Adnexal Masses in Pregnancy

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Objectives
- To describe the epidemiology of adnexal masses in pregnancy
- To review the ultrasound characteristics of these masses
- To describe management options during pregnancy

Or........

What to recommend when you get that consult......

24 year old P0020 at 9 weeks with an adnexal mass

Background: Before we go into the room..

Adnexal Masses in Pregnancy
- 0.05 – 2.4% of general pregnant population [0.19%]
- Usually found incidentally on ultrasound [>50%]
- Risks:
  - Malignancy: 1-9% → persistent, complex
  - Torsion: 3-10%
  - Rupture: 0-5%
  - Hemorrhage
  - Labor obstruction: 2-17%

A simple cyst = ALL of the below

- Unilocular
- Hypoechoic fluid
- No papillary protrusions, excrescences, nodularity
- No solid component
- Thin and regular cyst wall
- Little to no Doppler flow

Not a simple cyst

Incidence of the most common ovarian masses in pregnancy

<table>
<thead>
<tr>
<th>Type of mass</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermoid</td>
<td>25</td>
</tr>
<tr>
<td>Corpus luteal cyst, functional cyst</td>
<td>17</td>
</tr>
<tr>
<td>Serous cystadenoma</td>
<td>14</td>
</tr>
<tr>
<td>Mucinous cystadenoma</td>
<td>11</td>
</tr>
<tr>
<td>Endometrioma</td>
<td>8</td>
</tr>
<tr>
<td>Carcinoma</td>
<td>2.8</td>
</tr>
<tr>
<td>Low malignant potential tumor</td>
<td>3</td>
</tr>
<tr>
<td>Leiomyoma</td>
<td>2</td>
</tr>
</tbody>
</table>

Hoover, AJOG 2011
ACOG Practice Bulletin #174, 2016

Cystic Teratoma

- Typical punctate, low-level echoic fluid (sebum and hair) and often hyperechoic
- Shadowing central component with a typical lack of vascularization.

Corpus Luteum

- Meshlike or low-level echogenic content; patient in secretory phase
  - Represents some bleeding into follicle s/p ovulation

- Color flow Doppler: typical "ring of fire."

- If enlarges because of a more than usual amount of blood → hemorrhagic corpus luteum

- Physiologic features same regardless of size
Corpus Luteum

Malignancy in Pregnancy
- Overall rates are low despite selection bias, increasing
- Ovarian cancer is 2nd most common GYN cancer in pregnancy
- Favorable histologic distribution
  - 50% epithelial, mostly LMP
  - 39% germ cell (esp dysgerminoma)
- Favorable stage at diagnosis
  - 84% ovarian cancers: stage I
  - 95% LMP tumors: stage I
- Low maternal mortality
- Similar fetal outcomes
  - Leiserowitz, Gynecol Oncol, 2006
  - Palmer, BJOG 2009

Sonographic Signs of Malignancy

Table 1. Incidence of ovarian cancer during pregnancy

<table>
<thead>
<tr>
<th>Study reference</th>
<th>Year of publication</th>
<th>Incidence (per 1000 pregnancies)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leiserowitz et al</td>
<td>2006</td>
<td>0.0179</td>
</tr>
<tr>
<td>Machado et al</td>
<td>2007</td>
<td>0.11</td>
</tr>
<tr>
<td>Zhao et al</td>
<td>2006</td>
<td>0.073</td>
</tr>
<tr>
<td>Sayedur et al</td>
<td>2002</td>
<td>0.08</td>
</tr>
<tr>
<td>Behtash et al</td>
<td>2008</td>
<td>0.083</td>
</tr>
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So even before we have seen the patient, we are feeling okay.....

Let's go in...
Presentation

• 24 yo P0020 at 9 weeks
• Scheduled for laparoscopic ovarian cystectomy for a persistent mass → hCG positive on the day of surgery
  → States was first noted 7 years ago outside of US, 5 cm at that time, told to have surgery but declined (her mother was sick).
  → 4 years ago - Reports an episode of torsion managed expectantly because of her insurance. States was pregnant but didn’t diagnose pregnancy until she was miscarrying.

POBhx: SAb x 2
PGYNhx: mass as above, o/w neg
PMHx: overweight
PSHx D&C x 1
SHx: aesthetician, lives with FOB - new partner, no toxic habits

Diagnosis

• Ultrasound is first line – both TV and TA
• MR as an adjunct especially for:
  → Large lesions, incompletely visualized on US
  → Paraovarian cystic lesions
• CT when MR not available, especially for non-gynecologic masses
• Tumor markers have limited diagnostic value during pregnancy, but may be helpful for monitoring after therapy
  → CA-125 peaks in the 1st trimester 7-251 units/mL

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First Steps

• Initial observation is appropriate for most
  → 70% of cystic masses resolve
  → Planned surgery is usually delayed until second trimester – organogenesis, CL → placenta, SAb

• Observation is not appropriate if
  → Significantly symptomatic
  → Torsion suspected
  → Malignancy suspected

Our patient’s mass persists into the second trimester, and she reports increasing pain. Ultrasound is unchanged.

This one is easy...

Aggarwal, Eur J OBGYN Reprod Biol 2011
Management of asymptomatic masses is harder.

Risk of observation vs. Risk of surgery

Is emergent surgery more risky?

- Review of publications with ultrasonographic diagnosis of adnexal masses in pregnancy
- 10% torsion rate – 1st trimester, CLs, 6-10 cm
- 6.17% malignancy rate

<table>
<thead>
<tr>
<th>Table 1: Emergent vs nonemergent surgical outcomes</th>
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<tr>
<td>Postoperative complications</td>
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<tr>
<td>------------------------------</td>
</tr>
<tr>
<td>Total number of women with adnexal mass in these publications</td>
</tr>
<tr>
<td>OR (95% CI) for emergency vs. elective surgery</td>
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</table>


Does waiting increase PTB?

- Masses were smaller in the torsion group
- No difference in GA at delivery or BW
- More delivery <37 weeks in group A, but no difference in birth weight
- Dermoid most common

Lee, Int J Gynecol Obstet 2004

Does waiting increase the risk of malignancy?

- Between 1990-2003: 127,177 deliveries
- 63 (0.05%) with mass ≥ 5 cm; 59 with pathology results
- 17 patients (29%) had antepartum surgery:
  - 13 suspected malignancy (5 were malignant)
  - 4 ovarian torsion
  - 1 PPROM at 23 weeks → delivered at 28 weeks
- 42 observed through pregnancy - had surgery at cesarean or postpartum

Schemeler, Obstet Gynecol, 2005
All malignant and borderline tumors were recognized and removed antepartum

Laparoscopy vs. Laparotomy

- Theoretical risks of laparoscopy
  - Effects of CO₂ on fetal acid/base status
  - Possible puncture by Veress, trocars
  - Possible injection of CO₂ into uterus
  - Increased pressure → decreased venous return, esp if impaired cardiac output

- Known benefits of laparoscopy over laparotomy
  - Shorter hospital stay
  - Earlier ambulation
  - Decreased narcotic use
  - Decreased risk of wound breakdown
  - Decreased uterine irritability

Are there size cut-offs?

- Retrospective 1990-2004 of women who underwent surgery with adnexal mass ≥4 cm
  - 174/213 = 81.7% diagnosed before surgery
  - 113/174 (64.9%) uneventful pregnancy with resection at cesarean – all benign
  - 24/174 (13.8%) torsion – no difference in age, parity, laterality, average tumor diameter
  - 6/174 (3.4%) malignancy → OR 11.2 for size ≥ 10 cm at diagnosis [1.3, 97.9]
  - 1 pregnancy loss at 15 wks, 6 wks after planned surgery
  - No data on PTD, BW

Intraoperative Guidelines

- Left lateral decubitus position
- Initial access: open (Hasson), Veress, or optical trocar; location adjusted according to fundal height and previous incisions
- CO₂ insufflation: 10–15 mmHg
- CO₂ monitoring by capnography: goal 32–34 mmHg
In 2016 the US Food and Drug Administration (FDA) announced warnings about potential risks of negative effects on the developing brain from administration of anesthetics and sedative drugs to pregnant women and children under age three, especially for repeated exposures or procedures lasting more than three hours.

ACOG RESPONSE

- This warning is based on animal studies and pediatric studies; there are no data regarding pregnant women cited in this warning.
- The clinical significance of those findings is not known. Additionally, the likelihood that a pregnant woman and her fetus would be vulnerable to a general anesthetic or sedative agent for the time periods suggested in this warning is extremely low.
- Input from ACOG and obstetrician-gynecologists was not requested and would have been valuable in the development of this published safety announcement.
- ACOG is concerned that this warning could potentially dissuade providers from providing medically indicated care during pregnancy.
- Obstetrician-gynecologists and other obstetric providers should continue to follow ACOG’s clinical guidance as outlined in Committee Opinion 474.

Society of American Gastrointestinal Endoscopic Surgeons

- Laparoscopy can be safely performed during any trimester.
- Laparoscopy is a safe and effective treatment for symptomatic ovarian masses.
- Observation is acceptable for asymptomatic lesions provided ultrasound is not concerning for malignancy.
- Initial observation is warranted for most lesions <6 cm.
- Laparoscopy is recommended for both diagnosis and treatment of adnexal torsion.

ACOG COMMITTEE OPINION, APRIL 2017

- No currently used anesthetic agents have been shown to have any teratogenic effects in humans when using standard concentrations at any gestational age.
- There is no evidence that in utero human exposure to anesthetic or sedative drugs has any effect on the developing brain in humans, and there are no animal data to support an effect with limited exposures to anesthetic and sedative drugs.
- If the fetus is considered viable, it is generally sufficient to ascertain the FHR by Doppler before and after the procedure.
- At a minimum, if the fetus is considered to be viable, simultaneous electronic FHR and contraction monitoring should be performed before and after the procedure to assess fetal well-being and the absence of contractions.
- Intraoperative electronic fetal monitoring may be appropriate when all of the following apply:
  - The fetus is viable.
  - It is physically possible to perform intraoperative electronic fetal monitoring.
  - A health care provider with obstetric surgery privileges is available.
  - The woman and her health care provider have provided informed consent that allows for emergency cesarean delivery for fetal indication.
  - The benefit of the desired surgery will allow the safe interruption or alteration of the procedure to provide access to perform emergent delivery.

Conclusions

- Transvaginal ultrasound is the imaging modality of choice for the evaluation of adnexal masses during pregnancy.
- Simple cysts are strictly defined and are almost always benign.
- Most masses can be managed expectantly unless malignancy is suspected or patient is symptomatic.
- If there is a size cut-off for observation, it is probably 10 cm.
- Laparoscopy is first line during pregnancy.
- General anesthesia is compatible with pregnancy.

Any questions?

Thank you!