Vehbi Koç Vakfı

HEALTHCARE INSTITUTIONS

AMERICAN HOSPITAL | **KOÇ UNIVERSITY HOSPITAL**

Reviewing IOTA terminology and definitions used to describe ovarian tumors
Simple Rules
Adnex Model
O RADS-2

Ayşe SEYHAN

Key Questions

- How do I describe my ultrasound findings using the standardized IOTA terminology?

- Which patients should I refer for specialist opinion?

We need standardised terms, definitions and measurements to describe ultrasound images

- To understand each other

- To compare scientific studies

How to describe ultrasound findings using standardised terminology

Terms, definitions and measurements to describe the sonographic features of adnexal tumors: a consensus opinion from the International Ovarian Tumor Analysis (IOTA) group

D. TIMMERMAN, L. VALENTIN*, T. H. BOURNE†, W. P. COLLINS‡, H. VERRELST§ and I. VERGOTE

Systematic approach to sonographic evaluation of the pelvis in women with suspected endometriosis, including terms, definitions and measurements: a consensus opinion from the International Deep Endometriosis Analysis (IDEA) group

S. GUERRIERO[1]#, G. CONDOUS[2]#, T. VAN DEN BOSCH[3], L. VALENTIN[4], F. P. G. LEONE[5], D. VAN SCHOUBROECK[3], C. EXACOUSTOS[6], A. J. F. INSTALLÉ[7], W. P. MARTINS[8], M. S. ABRAO[9], G. HUDELIST[10], M. BAZOT[11], J. L. ALCAZAR[12], M. O. GONÇALVES[13], M. A. PASCUAL[14], S. AJOSSA[1], L. SAVELLI[15], R. DUNHAM[16], S. REID[17], U. MENAKAYA[18], T. BOURNE[19], S. FERRERO[20], M. LEON[21], T. BIGNARDI[22], T. HOLLAND[23], D. JURKOVIC[23], B. BENACERRAF[24], Y. OSUGA[25], E. SOMIGLIANA[26] and D. TIMMERMAN[3]

Terms, definitions and measurements to describe the sonographic features of the endometrium and intrauterine lesions: a consensus opinion from the International Endometrial Tumor Analysis (IETA) group

F. P. G. LEONE*, D. TIMMERMAN†, T. BOURNE‡, L. VALENTIN§, E. EPSTEIN¶, S. R. GOLDSTEIN**, H. MARRET††, A. K. PARSONS‡‡, B. GULL§§, O. ISTRE¶¶, W. SEPULVEDA***, E. FERRAZZI††† and T. VAN DEN BOSCH†

Consensus statement on how to
- **measure**
- **describe ultrasound images**
  - **terms**
  - **definitions**

IOTA terms for describing an adnexal mass

- Solid component
- Papillary projection
- Type of tumor
- Echogenicity of cyst fluid
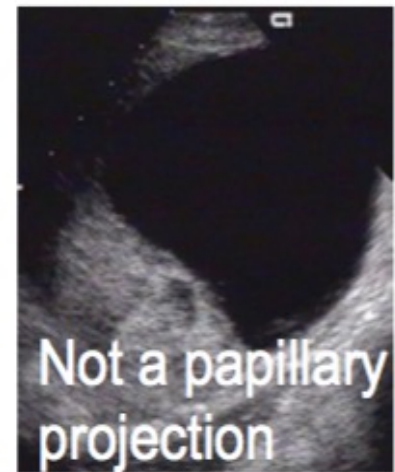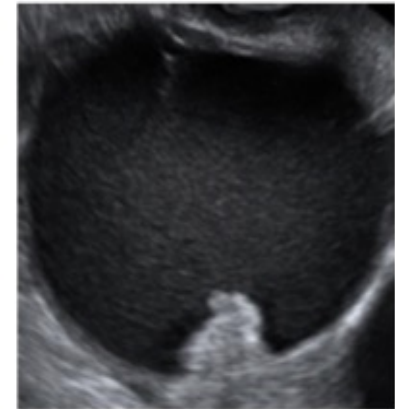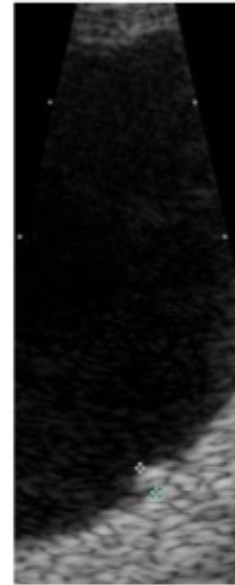- Shadowing
- Ascites
- Color score

IOTA definition of solid component

A structure that has
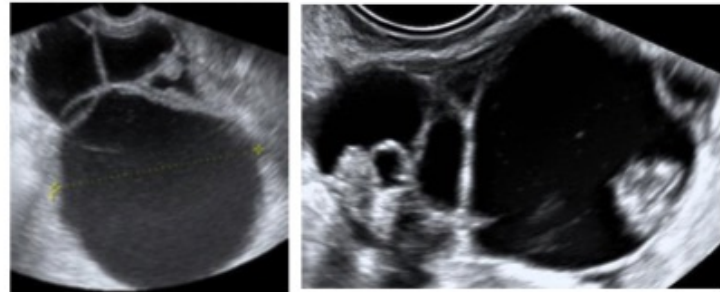echogenicity suggestive
 of tissue (myometrium, the
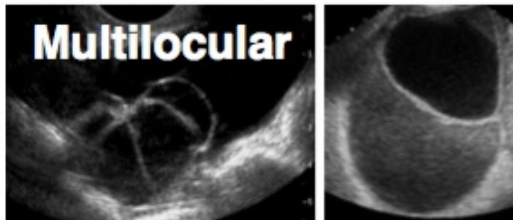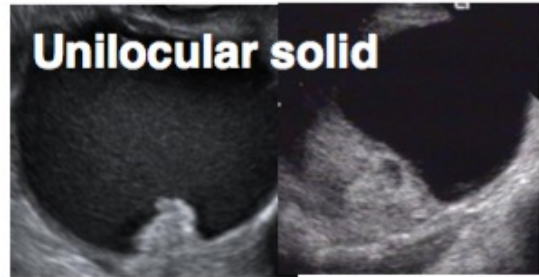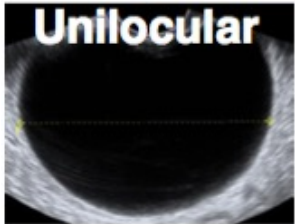ovarian stroma, myomas,
fibromas)
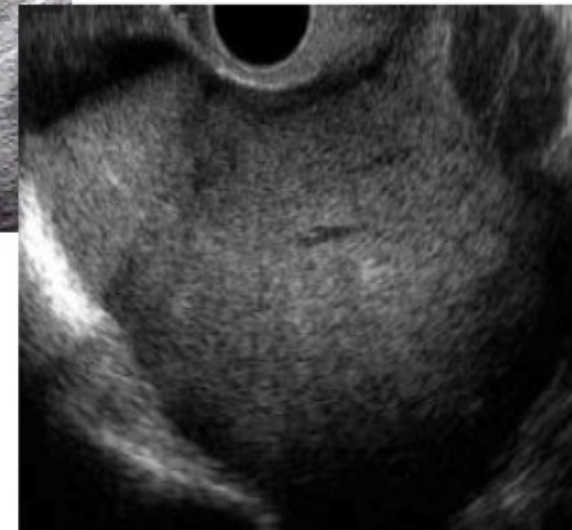
IOTA definition of papillary projection

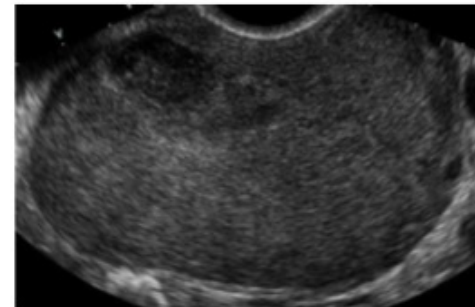- Protrusion of solid tissue into a cyst cavity >3 mm (height)

- Protrusions <3 mm (height = irregularities

- Papillary projections

= solid component

Not a papillary projection

Five types of lesion/tumor (IOTA)

Five types of cyst contents (IOTA)
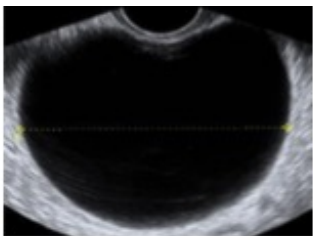
Anechoic
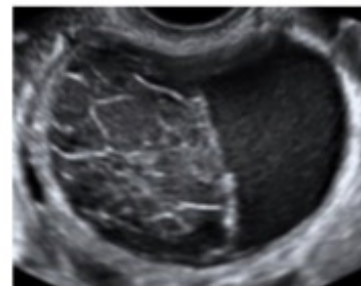
Low level

Ground glass

Haemorrhagic
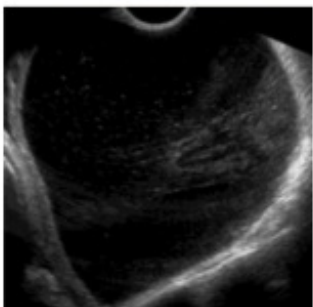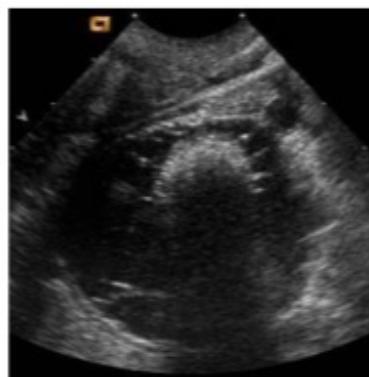
Mixed

Internal Wall of The Cyst

Smooth, regular   Irregular
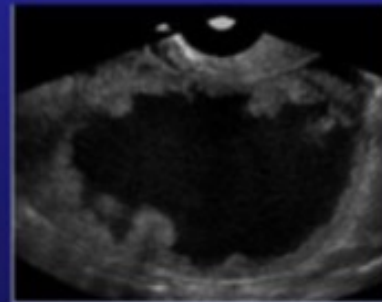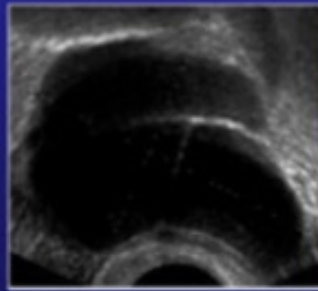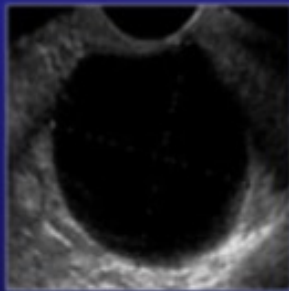
Shadowing (IOTA)
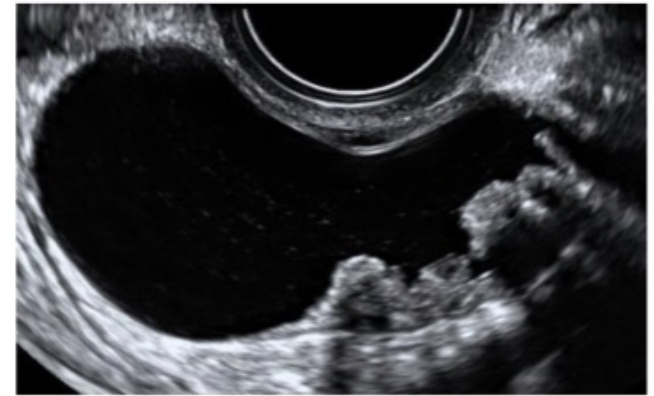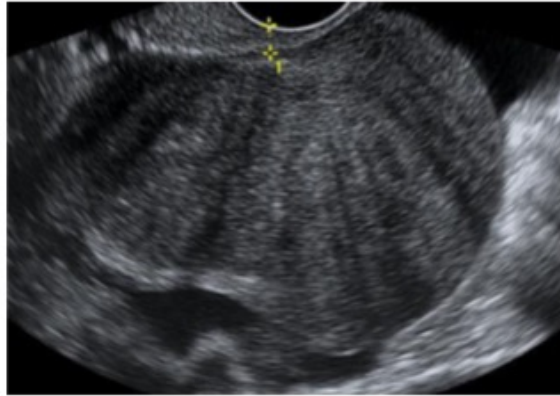
Ascites (IOTA)

Fluid outside the pouch of Douglas

The IOTA colour score
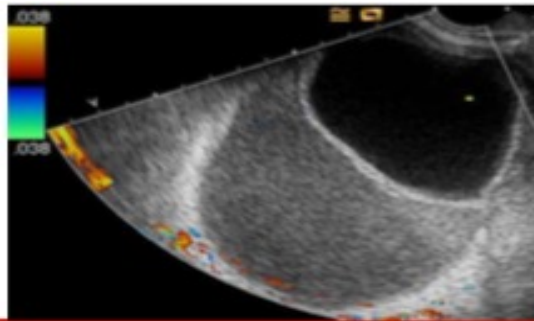
Score 1
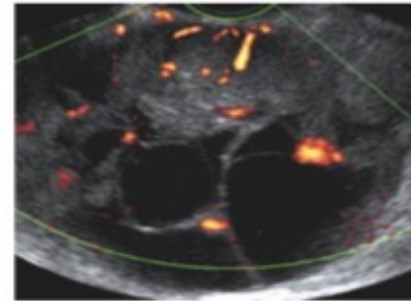
Score 3

Adjust settings: maximize detection of flow without artifacts
(Pulse repetition frequency 0.3-0.6 KHz,
3-6 cm/s velocity scale)
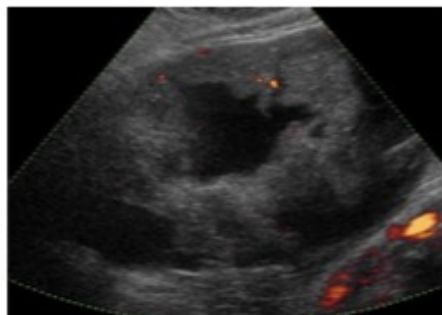
Score 2
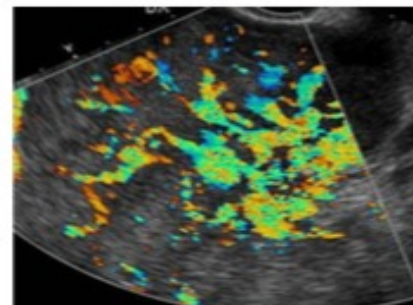
Score 4

How to measure a papillary projection

- Measure the largest papillary projection

- Three orthogonal diameters

- Height: do not include cyst

Wall or septum
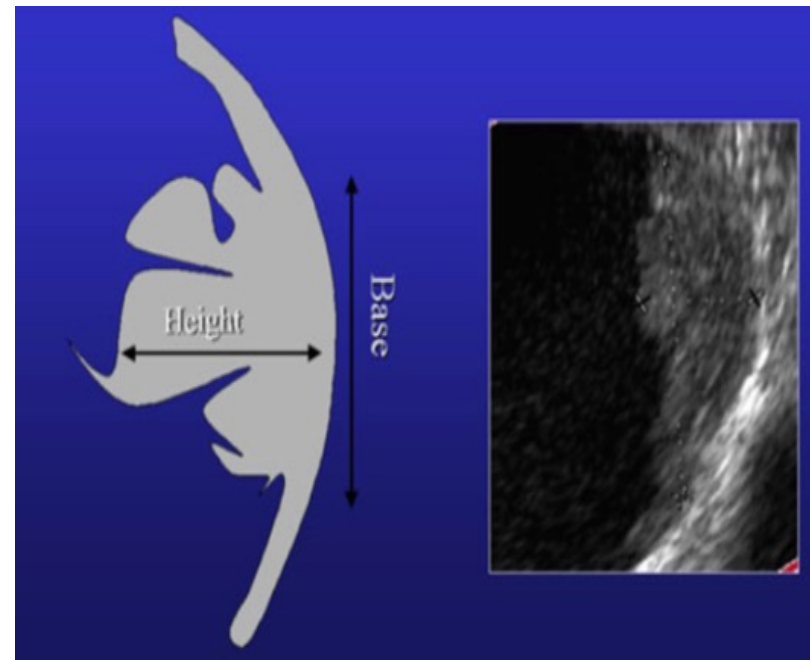
Simple Rules- Features of a Benign Lesion
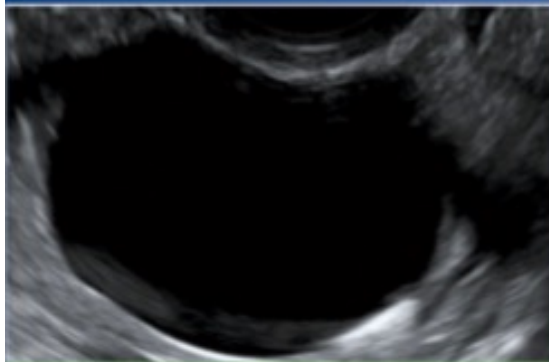
B1: Unilocular cyst

A mass is classified as benign if at least one B-feature is present and no M-features are present
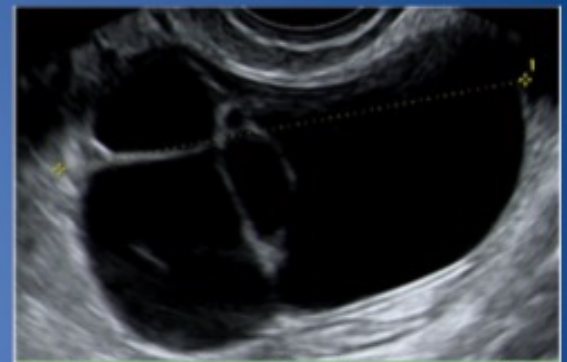
B4: Smooth multilocular tumor, with largest diameter < 100 mm
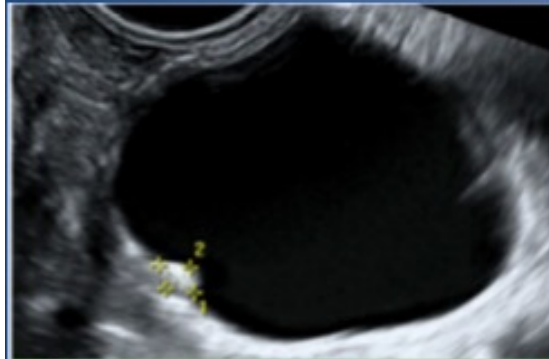
B2: Presence of solid components, with largest diameter < 7 mm
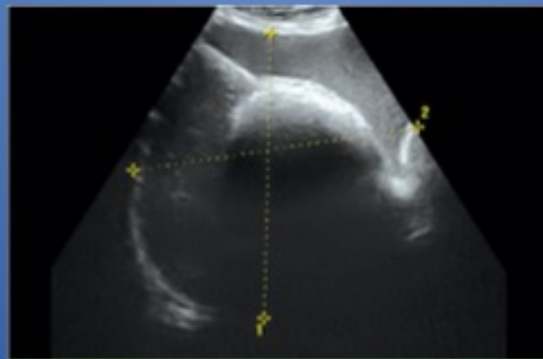
B3: Presence of acoustic shadows
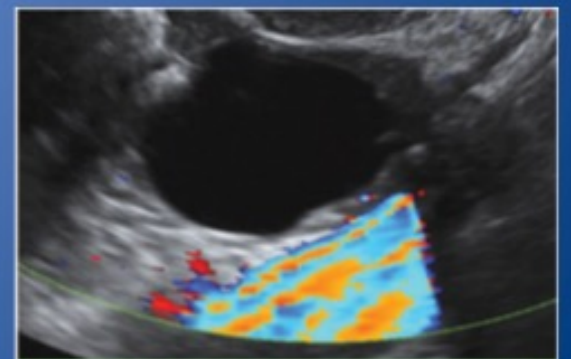
B5: No blood flow (color score 1)

Simple Rules- Features of a Malignant Lesion

M1: Irregular solid tumor

A mass is classified as malignant if at least one M-feature is present and no B-features are present
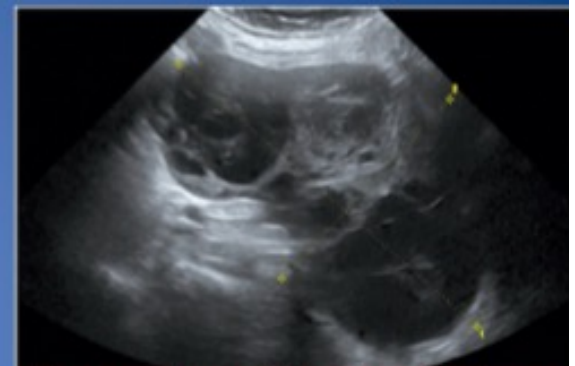
M4: Irregular multilocular solid tumor with largest diameter ≥ 100 mm

M2: Presence of ascites
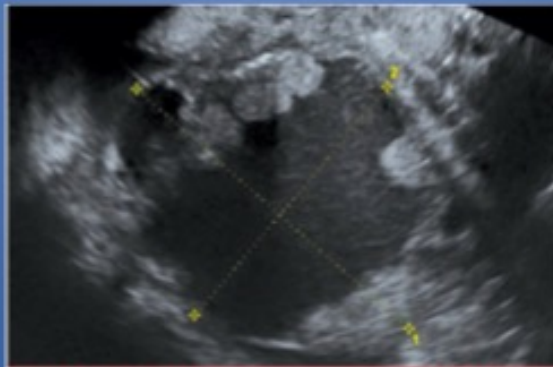
M3: At least four papillary structures
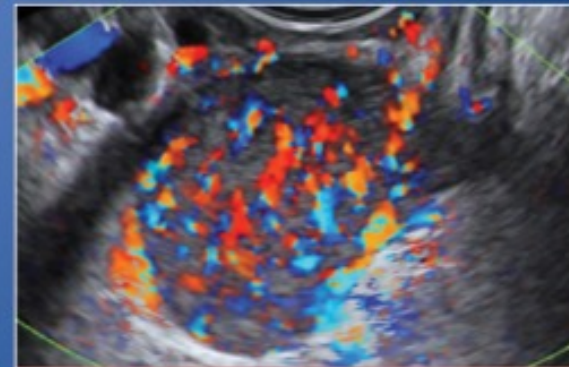
M5: Very strong blood flow

IOTA description

- Lesion: Unilocular, unilocular-solid, **multilocular**, multilocular-solid or solid

- Cyst contents – anechoic, **low level**, ground glass, haemorrhagic or mixed

- Solid material or papillary structures or wall irregularity (presence and size) : **NO**

- Color Score: **1**

- Shadows **NO**

- Ascites **NO**
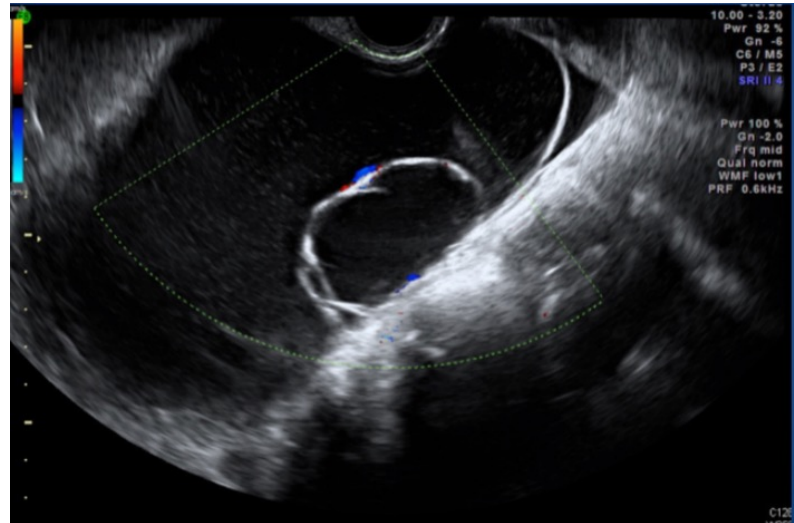
Simple Rules
Mucinous cystadenoma
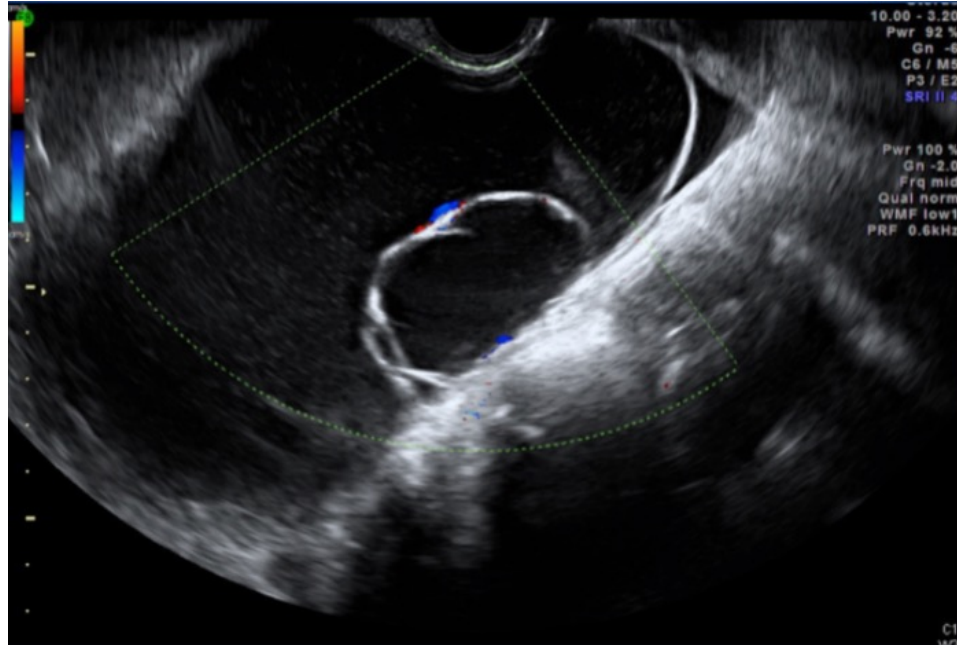
- **Benign** - unilocular, smooth **multilocular tumor < 100 mm**, largest solid component diameter < 7mm, acoustic shadows, no blood flow (color score 1)

- Malignant - Irregular solid tumor, Irregular multilocular-solid tumor ≥ 100 mm, ≥ 4 papillary structures, ascites, very strong blood flow (color score 4)

IOTA description

- Lesion: Unilocular, **unilocular-solid**, multilocular, multilocular-solid or solid

- Cyst contents – **anechoic,** low level, ground glass, haemorrhagic or mixed

- Solid material or **papillary structures** or wall irregularity (presence and size): **45 mm**

- Color Score: **2**

- Shadows YES

- Ascites NO
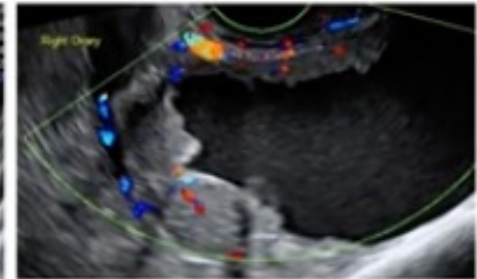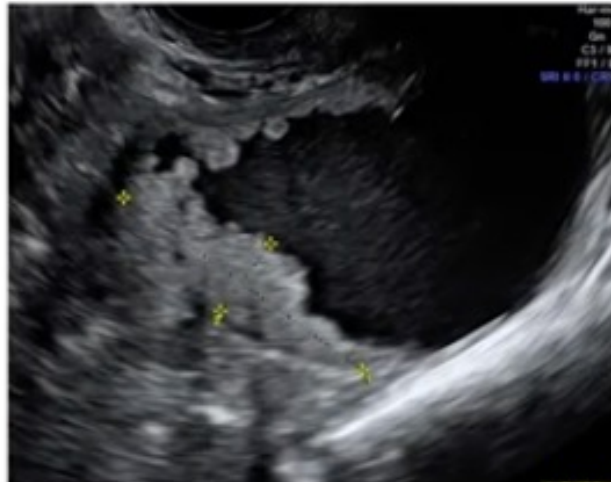
No benign rules no malignant Rules = **UNCERTAIN**

Adnex model
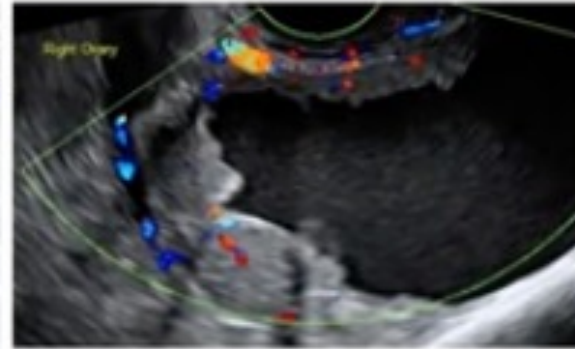
- ➢ 40 yo
- ➢ 88mm unilocular solid cystic mass
- ➢ >4 papillation Max Solid part 45 mm

➢Low level echogenity
➢Color score 2
➢ShadowingLow level echogenity
➢Color score 2
➢Shadowing

ADNEX model

www.iotagroup.org/adnexmodel

desktop or phone
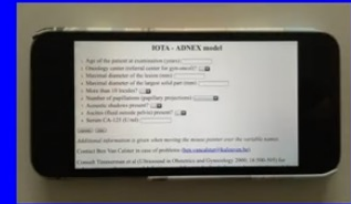
Unilocular-solid cyst
Low level echogenicity
>4 papillations
Minor vascularity
Shadowing

IOTA - ADNEX model

1. Age of the patient at examination (years)
2. Oncology center (referral center for gyn-oncol)?
3. Maximal diameter of the lesion (mm)
4. Maximal diameter of the largest solid part (mm)
5. More than 10 locules?
6. Number of papillations (papillary projections)
7. Acoustic shadows present?
8. Ascites (fluid outside pelvis) present?
9. Serum CA-125 (U/ml)

calculate   Clear

Additional information is given when moving the mouse pointer over the variable names.

Contact Ben Van Calster in case of problems (ben.vancalster@kuleuven.be).

Consult Timmerman et al (Ultrasound in Obstetrics and Gynecology 2000; 16:500-505) for information on the terms and definitions used for standardized ultrasound examination and data collection.
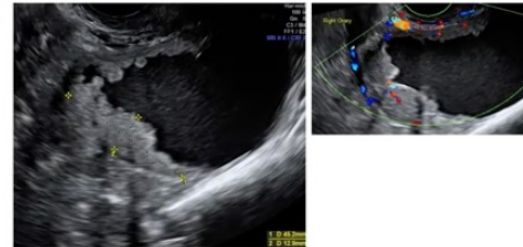
IOTA - ADNEX model

1. Age of the patient at examination (years) 40
2. Oncology center (referral center for gyn-oncol)? yes
3. Maximal diameter of the lesion (mm) 88
4. Maximal diameter of the largest solid part (mm) 45
5. More than 10 locules? no
6. Number of papillations (papillary projections) more than three
7. Acoustic shadows present? yes
8. Ascites (fluid outside pelvis) present? no
9. Serum CA-125 (U/ml)

calculate   Clear

Results

Legend:
- chance of benign tumor
- risk metastatic cancer to the adnexa
- risk stage II-IV ovarian cancer
- risk stage I ovarian cancer
- risk borderline

Highcharts.com
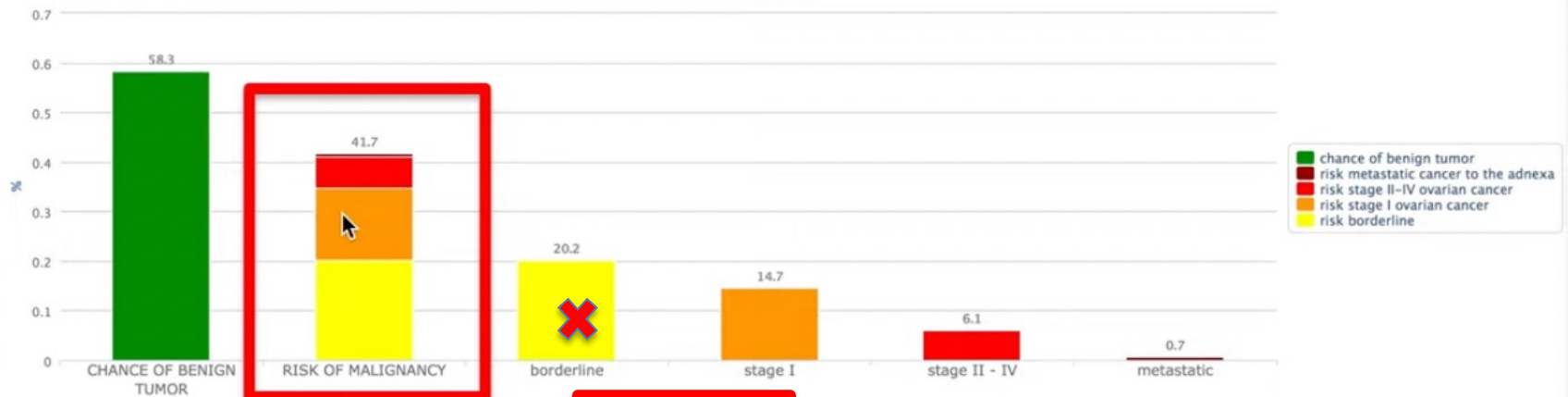
	Patient Specific Risk	Relative Risk	Baseline Risk
CHANCE OF BENIGN TUMOR	58.3 %	0.9	68.2%
RISK OF MALIGNANCY	41.7 %	1.3	31.8 %
->Risk borderline	20.2 %	3.2	6.3 %
->Risk stage I ovarian cancer	14.7 %	2	7.5 %
->Risk stage II-IV ovarian cancer	6.1 %	0.4	14.1 %
->Risk metastatic cancer to the adnexa	0.7 %	0.2	4.0 %

Contact Ben Van Calster in case of problems (ben.vancalster@kuleuven.be).

ORIGINAL ARTICLE   CLINICAL PRACTICE MANAGEMENT

CrossMark

EC: Editor's Choice

SA-CME

Ovarian-Adnexal Reporting Lexicon for Ultrasound: A White Paper of the ACR Ovarian-Adnexal Reporting and Data System Committee

Rochelle F. Andreotti, MD[a], Dirk Timmerman, MD, PhD[b,c], Beryl R. Benacerraf, MD[d],
Genevieve L. Bennett, MD[e], Tom Bourne, PhD[f], Douglas L. Brown, MD[g], Beverly G. Coleman, MD[h],
Mary C. Frates, MD[i], Wouter Froyman, MD[b,c], Steven R. Goldstein, MD[j],
Ulrike M. Hamper, MD, MBA[k], Mindy M. Horrow, MD[l], Marta Hernanz-Schulman, MD[m],
Caroline Reinhold, MD, MSc[n], Lori M. Strachowski, MD[e], Phyllis Glanc, MD[p]

ORIGINAL RESEARCH · STATEMENTS AND GUIDELINES

Radiology

O-RADS US Risk Stratification and Management System:
A Consensus Guideline from the ACR Ovarian-Adnexal Reporting and Data System Committee

Rochelle F. Andreotti, MD · Dirk Timmerman, MD, PhD · Lori M. Strachowski, MD · Wouter Froyman, MD ·
Beryl R. Benacerraf, MD · Genevieve L. Bennett, MD · Tom Bourne, PhD · Douglas L. Brown, MD ·
Beverly G. Coleman, MD · Mary C. Frates, MD · Steven R. Goldstein, MD · Ulrike M. Hamper, MD, MBA ·
Mindy M. Horrow, MD · Marta Hernanz-Schulman, MD · Caroline Reinhold, MD, MSc · Stephen L. Rose, MD ·
Brad P. Whitcomb, MD · Wendy L. Wolfman, MD · Phyllis Glanc, MD

AJR

Online First
Accepted Manuscript

O-RADS Ultrasound: A User's Guide, From the AJR Special Series on Radiology Reporting and Data Systems

Lori M. Strachowski, MD, Priyanka Jha, MBBS, Tanya P. Chawla, MBBS, MRCP, FRCR,
FRCPC, Katie M. Davis, DO, Christine K. Dove, MD, Phyllis Glanc, MD, Tara A. Morgan, MD,
Rochelle F. Andreotti, MD

Lesion	Descriptors and Definitions For any atypical features on initial or follow-up exam, use other lexicon descriptors (eg, unilocular, multilocular, solid, etc.)	Management If sonographic features are only suggestive, and overall assessment is uncertain, consider follow-up US within 3 months

Typical Hemorrhagic Cyst	Unilocular cyst, **no internal vascularity***, <u>and at least one</u> of the following:
	• Reticular pattern (fine, thin intersecting lines representing fibrin strands)
	• Retractile clot (intracystic component with straight, concave, or angular margins)
		Imaging:
		○ Premenopausal:
		  • ≤5 cm: None
		  • >5 cm but <10 cm: Follow-up US in 2–3 months
		○ Early postmenopausal (<5 years):
		  • <10 cm, options to confirm include:
		    ▪ Follow-up US in 2–3 months *or*
		    ▪ US specialist (if available) *or*
		    ▪ MRI (with O–RADS MRI score)
		○ Late postmenopausal (≥5 years):
		  • Should not occur; recategorize using other lexicon descriptors.
		
		Clinical: Gynecologist**

Typical Dermoid Cyst	Cystic lesion with ≤3 locules, **no internal vascularity***, <u>and at least one</u> of the following: • Hyperechoic component(s) (diffuse or regional) with shadowing • Hyperechoic lines and dots • Floating echogenic spherical structures	Imaging: ○ ≤3 cm: May consider follow-up US in 12 months*** ○ >3 cm but <10 cm: If not surgically excised, follow-up US in 12 months*** Clinical: Gynecologist**

Typical Endometrioma	Cystic lesion with ≤3 locules, **no internal vascularity***, homogeneous low–level/ground glass echoes, and smooth inner walls/septation(s)
	• ± Peripheral punctate echogenic foci in wall
		Imaging:
		○ Premenopausal:
		  • <10 cm: If not surgically excised, follow-up US in 12 months***
		○ Postmenopausal:
		  • <10 cm <u>and initial exam</u>, options to confirm include
		    ▪ Follow–up US in 2–3 months *or*
		    ▪ US specialist (if available) *or*
		    ▪ MRI (with O-RADS MRI score)
		
		Then, if not surgically excised, recommend follow-up US in 12 months***
		
		Clinical: Gynecologist**

Typical Paraovarian Cyst	Simple cyst separate from the ovary	Imaging: None Clinical: Gynecologist**
Typical Peritoneal Inclusion Cyst	Fluid collection with ovary at margin or suspended within that conforms to adjacent pelvic organs • ± Septations (representing adhesions)	Imaging: None Clinical: Gynecologist**
Typical Hydrosalpinx	Anechoic, fluid–filled tubular structure • ± Incomplete septation(s) (representing folds) • ± Endosalpingeal folds (short, round projections around inner walls)	

O-RADS Score	Risk Category [IOTA Model]	Lexicon Descriptors		Management	
				Pre-menopausal	**Post-Menopausal**
0	Incomplete Evaluation [N/A]	Lesion features relevant for risk stratification cannot be accurately characterized due to technical factors		Repeat US study or MRI	
1	Normal Ovary [N/A]	No ovarian lesion		None	
		Physiologic cyst: follicle (≤3 cm) or corpus luteum (typically ≤3 cm)			
2	Almost Certainly Benign [<1%]	Simple cyst	≤3 cm	N/A (see follicle)	None
			>3 cm to 5 cm	None	Follow-up US in 12 months*
			>5 cm but <10 cm	Follow-up US in 12 months*	
		Unilocular, smooth, non–simple cyst (internal echoes and/or incomplete septations) – – – – – – – – – – – – – – – Bilocular, smooth cyst	≤3 cm	None	Follow-up US in 12 months*
			>3 cm but <10 cm	Follow-up US in 6 months*	
		Typical benign ovarian lesion (see "Classic Benign Lesions" table)	<10 cm	See "Classic Benign Lesions" table for descriptors and management	
		Typical benign extraovarian lesion (see "Classic Benign Lesions" table)	Any size		
3	Low Risk [1 – <10%]	Typical benign ovarian lesion (see "Classic Benign Lesions" table), ≥10 cm		Imaging: • If not surgically excised, consider follow-up US within 6 months** • If solid, may consider US specialist (if available) _or_ MRI (with O-RADS MRI score)† Clinical: Gynecologist	
		Uni- or bilocular cyst, smooth, ≥10 cm			
		Unilocular cyst, irregular, any size			
		Multilocular cyst, smooth, <10 cm, CS <4			
		Solid lesion, ± shadowing, smooth, any size, CS = 1			
		Solid lesion, shadowing, smooth, any size, CS 2–3			
4	Intermediate Risk [10 – <50%]	Bilocular cyst without solid component(s)	Irregular, any size, any CS	Imaging: Options include: • US specialist (if available) _or_ • MRI (with O–RADS MRI score)† _or_ • Per gyn–oncologist protocol Clinical: Gynecologist with gyn–oncologist consultation _or_ solely by gyn–oncologist	
		Multilocular cyst without solid component(s)	Smooth, ≥10 cm, CS <4		
			Smooth, any size, CS 4		
			Irregular, any size, any CS		
		Unilocular cyst with solid component(s)	<4 pps or solid component(s) not considered a pp; any size		
		Bi- or multilocular cyst with solid component(s)	Any size, CS 1–2		
		Solid lesion, non-shadowing	Smooth, any size, CS 2–3		
5	High Risk [≥50%]	Unilocular cyst, ≥4 pps, any size, any CS		Imaging: Per gyn-oncologist protocol Clinical: Gyn-oncologist	
		Bi- or multilocular cyst with solid component(s), any size, CS 3–4			
		Solid lesion, ± shadowing, smooth, any size, CS 4			
		Solid lesion, irregular, any size, any CS			
		Ascites and/or peritoneal nodules††			

Age 49
Some pelvic pain
Ovarian cystectomy 10 years ago ?side
Normal CA125
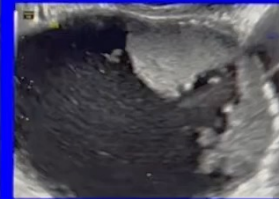
2 papillations
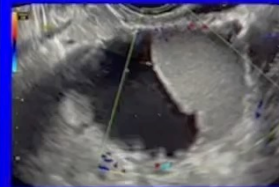
Minor vascularity (2+)

90 mm unilocular-solid (or unilocular WITH solid) lesion with
40 mm max. solid material, 2 papillations
minor vascularity
no shadowing
no ascites

Simple Rules:

	IOTA FEATURES				
Benign features	Unilocular cyst		Malignant features	Irregular solid tumour	
	Largest solid component <7 mm			Ascites	
	Acoustic shadows			At least four papillary structures	
	Smooth multilocular tumour <100 mm			Irregular multilocular-solid tumour >100 mm	
	No blood flow (1+)			Very strong blood flow (4+)	

- Rule 1: If one or more M features are present in absence of B feature, mass is classified as malignant.
- Rule 2: If one or more B features are present in absence of M feature, mass is classified as benign.
- Rule 3: If both M features and B features are present, or if no B or M features are present, result is inconclusive

Simple rules: benign / uncertain / malignant

90 mm unilocular-solid lesion with
40 mm max. solid material,
2 papillations
minor vascularity
no shadowing
no ascites

Simple Rules: no Benign features / no Malignant features = UNCERTAIN

Adnex Model

O-RADS Score	Risk Category [IOTA Model]	Lexicon Descriptors		Management	
				Pre-menopausal	Post-Menopausal
0	Incomplete Evaluation [N/A]	Lesion features relevant for risk stratification cannot be accurately characterized due to technical factors		Repeat US study or MRI	
1	Normal Ovary [N/A]	No ovarian lesion		None	
		Physiologic cyst: follicle (≤3 cm) or corpus luteum (typically ≤3 cm)			
2	Almost Certainly Benign [<1%]	Simple cyst	≤3 cm	N/A (see follicle)	None
			>3 cm to 5 cm	None	Follow-up US in 12 months*
			>5 cm but <10 cm	Follow-up US in 12 months*	
		Unilocular, smooth, non–simple cyst (internal echoes and/or incomplete septations) – – – – – – – – – – – – – – – Bilocular, smooth cyst	≤3 cm	None	Follow-up US in 12 months*
			>3 cm but <10 cm	Follow-up US in 6 months*	
		Typical benign ovarian lesion (see "Classic Benign Lesions" table)	<10 cm	See "Classic Benign Lesions" table for descriptors and management	
		Typical benign extraovarian lesion (see "Classic Benign Lesions" table)	Any size		
3	Low Risk [1 – <10%]	Typical benign ovarian lesion (see "Classic Benign Lesions" table), ≥10 cm		Imaging: • If not surgically excised, consider follow-up US within 6 months** • If solid, may consider US specialist (if available) _or_ MRI (with O-RADS MRI score)† Clinical: Gynecologist	
		Uni- or bilocular cyst, smooth, ≥10 cm			
		Unilocular cyst, irregular, any size			
		Multilocular cyst, smooth, <10 cm, CS <4			
		Solid lesion, ± shadowing, smooth, any size, CS = 1			
		Solid lesion, shadowing, smooth, any size, CS 2–3			
4	Intermediate Risk [10 – <50%]	Bilocular cyst without solid component(s)	Irregular, any size, any CS	Imaging: Options include: • US specialist (if available) _or_ • MRI (with O–RADS MRI score)† _or_ • Per gyn–oncologist protocol Clinical: Gynecologist with gyn–oncologist consultation _or_ solely by gyn–oncologist	
		Multilocular cyst without solid component(s)	Smooth, ≥10 cm, CS <4		
			Smooth, any size, CS 4		
			Irregular, any size, any CS		
		Unilocular cyst with solid component(s)	<4 pps or solid component(s) not considered a pp; any size		
		Bi- or multilocular cyst with solid component(s)	Any size, CS 1–2		
		Solid lesion, non-shadowing	Smooth, any size, CS 2–3		
5	High Risk [≥50%]	Unilocular cyst, ≥4 pps, any size, any CS		Imaging: Per gyn-oncologist protocol Clinical: Gyn-oncologist	
		Bi- or multilocular cyst with solid component(s), any size, CS 3–4			
		Solid lesion, ± shadowing, smooth, any size, CS 4			
		Solid lesion, irregular, any size, any CS			
		Ascites and/or peritoneal nodules††			

BORDERLINE mucinous ovarian tumour, FIGO 1

90 mm Unilocular-solid, 40 mm max solid , 2 papillations, minor vascularity, no shadowing, no ascites

Easy Descriptors: No

Simple Rules: Uncertain

ADNEX: 57.8 %
likely Borderline

O-RADS: 4 - Intermediate risk
10-50%

Example 2

64 yo
Ca 125: 27.5
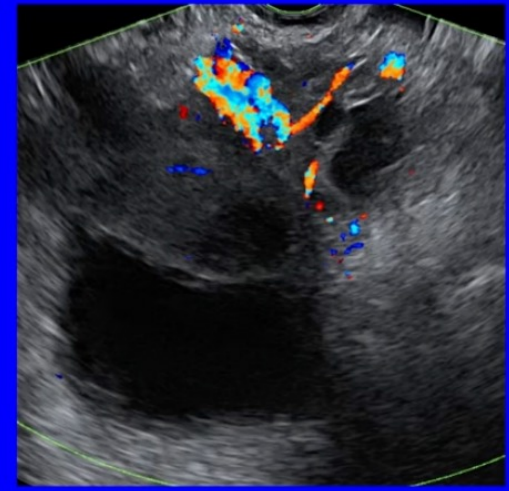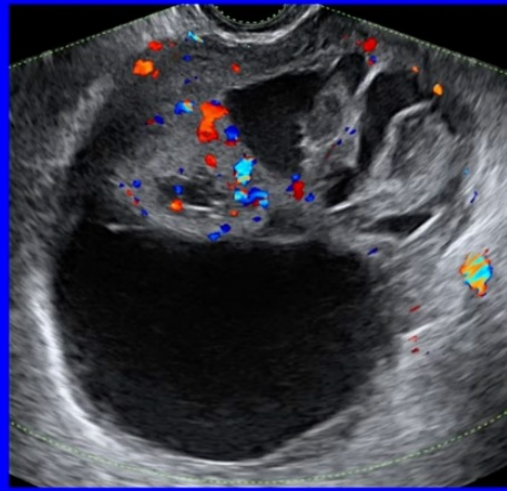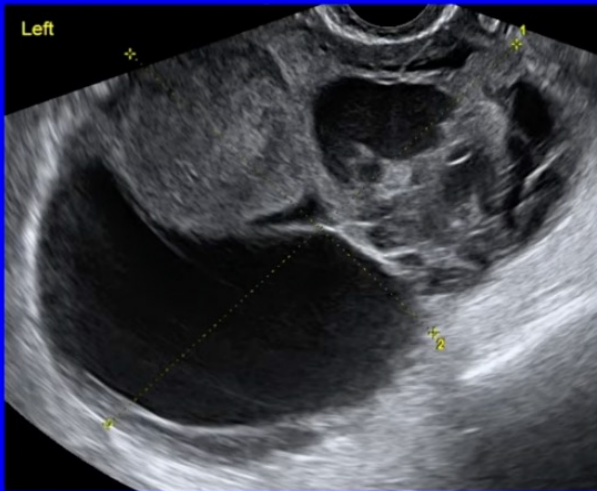
152 mm irregular multilocular-solid lesion (or multilocular WITH solid)
Strong vascularity, no shadowing, no ascites

Simple Rules:

	IOTA FEATURES					
Benign features	Unilocular cyst		Malignant features	Irregular solid tumour		
	Largest solid component <7 mm			Ascites		
	Acoustic shadows			At least four papillary structures		
	Smooth multilocular tumour <100 mm			Irregular multilocular-solid tumour >100 mm		⭐
	No blood flow (1+)			Very strong blood flow (4+)		✶

- Rule 1: If one or more M features are present in absence of B feature, mass is classified as malignant.
- Rule 2: If one or more B features are present in absence of M feature, mass is classified as benign.
- Rule 3: If both M features and B features are present, or if no B or M features are present, result is inconclusive

Simple rules: benign / uncertain / malignant

IOTA - ADNEX model

1. Age of the patient at examination (years) 64
2. Oncology center (referral center for gyn-oncol)? yes
3. Maximal diameter of the lesion (mm) 152
4. Maximal diameter of the largest solid part (mm) 55
5. More than 10 locules? no
6. Number of papillations (papillary projections) three
7. Acoustic shadows present? no
8. Ascites (fluid outside pelvis) present? no
9. Serum CA-125 (U/ml) 27.5

[calculate] [Clear]

Additional information is given when moving the mouse pointer over the variable names.

Results

Legend:
- chance of benign tumor
- risk metastatic cancer to the adnexa
- risk stage II-IV ovarian cancer
- risk stage I ovarian cancer
- risk borderline

	Patient Specific Risk	Relative Risk	Baseline Risk
CHANCE OF BENIGN TUMOR	19.2 %	0.3	68.2%
RISK OF MALIGNANCY	80.8 %	2.5	31.8%
->Risk borderline	31.2 %	5	6.3 %
->Risk stage I ovarian cancer	30.4 %	4.1	7.5 %
->Risk stage II-IV ovarian cancer	15.4 %	1.1	14.1 %
->Risk metastatic cancer to the adnexa	3.8 %	0.9	4.0 %

Contact Ben Van Calster in case of problems (ben.vancalster@kuleuven.be).

Consult Timmerman et al (Ultrasound in Obstetrics and Gynecology 2000; 16:500-505) for information on the terms and definitions used for standardized ultrasound examination and data collection.

| O-RADS Score	Risk Category [IOTA Model]	Lexicon Descriptors		Management	
				Pre-menopausal	Post-Menopausal
0	Incomplete Evaluation [N/A]	Lesion features relevant for risk stratification cannot be accurately characterized due to technical factors		Repeat US study or MRI	
1	Normal Ovary [N/A]	No ovarian lesion		None	
		Physiologic cyst: follicle (≤3 cm) or corpus luteum (typically ≤3 cm)			
2	Almost Certainly Benign [<1%]	Simple cyst	≤3 cm	N/A (see follicle)	None
			>3 cm to 5 cm	None	Follow-up US in 12 months*
			>5 cm but <10 cm	Follow-up US in 12 months*	Follow-up US in 12 months*
		Unilocular, smooth, non–simple cyst (internal echoes and/or incomplete septations) - - - - - - - - - - - - - - - - Bilocular, smooth cyst	≤3 cm	None	Follow-up US in 12 months*
			>3 cm but <10 cm	Follow-up US in 6 months*	
		Typical benign ovarian lesion (see "Classic Benign Lesions" table)	<10 cm	See "Classic Benign Lesions" table for descriptors and management	
		Typical benign extraovarian lesion (see "Classic Benign Lesions" table)	Any size		
3	Low Risk [1 – <10%]	Typical benign ovarian lesion (see "Classic Benign Lesions" table), ≥10 cm		Imaging: • If not surgically excised, consider follow-up US within 6 months** • If solid, may consider US specialist (if available) or MRI (with O-RADS MRI score)† Clinical: Gynecologist	
		Uni- or bilocular cyst, smooth, ≥10 cm			
		Unilocular cyst, irregular, any size			
		Multilocular cyst, smooth, <10 cm, CS <4			
		Solid lesion, ± shadowing, smooth, any size, CS = 1			
		Solid lesion, shadowing, smooth, any size, CS 2–3			
4	Intermediate Risk [10 – <50%]	Bilocular cyst without solid component(s)	Irregular, any size, any CS	Imaging: Options include: • US specialist (if available) or • MRI (with O–RADS MRI score)† or • Per gyn–oncologist protocol Clinical: Gynecologist with gyn–oncologist consultation or solely by gyn–oncologist	
		Multilocular cyst without solid component(s)	Smooth, ≥10 cm, CS <4		
			Smooth, any size, CS 4		
			Irregular, any size, any CS		
		Unilocular cyst with solid component(s)	<4 pps or solid component(s) not considered a pp; any size		
		Bi- or multilocular cyst with solid component(s)	Any size, CS 1–2		
		Solid lesion, non-shadowing	Smooth, any size, CS 2–3		
5	High Risk [≥50%]	Unilocular cyst, ≥4 pps, any size, any CS		Imaging: Per gyn-oncologist protocol Clinical: Gyn-oncologist	
		Bi- or multilocular cyst with solid component(s), any size, CS 3–4			
		Solid lesion, ± shadowing, smooth, any size, CS 4			
		Solid lesion, irregular, any size, any CS			
		Ascites and/or peritoneal nodules††			

Granulosa cell tumour, FIGO 1C

152 mm irregular multilocular-solid lesion
Strong vascularity, no shadowing, no ascites
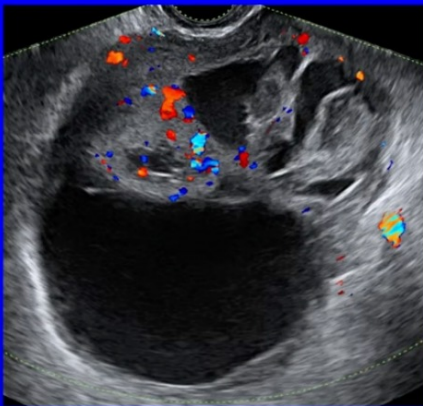
Easy Descriptors: No

Simple Rules: Malignant

ADNEX: 80.8 % predicts borderline or stage I

O-RADS: 5 = High risk of malignancy
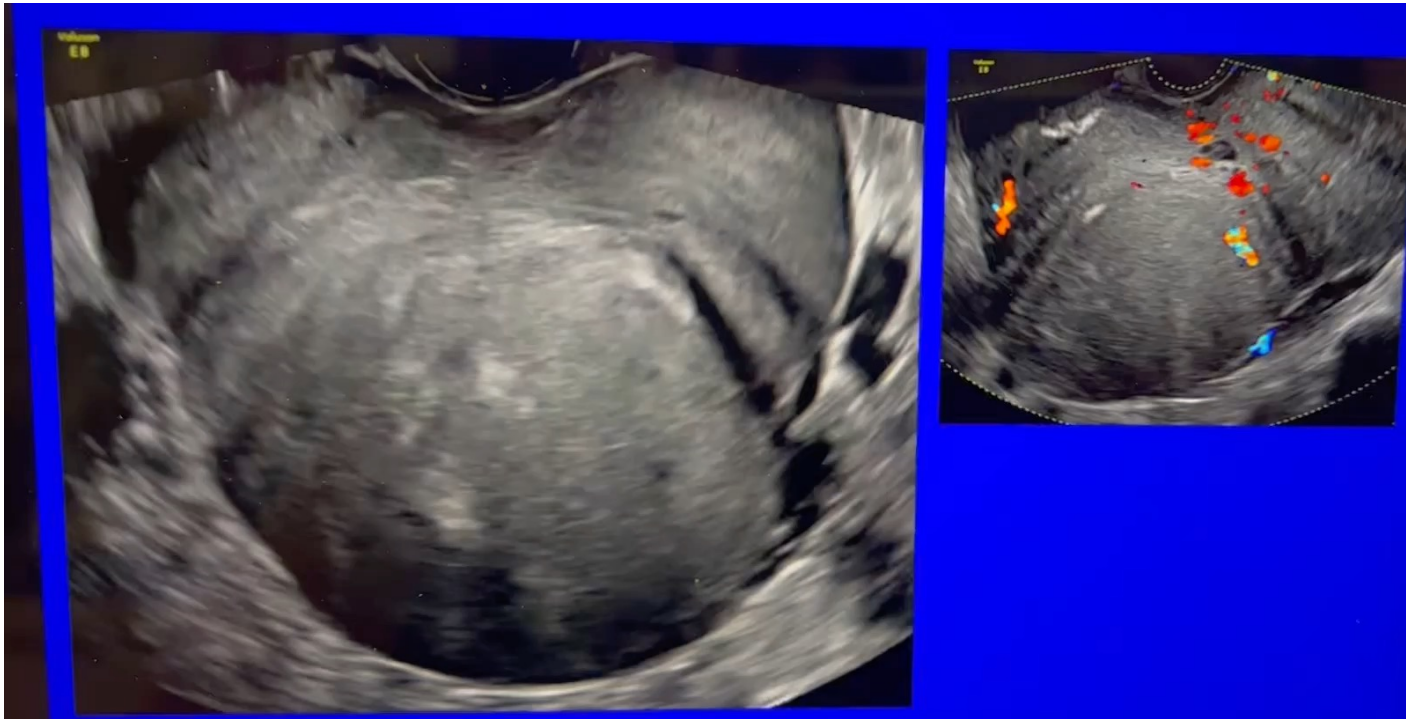
68 yo
Ca 125; 11 233

134 mm irregular solid mass with shadowing and moderate/strong vascularity, no ascites

Simple Rules:

Benign features	IOTA FEATURES		Malignant features		
	Unilocular cyst			Irregular solid tumour	★
	Largest solid component <7 mm			Ascites	
	Acoustic shadows	★		At least four papillary structures	
	Smooth multilocular tumour <100 mm			Irregular multilocular-solid tumour >100 mm	
	No blood flow (1+)			Very strong blood flow (4+)	★

- Rule 1: If one or more M features are present in absence of B feature, mass is classified as malignant.
- Rule 2: If one or more B features are present in absence of M feature, mass is classified as benign.
- Rule 3: If both M features and B features are present, or if no B or M features are present, result is inconclusive

Simple rules: benign / uncertain / malignant

Simple Rules: 1 Benign features / 2 Malignant features = UNCERTAIN

IOTA - ADNEX model

1. Age of the patient at examination (years) `68`
2. Oncology center (referral center for gyn-oncol)? `yes ▾`
3. Maximal diameter of the lesion (mm) `134`
4. Maximal diameter of the largest solid part (mm) `134`
5. More than 10 locules? `no ▾`
6. Number of papillations (papillary projections) `none ▾`
7. Acoustic shadows present? `yes ▾`
8. Ascites (fluid outside pelvis) present? `no ▾`
9. Serum CA-125 (U/ml) `11233`

Results

Legend:
- chance of benign tumor
- risk metastatic cancer to the
- risk stage II–IV ovarian cance
- risk stage I ovarian cancer
- risk borderline

Bar chart values:
- CHANCE OF BENIGN TUMOR: 0.9
- RISK OF MALIGNANCY: 99.1
- borderline: <0.1
- stage I: 0.9
- stage II - IV: 97.3
- metastatic: 0.8

	Patient Specific Risk	Relative Risk	Baseline Risk
CHANCE OF BENIGN TUMOR	0.9 %	0	68.2%
RISK OF MALIGNANCY	99.1 %	3.1	31.8 %
->Risk borderline	<0.1 %	0	6.3 %
->Risk stage I ovarian cancer	0.9 %	0.1	7.5 %
->Risk stage II-IV ovarian cancer	97.3 %	6.9	14.1 %
->Risk metastatic cancer to the adnexa	0.8 %	0.2	4.0 %

O-RADS Score	Risk Category [IOTA Model]	Lexicon Descriptors		Management	
				Pre-menopausal	Post-Menopausal
0	Incomplete Evaluation [N/A]	Lesion features relevant for risk stratification cannot be accurately characterized due to technical factors		Repeat US study or MRI	
1	Normal Ovary [N/A]	No ovarian lesion		None	
		Physiologic cyst: follicle (≤3 cm) or corpus luteum (typically ≤3 cm)			
2	Almost Certainly Benign [<1%]	Simple cyst	≤3 cm	N/A (see follicle)	None
			>3 cm to 5 cm	None	Follow-up US in 12 months*
			>5 cm but <10 cm	Follow-up US in 12 months*	
		Unilocular, smooth, non–simple cyst (internal echoes and/or incomplete septations) ----------------- Bilocular, smooth cyst	≤3 cm	None	Follow-up US in 12 months*
			>3 cm but <10 cm	Follow-up US in 6 months*	
		Typical benign ovarian lesion (see "Classic Benign Lesions" table)	<10 cm	See "Classic Benign Lesions" table for descriptors and management	
		Typical benign extraovarian lesion (see "Classic Benign Lesions" table)	Any size		
3	Low Risk [1 – <10%]	Typical benign ovarian lesion (see "Classic Benign Lesions" table), ≥10 cm		Imaging: • If not surgically excised, consider follow-up US within 6 months** • If solid, may consider US specialist (if available) or MRI (with O-RADS MRI score)† Clinical: Gynecologist	
		Uni- or bilocular cyst, smooth, ≥10 cm			
		Unilocular cyst, irregular, any size			
		Multilocular cyst, smooth, <10 cm, CS <4			
		Solid lesion, ± shadowing, smooth, any size, CS = 1			
		Solid lesion, shadowing, smooth, any size, CS 2–3			
4	Intermediate Risk [10 – <50%]	Bilocular cyst without solid component(s)	Irregular, any size, any CS	Imaging: Options include: • US specialist (if available) or • MRI (with O–RADS MRI score)† or • Per gyn–oncologist protocol Clinical: Gynecologist with gyn–oncologist consultation or solely by gyn–oncologist	
		Multilocular cyst without solid component(s)	Smooth, ≥10 cm, CS <4		
			Smooth, any size, CS 4		
			Irregular, any size, any CS		
		Unilocular cyst with solid component(s)	<4 pps or solid component(s) not considered a pp; any size		
		Bi- or multilocular cyst with solid component(s)	Any size, CS 1–2		
		Solid lesion, non-shadowing	Smooth, any size, CS 2–3		
5	High Risk [≥50%]	Unilocular cyst, ≥4 pps, any size, any CS		Imaging: Per gyn-oncologist protocol Clinical: Gyn-oncologist	
		Bi- or multilocular cyst with solid component(s), any size, CS 3–4			
		Solid lesion, ± shadowing, smooth, any size, CS 4			
		Solid lesion, irregular, any size, any CS			
		Ascites and/or peritoneal nodules††			

STAGE 3 SEROUS ADENOCA

134 mm irregular solid mass with <u>shadowing</u> and strong vascularity, no ascites
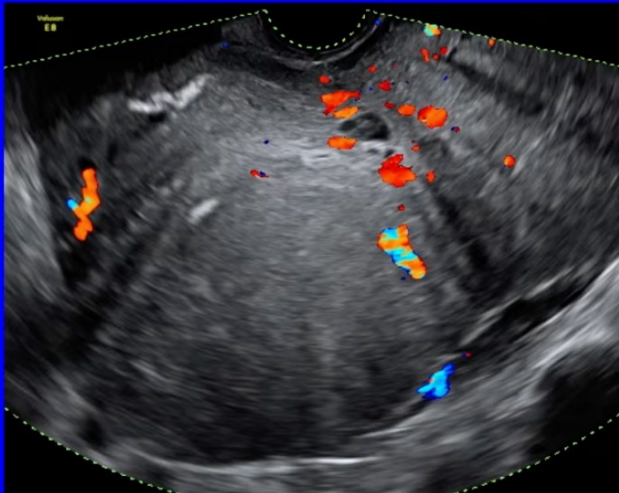
Easy Descriptors: No

Simple Rules: Uncertain

ADNEX: 99.1 %
predicts stage 2-4

O-RADS: 5 - High risk