

# Benign Ovarian Tumors

Topic- based Uworld Questions

Block 1, 2, 7, 8



A 23-year-old woman, gravida 1 para 1, comes to the office due to pain in the right lower quadrant for 2 months. The pain is unrelieved by acetaminophen and worsens with physical activity. Menses are regular and occur every 28 days. The patient has a history of severe dysmenorrhea and takes oral contraceptive pills daily. Two years ago, she was treated for pelvic inflammatory disease. She has no chronic medical conditions and has had no surgeries. The patient smokes a pack of cigarettes a day but does not use alcohol or illicit drugs. Temperature is 36.7 C (98.1 F), blood pressure is 126/74 mm Hg, and pulse is 87/min. BMI is 36 kg/m<sup>2</sup>. The abdomen is soft and nontender. Pelvic examination reveals right adnexal fullness but is limited by habitus. Pregnancy test is negative. Pelvic ultrasonography shows a 4-cm ovarian mass. The patient undergoes laparoscopic ovarian cystectomy, and a photograph of the cyst is shown in the [exhibit](#). Which of the following is the most likely diagnosis?

- A. Corpus luteum cyst
- B. Ectopic pregnancy
- C. Endometrioma
- D. Mature cystic teratoma
- E. Mucinous cystadenoma
- F. Tubo-ovarian abscess
- G. Yolk sac tumor

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- A. Corpus luteum cyst (0%)
- B. Ectopic pregnancy (0%)
- C. Endometrioma (0%)
- D. Mature cystic teratoma (97%)
- E. Mucinous cystadenoma (1%)
- F. Tubo-ovarian abscess (0%)
- G. Yolk sac tumor (0%)

Omitted

Correct answer

D

97%  
Answered correctly09 secs  
Time Spent02/15/2020  
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This patient has a **mature cystic teratoma** (ie, dermoid cyst), a benign **ovarian germ cell tumor** that typically occurs in young women. Patients with teratomas are usually asymptomatic and may be diagnosed incidentally (eg, adnexal fullness) on pelvic examination. Because teratomas have variable mass densities, they are prone to ovarian torsion because they have an intrinsically unstable suspension across the infundibulopelvic ligaments, which contain the ovarian vessels. As a result, sudden movement may cause intermittent ovarian vessel occlusion, leading to **intermittent ovarian torsion**, as seen in this patient's pelvic pain that worsens with physical activity.

Teratomas typically appear as adnexal masses with multiple calcifications on ultrasound but are definitively diagnosed after **ovarian cystectomy**, which preserves fertility and reduces the risk of torsion and malignant transformation. Teratomas have a gross appearance consistent with the **3 germ cell layers**, including ectodermal elements such as **thick, yellow sebaceous fluid** and **hair** (arrow); mesodermal (eg, cartilage, adipose tissue) and endodermal (eg, thyroid) components may also be seen.

**(Choice A)** A corpus luteum cyst is a physiologic remnant of a ruptured follicle after ovulation; it has a yellow appearance from granulosa cell lipids and pigment. This diagnosis is unlikely because this patient is on oral contraceptives (ie, anovulatory) and corpus luteum cysts do not contain hair.

**(Choice B)** Pelvic inflammatory disease and tobacco use are risk factors for **ectopic pregnancy**, which grossly appears as fetal tissue (orange arrow) implanted within a dilated fallopian tube (red arrow) in patients with a positive pregnancy test.

**(Choice C)** Endometriomas may cause severe dysmenorrhea and adnexal fullness; however, this diagnosis is unlikely because endometriomas are a collection of old blood that creates a "**chocolate cyst**" appearance.

**(Choice E)** Mucinous cystadenomas are benign surface epithelial ovarian masses that appear as thin-walled loculations of **mucinous fluid** (blue arrows); there is no associated hair.

**(Choices F)** Patients with pelvic inflammatory disease are at risk for tubo-ovarian abscess; however, these abscesses are typically filled with purulent material, which is not seen in this patient.

**(Choice G)** Yolk sac tumors are malignant germ cell tumors with gray-yellow, necrotic, and hemorrhagic areas on a gross specimen; there is no associated hair.

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**(Choice G)** Yolk sac tumors are malignant germ cell tumors with gray-yellow, necrotic, and hemorrhagic areas on a gross specimen; there is no associated hair.

#### Educational objective:

Mature cystic teratomas are benign ovarian germ cell tumors that contain all 3 germ cell layers and can have sebaceous fluid and hair on gross appearance.

#### References

- [Laparoscopic treatment of ovarian dermoid cysts is a safe procedure.](#)
- [Ovarian teratoma in routine biopsy material during a five-year period.](#)
- [Spectrums and outcomes of adnexal torsion at different ages.](#)



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(Choice G) Yolk sac tumors are malignant germ cell tumors with gray-yellow, necrotic, and hemorrhagic areas on a gross specimen, there is no

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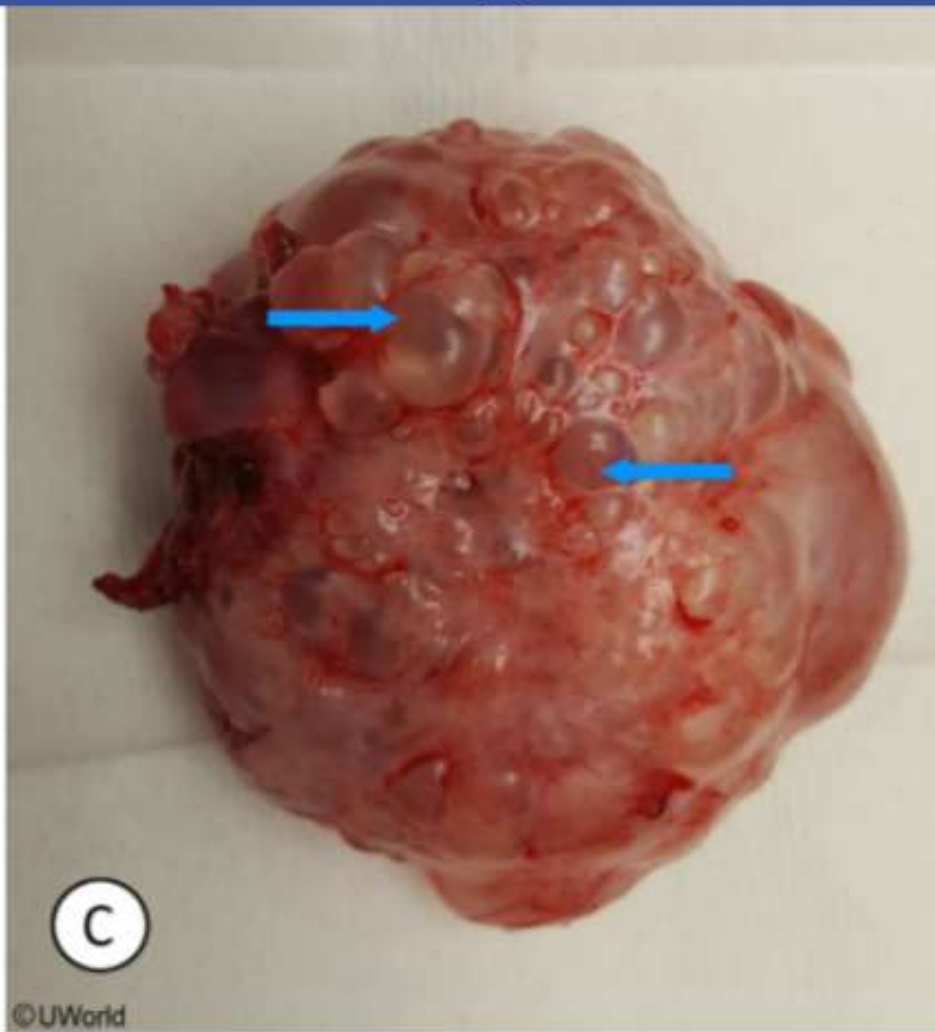
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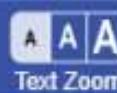
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A 40-year-old woman comes to the emergency department due to nausea, vomiting, and dizziness. The patient has been unable to tolerate any oral intake over the last 2 days. She has had no fevers, chills, diarrhea, or constipation. She reports no sick contacts. The patient has a history of migraines for which she takes daily preventive treatment, but she has been unable to take her medications for the past several days due to nausea. Her last menstrual period was approximately 8 weeks ago, and she has a history of irregular menses. Temperature is 36.7 C (98 F), blood pressure is 90/60 mm Hg, and pulse is 112/min. BMI is 32 kg/m<sup>2</sup>. Physical examination shows dry mucous membranes, decreased skin turgor, and prolonged capillary refill. The abdomen is soft and nontender. Pelvic examination shows a 12-week-size uterus and bilateral adnexal masses. Pelvic ultrasound shows a uterus filled with multiple small cysts but no embryo. The ovaries are 10 cm bilaterally with a multilocular cystic appearance. Urine pregnancy test is positive. Which of the following is the most likely mechanism of this patient's adnexal pathology?

- A. Excessive intra-ovarian androgen conversion
- B. Extrauterine implantation of a developing blastocyst
- C. Failure of follicular rupture during ovulation
- D. Ovarian hyperstimulation from abnormal trophoblastic proliferation
- E. Somatic differentiation of primordial germ cells

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- A. Excessive intra-ovarian androgen conversion (4%)
- B. Extrauterine implantation of a developing blastocyst (2%)
- C. Failure of follicular rupture during ovulation (10%)
- D. Ovarian hyperstimulation from abnormal trophoblastic proliferation (79%)
- E. Somatic differentiation of primordial germ cells (3%)

Omitted

Correct answer

D



79%

Answered correctly



12 secs

Time Spent



04/06/2020

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Explanation

Theca lutein cysts



Theca lutein cysts	
<b>Presentation</b>	<ul style="list-style-type: none"> <li>• Multilocular</li> <li>• Bilateral</li> <li>• 10-15 cm ovaries</li> </ul>
<b>Pathogenesis</b>	<ul style="list-style-type: none"> <li>• Ovarian hyperstimulation due to:               <ul style="list-style-type: none"> <li>◦ Gestational trophoblastic disease</li> <li>◦ Multifetal gestation</li> <li>◦ Infertility treatment</li> </ul> </li> </ul>
<b>Clinical course</b>	<ul style="list-style-type: none"> <li>• Resolve with decreasing <math>\beta</math>-hCG levels</li> </ul>

This patient presents with hyperemesis gravidarum, an enlarged uterus (12-week size at 8 weeks gestation), and **bilaterally enlarged ovaries**, a presentation concerning for a complete **hydatidiform mole**, a type of gestational trophoblastic disease. A [complete hydatidiform mole](#) results from abnormal fertilization of an empty ovum by either 2 sperm or by 1 that subsequently duplicates its genome. The resultant gestation is composed of proliferative trophoblastic tissue that secretes high levels of  $\beta$ -hCG. The markedly **elevated  $\beta$ -hCG** level causes hyperstimulation of the ovaries and formation of **theca lutein cysts**, which are large, **bilateral, multilocular** ovarian cysts. Theca lutein cysts are expectantly managed as they resolve after treatment of the hydatidiform mole by suction curettage or hysterectomy when the  $\beta$ -hCG level decreases.

**(Choice A)** Polycystic ovarian syndrome is associated with excessive intra-ovarian androgen conversion and presents with anovulatory oligomenorrhea, hyperandrogenism (eg, hirsutism), and multiple small ovarian cysts.

**(Choice B)** An ectopic pregnancy is a pregnancy (eg, blastocyst) that implants outside of the uterus, typically in the fallopian tube. Ectopic pregnancies typically present as a unilateral adnexal mass.

**(Choice C)** A simple cyst occurs when a follicle fails to rupture during ovulation. Simple cysts are unilateral and unilocular on ultrasound.

**(Choice E)** A benign cystic teratoma (eg, dermoid cyst) is a tumor composed of differentiated germ cells. Teratomas can be bilateral but have both solid and cystic components. Teratomas are usually asymptomatic and are not associated with an hydatidiform mole.

Educational objective:

This patient presents with hyperemesis gravidarum, an enlarged uterus (12-week size at 8 weeks gestation), and **bilaterally enlarged ovaries**, a presentation concerning for a complete **hydatidiform mole**, a type of gestational trophoblastic disease. A **complete hydatidiform mole** results from abnormal fertilization of an empty ovum by either 2 sperm or by 1 that subsequently duplicates its genome. The resultant gestation is composed of proliferative trophoblastic tissue that secretes high levels of  $\beta$ -hCG. The markedly **elevated  $\beta$ -hCG** level causes hyperstimulation of the ovaries and formation of **theca lutein cysts**, which are large, **bilateral, multilocular** ovarian cysts. Theca lutein cysts are expectantly managed as they resolve after treatment of the hydatidiform mole by suction curettage or hysterectomy when the  $\beta$ -hCG level decreases.

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#### Educational objective:

Hydatidiform mole, a type of gestational trophoblastic disease, can present with theca lutein cysts, bilateral multiloculated ovarian cysts that are associated with ovarian hyperstimulation from markedly elevated  $\beta$ -hCG levels. The theca lutein cysts resolve after treatment of the hydatidiform mole when the  $\beta$ -hCG level decreases.

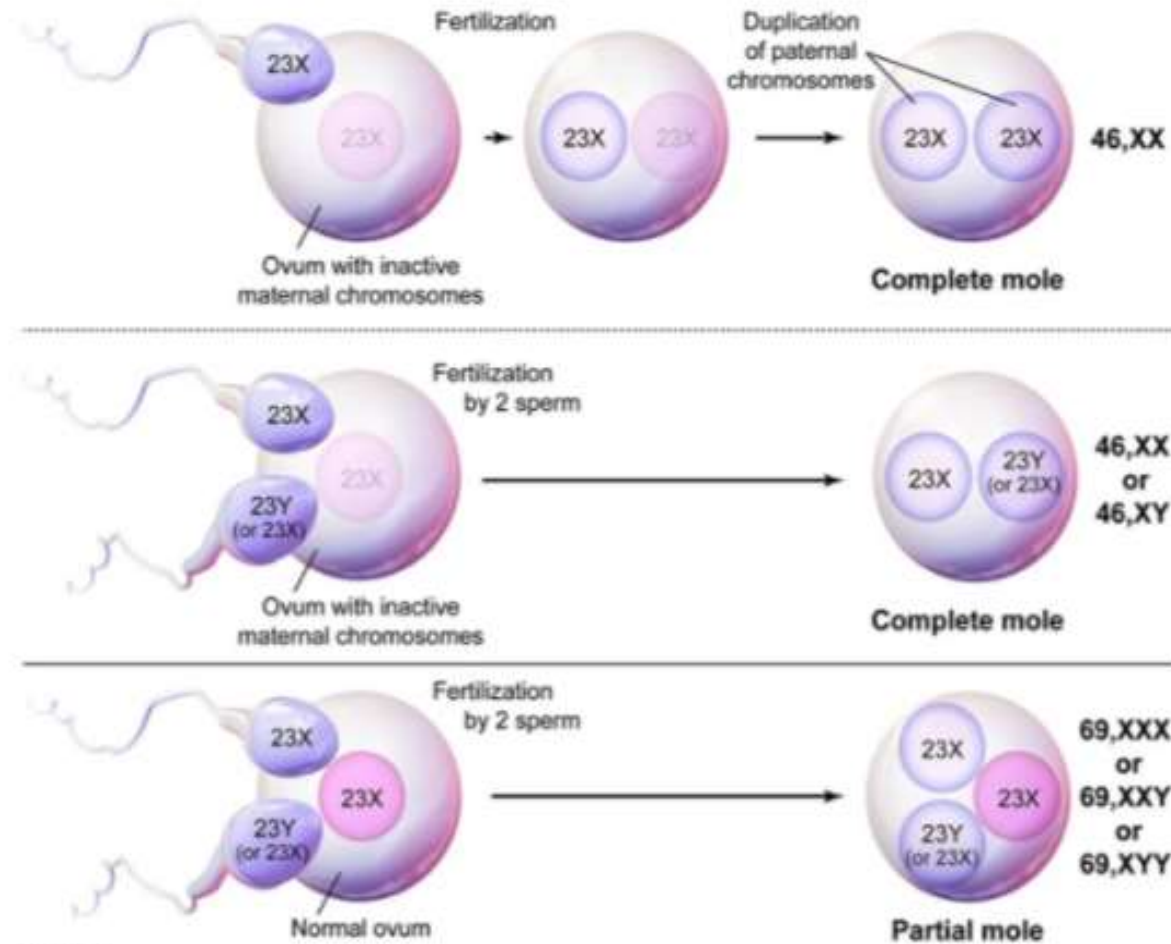
#### References

- [Gestational trophoblastic disease.](#)



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## Molar pregnancy



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A 32-year-old woman, gravida 2 para 1, at 18 weeks gestation comes to the office for her first prenatal visit. She has noticed new facial hair and acne over the past few weeks. The patient has had no vaginal bleeding or abdominal pain. Some mild nausea earlier in the pregnancy has resolved. The patient has had no vomiting and is eating 5 small meals a day. Her prepregnancy BMI was  $24 \text{ kg/m}^2$  and she has gained 2.3 kg (5 lb) over the past 2 months. Examination shows acne on her chest and back and coarse hair in the distribution of the upper lip, chin, periareolar area, chest, and lower abdomen. The uterus is nontender and fundal height is 2 cm below the umbilicus. Ultrasonogram shows an intrauterine gestation consistent with dates and bilateral 7-cm solid masses in the ovaries. Which of the following is the best next step in management of this patient?

- A. Clomiphene therapy
- B. Diagnostic laparoscopy with ovarian biopsy
- C. Exploratory laparotomy with oophorectomy
- D. Observation and expectant management
- E. Suction evacuation of the uterus

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- A. Clomiphene therapy (3%)
- B. Diagnostic laparoscopy with ovarian biopsy (12%)
- C. Exploratory laparotomy with oophorectomy (3%)
- D. Observation and expectant management (78%)
- E. Suction evacuation of the uterus (2%)

Omitted

Correct answer  
D78%  
Answered correctly01 sec  
Time Spent06/22/2020  
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Explanation

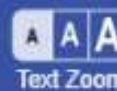
**Causes of hyperandrogenism in pregnancy**

Causes of hyperandrogenism in pregnancy	
Diagnosis	Clinical features
Placental aromatase deficiency	<ul style="list-style-type: none"><li>• No ovarian mass</li><li>• High maternal &amp; fetal virilization risk</li><li>• Resolution of maternal symptoms after delivery</li></ul>
Luteoma	<ul style="list-style-type: none"><li>• Solid, unilateral/bilateral ovarian masses</li><li>• Moderate maternal virilization risk; high fetal virilization risk</li><li>• Spontaneous regression of masses after delivery</li></ul>
Theca lutein cyst	<ul style="list-style-type: none"><li>• Cystic, bilateral ovarian masses</li><li>• Moderate maternal virilization risk; low fetal virilization risk</li><li>• Spontaneous regression of masses after delivery</li></ul>
Sertoli-Leydig tumor	<ul style="list-style-type: none"><li>• Solid unilateral ovarian mass</li><li>• High maternal &amp; fetal virilization risk</li><li>• Surgery required (2nd trimester or postpartum)</li></ul>

This patient has new-onset **hyperandrogenism during pregnancy** (ie, gestational hyperandrogenism) based on the acne and male-pattern terminal hair. Gestational hyperandrogenism arises from either maternal (eg, ovarian masses) or fetal (eg, placental aromatase deficiency) sources that result in maternal and possible fetal virilization. This patient's hyperandrogenism is due to **benign ovarian tumors**, which typically present as **bilateral ovarian masses** on ultrasound. The most common benign ovarian tumors resulting in gestational hyperandrogenism are luteomas of pregnancy and theca lutein cysts.

1. **Luteomas of pregnancy**, as seen in this patient, often appear as solid, bilateral ovarian masses on ultrasound. Elevated  $\beta$ -hCG levels stimulate the luteoma (composed of large lutein cells) to release androgens, which may cause maternal **virilization**; some patients are asymptomatic. Women who develop virilization symptoms are at high risk of delivering a female fetus with virilization.





1. **Luteomas of pregnancy**, as seen in this patient, often appear as solid, bilateral ovarian masses on ultrasound. Elevated  $\beta$ -hCG levels stimulate the luteoma (composed of large lutein cells) to release androgens, which may cause maternal **virilization**; some patients are asymptomatic. Women who develop virilization symptoms are at high risk of delivering a female fetus with virilization.
2. Theca lutein cysts are cystic, bilateral ovarian masses that occur from ovarian hyperstimulation secondary to markedly elevated  $\beta$ -hCG levels (eg, hydatidiform mole, multiple gestation). Theca lutein cysts may cause maternal virilization; however, there is a low risk of female fetal virilization.

Management of bilateral, benign ovarian masses is **observation and expectant management**, as the masses and symptoms **resolve spontaneously after delivery** due to falling  $\beta$ -hCG levels

**(Choice A)** Polycystic ovary syndrome causes hyperandrogenism, anovulation (eg, oligomenorrhea), and infertility in nonpregnant women. Clomiphene is a first-line infertility treatment in these patients but is not used during pregnancy. However, this diagnosis is unlikely in this patient, as the hirsutism and acne would likely predate the pregnancy and polycystic ovaries would likely be seen on ultrasound.

**(Choices B and C)** Surgery with either an ovarian biopsy or oophorectomy may be indicated if a malignant ovarian tumor is suspected. Sertoli-Leydig tumors secrete testosterone, which can result in virilization. In contrast to the masses in this patient, these tumors often appear as unilateral, solid, complex masses on ultrasound.

**(Choice E)** Suction curettage is indicated if a complete hydatidiform mole is seen on ultrasound (eg, "snowstorm" appearance). This patient has a normal intrauterine gestation.

#### Educational objective:

Hyperandrogenism in pregnancy is commonly due to benign, bilateral ovarian masses such as luteomas and theca lutein cysts. Patients with virilization during pregnancy and bilateral ovarian masses are observed and managed expectantly, as the symptoms and masses spontaneously regress after delivery.

#### References

- [Pregnancy luteomas: clinical presentations and management strategies.](#)
- [Diagnosis and treatment of polycystic ovary syndrome: an Endocrine Society clinical practice guideline.](#)