CONSENSO IOTA

CONSENSO IETA

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Variations in Ultrasound Reporting on Patients Referred for Investigation of Ovarian Masses

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The Complexity of a “Complex Mass” and the Simplicity of a “Simple Cyst”

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

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Figure 4. Examples of different kinds of unilocular cysts. A unilocular cyst is a cyst without septa and without solid parts or papillary structures.

Figure 5. Examples of different kinds of unilocular solid cysts. A unilocular solid cyst is a unilocular cyst with a measurable solid component or at least one papillary structure. If the solid part contains very small cysts the mass might be unilocular solid.
Figure 6  Examples of different kinds of multilocular cysts. A multilocular cyst is a cyst with at least one septum but no measurable solid components or papillary projections. The ‘lesion’ is measured in the planes indicated by the arrows.

Figure 7  Examples of different kinds of multilocular-solid cysts. A multilocular-solid cyst is a multilocular cyst with a measurable solid component or at least one papillary structure (solid tumor with an irregular cyst wall).

Figure 8  Examples of different kinds of solid tumors. A solid tumor is a tumor where the solid components comprise 80% or more of the tumor when assessed in a two-dimensional section. A solid tumor may contain papillary projections protruding into internal small cysts.
Simple ultrasound-based rules for the diagnosis of ovarian cancer


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Table 9: Ten simple rules for identifying a benign or malignant tumor

<table>
<thead>
<tr>
<th>Rules for predicting a malignant tumor (M-rules)</th>
<th>Rules for predicting a benign tumor (B-rules)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1: Irregular solid tumor</td>
<td>B1: Unilocular cyst</td>
</tr>
<tr>
<td>M2: Presence of ascites</td>
<td>B2: Presence of solid components where the largest diameter = 5 mm</td>
</tr>
<tr>
<td>M3: At least four papillary structures</td>
<td>B3: Presence of acoustic shadows</td>
</tr>
<tr>
<td>M4: Irregular multicellular solid tumor with largest diameter &gt; 100 mm</td>
<td>B4: Smooth multicellular tumor with largest diameter &lt; 100 mm</td>
</tr>
<tr>
<td>M5: Very strong blood flow (color score 4)</td>
<td>B5: No blood flow (color score 1)</td>
</tr>
</tbody>
</table>

If one or more M-rules apply in the absence of a B-rule, the mass is classified as malignant. If one or more B-rules apply in the absence of an M-rule, the mass is classified as benign. If both M-rules and B-rules apply, the mass cannot be classified. If no rule applies, the mass cannot be classified.
Simple ultrasound rules to distinguish between benign and malignant adnexal masses before surgery: prospective validation by IOTA group

Aplicables en 78-89% de casos
Sensibilidad 88-93%
Especificidad 94-96%
# Presurgical diagnosis of adnexal tumours using mathematical models and scoring systems: a systematic review and meta-analysis

Jeroen Kaijser\textsuperscript{1,2}, Ahmad Sayasneh\textsuperscript{1,2}, Kirsten Van Hoorebeke\textsuperscript{1}, Sabra Ghaem-Maghami\textsuperscript{2}, Tom Bourne\textsuperscript{1,2}, Dirk Timmerman\textsuperscript{1,2} and Ben Van Calster\textsuperscript{1}

## Table II: Pooled summary estimates of the expected operating point (sensitivity and specificity) and corresponding 95% confidence interval.

<table>
<thead>
<tr>
<th>Model</th>
<th>Cut-off</th>
<th>Studies (n)</th>
<th>Centres\textsuperscript{a} (n)</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Morphologic scoring systems</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sassone</td>
<td>&gt;9</td>
<td>19</td>
<td>19</td>
<td>0.85 [0.77;0.90]</td>
<td>0.80 [0.73;0.86]</td>
</tr>
<tr>
<td>Lerner</td>
<td>&gt;3</td>
<td>9</td>
<td>17</td>
<td>0.80 [0.70;0.86]</td>
<td>0.61 [0.53;0.68]</td>
</tr>
<tr>
<td>Depriest</td>
<td>&gt;5</td>
<td>8</td>
<td>8</td>
<td>0.90 [0.81;0.95]</td>
<td>0.68 [0.57;0.77]</td>
</tr>
<tr>
<td>Ferrazzi</td>
<td>&gt;9</td>
<td>7</td>
<td>7</td>
<td>0.86 [0.77;0.91]</td>
<td>0.80 [0.66;0.89]</td>
</tr>
<tr>
<td><strong>Ultrasound rules</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simple Rules</td>
<td>n/a\textsuperscript{b}</td>
<td>5</td>
<td>17</td>
<td>0.93 [0.89;0.95]</td>
<td>0.81 [0.76;0.85]</td>
</tr>
<tr>
<td><strong>Risk of Malignancy Index (RMI)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RMI I</td>
<td>200</td>
<td>23</td>
<td>41</td>
<td>0.72 [0.67;0.76]</td>
<td>0.92 [0.89;0.93]</td>
</tr>
<tr>
<td>RMI II</td>
<td>200</td>
<td>15</td>
<td>32</td>
<td>0.75 [0.69;0.80]</td>
<td>0.87 [0.84;0.90]</td>
</tr>
<tr>
<td>RMI III</td>
<td>200</td>
<td>9</td>
<td>19</td>
<td>0.70 [0.66;0.78]</td>
<td>0.91 [0.88;0.93]</td>
</tr>
<tr>
<td>RMI IV</td>
<td>450</td>
<td>3</td>
<td>13</td>
<td>0.68 [0.59;0.76]</td>
<td>0.94 [0.91;0.96]</td>
</tr>
<tr>
<td><strong>Logistic regression models</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taflor</td>
<td>50%</td>
<td>6</td>
<td>24</td>
<td>0.35 [0.24;0.49]</td>
<td>0.96 [0.94;0.98]</td>
</tr>
<tr>
<td>LRa</td>
<td>25%</td>
<td>3</td>
<td>20</td>
<td>0.76 [0.70;0.81]</td>
<td>0.87 [0.82;0.90]</td>
</tr>
<tr>
<td>LRb</td>
<td>60%</td>
<td>4</td>
<td>21</td>
<td>0.82 [0.77;0.86]</td>
<td>0.78 [0.73;0.83]</td>
</tr>
<tr>
<td>Prömpeter</td>
<td>10%</td>
<td>2</td>
<td>10</td>
<td>0.61 [0.46;0.74]</td>
<td>0.81 [0.70;0.89]</td>
</tr>
<tr>
<td>Jakubské</td>
<td>12%</td>
<td>2</td>
<td>20</td>
<td>0.77 [0.71;0.82]</td>
<td>0.87 [0.83;0.89]</td>
</tr>
<tr>
<td>IOTA LR2</td>
<td>10%</td>
<td>3</td>
<td>13</td>
<td>0.92 [0.88;0.95]</td>
<td>0.83 [0.77;0.88]</td>
</tr>
</tbody>
</table>
### TABLE 10
Summary classification of Simple Rules risk calculation based on all data (n = 4848)

<table>
<thead>
<tr>
<th>Features</th>
<th>Observed malignancy rate</th>
<th>Estimated individual risk of malignancy</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>No M-features AND &gt;2 B-features</td>
<td>1/175 (0.6%)</td>
<td>&lt;0.01–0.29%</td>
<td>Very low risk</td>
</tr>
<tr>
<td>- No M-features AND 2 B-features</td>
<td>20/1560 (1.3%)</td>
<td>0.19–2.7%</td>
<td>Low risk</td>
</tr>
<tr>
<td>- No M-features AND feature B1 present</td>
<td>12/1560 (0.8%)</td>
<td>1.2–3.1%</td>
<td></td>
</tr>
<tr>
<td>No M-features AND 1 B-feature present (except B1)</td>
<td>60/722 (8.3%)</td>
<td>2.4–15.2%</td>
<td>Intermediate risk</td>
</tr>
<tr>
<td>- No features</td>
<td>451/1096 (41.1%)</td>
<td>27.5–48.7%</td>
<td>Elevated risk</td>
</tr>
<tr>
<td>- Equal no. of M- and B-features</td>
<td>1/200 (0.5%)</td>
<td>5.6–78.1%</td>
<td></td>
</tr>
<tr>
<td>- &gt;0 M-features, but more B- than M-features</td>
<td>30/625 (4.8%)</td>
<td>1.3–28.4%</td>
<td></td>
</tr>
<tr>
<td>More M- than B-features present</td>
<td>1133/1295 (87.5%)</td>
<td>42.0–&gt;99.9%</td>
<td>Very high risk</td>
</tr>
</tbody>
</table>

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.

Clinically oriented three-step strategy for assessment of adnexal pathology

L. AMEYE†, D. TIMMERMAN†, L. VALENTIN†, D. PALADINI†, J. ZHANG†, C. VAN HOLSEKE††, A. A. LISSONI††, L. SAVELLI††, J. VELDMAN†, A. C. TESTA†, F. AMANT†, S. VAN HUFFEL* and T. BOURNE††

Table 1. Easy ‘instant’ diagnoses of adnexal masses identified by six descriptors (Phases 1 and 2, total n = 3511)

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Predicted histology</th>
<th>Correct histology (benign or malignant)</th>
<th>Correct histology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predicted outcome benign</td>
<td>Endometrioma</td>
<td>396/398 (99.5; 98.2–99.9)</td>
<td>360/398 (90.5; 87.2–93.0)</td>
</tr>
<tr>
<td>Unilocular tumor with ground glass echogenicity in a premenopausal woman</td>
<td>Teratoma</td>
<td>136/136 (99.6; 97.3–100)</td>
<td>126/136 (92.6; 87.0–96.0)</td>
</tr>
<tr>
<td>Unilocular tumor with mixed echogenicity and acoustic shadows in a premenopausal woman</td>
<td>Simple cyst/</td>
<td>240/243 (98.8; 96.4–99.6)</td>
<td>210/243 (86.4; 81.5–90.2)</td>
</tr>
<tr>
<td>Unilocular echogenic tumor with regular walls and maximum diameter of lesion &lt; 10 cm</td>
<td>cystadenoma</td>
<td>285/289 (98.6; 96.5–99.5)</td>
<td></td>
</tr>
<tr>
<td>Remaining unilocular tumor with regular walls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predicted outcome malignant</td>
<td>Tumor with ascites and at least moderate color Doppler blood flow in a postmenopausal woman</td>
<td>194/203 (95.6; 91.8–97.7)</td>
<td></td>
</tr>
<tr>
<td>Age &gt; 50 years and CA 125 &gt; 100 U/mL</td>
<td></td>
<td>386/414 (93.2; 90.4–95.3)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B1: Unilocular tumor with ground glass echogenicity in a premenopausal woman (suggestive of endometrioma)
B2: Unilocular tumor with mixed echogenicity and acoustic shadows in a premenopausal woman (suggestive of benign cystic teratoma)
B3: Unilocular tumor with regular walls and maximum diameter < 10 cm (suggestive of simple cyst or cystadenoma)
B4: Remaining unilocular tumor with regular walls
D1: Tumor with ascites and at least moderate color Doppler blood flow in a postmenopausal woman
D2: Age > 50 years and CA 125 > 100 U/mL
All patients
\((n = 1938)\)

Step 1: Easy ‘instant’ diagnoses

Applicable \((n = 902)\)

- Predicted as benign \((n = 654)\)
  - Risk of cancer 0.9% \((6/654)\); LOW
  - Risk of invasive cancer 0.6% \((4/654)\)
- Predicted as malignant \((n = 248)\)
  - Risk of cancer 95.2% \((236/248)\); HIGH
  - Risk of invasive cancer 88.3% \((219/248)\)

Not applicable \((n = 1036)\)

Step 2: Ultrasound-based simple rules

Conclusive \((n = 661)\)

- Predicted as benign \((n = 460)\)
  - Risk of cancer 4.1% \((19/460)\); LOW
  - Risk of invasive cancer 2.2% \((10/460)\)
- Predicted as malignant \((n = 201)\)
  - Risk of cancer 77.6% \((156/201)\); HIGH
  - Risk of invasive cancer 61.7% \((124/201)\)

Not conclusive \((n = 375)\)

Step 3: Subjective assessment by experienced ultrasound examiner

\((n = 375)\)

- Predicted as certainly benign \((n = 99)\)
  - Risk of cancer 7.1% \((7/99)\); LOW to MODERATE
  - Risk of invasive cancer 4.0% \((4/99)\)
- Predicted as probably benign or uncertain \((n = 154)\)
  - Risk of cancer 17.3% \((27/154)\); MODERATE
  - Risk of invasive cancer 5.2% \((8/154)\)
- Predicted as malignant \((n = 122)\)
  - Risk of cancer 74.6% \((91/122)\); HIGH
  - Risk of invasive cancer 50.8% \((62/122)\)
1. External validation of IOTA simple descriptors and simple rules for classifying adnexal masses.
PMID: 26748432

PMID: 26461661

3. Strategies to diagnose ovarian cancer: new evidence from phase 3 of the multicentre international IOTA study.
PMID: 24937676

PMID: 23578530
Masses included
N=666
Use of simple descriptors

Classified, N = 448
Benign, n=422
Reference standard benign, n = 421
Reference standard malignant, n=1
Malignant, n = 26
Reference standard benign, n = 2
Reference standard malignant, n=24

Masses not classified by simple descriptors
N= 218
Use of simple rules

Classified, N = 147
Benign, n = 118
Reference standard benign, n = 117
Reference standard malignant, n=1
Malignant, n = 29
Reference standard benign, n = 16
Reference standard malignant, n=33

Masses not classified by simple rules
N= 71
Use Expert Examiner Impression

Classified as benign
N=45
RS benign, n=44
RS malignant, n=1

Classified as malignant
N=12
RS benign, n=2
RS malignant, n=10

Classified as uncertain
N=14
RS benign, n=11
RS malignant, n=3
RESEARCH

Evaluating the risk of ovarian cancer before surgery using the ADNEX model to differentiate between benign, borderline, early and advanced stage invasive, and secondary metastatic tumours: prospective multicentre diagnostic study
ADNEX
Assessment of Different NEoplasias in the adnexa

The ADNEX-model computes the risk that a detected adnexal mass for which surgery is indicated is benign, borderline, stage I invasive, stage II-IV invasive, or metastatic cancer of the adnexa.
<table>
<thead>
<tr>
<th>Threshold for probability of malignancy*</th>
<th>Development data (n=3506)</th>
<th>Validation data (n=2403)</th>
<th>After updating on pooled data (n=5909)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sensitivity</td>
<td>Specificity</td>
<td>Diagnostic odds ratio</td>
</tr>
<tr>
<td>Not applicable</td>
<td>AUC</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.954</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>(0.947 to 0.961)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3%</td>
<td>—</td>
<td>98.8 (97.9 to 99.4)</td>
<td>52.3 (50.4 to 54.3)</td>
</tr>
<tr>
<td>5%</td>
<td>—</td>
<td>97.9 (96.8 to 98.7)</td>
<td>65.4 (63.6 to 67.3)</td>
</tr>
<tr>
<td>10%</td>
<td>—</td>
<td>95.9 (94.4 to 97.1)</td>
<td>75.5 (73.8 to 77.2)</td>
</tr>
<tr>
<td>15%</td>
<td>—</td>
<td>94.4 (92.8 to 95.8)</td>
<td>81.0 (79.4 to 82.5)</td>
</tr>
</tbody>
</table>

AUC = area under receiver operating characteristic curve.

Exact binomial 95% confidence intervals are reported in parentheses.

*Probability equal to or more than threshold indicates malignancy.
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

Figure 4 ‘Non-uniform’ endometrial echogenicity: homogeneous background with regular cystic areas (a), homogeneous background with irregular cystic areas (b), heterogeneous background without cystic areas (c), heterogeneous background with regular cystic areas (d) and heterogeneous background with irregular cystic areas (e); black color denotes cystic spaces.

Figure 5 Endometrial midline: ‘linear’ (a), ‘non-linear’ (b), ‘irregular’ (c) and ‘not defined’ (d).

Figure 6 ‘Bright edge’, the echo formed by the interface between an intracavitary lesion and the endometrium.
Figure 7  Endometrial–myometrial junction: ‘regular’ (a), ‘irregular’ (b), ‘interrupted’ (c) (dark gray area denotes the endometrial–myometrial halo, in this case the halo is interrupted and ‘not defined’ (d).

Figure 9  Intracavitary fluid: ‘anechogenic’ or ‘low-level’ echogenicity (a), ‘ground glass’ appearance (b) and ‘mixed’ echogenicity (c).
Figure 12  Endometrial outline at sonohysterography or when there is pre-existing fluid in the uterine cavity: ‘smooth’ (a), ‘endometrial folds’ (b), ‘polypoid’ (c) and ‘irregular’ (d).
Figure 13 Estimation of the extent of an endometrial lesion at sonohysterography or when there is pre-existing fluid in the uterine cavity: ‘localized’ - the base of the lesion involves less than 25% of the endometrial surface (a) or ‘extended’ - the base of the lesion involves 25% or more of the endometrial surface (b).

Figure 15 Outline of a lesion at sonohysterography or when there is pre-existing fluid in the uterine cavity: ‘smooth’ (a) and ‘irregular’ (b).
Figure 16 Proportion of a myoma protruding into the uterine cavity at sonohysterography or when there is pre-existing fluid in the uterine cavity: 100%, Grade 0 (a); ≥50%, Grade 1 (b); <50%, Grade 2 (c).
Figure 10: Color Doppler assessment of the endometrium: a score of 1 is given to indicate no color, i.e. no flow (a); a score of 2 indicates minimal color, i.e. minimal flow (b); a score of 3 indicates moderate color, i.e. moderate flow (c); and a score of 4 indicates abundant color, i.e. abundant flow (d).
Terms, definitions and measurements to describe sonographic features of myometrium and uterine masses: a consensus opinion from the Morphological Uterus Sonographic Assessment (MUSA) group

Gracias