



Adnexal Mass

In reproductive age

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Different types of adnexal masses are more likely depending upon the age and reproductive status of the patient.

➤ ***Children and adolescents***

➤ ***Premenopausal women***

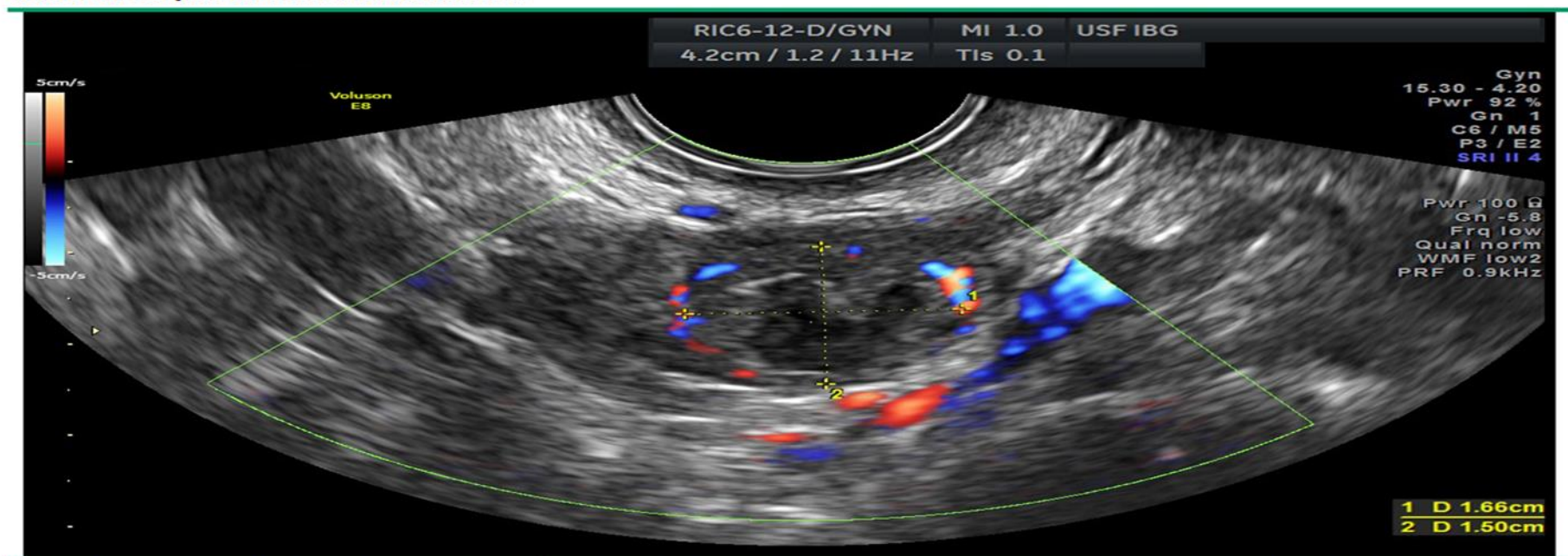
The incidence of ovarian cancer increases with age (eg, 1.8 to 2.2 per 100,000 women age 20 to 29 versus 9.0 to 15.2 per 100,000 women age 40 to 49).

➤ ***Pregnant women***

➤ ***Postmenopausal women***

Ovulatory

Ovarian corpus luteum on ultrasound



Power Doppler outlines the single peripheral vessel that is seen typically in a corpus luteum. The corpus luteum has scalloped edges and can have internal echoes, hemorrhage, or a blood clot.

Courtesy of Lauri Hochberg, MD.

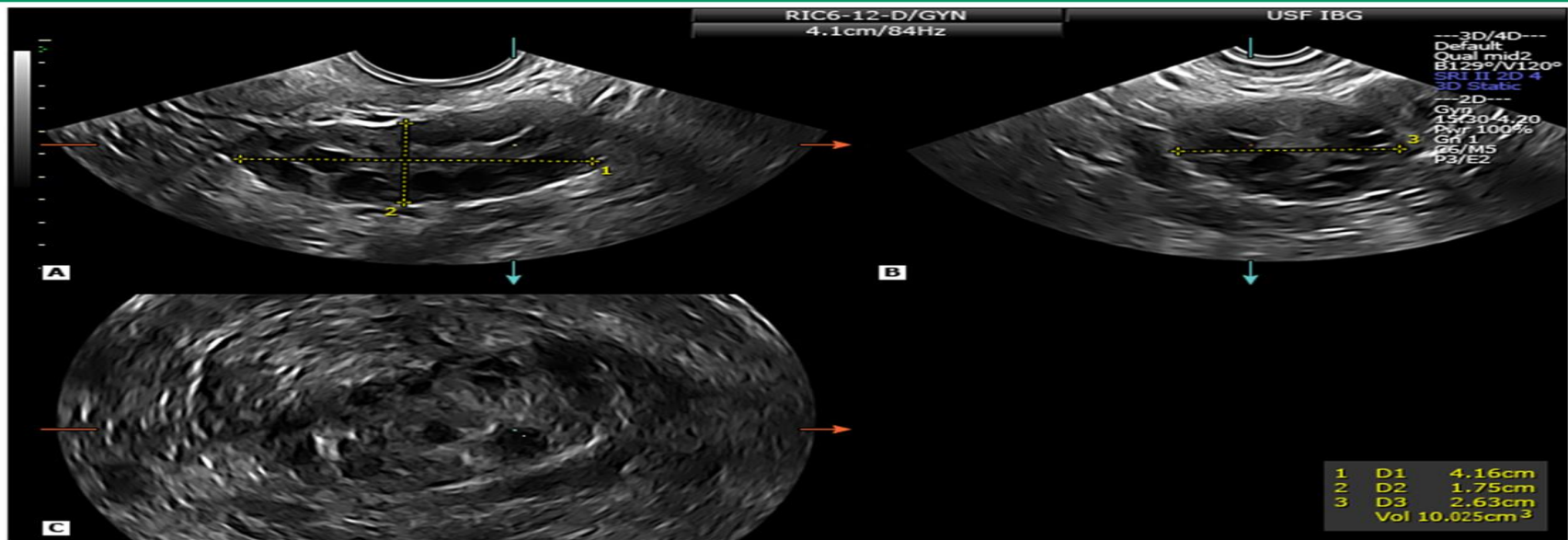
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They are **unilocular** and can contain **internal debris (hemorrhage)** and **thick walls**. They can also be enlarged, **up to 8 cm**, but typically resolve spontaneously .

An early intrauterine pregnancy is always associated with a corpus luteum cyst, which is **typically <2.5 cm** in diameter.

Functional and corpus luteal cysts are generally asymptomatic unless they rupture, they become hemorrhagic, or torsion occurs. Most spontaneously resolve within a few weeks, but some persist for several months.

Polycystic ovary on ultrasound



Three-dimensional transvaginal ultrasound image of a polycystic ovary. There are typical features present, including multiple (>10) small peripheral follicles <1 cm in diameter ("string of pearls" sign). There is also typically increased central stroma, and overall volume of the ovary is increased to greater than 10 cc.

Courtesy of Lauri Hochberg, MD.

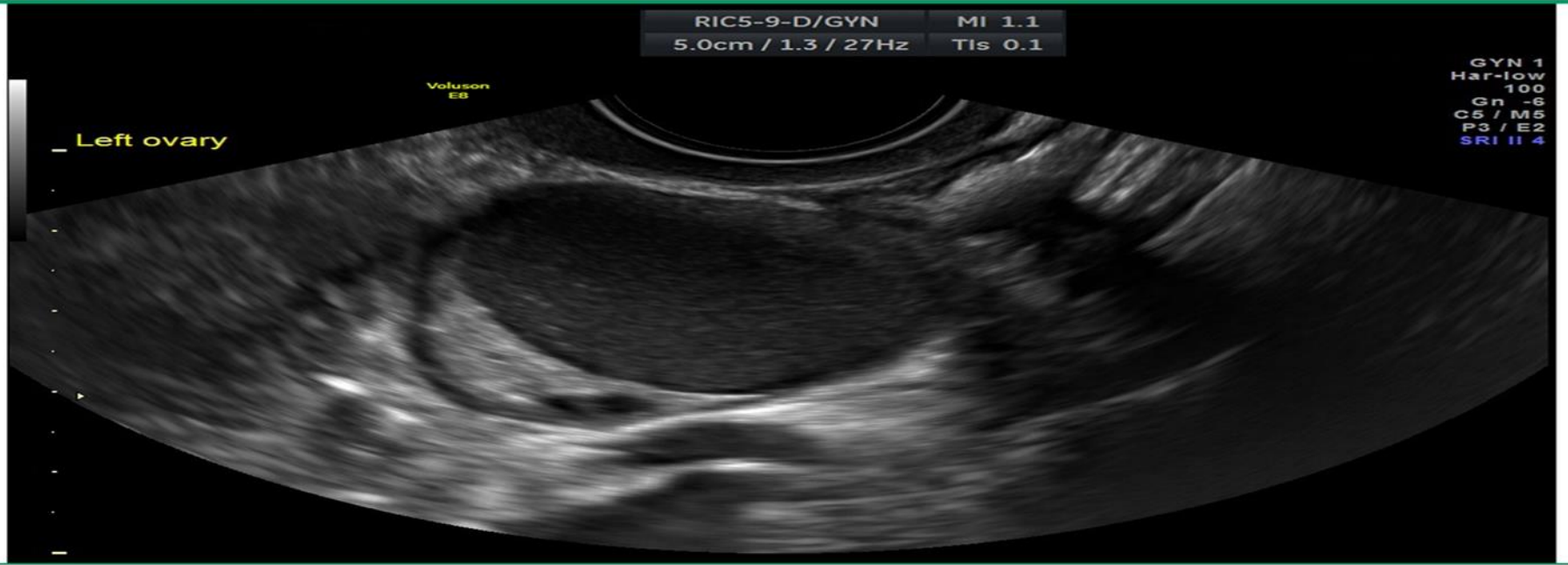
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Although the ovaries are enlarged, patients with PCOS rarely present with an adnexal mass

Stimulated by reproductive hormones

Adnexal masses that are stimulated by reproductive hormones tend to regress and become asymptomatic after menopause.

Ovarian endometrioma on ultrasound



Transvaginal ultrasound image of an endometrioma containing homogeneous internal echoes, which look like "ground glass." Ovarian crescent sign present.

Courtesy of Lauri Hochberg, MD.

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Patients with endometriosis often complain of pelvic pain, dysmenorrhea, and dyspareunia. An endometrioma, or "**chocolate cyst**," appears as a **unilocular or multilocular** cystic mass on ultrasound, typically containing homogeneous internal echoes. The ultrasound appearance of an endometrioma is often described as containing "**ground glass**" internal echoes

Leiomyoma

- *Depending on the size and location of the leiomyoma, patients often present with complaints of pelvic pressure, pain, heavy menstrual bleeding, and/or dysmenorrhea.*
- *Physical examination usually reveals an enlarged, irregularly shaped uterus that appears as a solid uterine tumor or tumors on ultrasound examination.*
- ***Cystic degeneration of a fibroid** can result in the appearance of a complex mass on ultrasound. This, coupled with the fact that fibroids can cause an elevation in the (CA 125) , results in further concern that the mass may be a malignant ovarian neoplasm.*

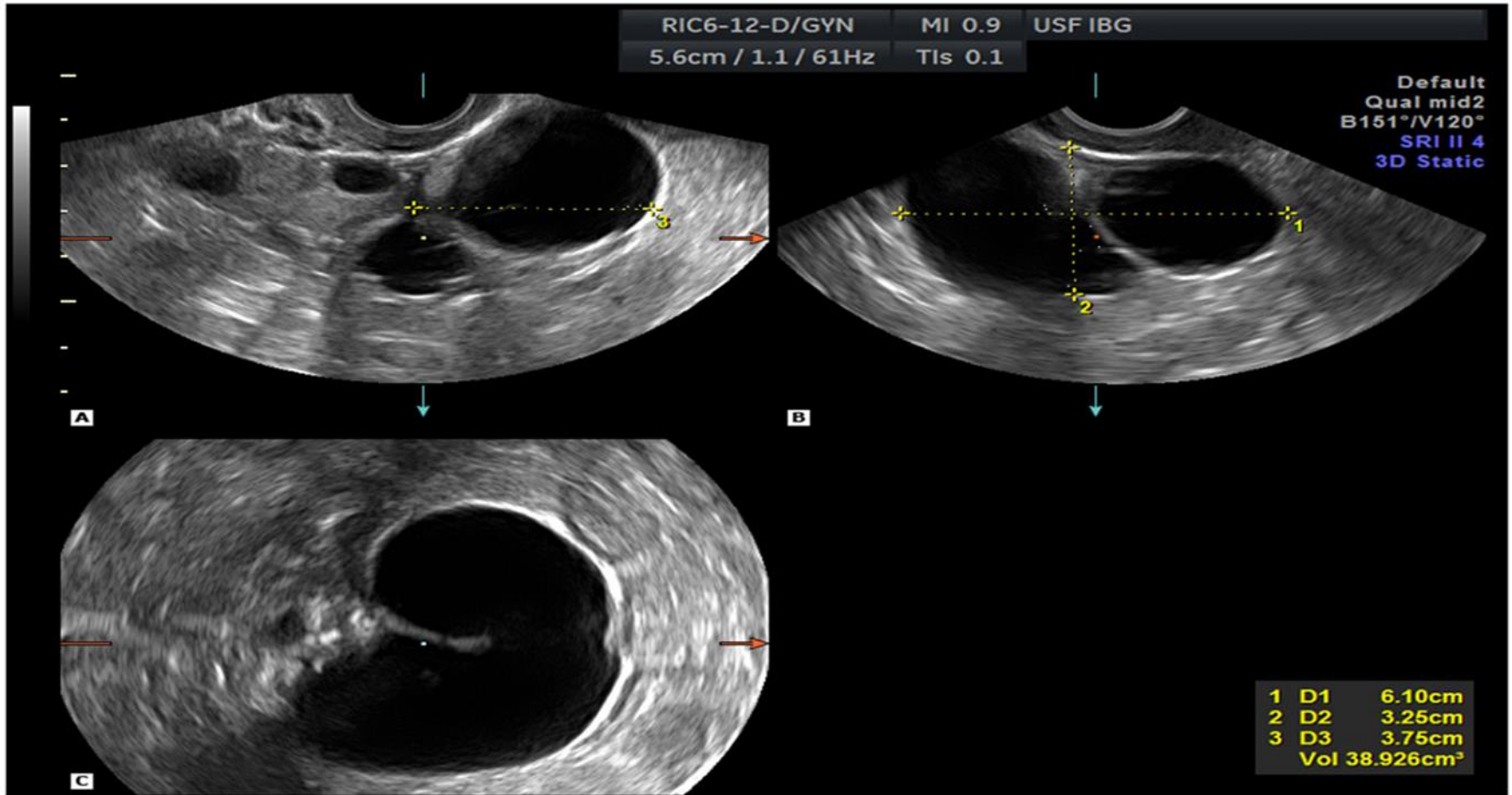
Infectious or inflammatory

tubo-ovarian abscess (TOA)

- *an inflammatory mass involves the fallopian tube, ovary, and, occasionally, other adjacent pelvic.*
- *This may manifest as a tubo-ovarian complex (an agglutination of those structures) or a collection of pus.*
- *These abscesses are found most commonly in reproductive-age patients and typically result from upper genital tract infection.*
- *TOA is usually a complication of pelvic inflammatory disease (PID).*
- *Findings of abdominopelvic pain, fever, purulent cervical discharge, and cervical motion tenderness in association with an adnexal mass suggest a diagnosis of TOA.*

Hydrosalpinx

Fallopian tube hydrosalpinx on ultrasound



Transvaginal ultrasound three-dimensional image of a hydrosalpinx. Features that suggest this entity include a cystic mass adjacent to the normal intact ovary, incomplete septations, and the mass is tubular in shape.

Courtesy of Lauri Hochberg, MD.

- Untreated or undertreated cases of PID result in scarring or "clubbing" of the tubal fimbriae.
- This leads to a collection of either tubal secretions or pus, resulting in a hydrosalpinx or pyosalpinx, respectively.
- After acute infection has resolved, a hydrosalpinx may remain. The tubal function is often compromised, and this may contribute to infertility.
- A hydrosalpinx should be suspected when a dilated, tubular cystic structure is seen adjacent to the ovary. Hydrosalpinges often have incomplete septations.
- **Three-dimensional ultrasound** using sectional planes is useful to visually reconstruct the hydrosalpinx .

Luminal contents vary from serous (hydrosalpinx) to blood (hematosalpinx) or pus (pyosalpinx).

Benign neoplasms

The most common types of benign neoplasms in reproductive-age patients are mature cystic teratoma (dermoid cyst) followed by serous cystadenoma and then mucinous cystadenoma.

Serous or mucinous cystadenoma

- *They are thin walled, uni- or multilocular, and range in size from 5 to <20 cm.*
- *Compared with serous cystadenomas, mucinous cystadenomas occur less frequently, are more likely to be multiloculated, are larger (they can attain an enormous size), and are less often bilateral (less than 5 versus 20 to 25 percent).*
- *Many of these tumors are asymptomatic and found incidentally on pelvic examination or with ultrasound. As the masses grow, they can cause pressure or pain, bloating, and urinary symptoms and can present with ovarian torsion.*

- *Benign-appearing masses that are **persistently symptomatic should be removed.***
- *There are no data regarding the decision to observe or remove these benign-appearing cystic masses if they are asymptomatic.*
- *several factors play a role in this important treatment decision, including age, size of the mass, ultrasound appearance, family history or other risk factors for ovarian cancer, and medical comorbidities:*

***If** the patient is a good candidate for surgery, it is reasonable to remove such masses due to uncertain future behavior.*

***If** the patient is not a good candidate for surgery or removal is not felt to be strongly indicated due to the other factors discussed above, then observation may be considered with serial ultrasound examinations to assess for stability and changes suspicious for malignant transformation*

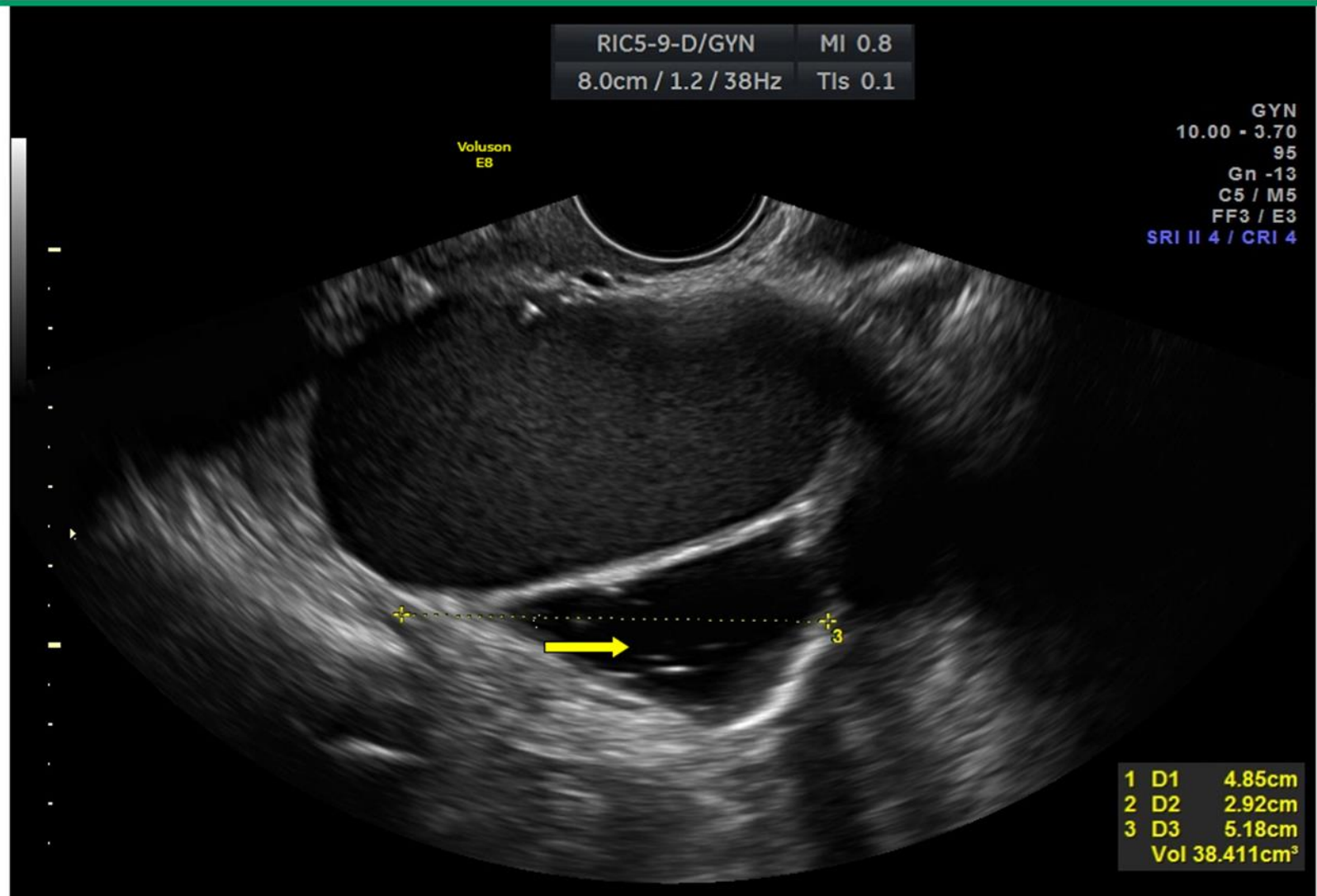
➤ *There are no high-quality data to support the frequency of repeat ultrasound examinations if the management plan is observation.*

*One common approach is to perform a repeat ultrasound in **six months and then yearly** thereafter if the mass is stable with benign features.*

Mature cystic teratoma

- *Mature cystic teratomas are a type of germ cell tumor.*
- *these ovarian neoplasms are found most commonly in patients **ages 10 to 30 years**.*
- *it can contain elements differentiated to all three germ cell layers.*
- *The tumors are **bilateral in 10 to 15 percent** of patients.*
- *Transvaginal ultrasound usually reveals a unilocular cystic mass, which can contain hyperechoic contents, hyperechoic lines or dots, fluid, and areas of acoustic shadowing.*
- *Mature teratomas may have a variety of appearances depending on their content.*

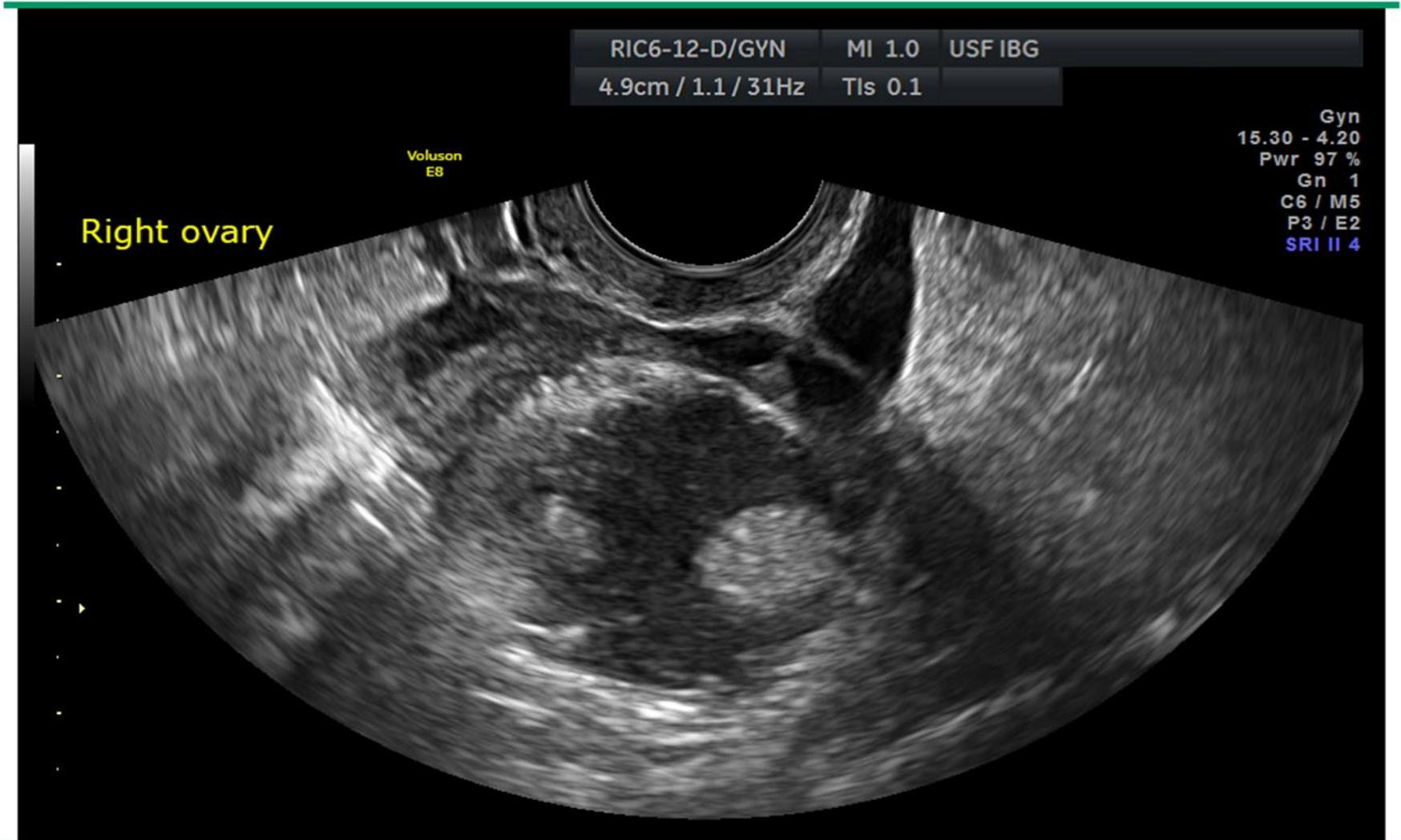
Benign mature ovarian teratoma (dermoid cyst) on ultrasound



Transvaginal ultrasound image of a benign teratoma that features heterogeneous contents, smooth outer surface. The arrow points to lines that are hair. There are hyperechoic portions and homogeneous echoes (mucin).

Courtesy of Lauri Hochberg, MD.

Benign mature ovarian teratoma (dermoid cyst) on ultrasound



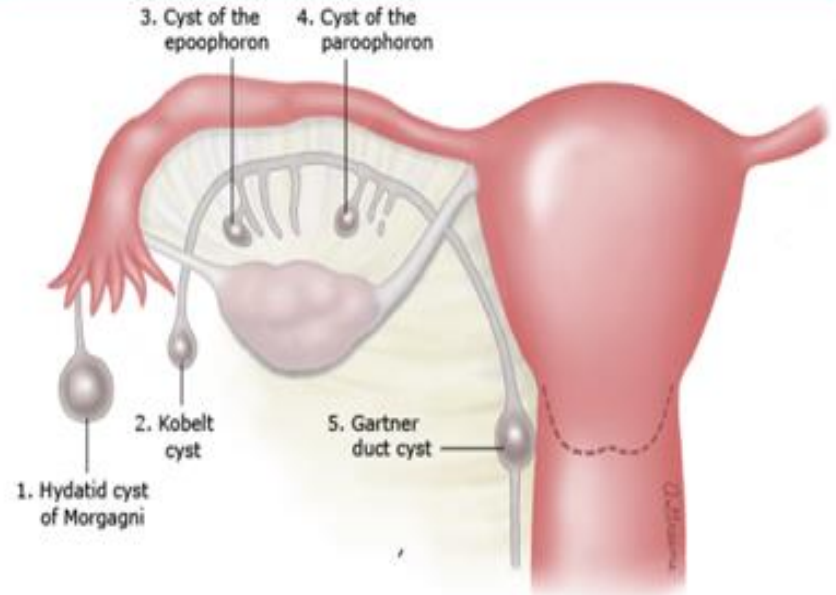
Transvaginal ultrasound of a mature teratoma in the ovary containing heterogeneous contents, which often shadow. It is round and well circumscribed. This image contains the "ovarian crescent" sign, which is a rim of normal-appearing ovary with follicles. These features suggest a benign cyst.

Courtesy of Lauri Hochberg, MD.

Paraovarian/paratubal cysts and tubal and broad ligament neoplasms

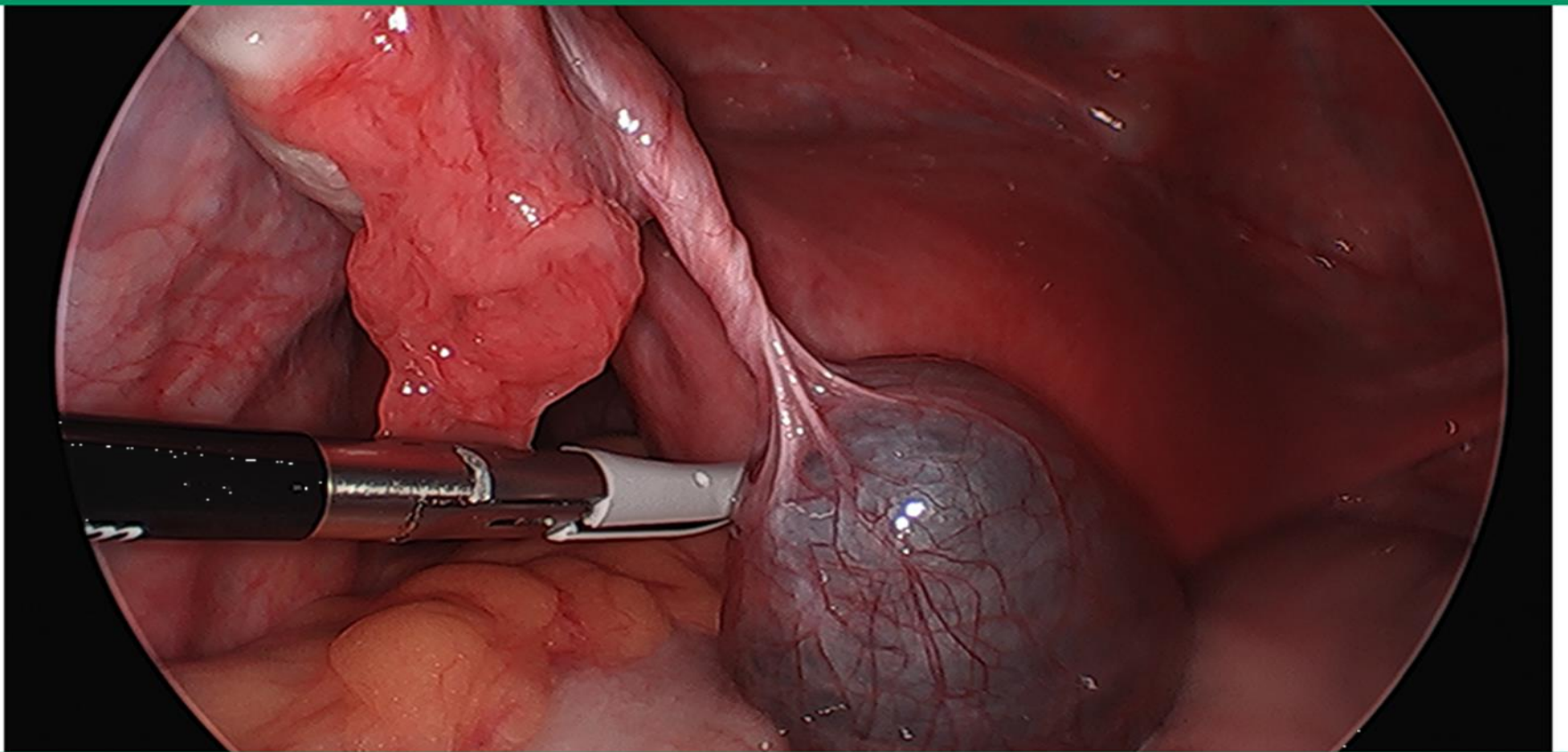
- ✓ *Neoplasms arising from the fallopian tube or broad ligament are rare.*
- ✓ *although it is now believed that most high-grade serous carcinomas in the adnexa arise in the fallopian tubes.*
- ✓ *Since the tubes and broad ligaments are not usually visualized on ultrasound, the source of these tumors may be erroneously attributed to the ovary or uterus which are more common sites for neoplasms.*

Anatomic locations of paratubal and paraovarian cysts



- *The key to diagnosis is a unilocular, anechoic cyst seen adjacent to a normal ovary.*

Torsion of paratubal cyst (fallopian tube)



Courtesy of Mitchel Hoffman, MD.

- In patients are *asymptomatic*, appear *simple* on ultrasound, and *are <10 cm* , *no intervention or continuing surveillance* is needed.
- If the cyst is *large or symptomatic*, it should be *removed surgically*.
- It is often difficult to distinguish between a paratubal cyst and an exophytic simple ovarian cyst as they can look similar on ultrasound. It is not clinically relevant to distinguish them as both are benign cysts and can be managed similarly.
- Patients with *complex* paratubal/paraovarian cysts should be managed in the same manner as patients with complex ovarian cysts.

Malignant neoplasms

- *The incidence of ovarian malignant neoplasms in patients of this age group with an adnexal mass ranges from 6 to 11 percent .*
- *Most primary ovarian neoplasms are partially cystic and derive from epithelial cells, although they can also arise from other cell types, such as germ cell, sex cord-stromal, and mixed cell types.*
- *Germ cell tumors are the second most common type of ovarian neoplasm in females younger than 30 years old, but they become rare after this age.*
- *The ovary can also be involved by metastatic malignant neoplasms forming in the gynecologic tract or nongynecologic primary sites ("Krukenberg tumor"), especially from endometrial carcinoma or GI tract or breast cancer.*

Management

- *The management of an adnexal mass depends upon the type of mass, urgency of the presentation, and degree of suspicion that the mass is malignant.*
- *Excluding malignancy is a principal goal of the evaluation of an adnexal mass:*
 - ✓ *The most important factor used to determine the clinical suspicion of malignancy of an adnexal mass is the sonographic appearance of the mass.*
 - ✓ *Other factors, such as menopausal status, an elevated tumor marker, symptoms, or risk factors may add to the degree of suspicion.*

- *Based upon the ultrasound morphology, we categorize masses as **high risk, intermediate risk** (not anechoic and/or unilocular, but no features of malignancy [eg, a mass with thin septations or low level echoes]), or **low risk** (anechoic unilocular fluid filled cysts with thin walls).*

Sonographic findings suggestive of malignancy in patients with a pelvic mass

Solid component that is not hyperechoic and is often nodular or papillary
Septations, if present, that are thick (>2 to 3 mm)
Color or power Doppler demonstration of flow in the solid component
Presence of ascites (any peritoneal fluid in postmenopausal women and more than a small amount of peritoneal fluid in premenopausal women are abnormal)
Peritoneal masses, enlarged nodes, or matted bowel (may be difficult to detect)

- Women with a high risk mass require **surgical exploration**. In addition, surgical exploration is required if imaging findings suggestive of metastatic disease are present, even in the absence of malignant features in the mass itself.
- acute pain and an ovarian mass should be evaluated without delay and may require urgent intervention (torsion and rupture).
- an ovarian mass with no clinical features of malignancy who have persistent pain, analgesics are first line therapy. For those with persistent pain despite analgesics, we suggest surgery.
- Surgical treatment of some types of (endometrioma, hydrosalpinx) may be therapeutic in women with infertility.

- *Oophorectomy rather than ovarian cystectomy is required for women with an ovarian mass that is suspicious for malignancy.*
- *For premenopausal women, ovarian cystectomy is reasonable if the preoperative suspicion of malignancy is low, the mass appears benign intraoperatively, and there is no evidence of metastatic disease.*

- **Intermediate risk masses** – We *repeat a transvaginal* ultrasound in *6 weeks*. This allows visualization of the mass at a different point of the menstrual cycle. We then repeat an ultrasound in *3 months* and then *6 more months*. We then do a final ultrasound *one year later*.
- **Low risk masses** – We *repeat* an ultrasound in *3 months* and then *6 more months*.
- We **do not routinely follow with CA 125 in premenopausal** women:
 - ✓ If an initial level was drawn and was *very elevated*, we proceed with surgery.
 - ✓ If the initial level was *<35 U/mL*, we do not repeat it.
 - ✓ If it was moderately elevated (*35 to <200 U/mL*), we draw it with each ultrasound until a pattern emerges.
 - ✓ If it is *consistently low or moderately elevated*, we discontinue CA 125 testing.

