Simple Cystic Masses

- ovary’s function is to mature oocytes until ovulation
- only one follicle enlarges from 3 mm to approximately 24 mm
- followed by ovulation corpus luteum or an abnormal unruptured follicle can persist
  - 1 to 10 cm in size.

- This functional cyst may produce discomfort and/or delayed menses
- criteria for a simple cyst include
  - a thin smooth wall
  - anechoic contents
  - acoustic enhancement.
differential consideration of simple adnexal cysts includes

• functional cyst
• paraovarian cyst
• Cystadenoma
• cystic teratoma
• Endometrioma
• rarely TOA.

Common Cystic or Complex Ovarian Mass

• Follicular cyst
• Corpus luteum cyst of pregnancy
• Cystic teratoma
• Paraovarian cyst
• Hydrosalpinx
• Endometrioma (low-level echoes)

Complex Masses

• simple cyst that hemorrhages may appear as a complex mass
• Cystadenoma
• Dermoid cyst
• Tuboovarian abscess
• Ectopic pregnancy
• Granulosa cell tumor
• Endometriosis
• PID
Solid Tumors

- most common are the serous types
  - cystadenoma and cystadenocarcinoma.
- The more complex the tumor, the more likely it is to be malignant
  - especially if associated with ascites
  - may be one or multiple cysts
  - 25% bilateral
- large in size and often fill the pelvic cavity

differential consideration of a solid-appearing adnexal mass includes

- pedunculated fibroid
- Dermoid
- Fibroma
- Thecoma
- granulosa cell tumor, Brenner tumor
- metastasis.
- TOA
- ovarian torsion
- hemorrhagic cysts
- ectopic pregnancy also may appear solid.

Common Solid Masses

- Adenocarcinoma
- Solid teratoma
- Arrhenoblastoma
- Fibroma
- Dysgerminoma
- Torsion
Vascular/Doppler

- a PI of greater than 1 as normal
- RI > 0.4 normal in a nonfunctioning ovary.
- Low RI, and absence of a diastolic notch are all signs that are worrisome for
- RI is that it is not a sensitive indicator of malignancy.
  - a low RI in only 25% of malignant lesions.

Benign Adnexal Cysts

**Functional Ovarian Cysts**

- result from the normal function include:
  - follicular cysts, corpus luteum cysts, and hemorhagic cysts.
- most common cause of enlarged ovary in young women
- Most measure > 5 cm

Follicular Cysts

- Occur when a dominant follicle does not succeed in ovulating and remains active although immature
- Usually unilateral
- Thin-walled, translucent, watery fluid, may project above or within surface of the ovary
- May grow 1 to 8 cm
  - can range from 2-20cm
- Usually disappear spontaneously by resorption or rupture
**Corpus Luteum Cyst**

- Cysts result from failure of absorption or hemorrhage within a corpus luteum.
- Filled with blood and cystic fluid
- May grow 1 to 10 cm in size most >4cm
- May accompany intrauterine pregnancy (IUP)

**Hemorrhagic Cysts**

- acute onset of pelvic pain.
- acute hemorrhagic cyst
  - usually hyperechoic
  - may mimic a solid mass.
- smooth posterior wall and shows posterior acoustic
- Diffuse low-level echoes may be seen
- internal pattern alters with age

**Theca-Lutein Cysts**

- largest of the functional cysts
- very large bilateral multiloculated cystic masses.
- associated with high levels of hCG
- frequently in association with gestational trophoblastic disease (mole).
- some patients being treated with infertility drugs, particularly Pergonal
Ovarian Syndromes

Ovarian hyperstimulation syndrome (OHS)
- a frequent complication of ovulation induction
- mild form, the patient presents with pelvic discomfort
  - ovaries are enlarged, but measure less than 5 cm
- Severe, the patient has severe pelvic pain, abdominal distention
  - markedly enlarged ovaries, measuring greater than 10 cm in diameter.
  - associated ascites and pleural effusions
  - numerous large, thin-walled cysts throughout the periphery of the ovary.

Polycystic Ovarian Syndrome (PCOS)
- Includes Stein-Leventhal syndrome
  - infertility, oligomenorrhea, and hirsutism
- Bilaterally enlarged polycystic ovaries
  - (less than 1 cm)
- cysts around the periphery of the ovary
- Occurs in late teens through twenties
- endocrine disorder associated with chronic anovulation.

Paraovarian Cysts
- Usually simple
- Can bleed or become torsed
- Wolffian duct remnants
- 10% of all adnexal masses
- Located in broad ligament
  - usually are of mesothelial or paramesonephric origin.
- Asymptomatic, but can be large
- size does not change with the hormone cycle.
Endometriosis

- common condition in which functioning endometrial tissue is present outside the uterus.
  - tissue is found on the ovaries
  - external surface of the uterus
  - scattered over the peritoneum, especially in the dependent parts of the pelvis.

Endometriosis

- may be bilateral or unilateral ovarian cysts with patterns ranging from anechoic to solid
- tissue bleeds results in endometrium lined collections of blood known as endometriomas in the ovary.
  - a well defined unilocular or multilocular, predominantly cystic mass containing diffuse homogeneous, low-level internal echoes

Ovarian Torsion

- partial or complete rotation of the ovarian pedicle on its axis.
- produces an enlarged edematous ovary,
  - > than 4 cm in diameter.
- most common presentation is a completely solid adnexal mass.
- Doppler examination usually reveals absent blood flow to the torsed ovary
Ovarian Torsion

• patient may have fever, nausea, and vomiting
• Intermittent pain may precede the acute pain by weeks
• occurs more frequently on the right side and the pain may mimic an acute appendicitis.

Ovarian Neoplasms

• Ultrasonography can describe the tumor morphology
  – but cannot distinguish benign from malignant tumors.
• Things that support the differential of malignant disease.
  – Ascites, extension to adjacent organs, peritoneal implants, lymphadenopathy, and hepatic metastases

Ovarian Carcinoma

• leading cause of death from gynecologic malignancy (25%) in the United States.
• Sixty percent occur in women between 40 and 60 years of age.
• absence of symptoms early in the disease, reason not detected until it has advanced, either having spread beyond the capsule
• CA-125 is helpful in some patients
• Masses less than 5 cm in their longest axis are much more likely to be benign,
• masses larger than 10 cm are much more likely to be malignant.
• Women with breast carcinoma have increased risk of developing ovarian cancer
• women with ovarian cancer are three to four times more likely to develop breast cancer.

Risk
• increasing age
• Nulliparity
• Infertility
• uninterrupted ovulation
• late menopause.

Symptoms
• vague abdominal pain
• swelling
• Indigestion
• frequent urination,
• constipation
• weight change
(ascites).

Sonographic findings
• presents with an adnexal mass
• frequent malignant features
  – irregular walls, thick, irregular septations, mural nodules, and solid echogenic elements
Doppler
• Absence of flow within a lesion usually indicates a benign lesion.
• malignant masses, because of internal neovascularization, will have high diastolic flow
### Epithelial Tumors
- 70% are benign and 30% malignant
- two most common types are serous and mucinous tumors

#### Mucinous Cystadenoma
- woman between the ages of 13 to 45 years old.
- 75% of patients show simple or septate thin-walled multilocular cysts.

### Mucinous Cystadenoma
- Unusually large (15–30 cm)
- Most common cystic tumor
- Usually unilateral
- Cyst filled with sticky, gelatin-like material
- Multilocular cystic spaces
- Benign type more common than malignant
- **Sonographic findings:** Simple or septate thin-walled multilocular cysts

### (Mucinous Cystadenocarcinoma):
- Bilateral
- May occur in menopausal women (10%)
- Large, likely to rupture—ascites
- Malignant cysts tend to have thick, irregular walls and septations
- **Sonographic findings:**
  - Ascites appears as hypoechoic fluid with bright punctate echoes; thick, irregular walls, and septations
**Serous Cystadenoma:**
- Usually unilateral
- Smaller than mucinous cysts
- Usually unilocular or multilocular
- Borders are irregular with a loss of capsular definition.
- **Sonographic findings:** Multilocular cyst—may have nodule

**Serous Cystadenocarcinoma**
- Constitutes 60% to 80% of all ovarian carcinomas
- External papillary mass adhesions and infection
- Loss of capsular definition
  - Tumor fixation; calcifications
- Peritoneal implants, ascites, metastases to omentum, lymph nodes, liver, and lungs
- **Sonographic findings:** Cystic structure with septations and/or papillary projections; internal and external papillomas usually present

**Germ Cell Tumors**
- Teratoma
  - Only one not rare
- Dysgerminoma
- Embryonal cell carcinoma
- Choriocarcinoma
- Endodermal sinus tumor.
- Associated with elevated (AFP) and (hCG) levels.
**Dermoid Tumors**

- common ovarian neoplasm 20% of ovarian tumors.
- have a spectrum of sonographic appearances
- Symptoms include abdominal mass and/or pain secondary to torsion or hemorrhage.

- Size ranges from small to 40 cm.
- Unilateral, round to oval mass.
- Contains fatty, sebaceous material, hair, cartilage, bone, and teeth.
- Asymptomatic to abdominal pain, enlargement and pressure; pedunculated, subject to torsion.
- **Sonographic findings:** Cystic/complex/solid mass, echogenic components; acoustic shadowing.

**Metastatic Disease**

- The ovary is a common site of metastasis from
  - bowel (Krukenberg tumor)
  - Breast
  - endometrium
  - melanoma
  - lymphoma.
- often is associated with ascites.
Carcinoma of the Fallopian tubes

- least common (less than 1%) of all gynecologic malignancies.
- postmenopausal women with pain, vaginal bleeding, and a pelvic mass.
- carcinoma of the fallopian tube appears as a sausage-shaped, complex mass, with cystic and solid components often with papillary projections.