

Ovarian Masses

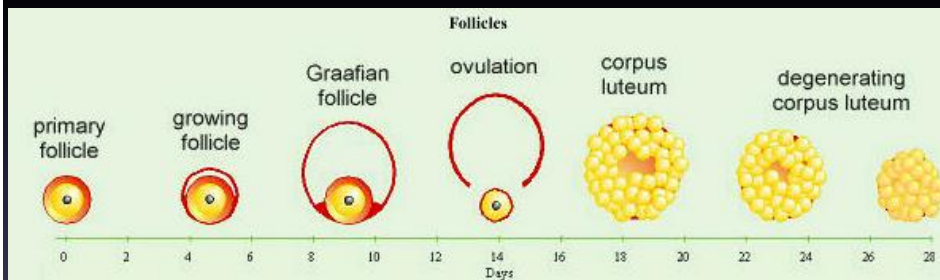
Ovarian Mass

- Learning Targets
 - Normal ovarian function
 - Sources of ovarian masses
 - Evaluation of ovarian masses
 - Differential diagnosis
 - Benign or Malignant?
 - Appropriate Evaluation

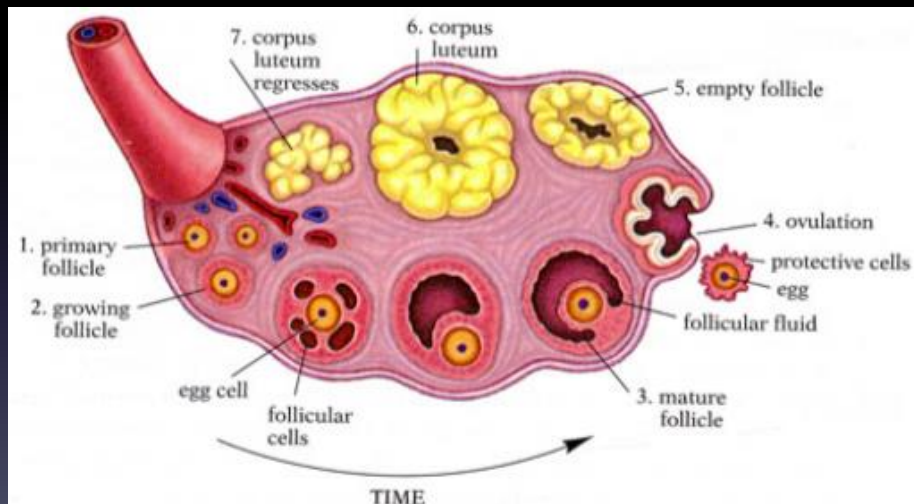
Normal Follicular Development

OVARIAN MASSES

Ovarian Mass



Ovarian Mass

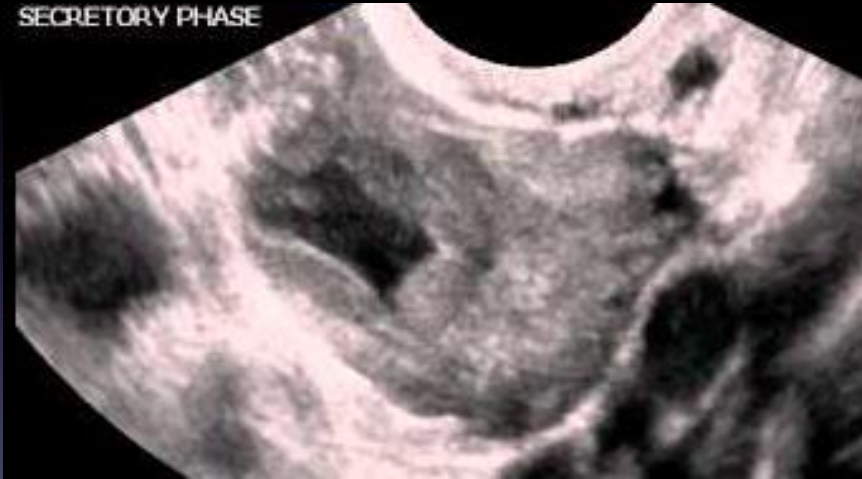


Ovarian Mass Normal Follicle

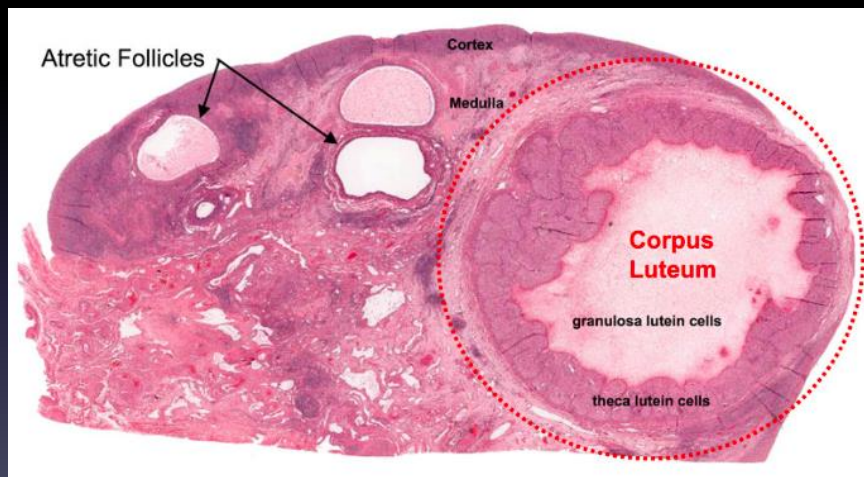


Ovarian Mass Corpus Luteum

SECRETORY PHASE

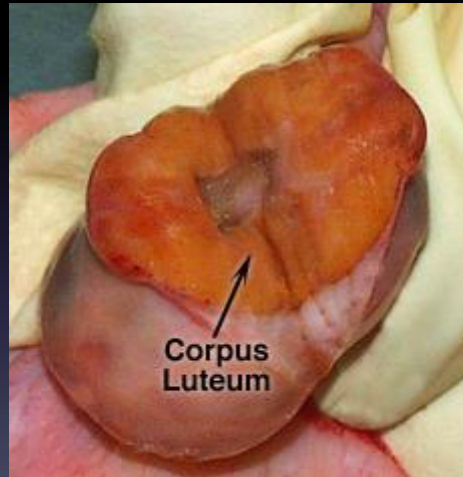


Ovarian Mass Corpus Luteum



Ovarian Mass

Corpus Luteum



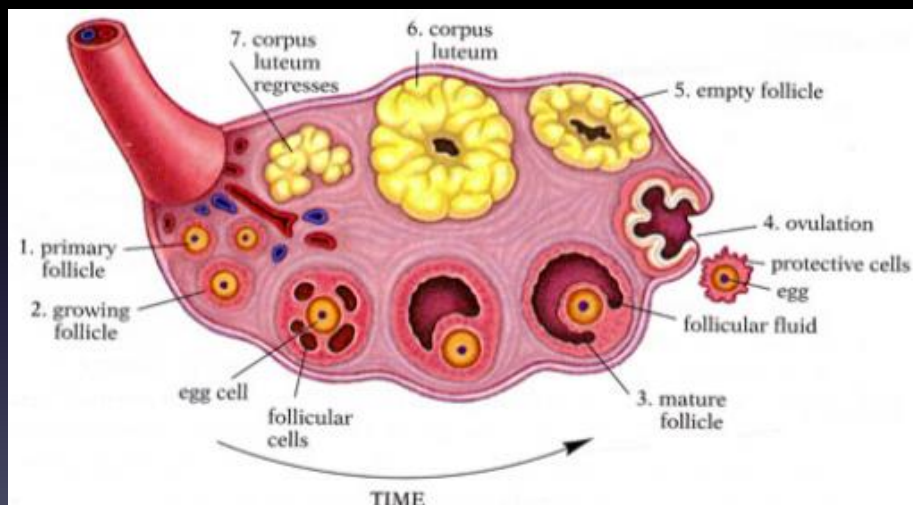
Sources of Ovarian Masses

OVARIAN MASSES

Ovarian Masses

- Sources of Benign Ovarian Masses
 - Disorders of Normal Follicular Development
 - Disorders of Germ Cell Development
 - Disorders of Epithelial Cell Development

Ovarian Mass



Evaluation of Ovarian Masses

OVARIAN MASSES

Ovarian Masses

- Evaluation of Ovarian Masses
 - Physical Exam
 - Ultrasonography
 - Color Doppler Ultrasonography
 - Other Imaging
 - Serum Marker Screening

Ovarian Masses

- Physical Exam
 - “Limited ability to identify an adnexal mass, especially with increasing body mass index (BMI) > 30.
 - Features to be considered:
 - Regular versus Irregular
 - Solid versus soft
 - Fixed versus mobile
 - Smooth versus nodular
 - Unilateral or Bilateral
 - Ascites?

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Ovarian Masses

- Ultrasound – Preferred imaging modality
 - Advantages
 - Widespread availability
 - Good patient tolerability
 - Cost-effective

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Ovarian Masses

- Ultrasound – Preferred imaging modality
 - Limitations
 - Lack of specificity
 - 68 – 81%
 - Low positive predictive value for cancer

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Ovarian Masses

- Ultrasound - Contents of Report
 - Size of the mass
 - Solid or cystic
 - Unilateral or bilateral
 - Presence or absence of septations
 - Mural nodules
 - Papillary excrescences
 - Free fluid in the pelvis

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Ovarian Masses

- Color Doppler Ultrasonography
 - Measurement of blood flow in and around the mass
 - Hypoxic tissue in tumors will recruit low resistance, high-flow blood vessels
 - Can measure pulsatility index, resistance index, maximum systolic velocity, etc.
 - Current role remains controversial

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Ovarian Masses

Modalities for the Evaluation of Adnexal Masses

<u>Modality</u>	<u>Sensitivity</u>	<u>Specificity</u>
Gray-scale transvaginal U/S	82-91%	68-81%
Doppler ultrasonography	86%	91%
Computed Tomography (CT)	90%	75%
Magnetic resonance imaging	91%	88%
Positron emission tomography	67%	79%
CA 125 level measurement	78%	78%

AHRQ. Management of adnexal mass.
#130

Ovarian Masses

- Serum Marker Screening
 - CA 125 –
 - Elevated in 80% of patients with epithelial ovarian cancer
 - Only elevated in 50% of patients with Stage 1 ovarian cancer
 - NOT useful as a screening test

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Ovarian Masses

- Serum Marker Screening
 - CA 125 – False positive
 - Uterine leiomyoma
 - Endometriosis
 - Acute or chronic PID
 - Ascites, of any etiology
 - Inflammatory conditions – SLE, IBD, etc.

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Ovarian Masses

- Serum Marker Screening
 - CA 125
 - Useful in distinguishing between benign and malignant masses in postmenopausal women
 - Only extreme values helpful in premenopausal women
 - CA 125 values will increase over time when a cancer is present

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Ovarian Masses

- Serum Marker Screening
 - Germ Cell Tumor Markers
 - Dysgerminoma Lactate dehydrogenase
 - Choriocarcinoma Beta-hCG level
 - Granulosa cell Inhibin A and B
 - Endodermal sinus Alpha-fetoprotein

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Differential Diagnosis

OVARIAN MASSES

Ovarian Mass

Differential Diagnosis

- Functional Cysts
 - Follicular cysts
 - Hemorrhagic corpus luteum
- Endometrioma
- Mature teratoma
- Germ Cell Tumors
- Benign neoplasm
- Malignant neoplasm

Ovarian Mass Follicular Cyst



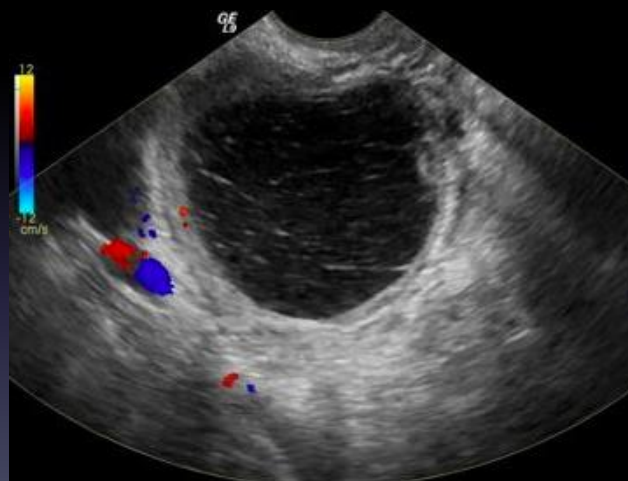
Ovarian Mass Follicular Cyst



Ovarian Mass Hemorrhagic Corpus Luteum

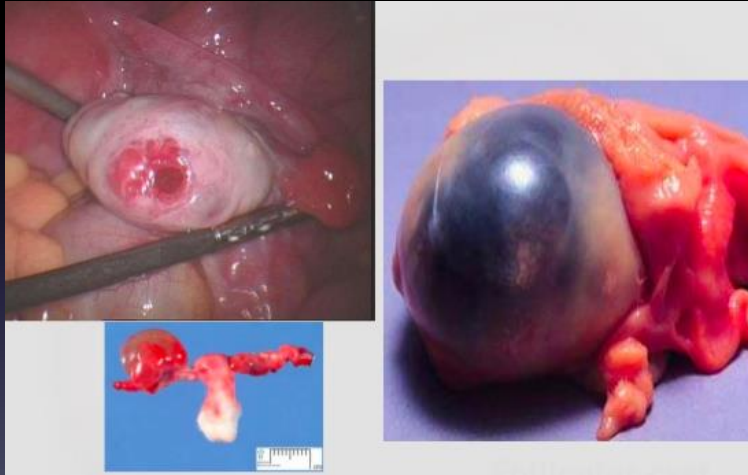


Ovarian Mass Hemorrhagic Corpus Luteum



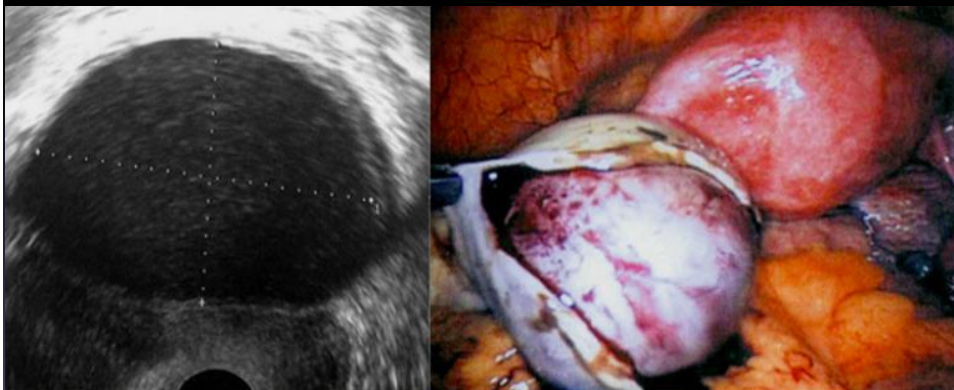
Ovarian Mass

Hemorrhagic Corpus Luteum

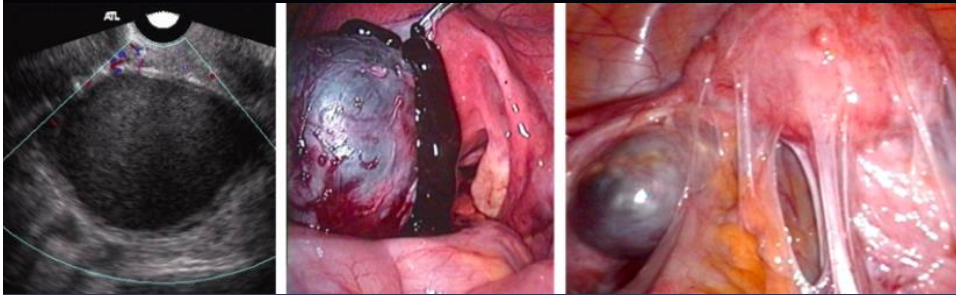


Ovarian Mass

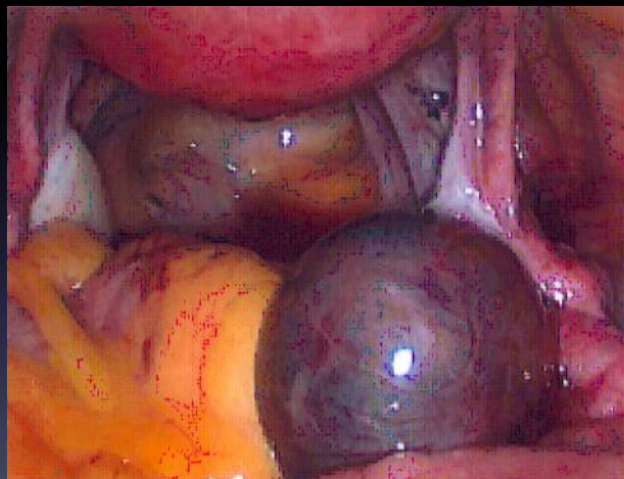
Endometrioma



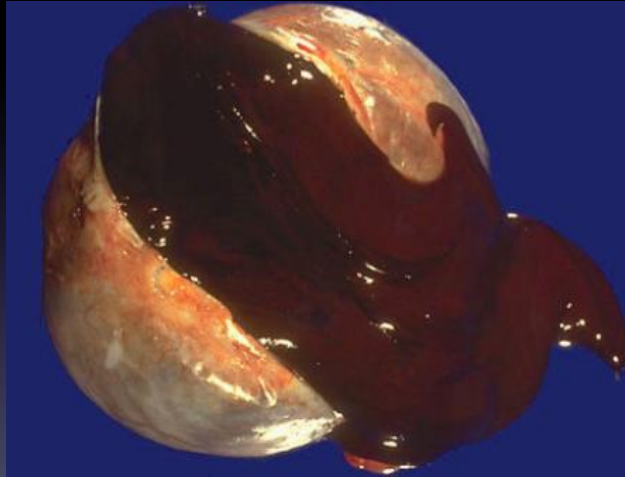
Ovarian Mass Endometrioma



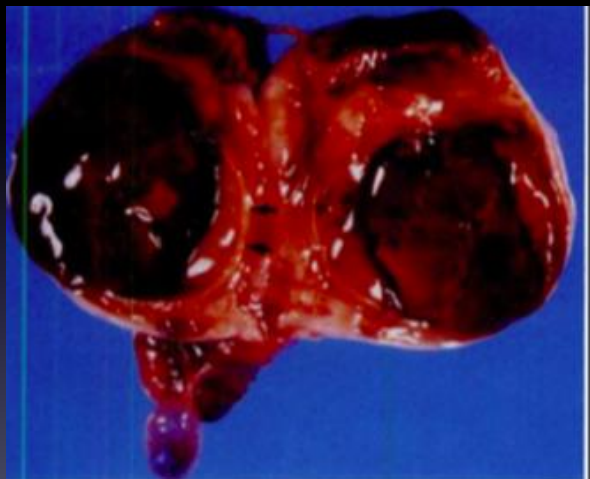
Ovarian Mass Endometrioma



Ovarian Mass Endometrioma



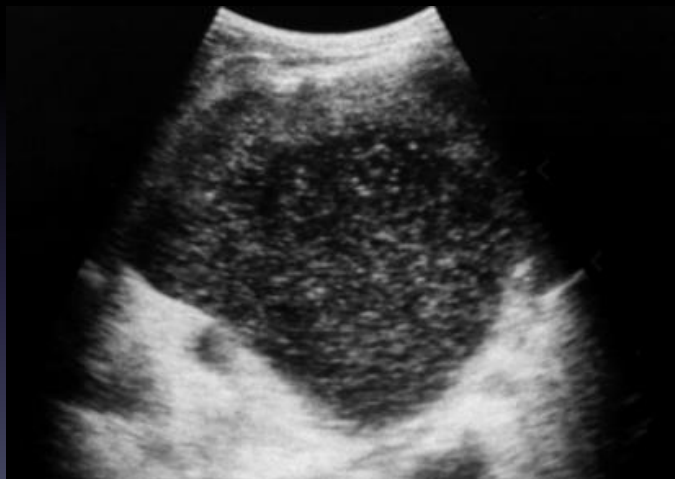
Ovarian Mass Endometrioma



Ovarian Mass Mature Teratoma

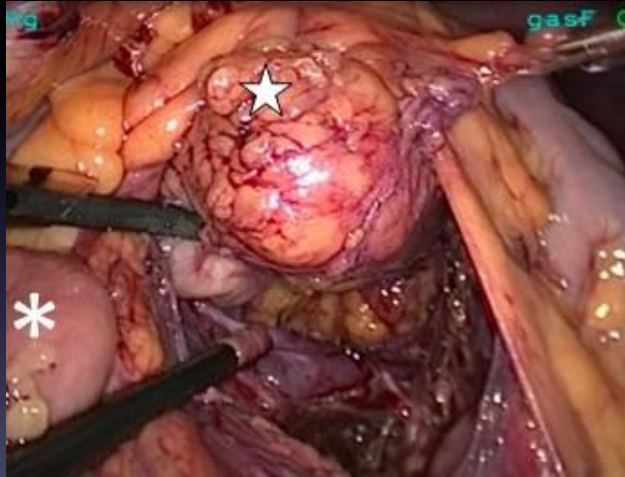


Ovarian Mass Mature Teratoma



Ovarian Mass

Mature Teratoma



Ovarian Mass

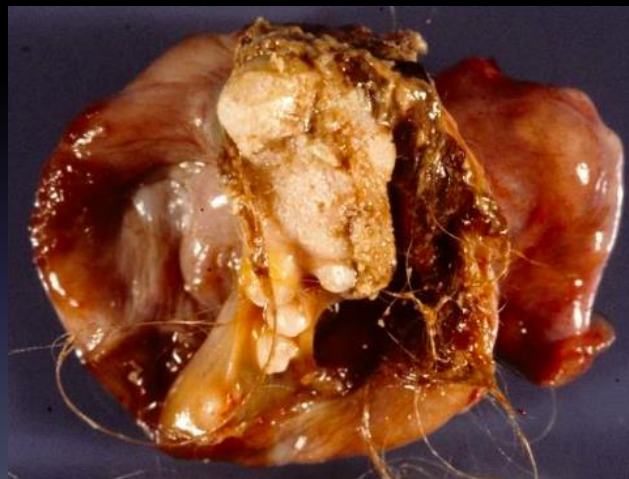
Mature Teratoma



Ovarian Mass
Mature Teratoma



Ovarian Mass
Mature Teratoma



Ovarian Mass

Mature Teratoma



Ovarian Mass

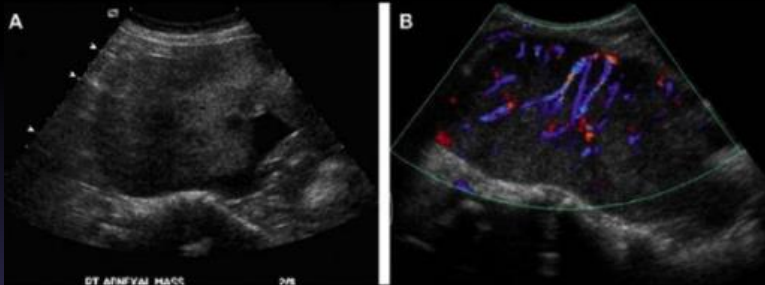
Dysgerminoma



Ovarian Mass Dysgerminoma



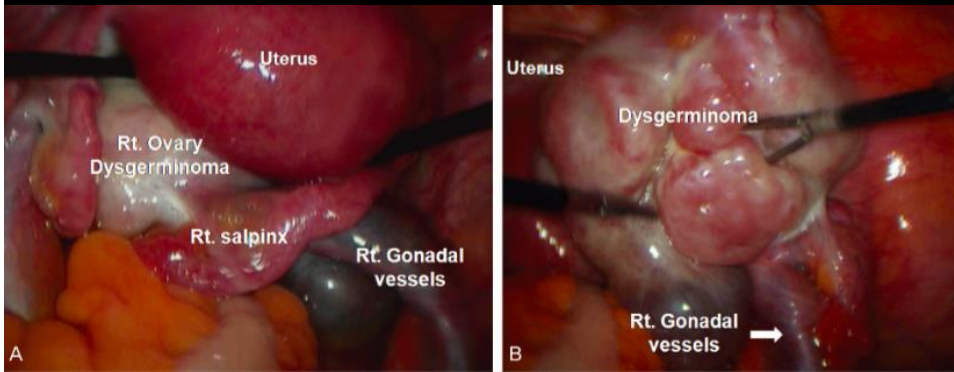
Ovarian Mass Dysgerminoma



Dysgerminoma.

Grayscale (A) and color flow Doppler (B) images of the right ovary demonstrate a solid mass with increased vascularity.

Ovarian Mass Dysgerminoma

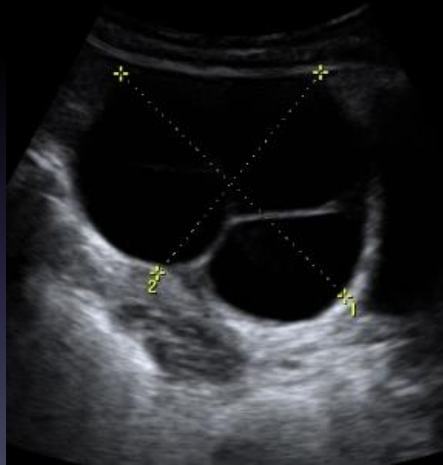


Ovarian Mass Dysgerminoma



Ovarian Mass

Serous cystadenoma



Ovarian Mass

Serous cystadenoma



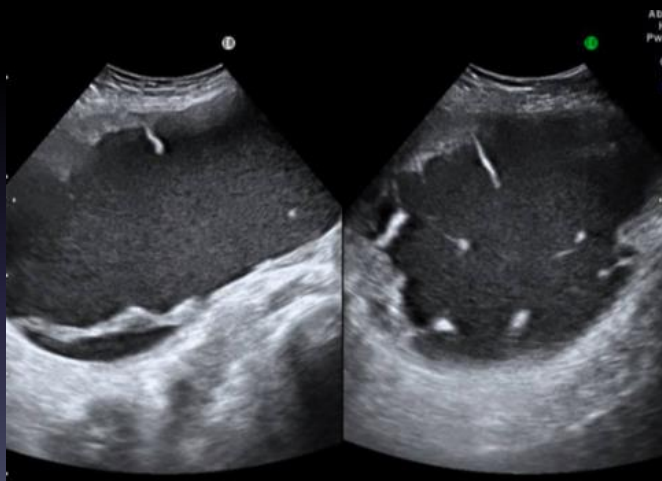
Ovarian Mass

Serous cystadenoma



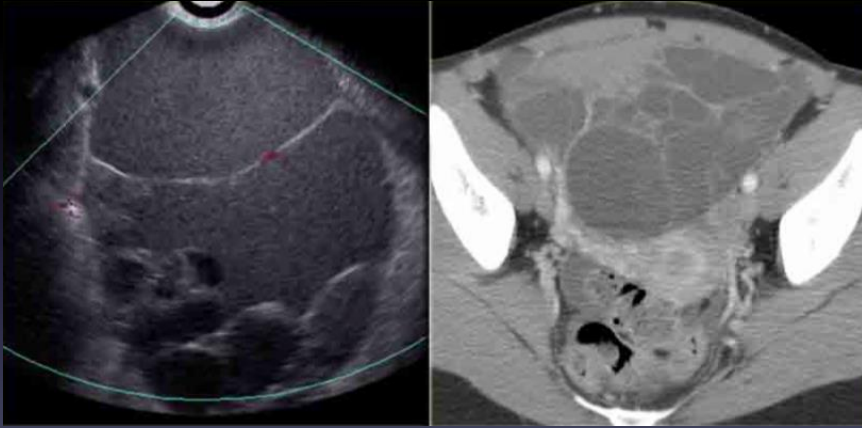
Ovarian Mass

Mucinous cystadenoma



Ovarian Mass

Mucinous cystadenoma



Ovarian Mass

Mucinous cystadenoma



Ovarian Mass

Mucinous cystadenoma



Ovarian masses

- Historical Risk Factors for Malignancy
 - Age
 - Family history of breast or ovarian cancer
 - Genetic susceptibility
 - Nulliparity
 - Primary infertility
 - Endometriosis

Ovarian masses

International Ovarian Tumor Analysis

10 SIMPLE RULES

RULES FOR PREDICTING A MALIGNANT TUMOUR (M – RULES)

M1	IRREGULAR SOLID TUMOUR
M2	PRESENCE OF ASCITES
M3	AT LEAST 4 PAPILLARY STRUCTURES
M4	IRREGULAR MULTILOCULAR SOLID TUMOUR WITH LARGEST DIAMETER \geq 100mm
M5	VERY STRONG BLOOD FLOW (COLOUR SCORE 4)

RULES FOR PREDICTING A BENIGN TUMOUR (B – RULES)

B1	UNILOCULAR
B2	PRESENCE OF SOLID COMPONENT, LARGEST DIAMETER <7mm
B3	PRESENCE OF ACOUSTIC SHADOWS
B4	SMOOTH MULTILOCULAR TUMOUR WITH LARGEST DIAMETER <100mm
B5	NO BLOOD FLOW (COLOUR SCORE 0)

Dr. Talla Ambar

Ovarian masses

International Ovarian Tumor Analysis

TABLE 5
Model coefficients for 11 predictors obtained on development data (n = 2445)

Predictor	Coefficient	SE
Intercept	−1.10	0.26
B1 (unilocular cyst)	−3.10	0.34
B2 (solid components present, but <7 mm)	−1.55	0.59
B3 (acoustic shadows)	−1.58	0.27
B4 (smooth multilocular tumor with largest diameter <100 mm)	−3.59	0.60
B5 (no blood flow; color score 1)	−1.96	0.24
M1 (irregular solid tumor)	2.38	0.39
M2 (ascites)	2.87	0.29
M3 (at least 4 papillary structures)	1.72	0.28
M4 (irregular multilocular-solid tumor with largest diameter \geq 100 mm)	1.12	0.23
M5 (very strong flow; color score 4)	1.53	0.24
Oncology center	0.95	0.31

Ovarian masses

International Ovarian Tumor Analysis

TABLE 10

Summary classification of Simple Rules risk calculation based on all data (n = 4848)

Features	Observed malignancy rate	Estimated individual risk of malignancy	Classification
No M-features AND >2 B-features	1/175 (0.6%)	<0.01–0.29%	Very low risk
- No M-features AND 2 B-features - No M-features AND feature B1 present	20/1560 (1.3%)	0.19–2.7% 1.2–3.1%	Low risk
No M-features AND 1 B-feature present (except B1)	60/722 (8.3%)	2.4–15.2%	Intermediate risk
- No features - Equal no. of M- and B-features - >0 M-features, but more B- than M-features	451/1096 (41.1%)	27.5–48.7% 5.6–78.1% 1.3–28.4%	Elevated risk
More M- than B-features present	1133/1295 (87.5%)	42.0–>99.9%	Very high risk

This simplified system only provides risk ranges for no. of B- and M-features present, but facilitates clinical triaging in absence of electronic devices. Personalized risk estimates can be obtained in second step.

B-feature, benign feature; M-feature, malignant feature.

Timmerman et al. Simple ultrasound rules to predict risk of malignancy in adnexal masses. *Am J Obstet Gynecol* 2016.

Ovarian masses

International Ovarian Tumor Analysis (IOTA)

ACOG/SGO Referral Guidelines

- Premenopausal (< 50 years of age)
 - CA 125 levels > 200
 - Ascites
 - Evidence of metastasis
 - Family history of breast or ovarian malignancy (1st Degree)

Ovarian masses

International Ovarian Tumor Analysis (IOTA)

ACOG/SGO Referral Guidelines

- Postmenopausal (> 50 years of age)
 - Elevated CA 125
 - Ascites
 - Nodular or fixed pelvic mass
 - Evidence of metastasis
 - Family history of breast or ovarian malignancy (1st degree)

Appropriate Evaluation

OVARIAN MASSES

Ovarian Masses

- Premenopausal
 - Medical history and physical examination
 - Quantitative B-hCG level
 - Complete Blood Count (CBC)
 - Transvaginal U/S
- Almost all pelvic masses in premenopausal women are benign

Ovarian Masses

- Postmenopausal
 - Medical history and physical examination
 - CA 125
 - Transvaginal U/S
- “With the exception of simple cysts on a transvaginal ultrasound, most pelvic masses in postmenopausal women will require surgical intervention.”