Learning Objectives

- Outline the approach to a patient with an adnexal mass
- Compare the characteristics of functional cysts, benign ovarian neoplasms and ovarian cancers
- Prerequisites:
  - NONE
- See also – for closely related topics
  - FLAME LECTURE 231 – Postmenopausal Adnexal Mass
  - FLAME LECTURE 232 – Ovarian Cancer
ADNEXAL MASSES OVERVIEW

- What's the most likely cause?
  - Premenopausal women: functional cyst
  - Postmenopausal women: serous cystadenoma

- What's the most concerning cause? OVARIAN CANCER
  - < 15 years old: most common ovarian cancer - yolk sac tumor (endodermal sinus tumor)
  - 15 – 30 yo: most common ovarian cancer - germ cell tumor
  - > 55 yo: most common ovarian cancer - epithelial tumor

- There is NO effective screening method for ovarian cancer at this time
  - Thus, even though the majority of ovarian masses are benign, we have a low threshold for escalating work up to rule out cancer
  - Most adnexal masses are discovered incidentally on exam or imaging and investigation must be broadened beyond gynecologic causes
# Differential Diagnosis

## Gynecologic
- Functional Cyst
- Leiomyomata
- Endometrioma
- Tubo-ovarian abscess
- Ectopic pregnancy
- Mature teratoma
- Serous cystadenoma
- Hydrosalpinx
- Paratubal cyst

## Malignant
- Germ cell tumor
- Sex cord/stromal tumor
- Epithelial carcinoma

## Non-Gynecologic

### Benign
- Diverticular abscess
- Appendicitis
- Urinary tract abnormalities

### Malignant
- GI cancers
- Renal cell carcinoma
- Retroperitoneal sarcomas
- Metastases

## Introduction

### Benign Masses

### Malignant Masses

### Evaluation Methods

### Workup

### Masses in Pregnancy

### NAVIGATION:

- **Introduction**
- **Benign Masses**
- **Malignant Masses**
- **Evaluation Methods**
- **Masses in Pregnancy**
- **Workup**
The symptoms of ovarian cancer are very insidious and should always be asked of any patient of any age with a known pelvic mass

- Are you experiencing any abdominal or pelvic pain?
- Have you been having any abnormal vaginal bleeding?
- Have you noticed you get full quickly, have a decreased appetite, or feel bloated?
- Have you experienced any weight loss over the past three to six months that you haven’t been trying to lose?
OVARIAN CANCER

- Woman’s lifetime risk: 1 in 70
  - If diagnosed at Stage I, 5-year survival is 90% BUT:
  - Most women are diagnosed at an advanced stage 2/2 the insidious nature of their symptoms, and 5-year survival is 30-55%!
- Risk factors:
  - Family hx is the strongest risk factor: BRCA 1 carriers have 60-fold increased risk, BRCA 2 carriers have 30-fold increased risk, and Lynch carrier has 13-fold increased risk
  - Anything that causes increased ovarian epithelium turnover causes more repair and more opportunities for cancer development
    - Conversely, factors that decrease ovulation, thereby decreasing ovarian epithelium disruption, are considered protective
- Most ovarian cancers are diagnosed in postmenopausal women

### Risk Factors

| ★ Familial ovarian cancer syndrome (BRCA, Lynch) |
| Ovarian cancer family hx |
| Personal hx of breast cancer |
| Early menarche / late menopause |
| Infertility / nulliparity |
| Increasing age |

### Protective Factors

| Oral contraceptives |
| Breastfeeding |
| Multiparity |
| Chronic anovulation (ex PCOS) |
| BTL / salpingectomy / hysterectomy |
Benign Masses

In premenopausal women, benign gynecologic masses are most commonly functional cysts

- **Follicular cyst** – most common
  - Failure of follicular rupture during follicular phase, usually unilateral (3-8cm)
  - Resolves in 60-90 days

- **Corpus luteum cyst** – CL that is >3cm or hemorrhagic
  - Over-enlargement of corpus luteum during luteal phase of cycle
  - Causes delayed menstruation
BENIGN MASSES – CONT’D

- **Theca lutein cyst**
  - Due to abnormally high ß-HCg (pregnancy, IVF, complete molar pregnancy)
- **Endometrioma – “Chocolate cyst”**
  - Ectopic endometrial tissue + pelvic pain, dysmenorrhea, dyspareunia, infertility
- **Mature teratoma – “Dermoid”**
- **Complications**: 4-10cm cyst can cause ovarian torsion
  - <5cm, twisted ovary would self resolve
  - >10cm, too large to tors
  - Dermoid cysts at particularly high risk of torsion
EVALUATION OF ADNEXAL MASS

- Physical exam:
  - Is beneficial for discovering masses incidentally, however has low sensitivity and is generally difficult to differentiate between benign and malignant conditions
  - Has especially limited ability to detect masses in patients with high BMI

- Transvaginal ultrasound:
  - Pros: highly available and tolerable, cost-effective, most effective routine imaging
  - Cons: lacks specificity and positive predictive value for cancer, especially in premenopausal women
  - Concerning findings: mixed or solid consistency, + septations, mural nodules, papillary excrescences (outgrowths), ascites

- Benign findings:
  - Benign cysts: Round, unilocular, thin-walled sonolucent cysts with smooth, regular borders
  - Mature teratoma (dermoid cyst): hypoechoic attenuating component with multiple small homogeneous interfaces
BENIGN CYST EVALUATION - TVUS

Pre-menarche
- < 2cm: Repeat US in 6-12 weeks
- > 2cm: Surgical evaluation

Pre-menopausal
- < 5 cm: No follow-up
- 5 – 10 cm:
  - Hemorrhagic: Repeat US in 6-12 weeks
  - Non-hemorrhagic: Repeat US in 1 year
- > 10 cm: Surgical evaluation

Post-menopausal
- Hemorrhagic: Repeat US in 6-12 weeks
- Non-hemorrhagic:
  - < 3 cm: No follow-up
  - 3 – 5 cm: Repeat US in 1 year
  - 5 – 10 cm: Repeat US in 6-12 weeks
  - > 10 cm: Surgical evaluation

*While waiting for repeat US, provide OCP’s (won’t resolve current cyst but will prevent future cysts)
EVALUATION OF ADNEXAL MASS

- **CT, MRI, PET:**
  - Not recommended for initial evaluation and don’t add significantly to TVUS
  - CT best used to look for metastases after all other workup suggests possible malignancy
  - MRI useful for distinguishing origin of non-adnexal masses but not for ovarian tumors

- **Serum CA-125:**
  - Low sensitivity because only elevated in 50% of stage I cancers and can also be elevated due to other conditions (fibroids, endometriosis, PID, ascites, pregnancy)
    - Higher sensitivity in postmenopausal women because less incidence of alternative causes of elevation
  - CA-125 is NOT diagnostic. Usually measured to trend responses to treatment and recurrence
    - However CA-125 should still be measured in evaluation of adnexal masses because extreme values are still helpful (e.g. Mass in premenopausal woman with CA-125 of 300 is suspicious)
In the premenopausal patient, laboratory evaluation is generally reserved for complex masses > 5 cm and/or associated symptoms (AUB, virulization, hirsutism).

<table>
<thead>
<tr>
<th><strong>Tumor marker</strong></th>
<th><strong>Typically elevated in:</strong></th>
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<tbody>
<tr>
<td>CA-125</td>
<td>Epithelial ovarian cancer</td>
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<tr>
<td>Inhibin A</td>
<td>Granulosa cell tumor</td>
</tr>
<tr>
<td>Anti-mullerian hormone</td>
<td>Granulosa cell tumor</td>
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<tr>
<td>LDH</td>
<td>Dysgerminoma, endodermal sinus</td>
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<td>AFP</td>
<td>Endodermal sinus, Embryonal</td>
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<tr>
<td>HCG</td>
<td>Choriocarcinoma</td>
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<tr>
<td>Testosterone/DHEA</td>
<td>Sertoli-Leydig cell tumor</td>
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** Mixed cell-type tumors, such as gonadoblastomas or mixed germ-cell tumors, display a range and mix of tumor markers.
SUMMARY OF WORK-UP

ADNEXAL MASS IN PREMENOPAUSAL FEMALE

**SYMPTOMATIC**
- Must first rule-out acute conditions: ectopic pregnancy, ovarian torsion, PID, ruptured cyst
- History, ß-hCG, CBC, GC-CT.
- Transvaginal US

**ASYMPTOMATIC**
- Transvaginal US
  - < 10 cm mass
    - No Ascites
      - CA-125 < 200u/mL
      - BENIGN CYST EVALUATION
    - Ascites
      - CA-125 > 200u/mL
      - REFER TO GYN/Onc
  - > 10 cm mass

TREAT CONDITION
ADNEXAL MASSSES IN PREGNANCY

- Up to 3% of pregnant women have an identified adnexal mass at the time of delivery.

- Most common pathologic causes include: mature teratomas, theca lutein cysts, corpus luteum cysts. Malignancies are very rare.

- Changes to evaluation process:
  - TVUS is still preferred but may need to add abdominal ultrasound if at high gestational age.
  - MRI is preferred to CT for additional imaging to avoid fetal radiation.
  - CA-125 levels are elevated in pregnancy, peaking in the first trimester.

- Complications: adnexal masses do not pose risk to the pregnancy, however masses >5 cm are at risk for torsion following delivery because the space created by the shrinking uterus allows more opportunity for twisting.
  - Treatment: expectant management with close postpartum follow-up.
  - If symptomatic then can safely perform surgery during pregnancy.
IMPORTANT LINKS / REFERENCES

1. ACOG Practice Bulletin 83, July 2007 ("Management of Adnexal Masses")
2. UpToDate.com