複雜性卵巢腫瘤之鑑別診斷

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OUTLINES

- Etiology
- Diagnosis
  - History
  - PE
  - Tumor markers
  - Image (Ultrasound)
  - Multi-modal tools
- Management

OUTLINES

- **Etiology**
- **Diagnosis**
  - History of PE
  - Tumor markers
  - Image (Ultrasound)
  - Multi-modal tools
- **Management**

ETIOLOGY

Gynecologic: Ovarian	Gynecologic: Tubal	Gynecologic: Extraovarian and extratubal	Nongynecologic
Benign			
▪ Functional (physiologic) cyst ▪ Corpus luteal cyst ▪ Luteoma of pregnancy ▪ Theca lutein cyst ▪ Polycystic ovaries ▪ Endometrioma ▪ Cystadenoma ▪ Benign ovarian germ cell tumor (eg, mature teratoma) ▪ Benign sex cord-stromal tumor	▪ Ectopic pregnancy ▪ Hydrosalpinx	▪ Paraovarian cyst ▪ Paratubal cyst ▪ Uterine leiomyoma (pedunculated or cervical) ▪ Tubo-ovarian abscess	▪ Constipation ▪ Appendiceal abscess ▪ Diverticular abscess ▪ Pelvic abscess ▪ Bladder diverticulum ▪ Ureteral diverticulum ▪ Pelvic kidney ▪ Peritoneal cyst ▪ Nerve sheath tumor
Malignant or borderline			
▪ Epithelial carcinoma ▪ Epithelial borderline neoplasm ▪ Malignant ovarian germ cell tumor ▪ Malignant sex cord-stromal tumor	▪ Epithelial carcinoma ▪ Serous tubal intraepithelial neoplasia	▪ Metastatic endometrial carcinoma	▪ Appendiceal neoplasm ▪ Bowel neoplasm ▪ Metastasis (eg, breast, colon, lymphoma) ▪ Retroperitoneal sarcoma

ETIOLOGY (Reproductive Age)

- Rule out pregnancy first
- Uterine mass
- Non-gynecologic
  - ✓Diverticular abscess
  - ✓Appendiceal abscess

ETIOLOGY (Reproductive Age)

- Ovarian mass (Non-neoplastic)
- ✓Functional ovarian cysts
  - Follicular cysts: Most common
    - Rarely larger than 8cm
    - Resolve in 4-8 weeks with expectant management
  - Corpus luteum cysts
    - Rupture: cycle days 20 to 26; more on right side
  - Theca lutein cysts: Least common
    - Bilateral
    - Occur with pregnancy (Including molar pregnancy)

ETIOLOGY (Reproductive Age)

- ➢ Ovarian mass (Neoplastic)
- ✓ Endometrioma

- ✓ Teratoma (Dermoid cyst)
  - Torsion: 15%; Bilateral: 10%
  - Malignant transformation: less than 2% (>40 y/o)

ETIOLOGY (Reproductive Age)

- Ovarian mass (Neoplastic)
- ✓Serous cystadenoma
  - Multilocular with papillary component
- ✓Mucinous cystadenoma
  - Multilocular with mucoid material
- ✓Malignancy
  - Epithelial ovarian cancer
  - Malignant ovarian germ cell tumor
  - Sex cord stromal tumor

ETIOLOGY (Postmenopausal Age)

- Ovarian mass (benign or malignancy)
  - ✓The risk of malignancy ↑
- Uterine and other mass

OUTLINES

Etiology

Diagnosis

- History
- PE
- Tumor markers
- Image (Ultrasound)
- Multi-modal tools

Management

DIAGNOSIS

HISTORY

- ✓ Pelvic pain (Pattern)
- ✓ Vaginal bleeding (r/o pregnancy)
- ✓ LMP
- ✓ Dysmenorrhea or dyspareunia
- ✓ Other hormone effect
- ✓ Fever, vaginal discharge
- ✓ IUD
- ✓ Family history

Physical/Pelvic Examination

- ✓ Assessment of abdominal pain (Tenderness or rebounding pain)
- ✓ Distension (Tympanic or ascites)
- ✓ Adnexal mass
  - Consistency
  - Size
  - Motility
- ✓ Posterior CDS nodularity

DIAGNOSIS

- Image (Ultrasound)

- ✓International Ovarian Tumour Analysis (IOTA) Simple Rules

- ✓Ovarian-Adnexal Reporting & Data System (O-RADS™)

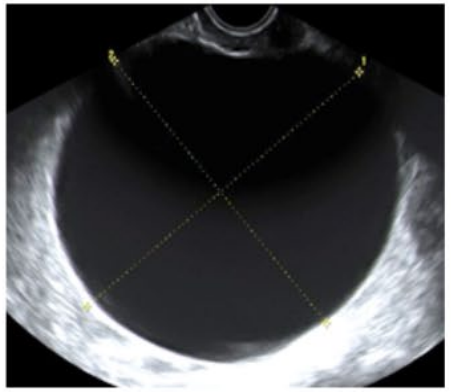
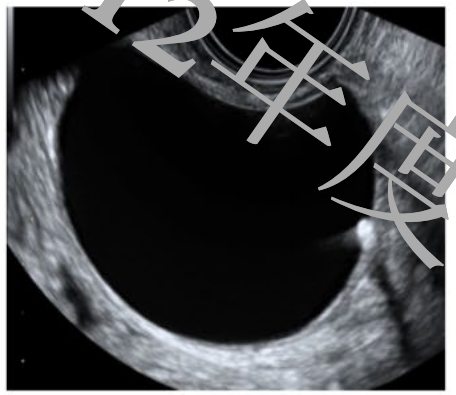
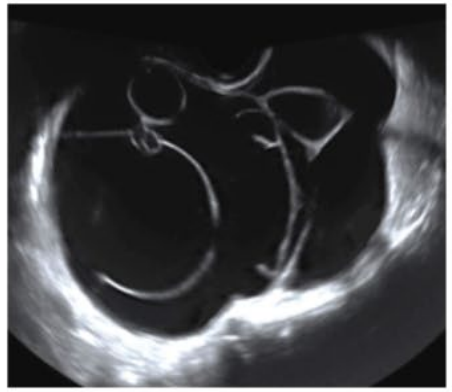
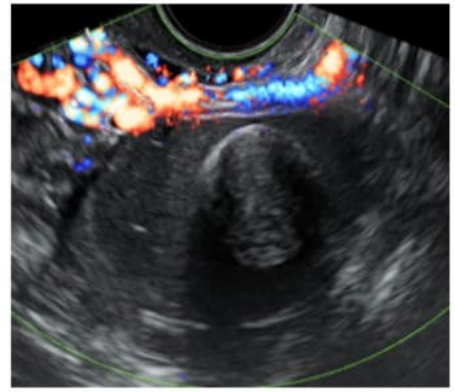
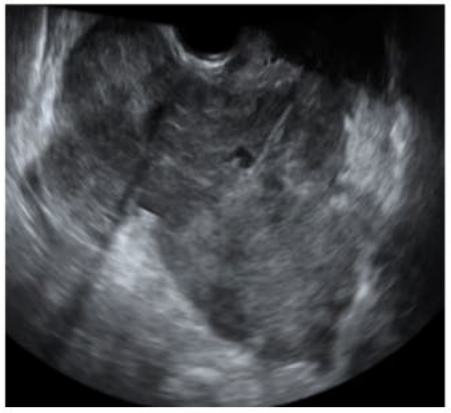
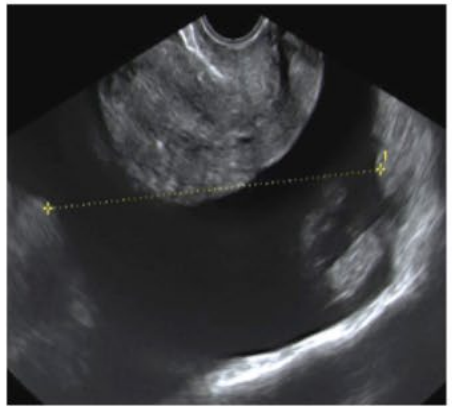
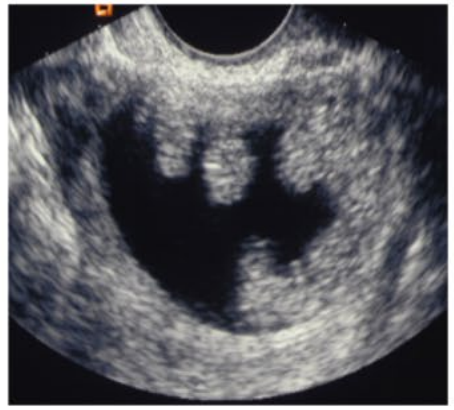
DIAGNOSIS

- Image (Ultrasound)

- ✓International Ovarian Tumour Analysis (IOTA) Simple Rules

- ✓Ovarian-Adnexal Reporting & Data System (O-RADS™)

IOTA Simple Rules

B1 Unilocular	B2 Presence of solid components with largest diameter < 7 mm	B3 Presence of acoustic shadows	B4 Smooth multilocular tumor with largest diameter < 100 mm	B5 No blood flow (color score 1)
				
M1 Irregular solid tumor	M2 Presence of ascites	M3 At least 4 papillary structures	M4 Irregular multilocular-solid tumor with largest diameter ≥ 100 mm	M5 Very strong blood flow (color score 4)
				

DIAGNOSIS

- Image (Ultrasound)
  - ✓International Ovarian Tumour Analysis (IOTA) Simple Rules
  - ✓Ovarian-Adnexal Reporting & Data System (O-RADS™)

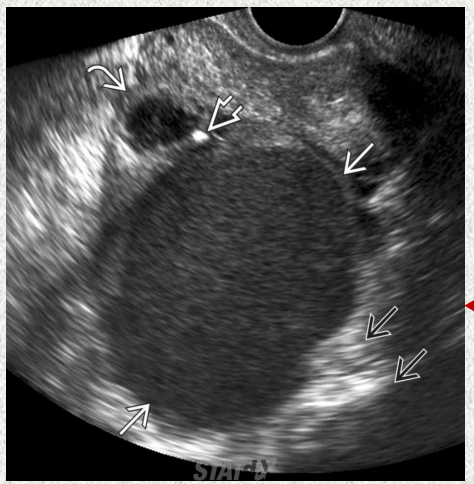
O-RADS Score	Risk Category [IOTA Model]	Lexicon Descriptors		Management	
				Pre-menopausal	Post-Menopausal
0	Incomplete Evaluation [N/A]	Lesion features relevant for risk stratification cannot be accurately characterized due to technical factors		Repeat US study or MRI	
1	Normal Ovary [N/A]	No ovarian 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)	≤3 cm	None	Follow-up US in 12 months*
		Bilocular, smooth cyst	>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††			

O-RADS

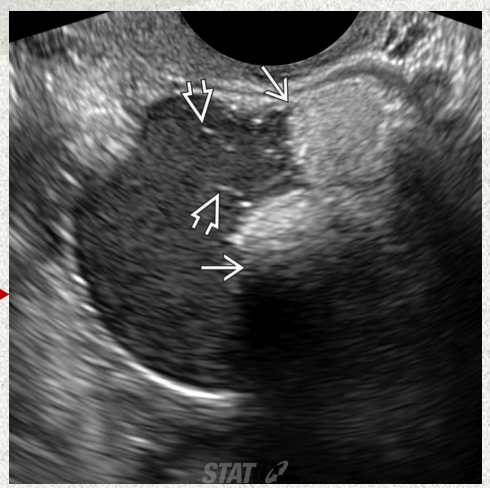
Smooth and irregular: refer to **inner** walls/septation(s) for **cystic** lesions, and **outer** contour for **solid** lesions; irregular inner wall for cysts = <3 mm in height
Shadowing: must be diffuse or broad to qualify; excludes refractive artifact
CS = color score; degree of intralesional vascularity; 1 = none, 2 = minimal flow, 3 = moderate flow, 4 = very strong flow

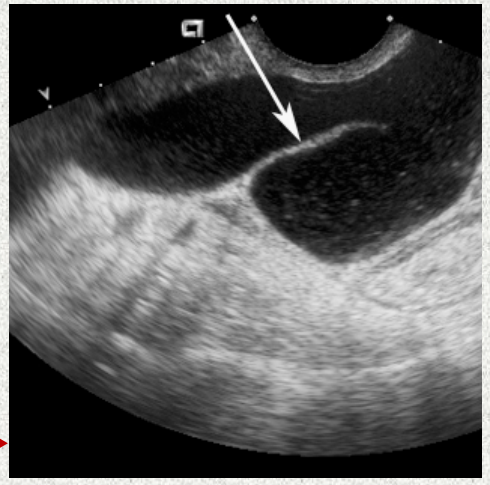
Solid: excludes blood products and dermoid contents; solid lesion = ≥80% solid; solid component = protrudes ≥3 mm (height) into cyst lumen off wall or septation
pp = papillary projection; subtype of solid component surrounded by fluid on 3 sides
Bilocular = 2 locules; multilocular = ≥3 locules; bilocular smooth cysts have a lower risk of malignancy, regardless of size or CS

O-RADS



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***, and at least one 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***, and at least one 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 and initial exam, 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

Normal Ovary

No lesion
Physiologic cyst
- Follicle
- Corpus Luteum

O-RADS 1

Classic Benign Lesion
For any atypical features, use other lexicon descriptors

- Extra-Ovarian
  - Typical Paraovarian Cyst
  - Typical Peritoneal Inclusion Cyst
  - Typical Hydrosalpinx
  - O-RADS 2
- Ovarian
  - Typical Hemorrhagic Cyst
  - Typical Dermoid Cyst
  - Typical Endometrioma
  - < 10 cm: O-RADS 2
  - ≥ 10 cm: O-RADS 3

Other Lesion

- **Cystic Lesion** ± internal echoes, ± incomplete septations
  - (-) Solid component(s)
    - Smooth
      - Uni- or bilocular
        - < 10 cm: O-RADS 2
        - ≥ 10 cm: O-RADS 3
      - Multilocular
        - CS <4
          - < 10 cm: O-RADS 3
          - ≥ 10 cm: O-RADS 4
        - CS 4: O-RADS 4
    - Irregular
      - Unilocular: O-RADS 3
      - Bi- or multi-: O-RADS 4
  - (+) Solid component(s)
    - Unilocular
      - < 4 pps OR solid component that is not a pp: O-RADS 4
      - ≥ 4 pps: O-RADS 5
    - Bi- or multi-
      - CS 1-2: O-RADS 4
      - CS 3-4: O-RADS 5
- **Solid/Solid-appearing Lesion** ≥ 80% solid
  - Smooth
    - Shadowing and CS < 4: O-RADS 3
    - CS 1: O-RADS 3
    - CS 2-3: O-RADS 4
    - CS 4 ± shadowing: O-RADS 5
  - Irregular: O-RADS 5

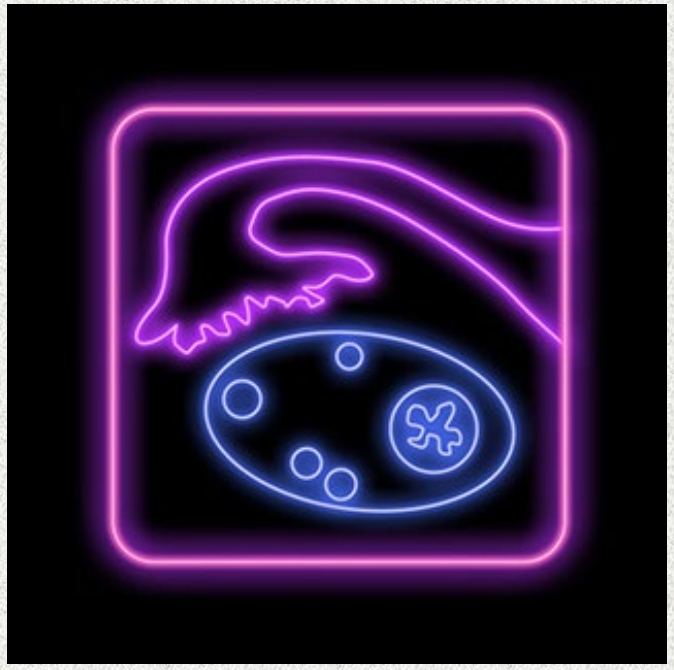
Glossary

- Solid: excludes blood products and dermoid contents
- Solid component: protrudes ≥ 3 mm (height) into cyst lumen off wall or septation
- pp = papillary projection; subtype of solid component ≥ 3 mm (height) and surrounded by fluid on 3 sides
- Smooth/irregular: **inner** walls/septation(s) for **cystic** lesions and **outer** contour for **solid** lesions; irregular wall thickening for cysts = < 3 mm (height)
- Bilocular = 2 locules; multilocular = ≥ 3 locules
- Shadowing: must be diffuse or broad to qualify; excludes refractive artifact
- CS = color score; intralesional vascularity (1=no flow; 2=minimal flow; 3=moderate flow; 4=very strong flow)

CAVEAT: Ascites ± peritoneal nodules not due to other malignant or non-malignant etiologies upgrades O-RADS 3 and 4 lesions to O-RADS 5. Must consider other etiologies of ascites in O-RADS categories 1 and 2.

DIAGNOSIS

- Ovarian-Adnexal Reporting & Data System (O-RADS™)



O-RADS score	Risk Category	Management
0	Incomplete evaluation	Repeat US or MRI
1	Normal ovary	None
2	Almost certainly benign (<1% risk)	Follow up 6-12 months
3	Low risk (1- <10%)	Surgical intervention Follow up within 6 months Consider US or MRI
4	Intermediate risk (10- <50%)	Refer to GYN oncologist
5	High risk (>50%)	Refer to GYN oncologist

DIAGNOSIS

- Tumor Markers

✓Cancer antigen 125 (CA125): monitor response to treatment and detect recurrence

- Elevated in ~50% of early-stage
- Elevated in >85% of advanced stage
- Elevated in several benign and other malignancy

- ✓ Infection/Inflammation
- ✓ Pregnancy
- ✓ Menstrual period
- ✓ Endometriosis
- ✓ Fibroids

✓Human epididymis protein 4 (HE4): Better specificity

DIAGNOSIS

- Tumor Markers
  - ✓Carcinoembryonic antigen (CEA)
  - ✓Carbohydrate antigen 199 (CA199)
    - Differentiating between metastatic tumors from the GI tract or pancreas and primary ovarian malignancy
  - ✓Others: LDH, alpha-fetoprotein (AFP), beta-HCG

DIAGNOSIS

- Tumor Markers

Table 52-5 Serum Markers for Germ Cell and Sex Cord–Stromal Ovarian Tumors

Tumor	LDH	AFP	hCG	E_2	Inhibin	Testosterone	Androgen	DHEA
Dysgerminoma	±	−	±	−	−	−	−	−
Embryonal	−	±	+	−	−	−	−	−
Endodermal sinus tumor	−	+	−	−	−	−	−	−
Polyembryoma	−	±	+	−	−	−	−	−
Choriocarcinoma	−	−	+	−	−	−	−	−
Immature teratoma	−	±	−	±	−	−	−	±
Granulosa cell	−	−	−	±	+	−	−	−
Thecoma-fibroma	−	−	−	−	−	−	−	−
Sertoli-Leydig cell	−	−	−	−	±	+	+	−
Gonadoblastoma	−	−	−	±	±	±	±	±

DIAGNOSIS

- Multi-modal

- ✓The Risk of Malignancy Algorithm (ROMA)

- ✓The Risk of Malignancy Index (RMI)

DIAGNOSIS

- Multi-modal

- ✓The Risk of Malignancy Algorithm (ROMA)

- ✓The Risk of Malignancy Index (RMI)

DIAGNOSIS

- The Risk of Malignancy Algorithm (ROMA)

CA125 **HE4** **Menopausal Status**

- **Premenopausal woman:**
  - ✓ **Predictive index (PI) = – 12.0 + 2.38 * LN [HE4] + 0.0626 * LN [CA 125]**
- **Postmenopausal woman:**
  - ✓ **Predictive index (PI) = – 8.09 + 1.04 * LN [HE4] + 0.732* LN [CA 125]**

ROMA score (%) = exp(PI)/[1 + exp(PI)] * 100

DIAGNOSIS

➢The Risk of Malignancy Algorithm (ROMA)

S. no.	Study	Year	EOC	ROMA cutoff (%)	CA 125 and HE4 test methods	Sensitivity (%)	Specificity (%)	AUC
1.	Moore et al. [8]	2009	129	13.1*, 27.7**	CMIA EIA	94	75	ND
2.	Bandiera et al. [14]	2011	113	7.4*, 25.3**	CMIA CMIA	84.6*, 93.1**	1.2*, 4.4**	ND
3.	Van Gorp et al. [10]	2011	161	12.5*, 14.4**	EIA EIA	84.9, 67.5*, 90.8**	79.7, 87.9*, 66.3**	0.898, 0.846*, 0.891**
4.	Montagnana et al. [15]	2011	55	12.5*, 14.4**	CLEIA EIA	75	82	ND
5.	Kim et al. [16]	2011	72	7.6*, 10.9**	CMIA CMIA	88	94	ND
6.	Jacob et al. [17]	2011	29	13.1	ELISA ELISA	90	87	ND
7.	Moore et al. [9]	2011	48	13.1*, 27.7**	CMIA ELISA	94	75	ND
8.	Chan et al. [11]	2013	65	7.4*, 25.3**	CMIA CMIA	89.2	87.3	0.95
9.	Sandri et al. [12]	2013	153	7.4*, 25.3**	CMIA CMIA	ND	ND	0.93, 0.91*, 0.93**
10.	Karlsen et al. [13]	2015	550	ND	ND	ND	ND	0.920
11.	Present study	2016	65	7.4*, 25.3**	CMIA CMIA	89.2, 97.1*, 87.1**	92.1, 85*, 100**	0.918, 0.914*, 0.975**

Cutoff value for high risk

- ✓**Premenopausal: 7.4-13.1**
- ✓**Postmenopausal: 14.4-27.7**

*Premenopausal value
**Postmenopausal value
EIA—enzyme immunoassay
ELISA—enzyme linked immunoadsorbent assay
CLEIA—chemiluminescence enzyme immunoassay
CMIA—chemiluminescent microparticle immunoassay
ND—not defined

Kumar V. Diagnostic Value of Risk of Malignancy Algorithm (ROMA) in Adnexal Masses. J Obstet Gynaecol India. 2020 Jun;70(3):214-219

DIAGNOSIS

- Multi-modal

- ✓The Risk of Malignancy Algorithm (ROMA)

- ✓The Risk of Malignancy Index (RMI)

DIAGNOSIS

- The Risk of Malignancy Index (RMI)

Parameter	RMI 1	RMI 2	RMI 3	RMI 4
Ultrasonography score (U)				
No feature	0	1	1	1
1 feature	1	1	1	1
≥ 2 features	3	4	3	4
Menopausal status (M)				
Premenopausal	1	1	1	1
Postmenopausal	3	4	3	4
CA-125 (U/mL)	-	-	-	-
Tumour size (S)				
< 7 cm	-	-	-	1
≥ 7 cm	-	-	-	2

U Score features:
- ✓ Multilocular cysts
- ✓ Solid areas
- ✓ Metastases
- ✓ Ascites
- ✓ Bilateral lesions

Cutoff value
- RMI1, 2, 3: 200
  - ✓ *U x M x CA125*
- RMI 4: 450
  - ✓ *U x M x CA125 x S*

DIAGNOSIS

- The Risk of Malignancy Index (RMI)

RMI	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
RMI 1 (cutoff: 200)	73.0	93.7	79.4	91.2
RMI 2 (cutoff: 200)	81.1	89.6	72.3	93.4
RMI 3 (cutoff: 200)	73.0	93.7	79.4	91.2
RMI 4 (cutoff: 450)	77.0	92.3	77.0	92.3

Yorito Yamamoto, et al. Comparison of 4 Risk-of-Malignancy Indexes in the Preoperative Evaluation of Patients With Pelvic Masses: A Prospective Study, Clinical Ovarian and Other Gynecologic Cancer, Volume 7, Issues 1–2, 2014, Pages 8-12, ISSN 2212-9553,

DIAGNOSIS

Which One Is Better?

DIAGNOSIS

	Sensitivity (95% CI)	Specificity (95% CI)	Accuracy (95%CI)
IOTA	80.7% (72.2–87.1%)	97.5% (95.3–98.7%)	93.6% (91.1–95.5%)
ROMA	81.5% (73.1–87.8%)	85.3% (81.3–88.5%)	84.4% (80.9–87.3%)
RMI	70.6% (61.4–78.4%)	94.3% (91.4–96.2%)	88.8% (85.7–91.3%)

	Sensitivity (95% CI)	Specificity (95% CI)	Accuracy (95%CI)
IOTA + expert	79.9% (73.1–85.3%)	92.8% (90.0–94.9%)	89.2% (86.5–91.5%)
IOTA + ROMA	73.2% (66.0–79.4%)	93.7% (91.0–95.7%)	88.0% (85.1–90.3%)
IOTA + RMI	72.1% (64.8–78.4%)	94.1% (91.5–96.0%)	88.0% (85.1–90.3%)
ROMA alone	74.3% (67.1–80.4%)	84.4% (80.7–87.5%)	81.6% (78.3–84.4%)
RMI alone	66.5% (59.0–73.2%)	91.1% (88.0–93.5%)	84.2% (81.1–86.9%)

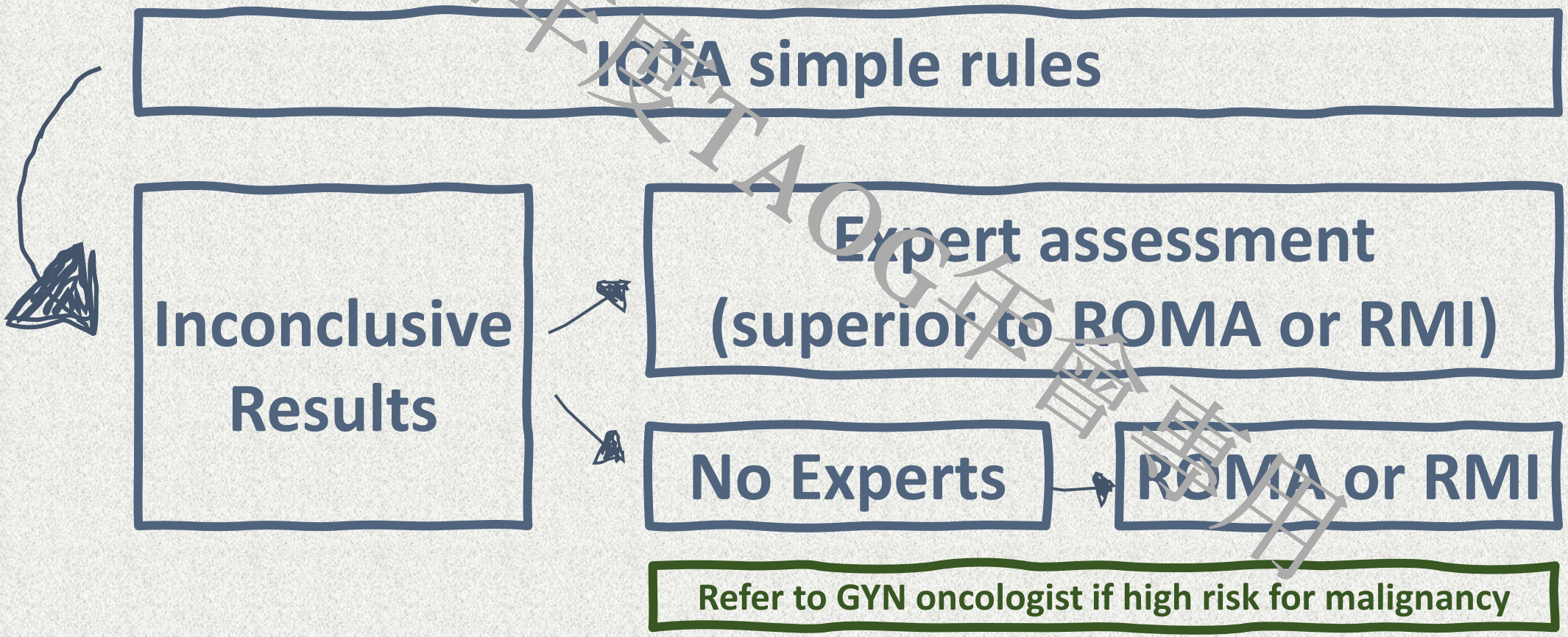
Ngu SF et al. Diagnostic Performance of Risk of Malignancy Algorithm (ROMA), Risk of Malignancy Index (RMI) and Expert Ultrasound Assessment in a Pelvic Mass Classified as Inconclusive by International Ovarian Tumour Analysis (IOTA) Simple Rules. Cancers (Basel). 2022 Feb 5;14(3):810

DIAGNOSIS

	Sensitivity (95% CI)	Specificity (95% CI)	Accuracy (95%CI)
Premenopausal			
IOTA + expert	80.9% (70.9–88.2%)	94.1% (91.0–96.2%)	91.5% (88.4–93.8%)
IOTA + ROMA	73.0% (62.4–81.6%)	94.4% (91.3–96.4%)	90.1% (86.9–92.6%)
IOTA + RMI	71.9% (61.2–80.7%)	96.1% (93.3–97.7%)	91.2% (88.1–93.6%)
ROMA alone	76.4% (66.0–84.5%)	84.0% (79.7–87.6%)	82.5% (78.5–85.8%)
RMI alone	66.3% (55.4–75.8%)	92.4% (89.0–94.9%)	87.2% (83.6–90.1%)
Postmenopausal			
IOTA + expert	78.9% (68.8–86.5%)	88.6% (80.5–93.7%)	84.1% (78.0–88.8%)
IOTA + ROMA	73.3% (62.8–81.9%)	91.4% (83.9–95.8%)	83.1% (76.9–87.9%)
IOTA + RMI	72.2% (61.6–80.9%)	87.6% (79.4–93.0%)	80.5% (74.1–85.7%)
ROMA alone	72.2% (61.6–80.9%)	85.7% (77.2–91.5%)	79.5% (73.0–84.8%)
RMI alone	66.7% (55.9–76.0%)	86.7% (78.3–92.3%)	77.4% (70.8–83.0%)

Ngu SF et al. Diagnostic Performance of Risk of Malignancy Algorithm (ROMA), Risk of Malignancy Index (RMI) and Expert Ultrasound Assessment in a Pelvic Mass Classified as Inconclusive by International Ovarian Tumour Analysis (IOTA) Simple Rules. Cancers (Basel). 2022 Feb 5;14(3):810

DIAGNOSIS



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DIAGNOSIS

- ➢Further Image Study: MRI, CT, PET-CT
- ✓A second-line tool
  - Further differentiate between benign, malignant and borderline masses

O-RADS MRI Risk Stratification and Management System

O-RADS MRI Score	Risk Category	Positive Predictive Value for Malignancy^	Lexicon Description
0	Incomplete Evaluation	N/A	N/A
1	Normal Ovaries	N/A	No ovarian lesion
			Follicle defined as simple cyst ≤ 3 cm in a premenopausal woman
			Hemorrhagic cyst ≤ 3 cm in a premenopausal woman
			Corpus luteum +/- hemorrhage ≤ 3 cm in a premenopausal woman
2	Almost Certainly Benign	<0.5%^	Cyst: Unilocular- any type of fluid content ▪ No wall enhancement ▪ No enhancing solid tissue*
			Cyst: Unilocular – simple or endometriotic fluid content ▪ Smooth enhancing wall ▪ No enhancing solid tissue
			Lesion with lipid content** ▪ No enhancing solid tissue
			Lesion with "dark T2/dark DWI" solid tissue ▪ Homogeneously hypointense on T2 and DWI
			Dilated fallopian tube - simple fluid content ▪ Thin, smooth wall/endosalpingeal folds with enhancement ▪ No enhancing solid tissue
			Para-ovarian cyst – any type of fluid ▪ Thin, smooth wall +/- enhancement ▪ No enhancing solid tissue
3	Low Risk	~5%^	Cyst: Unilocular – proteinaceous, hemorrhagic or mucinous fluid content*** ▪ Smooth enhancing wall ▪ No enhancing solid tissue
			Cyst: Multilocular - Any type of fluid, no lipid content ▪ Smooth septae and wall with enhancement ▪ No enhancing solid tissue
			Lesion with solid tissue (excluding T2 dark/DWI dark) ▪ Low risk time intensity curve on DCE MRI
			Dilated fallopian tube – ▪ Non-simple fluid: Thin wall /folds ▪ Simple fluid: Thick, smooth wall/ folds ▪ No enhancing solid tissue
4	Intermediate Risk	~50%^	Lesion with solid tissue (excluding T2 dark/DWI dark) ▪ Intermediate risk time intensity curve on DCE MRI ▪ If DCE MRI is not feasible, score 4 is any lesion with solid tissue (excluding T2 dark/DWI dark) that is enhancing ≤ myometrium at 30-40s on non-DCE MRI
			Lesion with lipid content ▪ Large volume enhancing solid tissue
5	High Risk	~90%^	Lesion with solid tissue (excluding T2 dark/DWI dark) ▪ High risk time intensity curve on DCE MRI ▪ If DCE MRI is not feasible, score 5 is any lesion with solid tissue (excluding T2 dark/DWI dark) that is enhancing > myometrium at 30-40s on non-DCE MRI
			Peritoneal, mesenteric or omental nodularity or irregular thickening with or without ascites

DIAGNOSIS

- IOTA-ADNEX
- ✓Differentiates between benign and four types of malignancy
  - Borderline
  - Stage I cancer
  - Stage II-IV cancer
  - Secondary metastatic cancer

IOTA-ADNEX calculator

- ✓ **Age of the patient at examination (years)**
- ✓ **Oncology center (referral center for gyn-oncol)?**
- ✓ **Maximal diameter of the lesion (mm)**
- ✓ **Maximal diameter of the largest solid part (mm)**
- ✓ **More than 10 locules?**
- ✓ **Number of papillations (papillary projections)**
- ✓ **Acoustic shadows present?**
- ✓ **Ascites (fluid outside pelvis) present?**
- ✓ **Serum CA-125 (U/mL)**

DIAGNOSIS

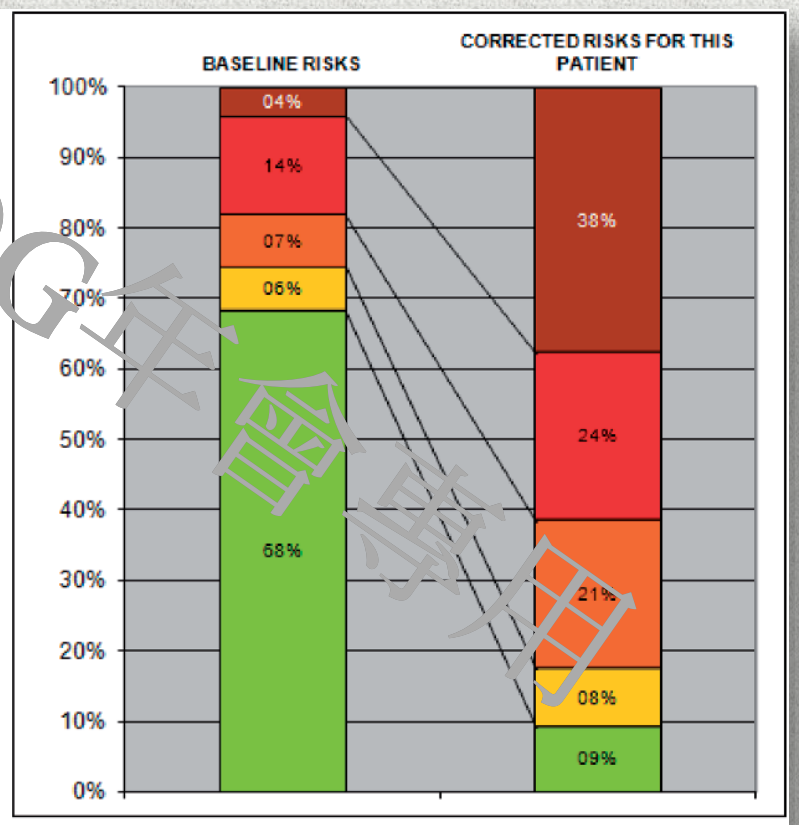
- IOTA-ADNEX

Predictors	ENTER VALUES
Age of the patient at examination (years)	55
Oncology center (referral center for gyn-oncol)?	Yes
Maximal diameter of the lesion (mm)	83
Maximal diameter of the largest solid part (mm)	66
More than 10 locules?	No
Number of papillations (papillary projections)	None
Acoustic shadows present?	No
Ascites (fluid outside pelvis) present?	Yes
CA-125 (U/ml)	325

RISK OF MALIGNANCY	90.8%
RISK METASTATIC CANCER TO THE ADNEXA	37.7%
RISK STAGE II-IV OVARIAN CANCER	23.8%
RISK STAGE I OVARIAN CANCER	21.0%
RISK BORDERLINE	8.2%

CHANCE OF BENIGN TUMOR	9.2%

a



b

OUTLINES

Etiology

Diagnosis

History of PE

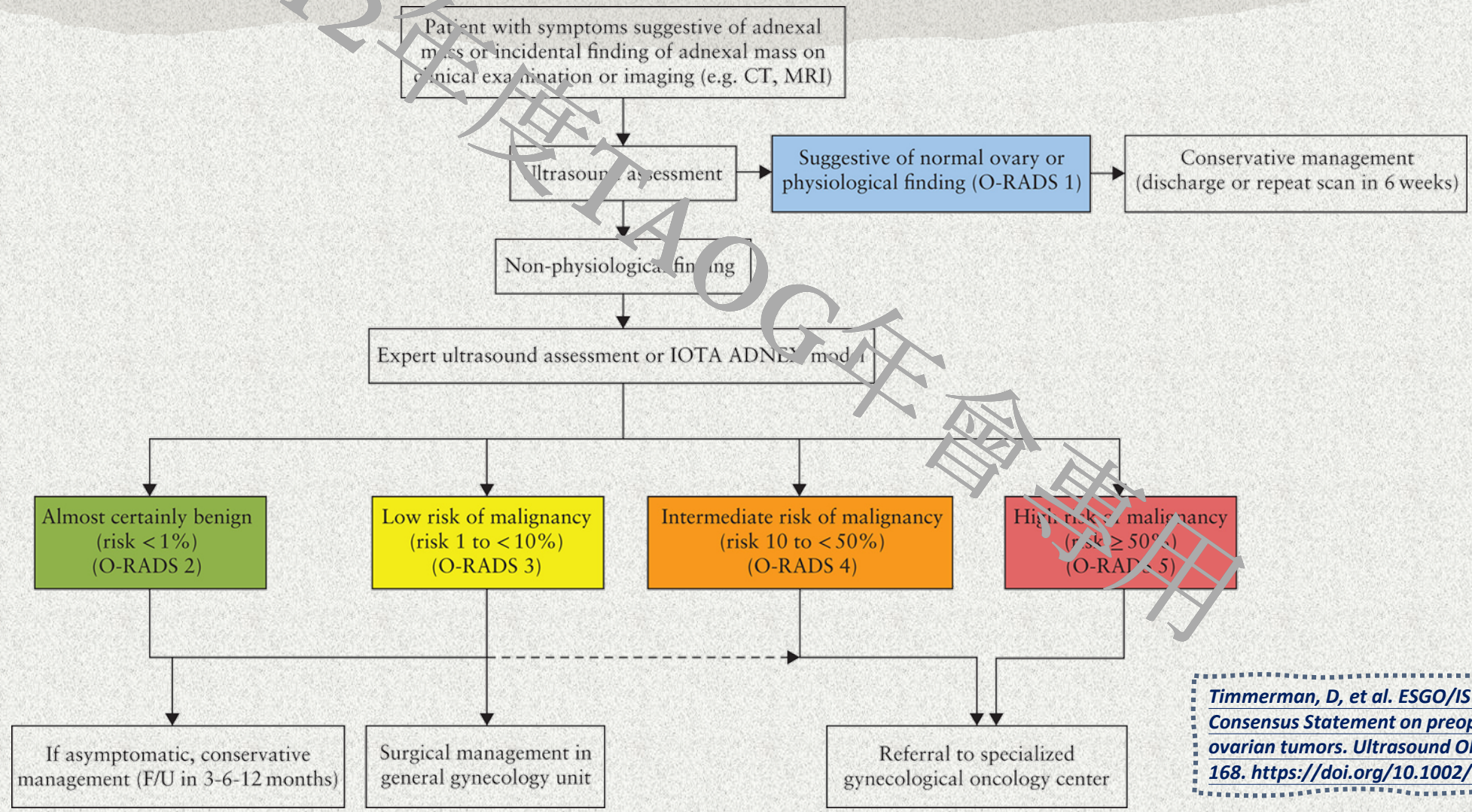
Tumor markers

Image (Ultrasound)

Multi-modal tools

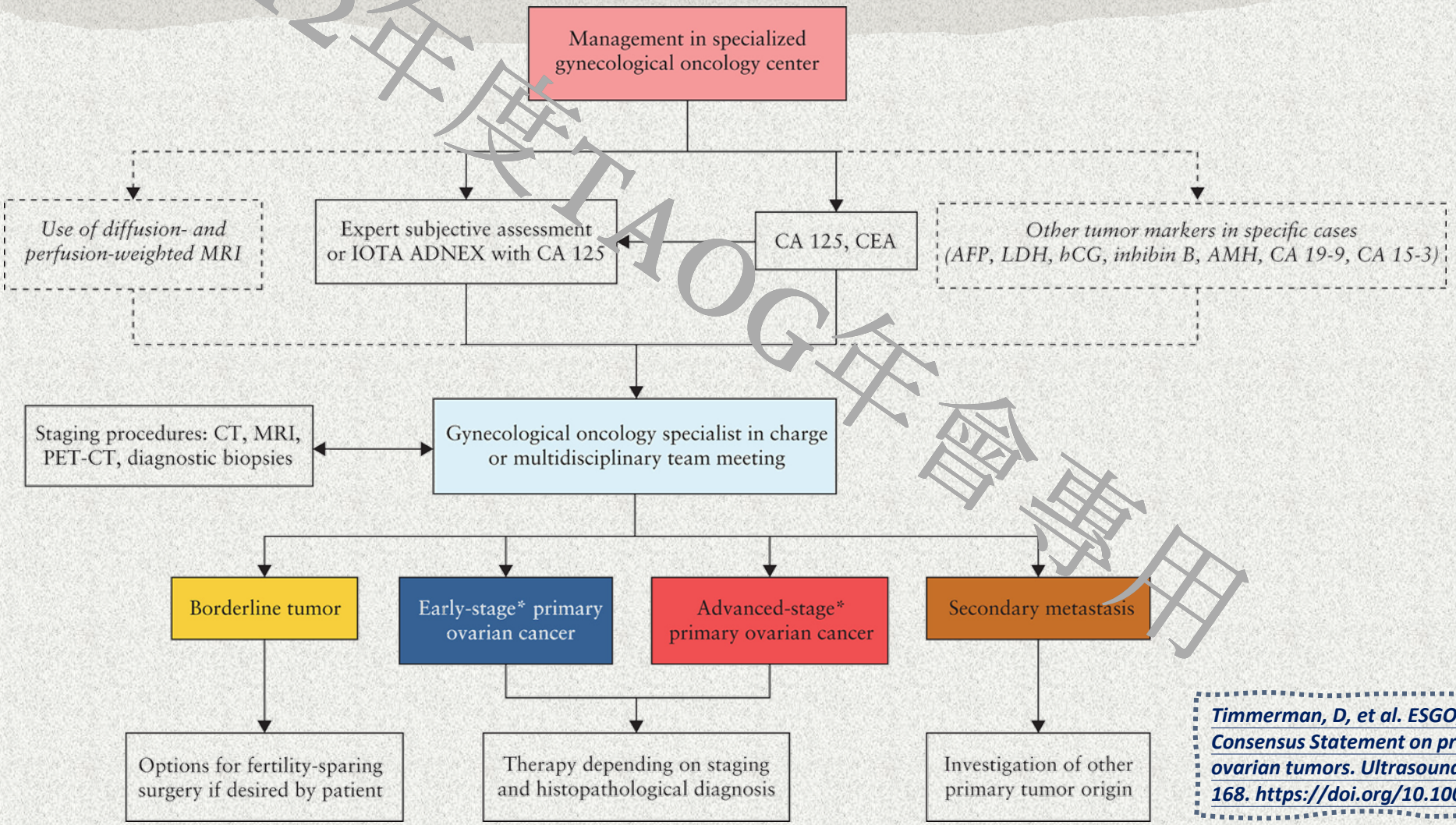
Management

Management



Timmerman, D, et al. ESGO/ISUOG/IOTA/ESGE Consensus Statement on preoperative diagnosis of ovarian tumors. Ultrasound Obstet Gynecol, 58: 148-168. https://doi.org/10.1002/uog.23635

Management



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TAKE HOME MESSAGE

- ➢ Etiology
- ✓ GYN:
  - r/o pregnancy first!
  - Ovarian (physiologic or neoplastic), uterine origin
- ✓ Non-GYN: GI tract origin
- ➢ Diagnosis
- ✓ History and PE
- ✓ Ultrasound: IOTA simple rule, O-RADS
  - Differentiation benign or malignancy

TAKE HOME MESSAGE

- ✓Tumor markers: CA-125, HE4, CA-199, CEA, etc
- ✓Multi-modal tools: ROMA, RMI
- ✓Further differentiation of malignancy: O-RADS MRI, IOTA-ADNEX
- ➢Management: high risk of malignancy-> Refer to GYN oncology

- ➢Ultrasound is a very useful tool

THANKS FOR YOUR ATTENTION