Adnexal mass During Pregnancy

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INCIDENCE

- The incidence of adnexal masses in pregnancy: 0.05 to 2.4 percent 1 to 6 percent of these masses are malignan
- ovarian cancer was the fifth most common cancer diagnosed during pregnancy after breast, thyroid, cervical cancer, and Hodgkin lymphoma .
- A retrospective review reported that ovarian cancer was the sixth most common cancer in an Asian population

PATIENT PRESENTATION

- many asymptomatic masses are recognized in the first half of pregnancy when they are identified incidentally during an antenatal ultrasound performed for obstetric indications

- Adnexal masses that have not been diagnosed antepartum may be identified at cesarean delivery

PATIENT PRESENTATION

- Nonspecific symptoms :

Symptoms and signs that precede the diagnosis of ovarian cancer include abdominal or back pain, constipation, abdominal swelling, and urinary symptoms Since these symptoms are almost universally present in normal pregnancies, their presence is unlikely to trigger a diagnostic evaluation

- Palpable mass :

In some patients, a suspicious finding, such as a palpable adnexal mass or posterior cul-de-sac mass or nodularity, may be identified during a routine antenatal physical examination and subsequently evaluated by ultrasound.

- Acute abdominal pain :
  - In a few patients, acute abdominal pain due to torsion of the adnexa prompts the diagnostic evaluation. Adnexal torsion occurs in approximately 5 percent of pregnant patients with an adnexal mass (benign or malignant).
  - In one review, adnexal masses between 6 and 8 cm in diameter had a significantly higher rate of torsion (22 percent) than either smaller or larger masses.
  - Sixty percent of the torsions occurred between the 10th and 17th week of gestation; only 6 percent occurred after 20 weeks.
- Elevated maternal analytes

TYPES OF ADNEXAL MASSES IN PREGNANT PATIENTS

Benign neoplasms

- Most adnexal masses identified in pregnant patients are benign simple cysts less than 5 cm in diameter.

functional ovarian cysts, either follicular or corpus luteum cysts that spontaneously resolve by the early part of the second trimester, which is consistent with the natural history of functional cysts.

- The majority of persistent adnexal masses 5 cm or greater in diameter are mature teratoma

Benign masses without complex features

- Are generally physiologic/functional cysts (eg, follicular cysts) may be uni locular serous or mucinous cystadenoma or hydrosalpinx.

Benign masses with complex features :

- corpus luteum
- mature teratomas
- hydrosalpinx with septation
- theca lutein cysts
- endometriomas
- multilocular cystadenomas
- extrauterine pregnancies.

- Theca lutein cysts (also called lutein cysts, hyperreactio luteinalis)

Are luteinized follicle cysts that form as a result of overstimulation from high human chorionic gonadotropin (hCG) levels or hypersensitivity to hCG.

Bilateral multiseptated cystic adnexal masses in gestational trophoblastic disease, multiple gestation, ovulation induction, or a pregnancy complicated by fetal hydrops

- Luteoma

An uncommon solid benign lesion specific to pregnancy.

It is a non-neoplastic ovarian change associated with pregnancy that can simulate a neoplasm on clinical, gross, or microscopic examination.

The diagnosis should be suspected when a solid adnexal mass is associated with maternal hirsutism or virilization.

- Uncomplicated pedunculated leiomyomas

Malignant neoplasms

- Epithelial ovarian tumor approximately one-half of all ovarian malignancies in pregnant patients
- germ cell tumors make up approximately one-third
- Sex cord-stromal tumors most are limited to one ovary

DIAGNOSIS

- Definitive diagnosis can only be made by resecting the ovarian neoplasm for pathologic examination.
- Pelvic exam
- Ultra sonography + color doppler

some benign ovarian masses, including follicular or corpus luteal cysts, endometriomas, and mature teratomas (dermoid), have characteristic sonographic features, and the diagnosis is reasonably certain without surgical exploration.

- MRI

Patient selection for surgery

The general consensus regarding management of adnexal masses in pregnancy is to surgically resect asymptomatic masses that are present after the first trimester and are >10 cm in diameter solid or contain solid and cystic areas or have papillary areas or septa

for this approach is :

- that these findings increase the likelihood of malignancy, and it is desirable to diagnose malignancy, if present, at an early stage.
- resection of large adnexal masses (benign or malignant) reduces the risk of complications such as adnexal torsion, rupture, or obstruction of labor.
- Emergency surgery during pregnancy for management of a torsed or ruptured adnexal mass is uncommon (<5 percent of cases)and can lead to preterm delivery

Adnexal masses that do not have concerning features

- persistence into the second trimester, large size, or solid components……concerning features
- Expectant management is also appropriate for cysts with these features if the sonographer is reasonably certain that the neoplasm is a follicular or corpus luteal cyst, endometrioma, or mature teratoma.
- Surgical treatment of endometriomas depends upon whether the patient is symptomatic.
- Most mature teratomas are benign, but surgery may be indicated postpartum to prevent torsion

If the diagnosis is uncertain

further evaluation is required.

Up to 10 percent of adnexal masses that persist during pregnancy are malignant.

A substantial portion of these are epithelial low malignant potential tumors or germ cell tumors, both tumors with a typically favorable prognosis

Timing

The optimal time for semi-elective surgery during pregnancy is after the first trimester for a number of reasons:

Almost all functional cysts will have resolved by this time.

- Organogenesis is mostly complete, thus minimizing the risk of drug-induced teratogenesis.
- The hormonal function of the corpus luteum has been replaced by the placenta, so reduction in progesterone secretion from oophorectomy or cystectomy does not result in loss of the pregnancy if not replaced.
- Spontaneous pregnancy losses due to intrinsic fetal abnormalities are likely to have already occurred and will not be erroneously attributed to the surgery

Preoperative assessment

- In most cases, the preoperative workup for a pregnant patient with a pelvic mass can be limited to ultrasound imaging.
- If the ultrasound findings cannot distinguish between a possible pedunculated or degenerating leiomyoma and an ovarian neoplasm, we suggest obtaining magnetic resonance imaging (MRI).
- The more precise diagnosis afforded by MRI may be useful in opting for expectant management until delivery
- MRI is particularly useful in characterizing a pedunculated leiomyoma, red degeneration of leiomyomas, endometriomas, decidualized endometriomas, and massive ovarian edema and distinguishing these lesions from ovarian cancer
- A routine preoperative chest radiograph is unnecessary; however, if the history and physical examination suggest pulmonary disease, then a chest radiograph should be obtained with shielding of the abdomen/pelvis.

Tumor markers studies

- Pregnancy may alter the serum levels of tumor markers

Serum CA 125

may be elevated during early gestation 11-14w

CA 125 may be helpful as a tumor marker of EOC between 15 weeks of gestation and delivery

A CA 125 in the range of 1000 to 10,000 is likely (but not invariably) related to cancer, but values in the range of 75 to 150 could be either pregnancy-related or due to an ovarian cancer that does not demonstrate high expression of CA 125.

- Alpha-fetoprotein
- normally rise during pregnancy.
- High MSAFP levels are seen in some types of ovarian germ cell tumors (eg, endodermal sinus tumor, embryonal carcinoma, and mixed tumors).
- Some authors suggest that a MSAFP level above 9 MoM should prompt concern for germ cell tumors of either gonadal or nongonadal origin in the absence of fetal abdominal wall defects or anencephaly

- Lactate dehydrogenase
- Serum LDH is elevated in the serum of patients with ovarian dysgerminomas a reliable marker for diagnosis and follow-up of these tumors in pregnant patients
- LDH is not elevated in normal pregnancy, although elevations can occur in some pregnancy-related disorders such as preeclampsia and HELLP syndrome (Hemolysis, Elevated Liver function tests, Low Platelets)

Inhibin A

- Although serum inhibin A is a useful tumor marker for following the course of treatment for ovarian granulosa cell tumors in nonpregnant patients, inhibin A is made in the developing placenta, and serum levels are elevated in early gestation
- This limits the value of inhibin A as a tumor marker during pregnancy. Like AFP, inhibin A levels may be measured as a component of screening for Down syndrome. Inhibin A concentrations are, on average, twofold higher in pregnancies complicated by Down syndrome than in unaffected pregnancies.

Human chorionic gonadotropin

The beta hCG is a useful marker for some germ cell neoplasms (particularly choriocarcinoma.

it cannot be used as a tumor marker during pregnancy due to the large physiologic increase in this hormone.

Human epididymis protein 4 (HE4)

the product of the WFDC 2 (HE4) gene that is overexpressed in ovarian cancer.

Assessment of the HE4 level is approved for monitoring patients with ovarian cancer for disease recurrence or progression, but not for screening.

HE4 serum biomarkers are lower or unaffected by pregnancy and therefore may be helpful in the evaluation of pelvic masses in pregnancy.

SURGERY

- Laparoscopy is an acceptable alternative to laparotomy for management of benign adnexal masses
- If a malignancy is suspected, a laparotomy should be performed. A Pfannenstiel incision should be avoided, as it would not provide sufficient exposure.
- The vertical midline incision should be adequate to minimize the need to manipulate the gravid uterus while obtaining exposure to the adnexal mass.
- Immediately after entry into the peritoneal cavity, peritoneal washings should be obtained for staging purposes in case the mass is malignant. The opposite adnexa should be carefully inspected and palpated for a contralateral adnexal mass. Contralateral ovarian biopsy is recommended if the ovary appears to be involved, but routine biopsy or wedge resection of a normal-appearing contralateral ovary is unwarranted

- The most common findings at surgery are persistent corpus luteal functional cysts, benign dermoid cysts, and serous or mucinous cystadenomas.
- If the preoperative imaging and intraoperative gross findings are both consistent with a benign diagnosis, it is reasonable to attempt a cystectomy rather than perform a salpingo-oophorectomy.
- If the mass is larger than 10 cm, it may not be technically feasible to perform an ovarian cystectomy.
- If the mass is solid, has surface excrescences, is associated with ascites, or has other features suggesting malignancy, then ipsilateral salpingo-oophorectomy is appropriate.
- The mass should be sent for frozen section and the pathologist informed of the concurrent pregnancy. Resection of the contralateral ovary should not be performed unless bilateral disease is identified; this decision must await the frozen section analysis. All suspicious lesions should be biopsied.

- If the pathologist confirms a malignant tumor at frozen section, the surgeon should be prepared to complete an adequate surgical staging procedure, and a gynecologic oncologist should be consulted.
- Obviously, hysterectomy is not performed if preservation of the pregnancy is desired, and the surgeon must individualize each case, weighing the pros and cons of staging versus potential risk to the mother and fetus.
- In certain malignant germ cell tumors of the ovary (eg, endodermal sinus tumors), lymph node dissection may be omitted, as the patient will require chemotherapy based on the histopathology alone

- Adequate surgical staging is of particular importance for stage I cancers (ie, those that are limited to the ovary as many, but not all, of these neoplasms are adequately treated with surgery alone.
- In such cases, the need for postoperative adjuvant chemotherapy is determined by the histologic tumor type.
- Surgical staging (eg, sampling of lymph nodes) is less critical in the setting of obvious advanced disease (eg, stage IIIB/C disease), as these tumors (with the exception of tumors of low malignant potential) will require chemotherapy.

- If a metastatic ovarian cancer is identified, cytoreduction should be attempted. The extent of surgical cytoreduction involves individual judgment, balancing the extent of surgery with the expected benefit. It is rare that removal of the gravid uterus is required for maximal cytoreductive surgery at the initial surgery because it is possible, if necessary, to return for secondary cytoreduction following chemotherapy and successful completion of the pregnancy.
- This management strategy is not thought to adversely impact survival, although as a general rule, survival is poor for patients who have late-stage disease. Despite the importance of early surgical debulking to outcomes in ovarian cancer, the surgeon should keep in mind the sensitivity of these tumors to platinum-based chemotherapy when aggressive resection of metastatic disease is considered. With modern platinum-based adjuvant chemotherapy, approximately 70 percent of patients who present with advanced disease will respond to chemotherapy, even if they have residual disease remaining after cytoreductive surgery

- For patients with advanced-stage ovarian cancer diagnosed before delivery, hysterectomy and secondary cytoreductive surgery are reasonable postpartum to remove persistent disease.
- This surgery can be performed following vaginal delivery or in conjunction with cesarean delivery.
- This approach has been taken by a few investigators who reported managing advanced epithelial ovarian cancer (EOC) cases during pregnancy

Management of corpus luteum

- Removal of the corpus luteum should be avoided prior to eight weeks of gestation because the corpus luteum is primarily responsible for progesterone production and maintenance of the pregnancy at this time .
- If the corpus luteum is removed prior to eight weeks, progesterone supplementation should be given as a 50 to 100 mg vaginal suppository every 8 to 12 hours or as a daily intramuscular injection of 1 mL (50 mg) progesterone in oil.
- After eight weeks, the ovary gradually shifts progesterone production to the placenta (called the luteal-placental shift) .
- As of 10 weeks of gestation, the placenta is the primary provider of progesterone, so progesterone supplementation is no longer indicated

Adnexal mass at cesarean delivery

- At cesarean delivery, any adnexal mass that appears suspicious for malignancy should be removed and sent for frozen section.
- Complete surgical removal is preferred to aspiration and cytologic evaluation of cystic fluid, since malignancy could be missed with the latter.
- If the mass is an incidental finding at cesarean delivery, the patient typically will not have an appropriate incision for surgical staging. In these cases, if frozen section indicates malignancy, salpingo-oophorectomy is performed and postpartum, the patient is referred to a gynecologic oncologist for counseling, staging, and possible hysterectomy within the next one to two weeks.
- If an adnexal mass suspicious for malignancy is detected antepartum, the patient should be counseled and consented appropriately. Cesarean delivery should be performed through a midline incision, and a gynecologic oncologist should be available, if required. After delivery of the infant and placenta and control of bleeding, the adnexal mass is resected and sent for frozen section. If positive for malignancy, full surgical staging can be performed

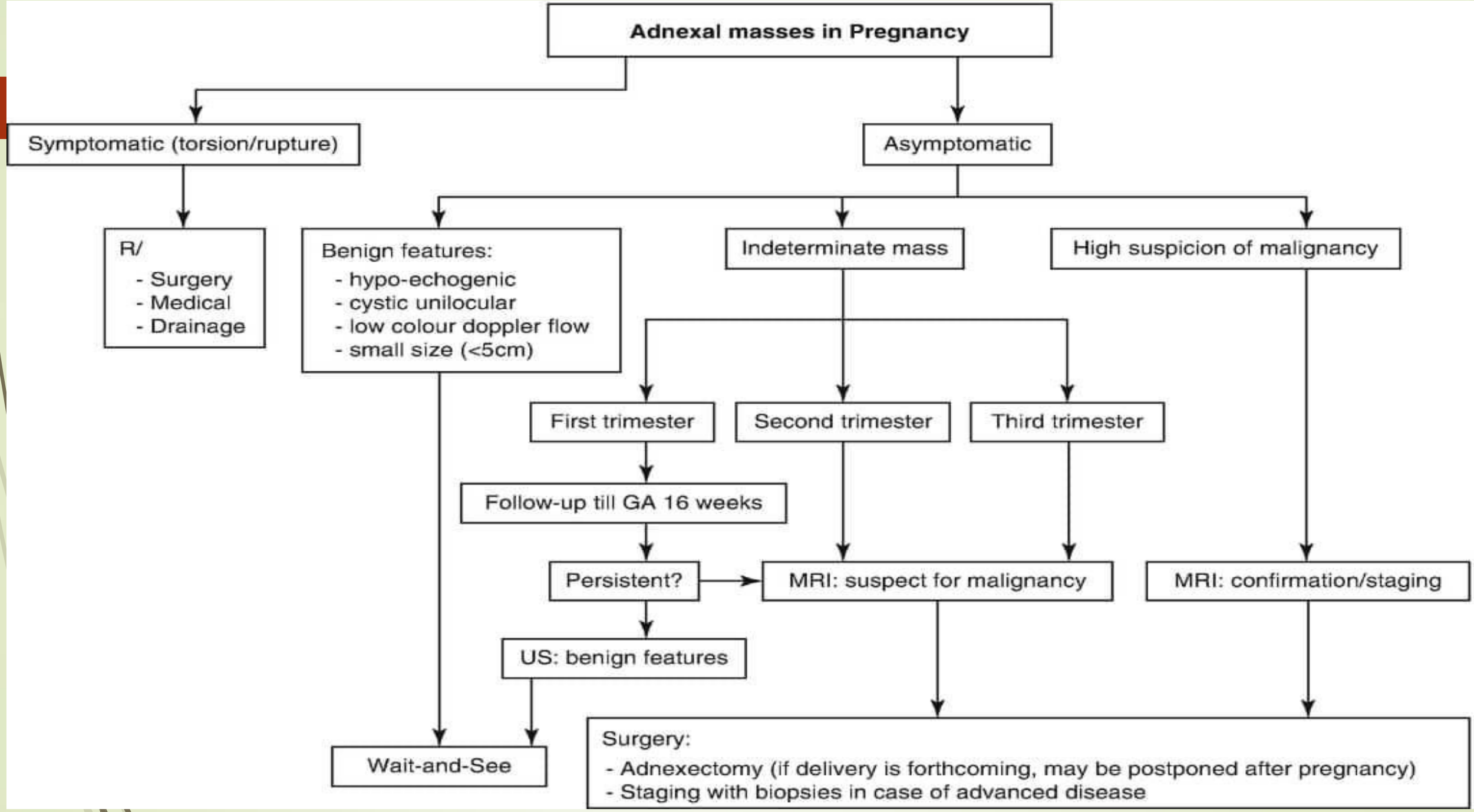
PROGNOSIS

- There is no evidence that pregnancy worsens the prognosis of ovarian tumors compared with nonpregnant patients matched for tumor histology, stage, and grade Approximately 75 percent of invasive ovarian malignancies in pregnant patients are early-stage disease.
- Due to the favorable mix of stage, grade, and histology, the five-year survival rate for ovarian tumors associated with pregnancy is between 72 and 90 percent.
- The presence of ascites at diagnosis implies advanced disease and poor prognosis Although one cohort study found that postpartum lactating patients diagnosed with ovarian cancer had a poorer prognosis than patients diagnosed before or during pregnancy, the number of cases was small .This finding needs to be confirmed in larger studies.

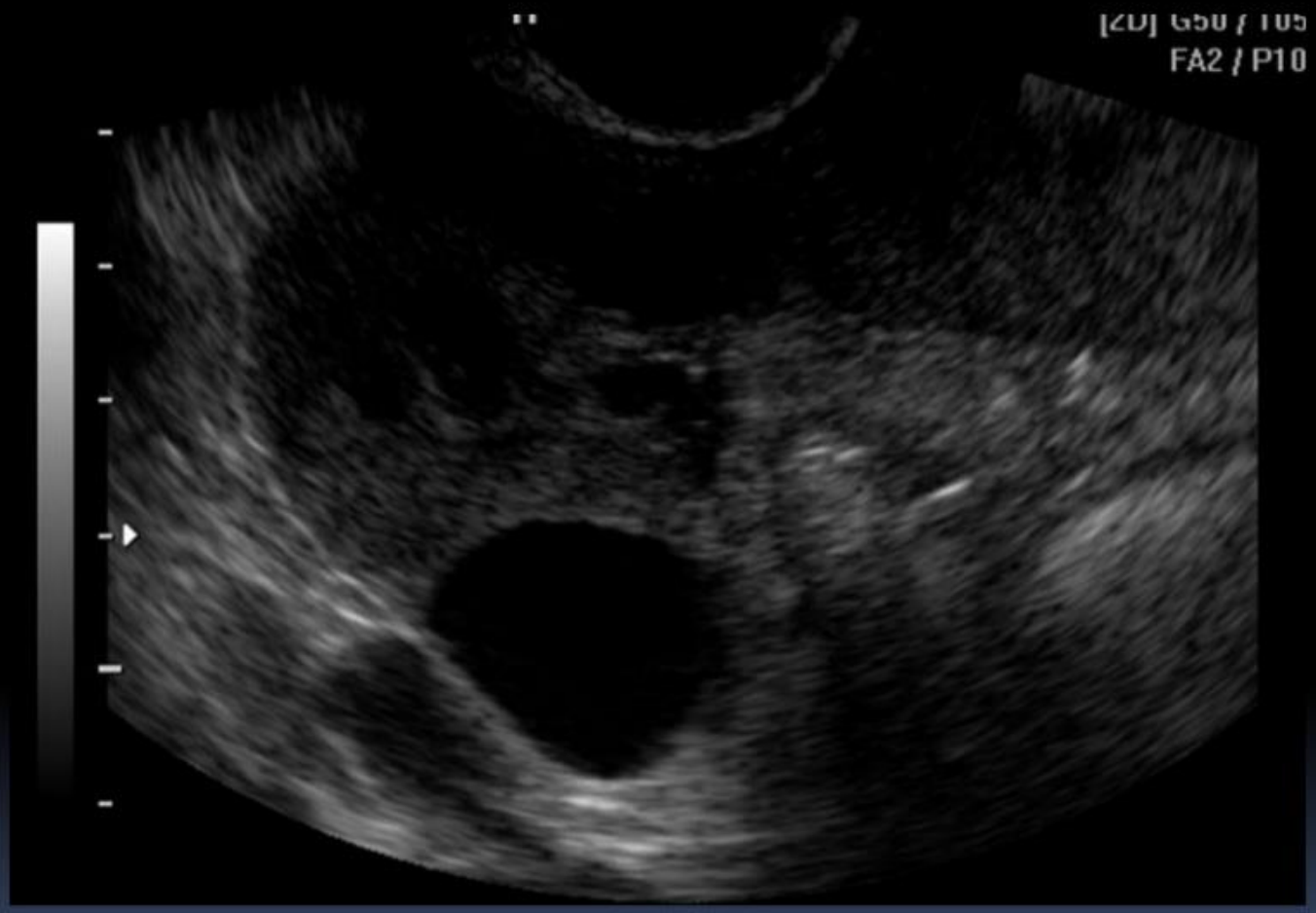
The decision to continue or terminate a pregnancy when ovarian cancer is diagnosed in the first trimester should be individualized and made by a fully informed patient in collaboration with her clinician.

Early termination of pregnancy does not improve the outcome of ovarian cancer. In addition to the usual reasons for pregnancy termination, some factors that should be considered in patients with ovarian cancer include:

- Whether she is willing to assume a possible risk of fetal toxicity or complications from ovarian cancer treatment during pregnancy.
- Her prognosis and ability to care for her offspring.
- The effect of ovarian cancer treatment on future fertility

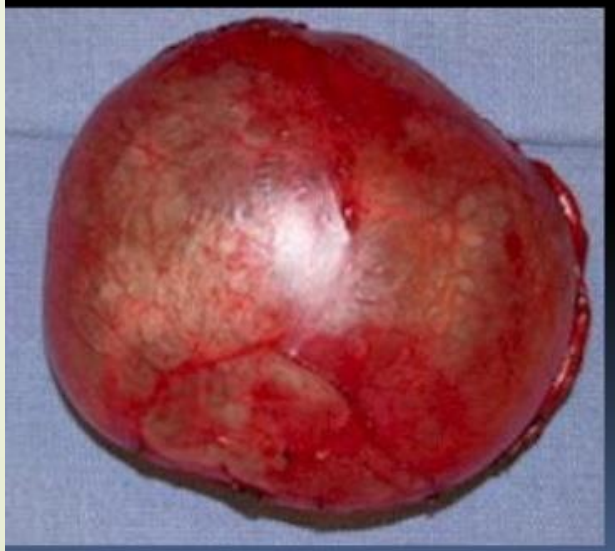

Adnexal masses in Pregnancy
Symptomatic (torsion/rupture)
Asymptomatic
R/
- Surgery
- Medical
- Drainage
Benign features:
- hypo-echogenic
- cystic unilocular
- low colour doppler flow
- small size (<5cm)
Indeterminate mass
High suspicion of malignancy
First trimester
Second trimester
Third trimester
Follow-up till GA 16 weeks
Persistent?
MRI: suspect for malignancy
MRI: confirmation/staging
US: benign features
Wait-and-See
Surgery:
- Adnexectomy (if delivery is forthcoming, may be postponed after pregnancy)
- Staging with biopsies in case of advanced disease

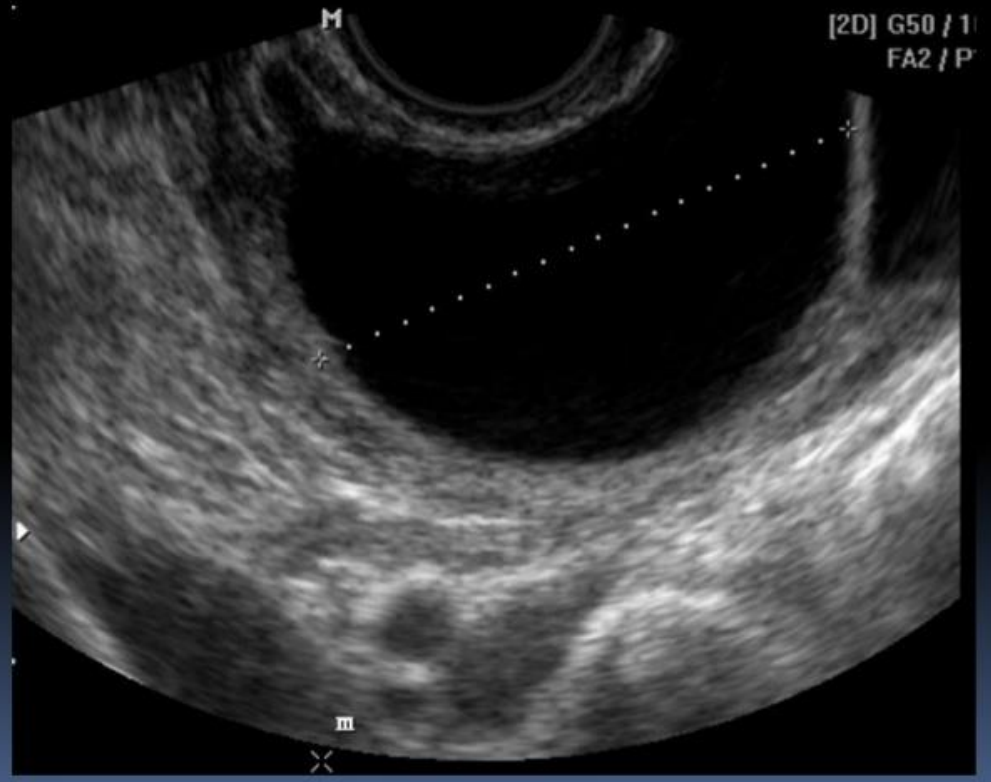
I. Simple ovarian Cyst



Unilocular, thin-walled, anechoic

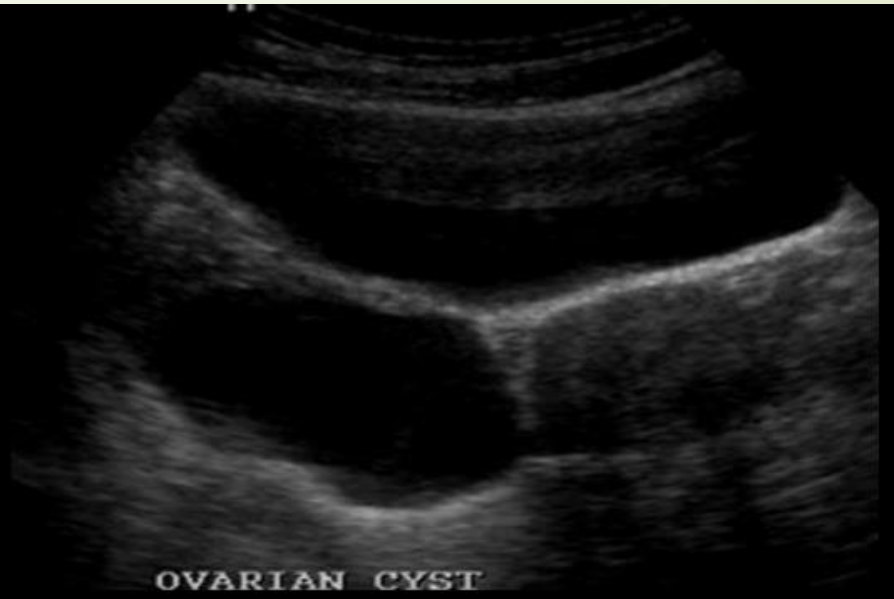
- Unilocular
- Thin-walled
- Anechoic



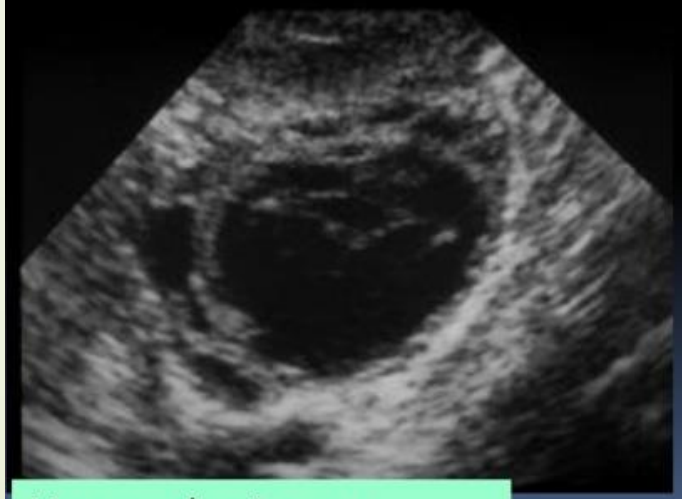


Follicular cyst

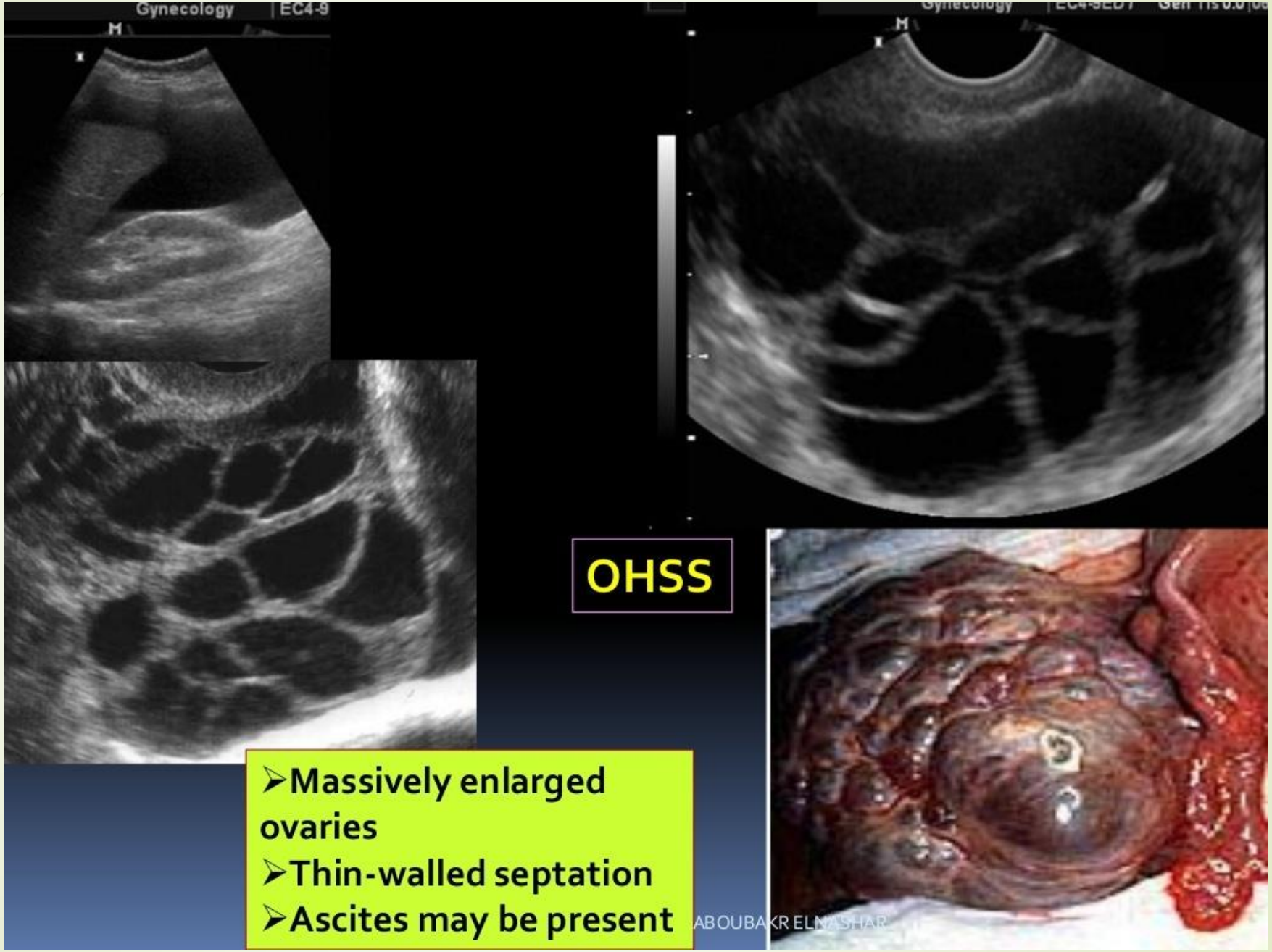
Simple cysts

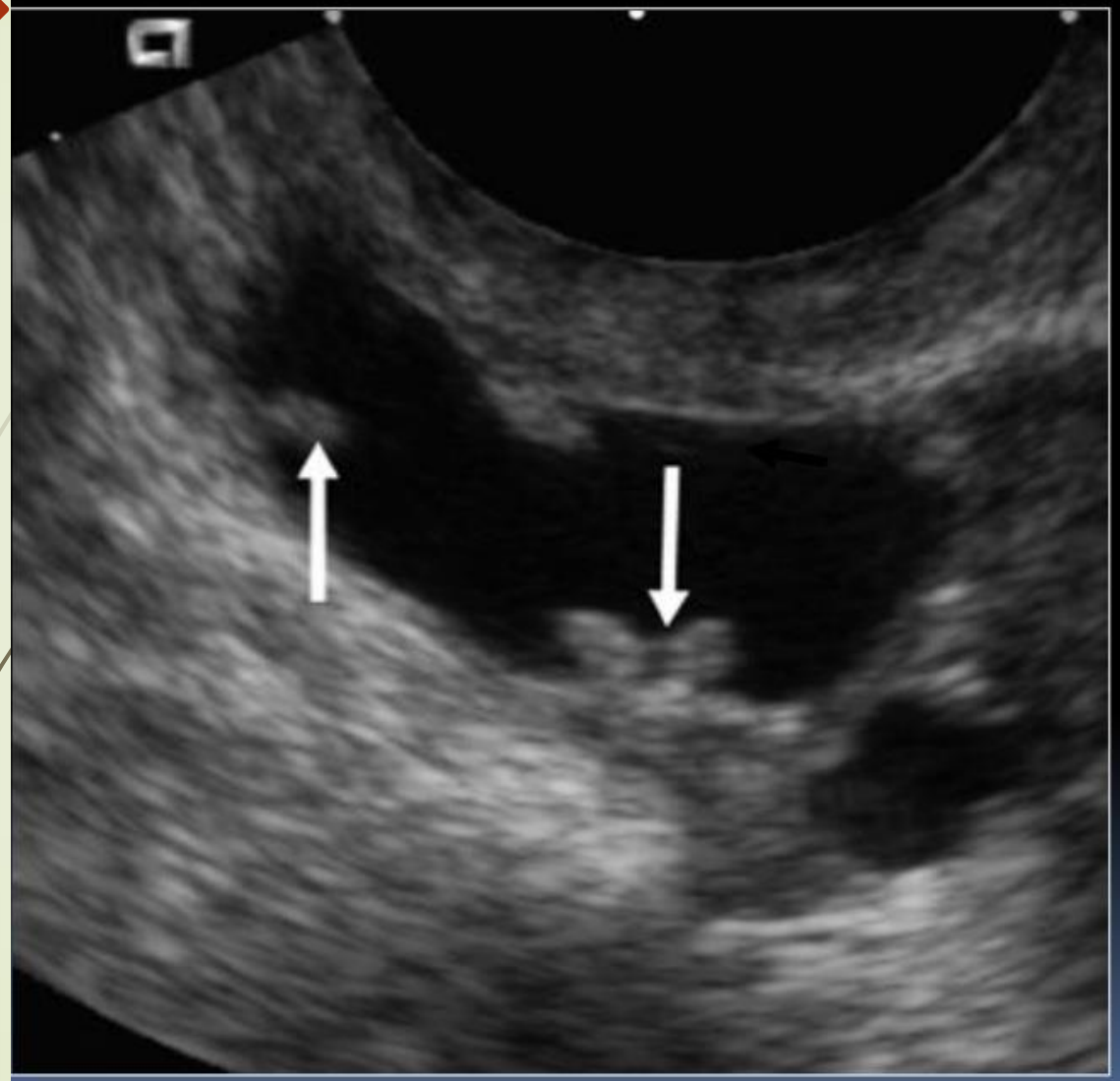


Corpus luteal or follicular cyst



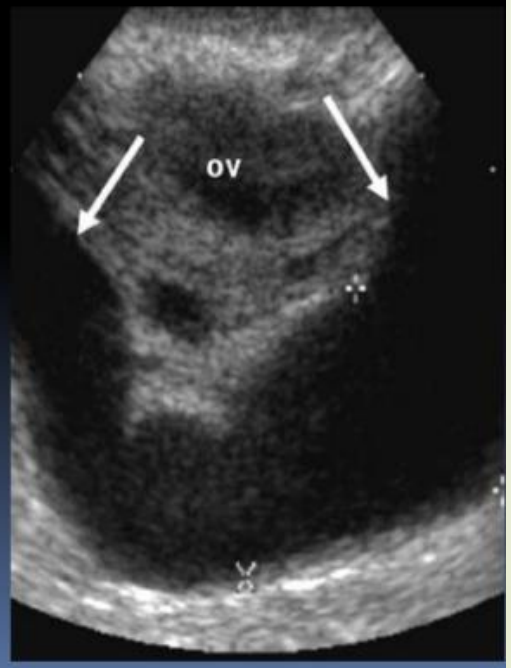
Haemorrhagic cysts

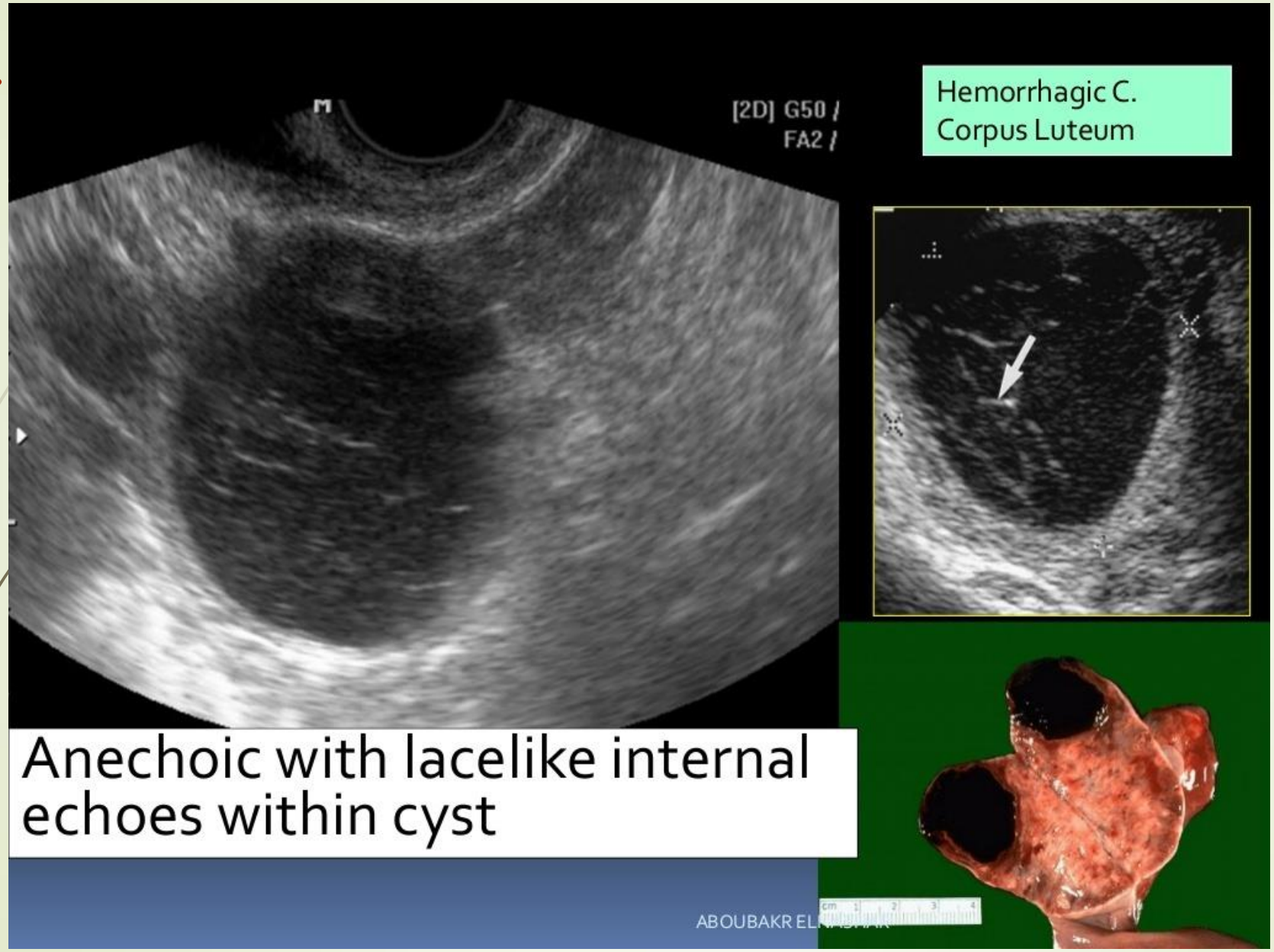

Gynecology
OHSS
➢Massively enlarged ovaries
➢Thin-walled septation
➢Ascites may be present
ABOUBAKR ELMASHAR



Hydrosalpinx

- Tubular-shaped structure
- Anechoic content
- Incomplete septum



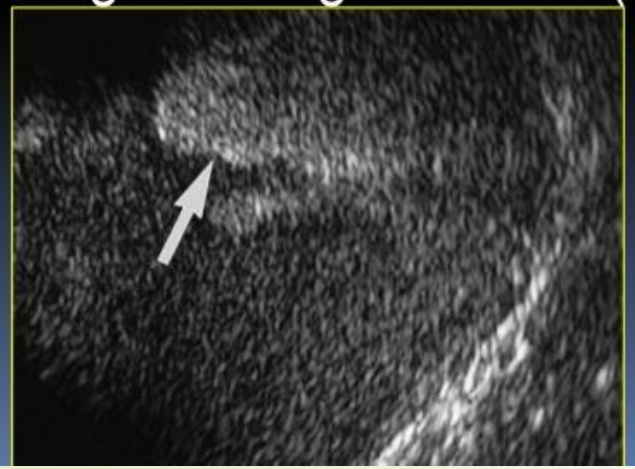

[2D] G50 /
FA2 /
Hemorrhagic C.
Corpus Luteum
Anechoic with lacelike internal echoes within cyst

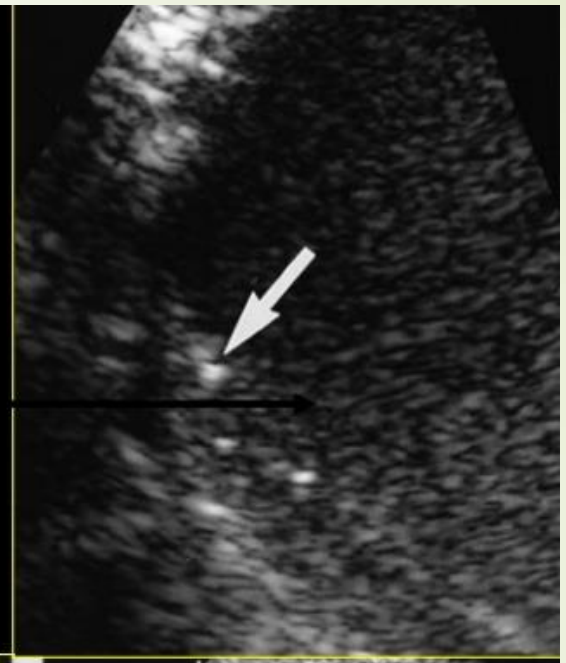
Low-level echo cysts + Characteristic Features

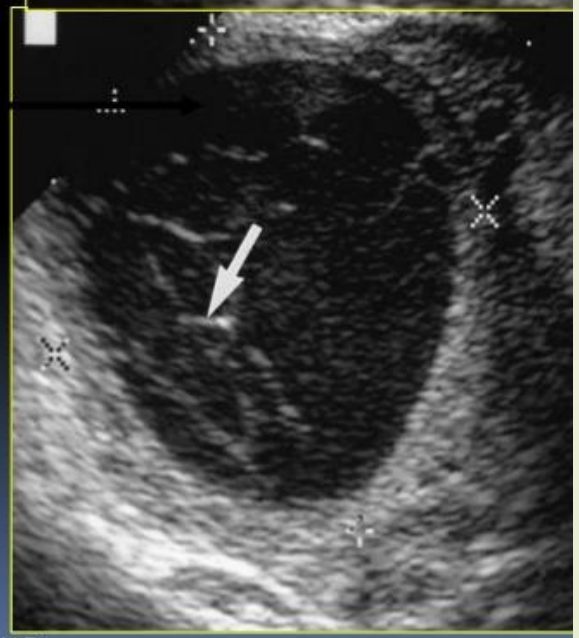
Endometrioma
Hyperechoic wall foci (in 35%)

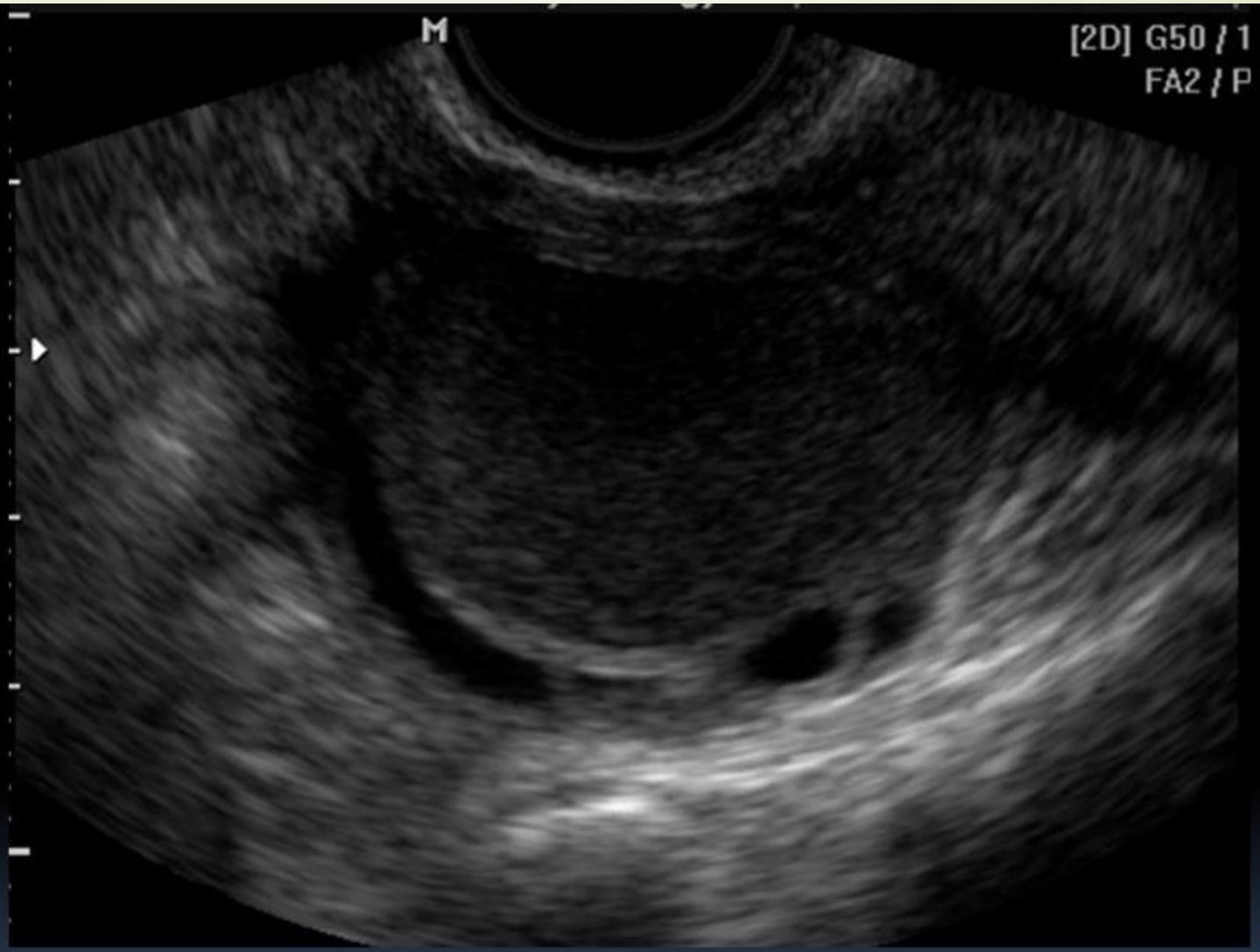
Hemorrhagic cyst :
Lacelike internal echoes (in 40%)

Teratoma
Regional bright echoes (in 97%)





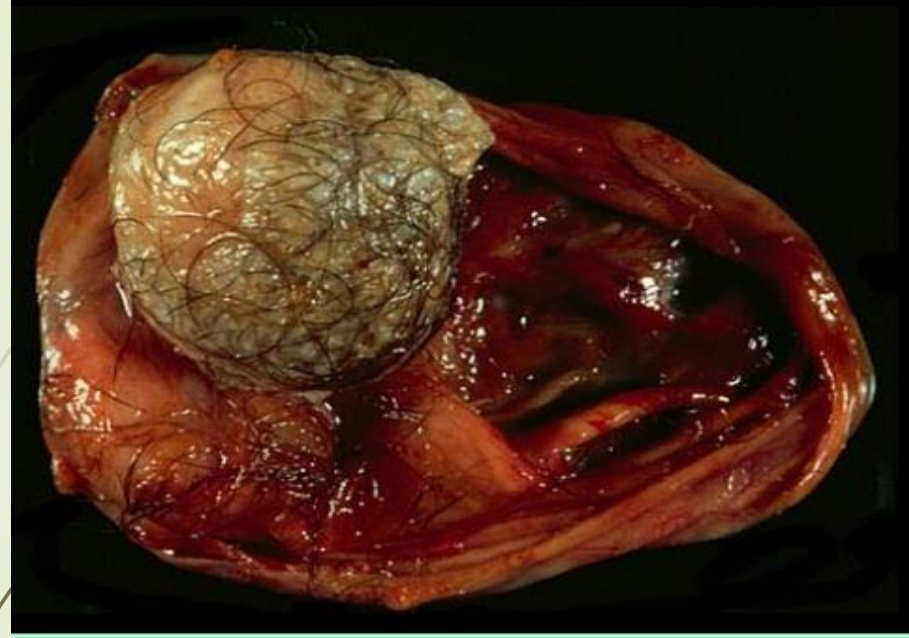




Endometrioma

Diffuse ‘ground glass’ pattern due to presence of old blood

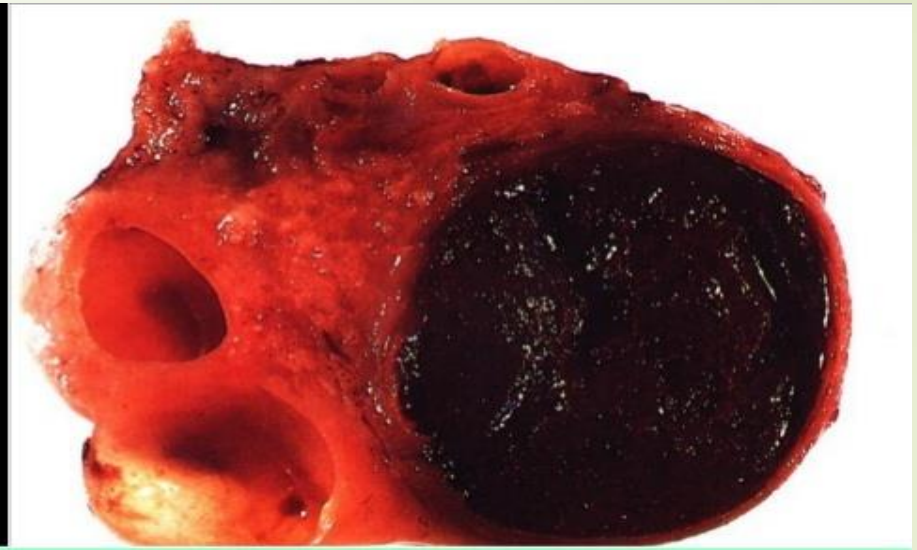
III. Complex cyst



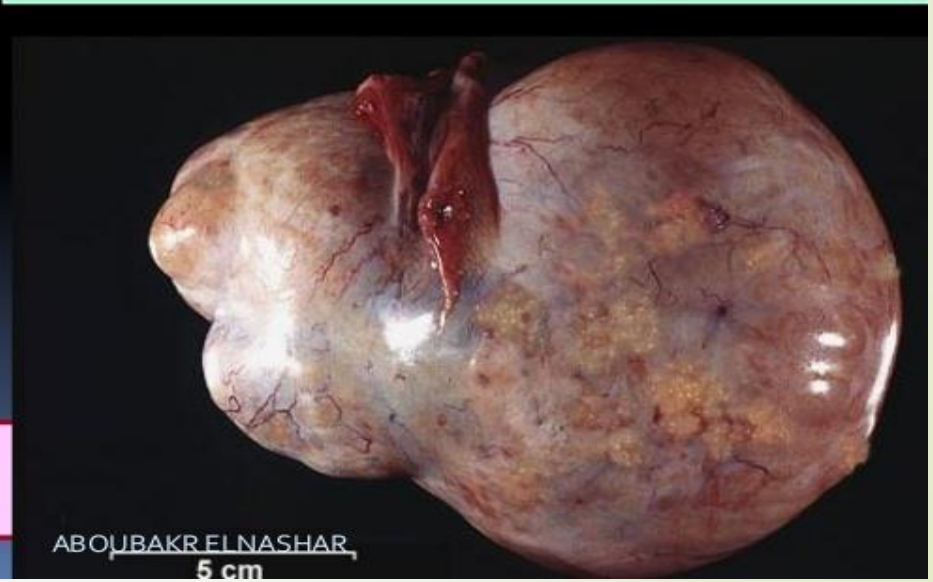
1-Dermoid Cyst

The commonest 36%

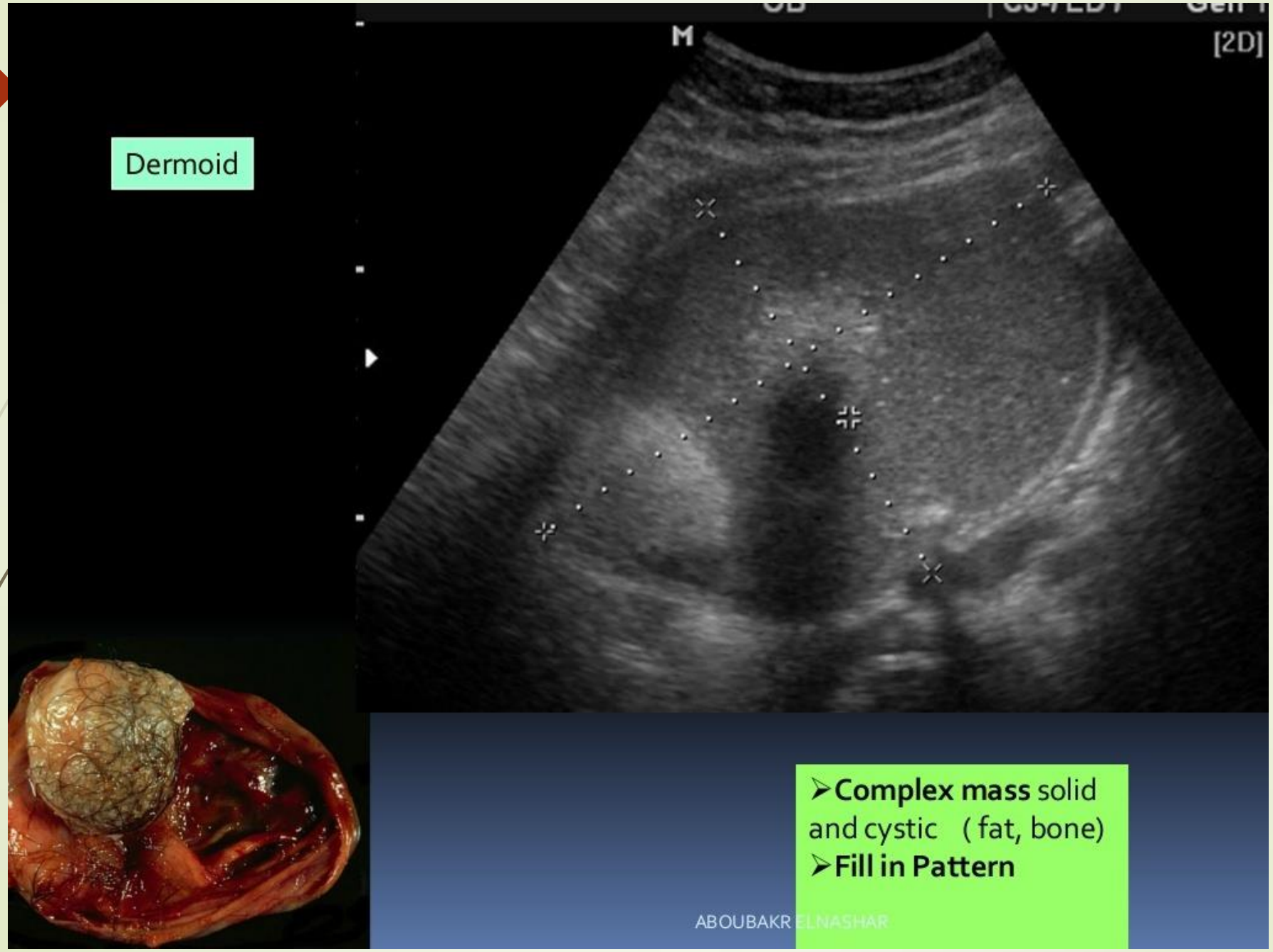
3-Malignant Cyst 1-3%



2-Endometriotic cyst 5%



Dermoid



- **Complex mass** solid and cystic (fat, bone)
- **Fill in Pattern**

Malignant cyst

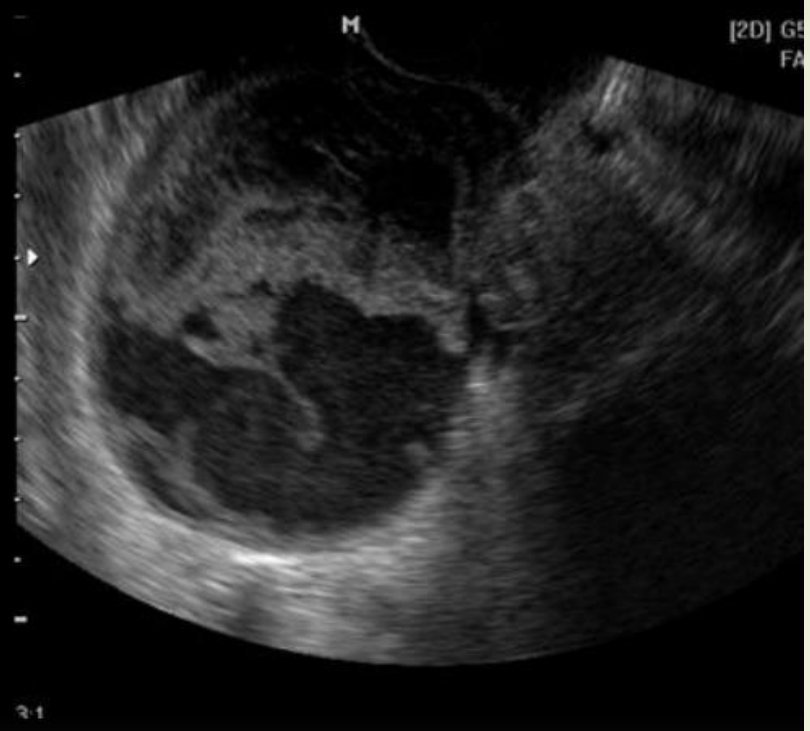
- **Wall thickening**
- **Wall nodularity**
- **Septations > 3 mm**
- **Papillary projections**
- **Solid component:**

the most significant predictor of malignancy

- **Ascites:**

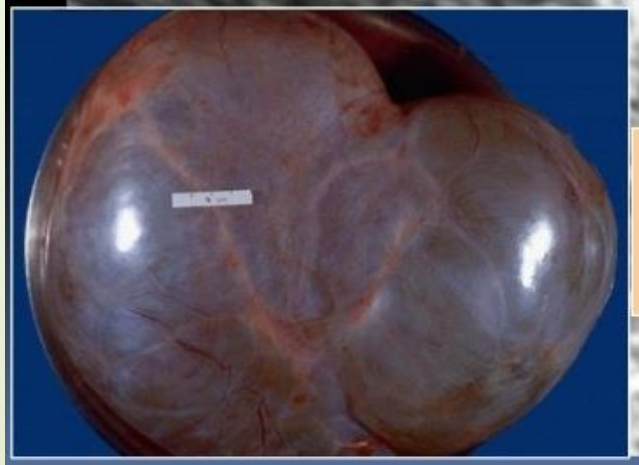
positive predictive value of 95% for malignancy

(Brown et al , 1998)



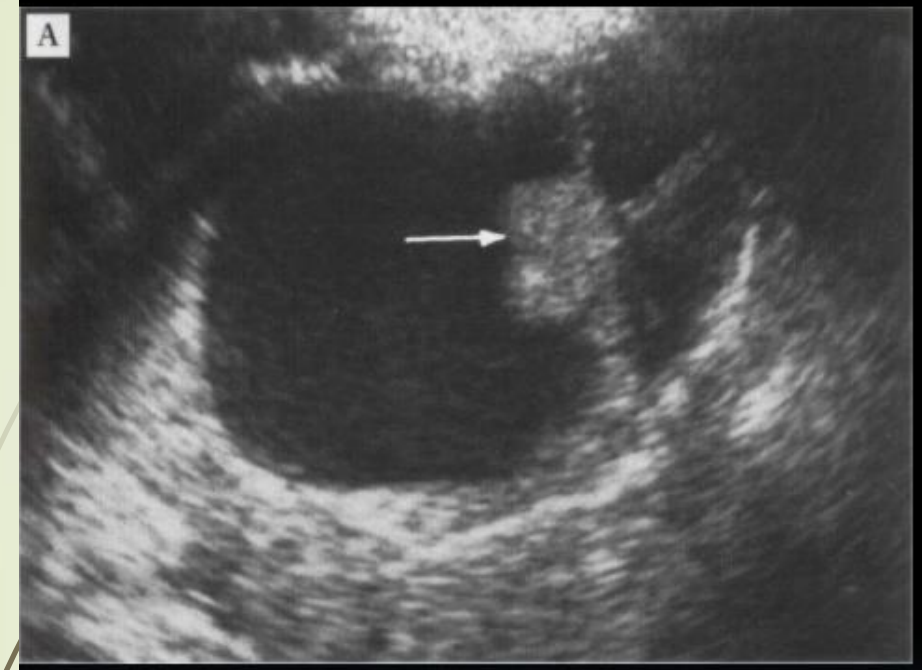
Papillary serous Cystadenom

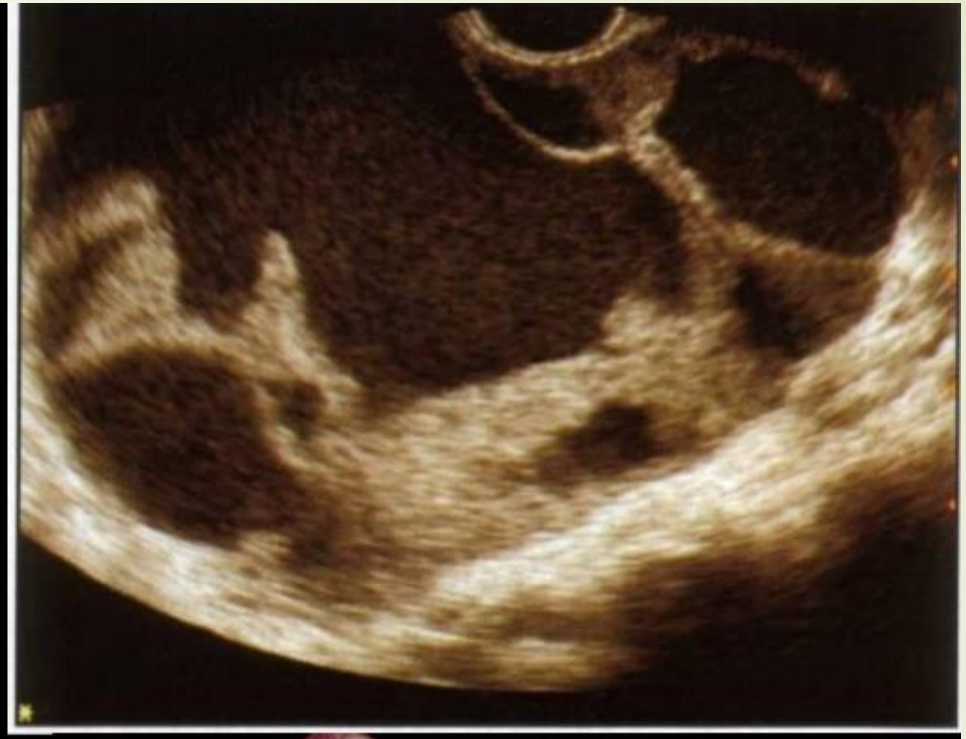
Few small papillae

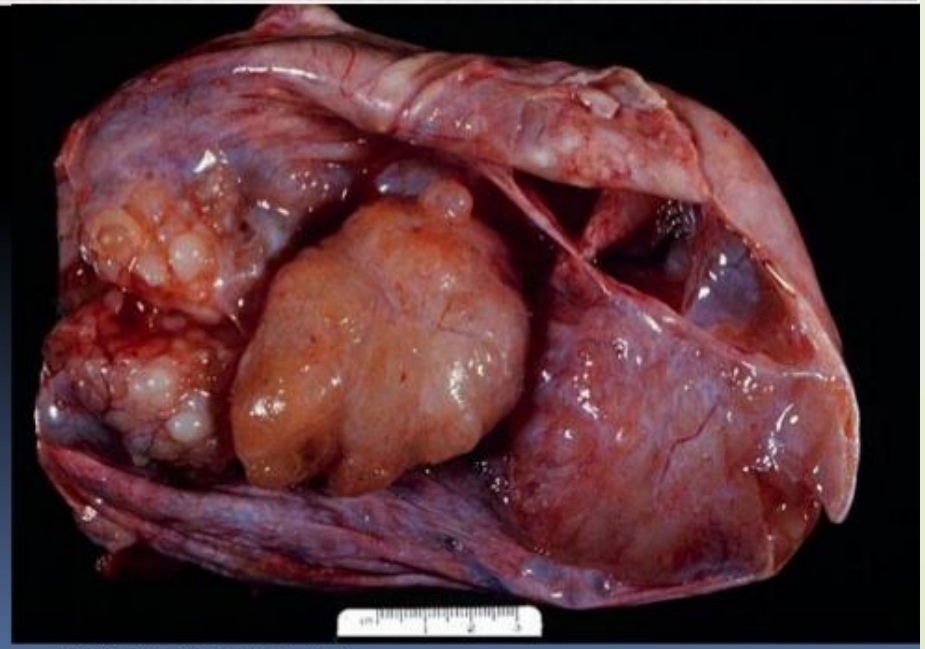


U/S echogenic mural nodule in cystic mass.

Mucinous Cystadenocarcinoma







Solid areas Many papillary. P


B
P
At 16 weeks' gestation with R adnexal solid mass Leiomyoma or ovarian mass.
ABOUBAKR ELNASHAR