortical cystic follicles in the ovary C: Cystic follicles seen in a low-power microphotograph.  <p>Cystic follicle</p>	<ul style="list-style-type: none"> The ovaries are 2 times the normal size with many subcortical cysts measuring 0.5 to 1.5 cm in diameter. The outer portion of the cortex is thickened and fibrotic (cortical stromal fibrosis) with multiple cysts underneath. The follicular cysts usually have a prominent theca interna layer. Corpora lutea are frequently absent (No ovulation occurs, women with PCOD have anovulatory cycles). 	<p>Chronic anovulation ↓ unopposed estrogen ↓ hyperestrogenic state ↓ endometrium may develop estrogen-associated hyperplasia (pre-neoplastic)</p> <p>and show any of the following:</p> <ul style="list-style-type: none"> hyperplasia, with or without atypia (Simple with or without atypia, Complex hyperplasia, with or without atypia) or even endometrial adenocarcinoma



Polycystic Ovarian Disease

Treatment

The goal of treatment is to **induce ovulation** and regulate the menstrual cycle to restore fertility by:

Medically

treatment with drugs such as:
clomiphene or **hCG**
 (Human Chorionic Gonadotropin)

Surgically

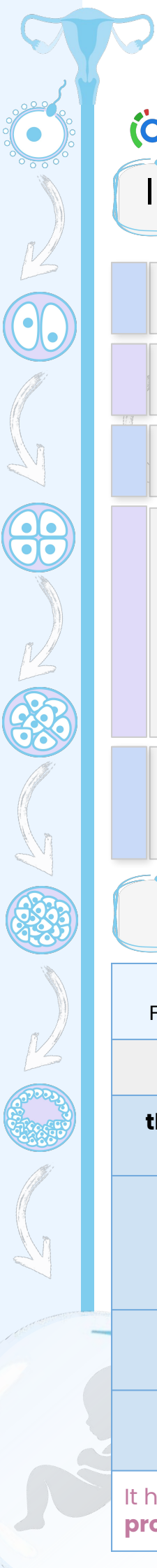
Reduction of ovarian volume by
wedge resection of the ovaries
 (successful in initiating ovulation and restoring fertility)

The endometrial changes (**endometrial hyperplasia**) usually regress once ovulation is achieved.

Clinical Note

Rotterdam criteria : Diagnosis requires 2 of the 3 following criteria:

Biochemical hyperandrogenism: elevated levels of free testosterone, a free androgen index, or a calculated bioavailable testosterone	-Liquid chromatography–mass spectrometry (LCMS) or extraction/chromatography immunoassays should be used for testing. -Elevated levels are defined by lab reference ranges. -Note: Androgen levels can not be reliably tested in individuals taking hormonal contraceptives because of their effects on SHBG levels and production of androgens; individuals must be off hormonal contraception for ≥ 3 months prior to testing.
Signs	Signs of clinical hyperandrogenism include: Hirsutism , Alopecia , Acne
Oligoovulation or anovulation, defined as:	<ul style="list-style-type: none"> •Primary amenorrhea by age 15 or > 3 years after thelarche (breast development) • > 90 days for any 1 cycle in individuals ≥ 1 year post menarche • Cycles < 21 or > 45 days in individuals 1 to < 3 years post menarche • Cycles < 21 or > 35 days or < 8 cycles per year in individuals > 3 years post menarche
Polycystic ovaries on ultrasound, defined as:	<ul style="list-style-type: none"> • ≥ 20 follicles (measuring 2–9 mm) per single ovary, in either ovary OR •Ovarian volume (in an ovary without cysts, a dominant follicle, or corpus luteum) of ≥ 10 ml in either ovary •Note: Ultrasound should not be used to diagnose PCOS in individuals < 8 years post menarche



Endometriosis

Introduction

Normally **endometrial glands** and **endometrial stroma** are found in the **endometrium** of the uterus.

Endometriosis is the presence of ectopic endometrial glands and stroma outside the uterus.

The behavior of endometriosis is Benign with no malignant potential. May recur after surgical excision but the risk is low. (**non-neoplastic condition**)

Like the **uterine endometrium**:

- it is **responsive to the hormonal variations** of the menstrual cycle, and bleeds during **menstruation**.
- ★ Therefore, there is menstrual type **bleeding** at the site of the ectopic endometrium, resulting in blood filled areas (**e.g. chocolate cysts *****).

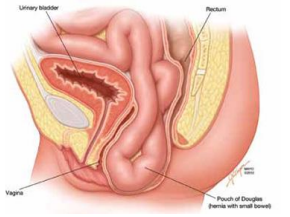
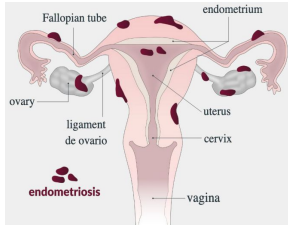
Proposed theories:
-Metastatic: retrograde menstruation and implantation of endometrial cells.
-Metaplastic: due to metaplasia of pelvic peritoneal cells.

Locations

Locations
Found on the **peritoneal** surfaces of the reproductive organs and adjacent pelvic organs.

The most frequent locations are:

the most common site	★ Ovary (around 50%)
second most common	Pouch of Douglas (pouch of Douglas = pouch between uterus and rectum) / rectouterine pouch/ cul- de- sac and uterine ligaments.
Occasionally	cervix, vagina, perineum, bladder, large bowel and umbilicus.
Rarely	small bowel, kidneys, lungs, nose and brain .



It has been reported in **men**. The sites involved have been the **bladder, scrotum and prostate**.

Endometriosis

Clinical Presentation

- Depends on the site of endometriosis:

Often results in
Infertility

Dysmenorrhea
painful menstruation

Cyclic abdominal
pain
there is usually a
severe
menstrual-related
pain

Dyspareunia
painful sexual intercourse

Fibrous adhesions

Women in active reproductive life.

Morphology

IMPORTANT

Gross

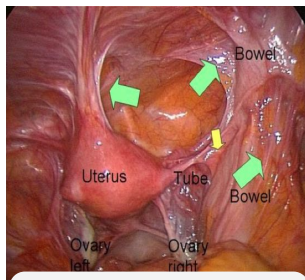
- Endometriosis usually appears as multiple red or brown (due to the hemosiderin) 1 mm to 5 mm nodules (some may form larger masses or cysts).
- Dense fibrous adhesions may surround the foci.
- Repeated hemorrhage into the ovary with each menstrual cycle produces cysts, filled with chocolate-brown material. The cyst is called "chocolate cyst".
- With time the ovaries become totally cystic and turn into large cystic masses filled with chocolate brown fluid.

Microscopic

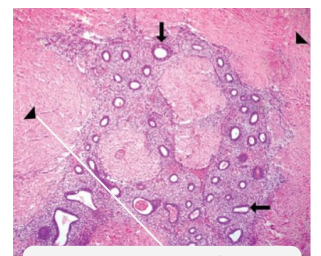
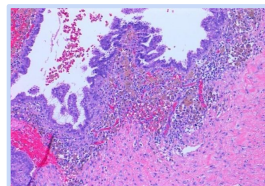
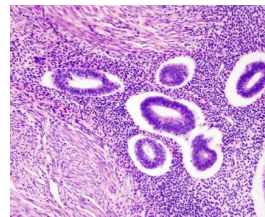
- Ectopic endometrial glands and endometrial stroma are present.
- Denatured blood from previous bleeding is present.
- Macrophages containing hemosiderin (siderophages) are present.
- When endometriosis develops in a muscular organ, the smooth muscle around it becomes hyperplastic.



Chocolate cyst of ovary
(endometriotic cyst)



Fibrous adhesions



Hyperplastic
muscles

Adenomyosis

Introduction

Presence of endometrial glands and endometrial stroma deep in the myometrium of the uterus.

It is more common in the posterior wall than the anterior wall, but it may affect both walls of the same uterus.

The disease is primarily a disorder of parous women (having produced offspring) and is uncommon in the nullipara.

Clinical presentation

- Asymptomatic in $\frac{1}{3}$ of the patients.
- Associated with menorrhagia, severe dysmenorrhea, and Abdominal pain.
- When extensive the lesions causes:
 - Myometrial thickening.
 - Small yellow or brown cystic spaces.
 - containing fluid or blood.

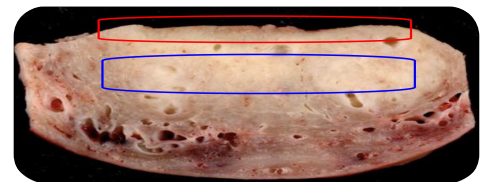
Clinical behavior

Benign with no known malignant potential
Usually regresses after menopause.

Morphology

Cross section through the wall of a hysterectomy specimen of a 30 year old woman who reported chronic pelvic pain and abnormal uterine bleeding:

- The endometrial surface is at the top of the image.
- The serosa is at the bottom.



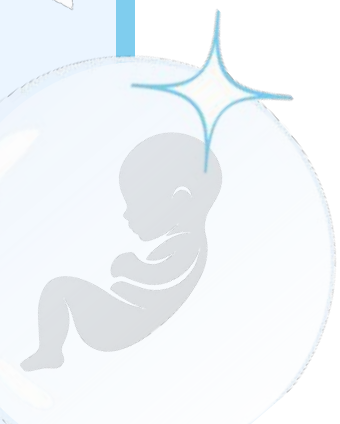
- Salpingitis is inflammation of the fallopian tube.
- **Tuberculous salpingitis: granuloma + necrosis.**
- Oophoritis is inflammation of the ovary, pelvic inflammatory disease.

Keywords

Polycystic Ovarian Syndrome	<ul style="list-style-type: none">• bilateral enlargement of ovary• chronic anovulation• excessive production of estrogens and mainly Androgens• High : testosterone , LH , estrogen• Low : FSH• Secondary amenorrhea , Oligomenorrhea , Infertility , Hirsutism , acne , Obesity• Gross : subcortical cystic follicles in the ovary.• Microscopic : The outer portion of the cortex is thickened & fibrotic• Corpora lutea are frequently absent• endometrium may develop estrogen-associated hyperplasia which may progress to endometrial adenocarcinoma• Acanthosis nigricans , Insulin resistance
Endometriosis	<ul style="list-style-type: none">• presence of ectopic endometrial glands and stroma outside the uterus.• non-neoplastic condition• bleeds during menstruation.• Form chocolate cysts• most common site Ovary• second most common site Pouch of Douglas• Red or brown nodules : Due to hemosiderin.• Fibrous adhesions• Macrophages containing hemosiderin (siderophages) are present.• hyperplastic Muscles
Adenomyosis	<ul style="list-style-type: none">• Presence of endometrial glands and endometrial stroma deep in the myometrium of the uterus.• disorder of parous women• Benign with no known malignant potential• regresses after menopause



IF YOU WANT A SUMMARY [CLICK HERE](#)



YOU VS MCQs



Question 1

Which hormone is over-secreted in patients with polycystic ovarian disease ?

- Follicle-stimulating hormone (FSH)
- Luteinizing hormone (LH)
- Estrogen
- Testosterone



Question 2

Which term is used to describe patches of darkened skin in PCOD?

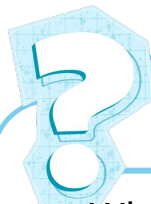
- Acanthosis nigricans
- Vitiligo
- Melasma
- Psoriasis



Question 3

A patient came to the clinic and his histopathological examination shows granuloma with necrosis, what is the diagnosis?

- Tuberculous salpingitis
- Gonorrhoea
- HPV
- HSV



Question 4

Which of the following is a characteristic histopathological feature of Stein-Leventhal syndrome?

- Chocolate cyst
- Cortex nodules
- Multiple small follicular cyst
- mucinous cyst

YOU VS MCQs



Question 5

A 29 year old female came with severe abdominal pain and pain during sexual intercourse she was diagnosed with endometriosis an Oophorectomy was done , which of the following is the most likely gross feature to be observed ?

- Psammoma bodies
- Non caseating granuloma
- chocolate-brown material
- Wedge shaped infarction



Question 6

Patient with history of hirsutism and irregular menstruation due to ?

- high androgen
- low LH
- high FSH
- Low androgen

Cases

1. A 36-year-old woman presents with infertility. She complains of having had dull pelvic pain for 9 months, which is accentuated during menstruation. Physical examination and endocrinologic studies are normal. Laparoscopy reveals multiple, small hemorrhagic lesions over the surface of both ovaries and fallopian tubes and abundant pelvic scarring. Which of the following is the most likely diagnosis?

- A. Borderline serous tumor B. Ectopic pregnancy C. Endometriosis D. Metastatic cervical carcinoma

2. A 30-year-old woman presents to the clinic to establish care. She is starting a new job as a receptionist and wants to "take care of her irregular periods." Her menarche was at age 14 and she has been having irregular periods since then. Review of systems is significant for deepening of voice. Past medical history is unremarkable. She only takes over the counter multivitamins. Vitals are within normal limits. BMI is 32 kg/m². Physical examination shows papulo-pustular acne on the face and a receding hairline. Pelvic examination reveals normal external genitalia and a mobile and nontender uterus with no adnexal masses. This patient is at increased risk of developing which of the following?

- A. Narcolepsy B. Ovarian cancer C. Endometrial carcinoma D. Ovarian cyst rupture

3. A 27-year-old woman comes to the clinic for the evaluation of irregular periods. For the last three years, the patient has had about four periods a year. She recently began shaving her upper lip and chin due to excessive hair growth. Review of systems is significant for 30 lbs weight gain in the last 7 months. Past medical history is unremarkable. She has a family history of breast cancer in her mother at age 49 and myocardial infarction in her father at age 52. Temperature is 36.9°C (98.4°F), pulse is 74/min, respirations are 13/min, and blood pressure is 124/72 mmHg. Physical examination shows terminal hair on the upper lip and nipples. The abdomen is obese and nontender without masses or tenderness. Development is Tanner stage V. A transvaginal ultrasound shows polycystic ovaries bilaterally. Serum TSH is within normal limits. Which of the following sets of hormonal changes will most likely be observed in this patient?

- A.

GnRH	FSH	Estrogen
↑	↑	↓

 B.

GnRH	FSH	Estrogen
↓	↓	↓

 C.

GnRH	FSH	Estrogen
Normal	Normal	Normal

 D.

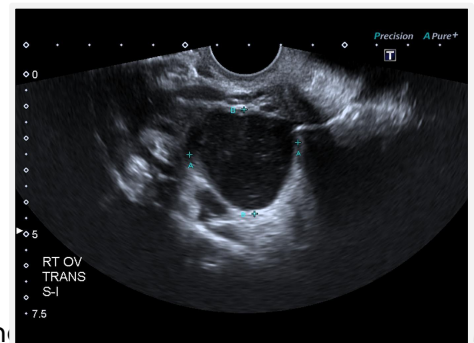
GnRH	FSH	Estrogen
↑	Normal	↑

Cases

1. A 26-year-old nulliparous woman presents to the office for the evaluation of infertility. She has also been experiencing episodic dull pelvic pain for the past 3 years that usually begins 3 days before menses and resolves after menstruation. She also complains of pain during sexual intercourse for the past 6 months. Her menstrual cycle is regular with periods occurring every 25th day and lasting for 6 days. She usually soaks 5-6 pads during her periods. The couple is currently not using contraception and has no history of sexually transmitted disease. She has had no hot flashes. Speculum examination reveals a moist vaginal mucosa with no abnormalities. Pelvic examination shows a normal-sized retroverted uterus. There is tenderness and nodularity in the posterior cul-de-sac. Semen analysis of her partner is normal. Which of the following is the most likely cause of infertility in this patient?

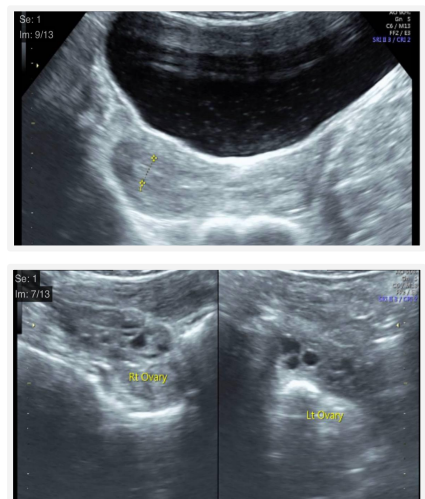
- | | | | |
|------------------------------|------------------|----------------------|----------------|
| A. Premature ovarian failure | B. Endometriosis | C. Asherman syndrome | D. Adenomyosis |
|------------------------------|------------------|----------------------|----------------|

2. A 28-year-old nulliparous woman comes to the office because of chronic intermittent dull pelvic pain for 7 months. The pain usually begins a day before menses and resolves 1-2 days after the menstruation stops. She also complains of crampy pain with defecation. Menarche was at age 13. Her cycles are regular but are associated with heavy bleeding for 5 days. She is not sexually active, and there is no history of sexually transmitted disease. Family history is remarkable for ovarian cancer in her maternal grandmother. Vitals are within normal limits. BMI is 33 kg/m². Abdominal examination shows no abnormality. She has a fixed anteverted uterus and palpable right-sided adnexal mass. Transvaginal ultrasound of the right ovary is shown below. Which of the following is the most likely diagnosis?



- | | | | |
|-----------------------|------------------------------|------------------|----------------------------|
| A. Corpus luteal cyst | B. Polycystic ovary syndrome | C. Endometriosis | D. Ovarian cystic teratoma |
|-----------------------|------------------------------|------------------|----------------------------|

3. A 20-year-old female, unmarried and nulliparous woman, 8 years ago she presented to the clinic with irregular menstrual cycle from her first period ever, and experienced severe pain during her menstruation. During these years her menstruation can be induced with Duphaston (synthetic progesterone), experienced multiple estrogen-associated hyperplasia of the endometrium without atypia that has regressed with medications. During her last visit the patient presented with low FSH and High Estrogen and LH levels, uterus and ovaries ultrasound was performed. What is her diagnosis?



- | | | | |
|-----------------------|------------------------------|------------------|----------------------------|
| A. Corpus luteal cyst | B. Polycystic ovary syndrome | C. Endometriosis | D. Ovarian cystic teratoma |
|-----------------------|------------------------------|------------------|----------------------------|

Pathology Team

Leader

لمى العتيبي

Leader

زياد العتيبي



سديم اليحيى



الجوهرة الوهبي



رغد المصلح



هياء العجمي



عائشة إبراهيم



ريناد صالح الشهري



ألين الكلية



ريماس المحمود



شادن الهزاني



دانه المحيسن



مريم الغنام



لؤي الحديثي



ساره الدوسري



الدانه عبدالله



محمد العرفج



فيصل الشويعر



هدى الجدعان



ساره الشهراني



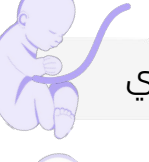
رند ابا الخيل



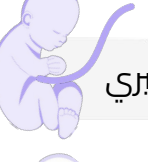
محمد السلامة



ليان الرويلي



أفنان الأحمري



وجد المطيري



عبدالمحسن الدايل



ساره العجاي



هيا الزير



ريوف الأحمري



أريج القريني



رغد الحامد



محمد معشي



سلطان البقمي



عبدالله الزامل



مشعل الدخيل



يزيد المطيري



شوق الخليفة



رزان السطيحي



سلمى السعدون



ريما القرني



عروب المحمود