Approach to the adnexal masses and Ovarian masses in infants, children and adolescents

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An adnexal mass is a common gynecologic problem and may be found in females of all ages (fetuses to the elderly).

The goal is to address acute conditions (adnexal torsion) and to determine whether a mass is malignant.
1. Excluding urgent conditions or malignancy

✓ Urgent conditions such as EP or adnexal torsion

✓ Malignancies must be excluded for any masses that is NOT CLEARLY BENIGN (most complex masses: solid component, thick wall, septations or other hyper echoic findings) with surgical exploration or may require follow up with pelvic ultrasound for a prolonged period of time.
After excluding urgent conditions and malignancies, the remaining patients are:

- Simple ovarian cyst (anechoic fluid filling - thin walls)
- Ovarian masses that ultrasound diagnosis is fairly certain - Teratoma, Endometrioma, Hemorrhagic cyst
- Other benign adnexal masses such as paratubal or paraovarian cyst.
2. **Anatomic location** to narrow the DDx.

<table>
<thead>
<tr>
<th></th>
<th>Gynecologic: Ovarian</th>
<th>Gynecologic: Tubal</th>
<th>Gynecologic: Extraovarian and extratubal</th>
<th>Nongynecologic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Benign</strong></td>
<td>▪ Functional (physiologic) cyst</td>
<td>▪ Ectopic pregnancy</td>
<td>▪ Paraovarian cyst</td>
<td>▪ Constipation</td>
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<td></td>
<td>▪ Corpus luteal cyst</td>
<td>▪ Hydrosalphinx</td>
<td>▪ Paratubal cyst</td>
<td>▪ Appendiceal abscess</td>
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<td></td>
<td>▪ Luteoma of pregnancy</td>
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<td>▪ Uterine leiomyoma (pedunculated or cervical)</td>
<td>▪ Diverticular abscess</td>
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<tr>
<td></td>
<td>▪ Theca lutein cyst</td>
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<td>▪ Tubo-ovarian abscess</td>
<td>▪ Pelvic abscess</td>
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<td></td>
<td>▪ Polycystic ovaries</td>
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<td></td>
<td>▪ Bladder diverticulum</td>
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<td></td>
<td>▪ Endometrioma</td>
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<td>▪ Ureteral diverticulum</td>
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<td>▪ Cystadenoma</td>
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<td>▪ Pelvic kidney</td>
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<td>▪ Benign ovarian germ cell tumor (eg, mature teratoma)</td>
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<td>▪ Peritoneal cyst</td>
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<td>▪ Benign sex cord-stromal tumor</td>
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<td>▪ Nerve sheath tumor</td>
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Note: DDx refers to Differential Diagnosis.
3. **Age and reproductive status**

- Children and adolescents (most are urgent or malignant conditions)
- Premenopausal women (most of them are benign)
- Pregnant women
- Postmenopausal women (excluding malignancies is the main priority)
General evaluation

- **Medical history:**
  - Pelvic pain & pressure + characteristics
  - Genital tract bleeding
  - Dysmenorrhea, dyspareunia
  - Hx of infertility
  - Fever / vaginal discharge/ Hx of PID

- **Physical examination & pelvic imaging:**
  - size, consistency and mobility of the mass
  - Irregularity of nodularity of the cul-de-sac (malignancy or endometrioma)
  - Rectovaginal exam
Imaging studies:

- **Pelvic ultrasound (first choice)** → TAS + TVS
  
  It is highly predictive for:
  1. simple ovarian cyst
  2. hemorrhagic cysts
  3. endometrioma
  4. teratoma

- **MRI** (secondary choice if surgical evaluation is needed):
  - Hemorrhagic masses with mural solid appearance
  - Mature teratoma with atypical appearance
  - Solid ovarian neoplasm

- **CT** → is NOT a primary modality for adnexal mass
Laboratory evaluation

- **BHCG**: for any reproductive age woman with an adnexal mass
- **CBC**: evaluation of anemia or leukocytosis
- **Lab test to evaluate malignancies**
Referral to a specialist

<table>
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<th>Premenopausal women (refer if any are present)</th>
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<tbody>
<tr>
<td>Very elevated CA 125 level</td>
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<tr>
<td>Ascites</td>
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<td>Evidence of abdominal or distant metastases</td>
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<th>Postmenopausal women (refer if any are present)</th>
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<td>Elevated CA 125 level</td>
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<tr>
<td>Ascites</td>
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<tr>
<td>Nodular or fixed pelvic mass</td>
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Ovarian masses in children and adolescents
Ovarian masses can occur in children and young girls. They can be discovered due to symptoms or through imaging studies.

Pelvic masses are usually of gynecology origin but can also arise from the urinary tract, bowel or other pelvic structures.

Ovarian masses can be:
- Physiologic cyst
- Benign neoplasm
- Malignant neoplasm
Historically, all ovarian masses in infants, children and adolescents were removed surgically but nowadays tumor markers and radiologic imaging provide a risk assessment, allow conservative approach and ovarian preservation in cases of cancers.
Ovarian cyst in fetus & neonates

- Follicular cyst in neonate and fetus are common (often unilateral)
- It is related to some maternal conditions => DM - preeclampsia - Rh isoimmunization
- Dx => sonographically:
  - Female
  - Nonmidline regular cystic structure
  - NL urinary tract
  - NL GI tract
Simple cyst less than 2cm => NL & physiologic
Complex cyst & larger than 2cm => non physiologic

Management in fetuses:
- Expectant: Spontaneous regression antenatally or postpartum by 6 months
  - Follow up with sonography every 3-4 weeks antenatally
  - Antenatal aspiration of large cyst (greater than 4-6cm) to reduce complications
Management in neonates:

- Spontaneous regression of simple or complex cyst → in 4-6 months (50%)
- Serial ultrasound at birth and every 4-6 weeks till cyst resolves or enlarged or persisted for 4-6 months or becomes symptomatic.
- Torsion may occur, particularly with long utero-ovarian ligament => untwisting the vascular pedicle
- Surgical intervention: - complex cyst
  - concern of torsion
  - cyst enlargement
  - symptomatic cyst
  - >4-6 months persistent cyst
Ovarian cyst in infants and prepubertal children

- Physiologic cyst are uncommon
- Some ovarian cyst result in precocious puberty => McCune-Albright synd.
Clinical manifestations:
- Asymptomatic abdominal mass
- Increasing abdominal growth
- Acute or chronic or intermittent abdominal pain (R/O torsion)
- Abdominal fullness/ bloating/ urinary frequency or retention
Evaluations:
- Ultrasonography
- +/- Doppler Ultrasonography (not very diagnostic)
- CT
- MRI

- ATTENTION to the signs of precocious puberty
Management:
Depends on the appearance of the cyst on ultrasonography + clinical manifestation+ significant symptoms

- **Expectant management** => follow up sonography in 4-8 weeks

  IF **NOT** resolved BUT ultrasonic characteristics are **reassuring** CONTINUE OBSERVATION as long as the girl remains asymptomatic.

- **Urgent conditions** (surgical management)

- **Ovarian masses greater than 9 cm are at increased risk of malignancy**
Ovarian cyst in adolescents

- Both simple and complex cyst are common

- Most simple cysts result from failure of maturing follicle to ovulate

- **Clinical features:**
  - Asymptomatic & found incidentally
  - Menstrual irregularities
  - Pelvic pain
  - Urinary or GI symptoms
  - Pelvic heaviness
  - Clinical features of Torsion or Ruptured cysts
- **Evaluations:**
  - Menstrual and sexual history
  - Contraceptive use?
  - PH/E
  - Ultra sonography is the first line method
  - Color Doppler and abdominal radiograph (?)
  - CBC & BHCG
DDx of adnexal masses in this age group:

1. Obstructive genital lesions
2. Ovarian Tumors
3. Tubal conditions
4. Uterine mass
5. GI conditions
- **Follicular cyst:**
  - Resolve spontaneously in 2-8 weeks
  - Asymptomatic simple cyst <6cm → observed +/- OCP
  - Monthly Ultrasound or BME.

OCP suppresses Ovarian-Hypothalamic axis SO NEW cysts will not form.

- **Laparoscopic cystectomy if:**
  Simple cyst persists + increases in size (greater than 6cm) + symptomatic
- **Corpus luteum cysts:**
  - Hemorrhagic or ruptured cyst may occur
  - Size of the cyst can reach to 5-12 cm
  - Ultrasound appearance is characterized

- Observation in asymptomatic cyst => 2 weeks to 3 months +/- OCP
- Size is not important in the management
- IF persistent => manage surgically..
Ovarian Neoplasms

- 1% of all tumors in children & adolescents
- Most ovarian neoplasms are physiologic and benign
- 35-45% of ovarian cancers in children are germ cell tumors

- Most common gynecologic malignancies in women<25 y:
  Ovarian cancer
  - Most common histology=> Germ cell
  - Every Persistent ovarian masses need to be evaluated for malignancies
- **Evaluations:**
  
  - **Ultrasonography +/- Doppler** => a solid ovarian mass in childhood is ALWAYS considered malignant until proven otherwise
  
  - **CT/MRI**
  
  - **Tumor markers:**
    
    - AFP: endodermal sinus tumors, mixed germ cell, immature teratoma
    
    - LDH: dysgerminoma
    
    - CA 125
    
    - CEA: epithelial or germ cell tumors
    
    - Inhibin: granulosa cell tumor
    
    - **Thrombocytosis**
**Treatment:**
Surgical intervention + preservation of reproductive & sexual function

ABNL Tumor markers + suspected malignancy => USO + staging
Thank you for your attention