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 their management and follow up

Adnexal Masses in Pregnancy
• 1/81 to 1/8000 pregnancies
• Usually found incidentally at first trimester ultrasound
• Risks:
  – Malignancy: 1-8%
  – Torsion: 10-15%
  – Rupture: 0-9%
  – Hemorrhage
  – Labor obstruction: 2-17%

Diagnosis
• Ultrasound is first line
• 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

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>

Ultrasound Findings

Hoover, AJOG 2011
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

Hemorrhagic Corpus Luteum

Endometriomas

- Typical homogeneous “ground glass–like” inner content, with no evidence of blood flow within and with variable wall thickness.

- Do not typically resolve spontaneously
Cystadenoma
• Multilocular, mostly anechoic or low-level echoic content with thin walls and thin septations, usually emanating from a laterally placed point of origin, with a paucity of blood vessels.

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

Hydrosalpinx
Ectopic Pregnancy

ETC

Sonographic Signs of Malignancy

Torsion
Causes of Torsion

**Fetus/Neonate**
- Ovarian Cysts

**Premenarchal Girls**
- Ovarian cysts and neoplasms
- Elongated utero-ovarian ligament

**Premenopausal Women**
- Ovarian cysts and neoplasms
- OHSS

**Postmenopausal Women**
- Ovarian cysts and neoplasms

Diagnosis of Adnexal Torsion

- For adnexal masses ≥4 cm
  - 15% torsion
  - Most likely to occur at 10-17 weeks
  - Masses 6-8 cm more likely to undergo torsion

- Presentation similar to nonpregnant
  - lower abdominal pain, nausea, vomiting, low grade fever, leukocytosis, possibly with a palpable mass

- Ultrasound findings:
  - heterogeneously enlarged ovary – most common finding
  - absent venous blood flow
  - ovarian hemorrhage
  - none

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Management

Observation vs. Surgery

- 80-95% of adnexal masses ≤6 cm spontaneously resolve

- Characteristics associated with resolution:
  - Simple cysts
  - <5-6 cm in diameter
  - Diagnosed prior to 16 weeks

- Persistent masses more likely to result in:
  - Malignancy: 1-8%
  - Torsion: 10-15%
  - Rupture: 0-9%
  - Hemorrhage
  - Labor obstruction: 2-17%

Observation
Schmeler et al, Obstet Gynecol, 2005

- 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

Surgery

Table 2. Pathologic Findings (n = 59)

<table>
<thead>
<tr>
<th>Pathologic Diagnosis</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermoid</td>
<td>23 (42.3)</td>
</tr>
<tr>
<td>Functional cyst</td>
<td>9 (15.3)</td>
</tr>
<tr>
<td>Cystadenoma</td>
<td>9 (15.3)</td>
</tr>
<tr>
<td>Adenomliobroma</td>
<td>3 (5.0)</td>
</tr>
<tr>
<td>Fibroid</td>
<td>4 (6.8)</td>
</tr>
<tr>
<td>Malignancy</td>
<td>4 (6.8)</td>
</tr>
<tr>
<td>Endometriosis</td>
<td>3 (5.1)</td>
</tr>
<tr>
<td>Borderline tumor</td>
<td>1 (1.7)</td>
</tr>
</tbody>
</table>

Resolution of mass
1 (1.7)

All malignant and borderline tumors were recognized and removed antepartum

Schemeler, Obstet Gynecol, 2005

Surgical Management

- Management by symptoms
  - Acute symptoms → Immediate exploration
  - Chronic symptoms → Intervention based on severity of symptoms and gestational age
    - Consider aspiration of simple cysts
  - Asymptomatic → Case by case basis
- Increased risk for prematurity: up to 22%

Horowitz, Clin Ob Gyn, 2011
Asymptomatic Masses

• Planned surgery is expected to reduce:
  – Torsion
  – Rupture
  – Risk of progression to malignancy

• Planned surgery in the midtrimester has been associated with improved outcomes compared to emergency surgery

Laparoscopy vs. Laparotomy

• No prospective trials comparing outcomes

• Theoretical risks of laparoscopy
  – Effects of CO2 on fetal acid/base status
  – Possible puncture by Veress, trocars
  – Possible injection of CO2 into uterus

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

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 including torsion, unless clinical severity warrants laparotomy

• Observation is acceptable for asymptomatic lesions provided ultrasound is not concerning for malignancy.

• Initial observation is warranted for most lesions <6 cm

Intraoperative Guidelines

• Left lateral decubitus position

• Initial abdominal access with an open (Hasson) technique, Veress needle, or optical trocar; location is adjusted according to fundal height and previous incisions

• CO₂ insufflation of 10–15 mmHg

• Intraoperative CO₂ monitoring by capnography: goal 32–34 mmHg

Koo, Austral NZ J Obstet Gynaecol 2012; 52: 34–38

**Peripartum Management Guidelines**

- Pneumatic compression devices and early postoperative ambulation
- Fetal heart monitoring pre- and postoperatively; continuous monitoring depending on gestational age
- Obstetric consultation ideally preoperatively
- Tocolytics/steroids not used prophylactically; consider if signs of preterm labor

**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
- Masses < 5 cm can be managed expectantly unless malignancy is suspected
- Symptomatic masses should be surgically evaluated
- Laparoscopy can be used in pregnancy

Thank you!
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