OC201
The interobserver agreement between expert ultrasound operators when differentiating between adnexal tumors using ultrasound pattern recognition.

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Objectives: To assess interobserver agreement and diagnostic accuracy of expert ultrasound operators using pattern recognition to assess the nature of adnexal masses.
Methods: Static B-mode preoperative ultrasound images containing gray-scale and color Doppler information of a selected mix of difficult adnexal masses of 166 patients were examined independently by three expert ultrasound operators (A, B and C). They all had access to relevant clinical information, but none of the experts performed the original real-time scans. The experts were asked to classify tumors as benign or malignant and to subclassify tumors into one of 11 histological subgroups. The diagnostic performance of each expert was compared with the histological diagnosis of the respective specimen. Each operator's diagnoses were compared with the other two operators' diagnoses using Cohen's kappa coefficient.
Results: There were 36 invasive malignancies, 34 borderline ovarian tumors (BOT) and 96 benign tumors. The sensitivity and specificity with regard to malignancy (BOT and invasive) were: 86% (95% CI, 75–93) and 91% (95% CI, 83–96) for Expert A, 86% (95% CI, 75–93) and 80% (95% CI, 70–87) for Expert B, and 80% (95% CI, 68–89) and 85% (95% CI, 77–92) for Expert C. There was a good interobserver agreement when diagnosing ovarian tumors as benign, BOT and invasive (kappa = 0.69, 95% CI, 0.59–0.79 comparing Experts A and B; kappa = 0.71, 95% CI, 0.62–0.82, comparing Experts A and C; and kappa = 0.75, 95% CI, 0.66–0.84, comparing Experts B and C) and when predicting the histological subtypes (kappa = 0.63, 95% CI, 0.55–0.71, comparing Experts A and B; kappa = 0.67, 95% CI, 0.59–0.75, comparing Experts A and C; and kappa = 0.66, 95% CI, 0.58–0.76, comparing Experts B and C).
Conclusions: Expert ultrasound operators have a good level of agreement when differentiating between 'difficult' ovarian tumors using the ultrasound pattern recognition method. This shows that the high accuracy of this method is reproducible.

OC202
Real-time ultrasound versus static image evaluation of adnexal masses

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Objectives: Expert sonologists may use their subjective impression ('pattern recognition') to achieve a high accuracy in differentiation between benign or malignant adnexal masses. The aim of this study was to establish whether the ability to achieve a correct diagnosis differs between an expert performing real-time examination in comparison with experts making a diagnosis by evaluating static ultrasound images stored in the database.
Methods: A database was searched to identify 166 patients with an ultrasound diagnosis of adnexal tumors, who all subsequently underwent surgery. In all cases expert sonologists had access to all relevant clinical information. A single expert performed real-time examinations, whilst the stored static database images, containing gray-scale and color Doppler information on the adnexal masses, were independently examined by three other expert sonologists. All four sonologists had to classify the mass as benign or malignant. They also had to define the level of confidence with which they made the diagnosis. In cases of disagreement between the experts reviewing the images, the histological diagnosis made by two of the three examiners was taken as being representative of the particular case. The gold standard was the final histology after surgery. The McNemar test was used for statistical analysis.
Results: In 134/166 (80.7%) patients both the real-time examiner and the picture experts achieved a correct diagnosis of a benign or malignant adnexal tumor. In 14/166 (8.4%) cases they both made an incorrect diagnosis. In the remaining 18/166 (10.8%) cases where the experts disagreed, the real-time sonologist made a correct diagnosis in 14 cases and the image reviewing experts in four cases ($P = 0.0184$).
Conclusions: An expert performing a real-time ultrasound examination has a significantly better chance of achieving a correct diagnosis of a benign or malignant adnexal tumor compared with experts reviewing static ultrasound images.

OC203
How accurate is ultrasound pattern recognition at predicting the histological diagnosis of an ovarian mass?

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Objectives: To assess the accuracy of pattern recognition for the histological diagnosis of an adnexal mass, when the examinations are performed by ultrasound experts of similar experience.
Methods: Static B-mode preoperative ultrasound images, containing gray-scale and color Doppler information on the adnexal masses of 166 patients were examined independently by three expert sonologists. They all had access to relevant clinical information, but none of the experts performed the original real-time scans. The expert sonologists were asked to classify tumors into one of 11 histological groups. They were also asked to indicate the degree of confidence with which they made the diagnosis. In cases of disagreement between the experts reviewing the images, the histological diagnosis made by two of the three examiners was taken as the representative of the particular case. The gold standard was the final histology.
Results: As a group the experts reached an accuracy of 83.13% in classifying the adnexal mass as benign or malignant. In six patients all three examiners gave a different histological diagnosis and these cases were excluded from further analysis. The sensitivity and specificity for the different histologies were: 91.43% (32/35) and 97.60% (122/125) for dermoid cysts; 66.67% (22/33) and 90.55% (115/127) for cystadenoma (fibroma); 93.33% (14/15) and 99.31% (144/145) for endometrioma; 68.75% (22/32) and 90.63% (116/128) for borderline ovarian tumors (BOT); 42.86% (6/14) and 95.89% (140/146) for gastrointestinal BOTs; 88.89% (16/18) and 95.77% (136/142) for serous BOTs; 88.00% (22/25) and 99.26%

(134/135) for invasive epithelial cancer; and 90.00% (9/10) and 98.00% (147/150) for rare malignant tumors.
Conclusions: Using pattern recognition ultrasound experts are able to make a correct histological diagnosis in nearly 80% of cases. The diagnostic accuracy was highest in cases of dermoid cysts, endometriomas, serous BOTs, invasive epithelial cancer and rare malignant tumors.

OC204
Analysis of sonographic and Doppler features of struma ovarii: insights into a diagnostic dilemma

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Objectives: To describe the sonographic features typical of struma ovarii.
Methods: Twenty-five women diagnosed as having a struma ovarii at histopathological examination were recruited from databases available in the participating hospitals (Bologna, Rome, Leuven, Malmö) in the period between May 1997 to March 2006. Thirteen patients had pure struma ovarii, while in 12 cases an adjacent dermoid was found comprising less than 50% of the mass. Preoperative transabdominal and transvaginal sonographic findings were obtained, together with clinical/surgical reports. The diameters of the masses were measured, and morphology, content, presence of septa and solid portions were analyzed. Vascularization of the masses was evaluated in a semiquantitative manner. Subjective assessment after sonographic examination was recorded and compared to the final histological diagnosis.
Results: At surgery, 23/25 patients (92%) had a unilateral adnexal mass; two cases were bilateral. Mean diameter ranged from 25 to 214 mm (median, 60 mm). Sonographically, struma ovarii were multilocular–solid in 14 (59%) cases, multilocular in six (22%), unilocular–solid in three (11%) and purely unilocular or purely solid in one case each. Cystic content was anechoic in 11 (41%), 'ground-glass' in three (11%) and mixed in four (15%), while low-level echoes were present in eight (30%) cases. Color or power Doppler found no vascularization of the mass in five (19%) patients, minimal in six (22%), moderate in 14 (52%) and strong in two (7%). Subjective assessment of the risk of malignancy was correct in 19/27 cases (70%), but in no patient was struma ovarii suspected at transvaginal sonography.
Conclusions: Low-level or anechoic multilocular and multilocular–solid tumors can indicate the possibility of a struma ovarii, especially when found with a minor part resembling a typical dermoid. Minimal/moderate vascularization of the mass should strengthen such diagnostic suspicion. Clinical symptoms are vague and unspecific, and so of no value in the diagnosis.

OC205
Ultrasound characteristics of clear cell and endometrioid carcinoma

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Objectives: To describe the gray-scale and color Doppler ultrasound findings of clear cell (CCC) and endometrioid (EC) carcinoma in the ovary.
Methods: Eleven pre- and 27 postmenopausal women with a persistent adnexal mass, who had undergone preoperative transvaginal ultrasound examination using standardized terms and definitions and were subsequently found to have ovarian CCC and/or EC, were retrospectively included in the study. There were 17 CCCs, eight ECs, 10 tumors containing both CCC and EC, and three borderline CCC/EC. At ultrasound examination the tumors had been prospectively characterized and classified as unilocular, multilocular, unilocular–solid, multilocular–solid or solid.
Results: The 17 CCCs had a median maximal diameter of 118 (range, 41-154) mm; 41% (7/17) of the CCCs were multilocular–solid, 24% (10/17) unilocular–solid, 24% (4/17) solid and 11% (2/17) unilocular. The eight ECs had a median maximal diameter of 137 (range, 69–215) mm; five were multilocular–solid and three unilocular–solid. The 10 tumors containing both EC and CCC had a median maximal diameter of 106 (range, 32–250) mm; 70% (7/10) were multilocular–solid and 30% (3/10) were solid (30%). The three borderline tumors had a maximal diameter ranging from 59 to 133 mm; two were multilocular–solid and one unilocular–solid. Most of the tumors appeared as well vascularized structures (color score 4 in 53%, and color score 3 in 30%), while irregular cyst walls (100%) with more than 10 irregular papillary projections with internal flow (63%) characterized all the observed ultrasound masses. In four of the 17 CCCs and in four of the eight ECs endometriosis was encountered in the malignant lesion.
Conclusions: Ultrasound characteristics of CCE and EC are presence of solid tissue, irregular cyst walls, multiple irregular papillary projections and a high color score. There also seems to be an association between endometriosis and CCC and EC.

OC206
Pictorial assay of the granulosa cell tumor

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Objectives: Granulosa cell tumors (GCTs) are rare ovarian neoplasms accounting for approximately 3% of all ovarian malignancies. They are the most common malignant sex cord stromal tumor. The differences between the two types (juvenile and adult) are mainly microscopic. GCT is a slow-growing tumor that tends to recur very late. According to textbooks GCT is a large tumor with a smooth or lobulated surface with necrotic or hemorrhagic areas. The majority of the masses are solid; the minority are partially or totally cystic. Little is known about the correlation with preoperative sonographic features and most studies only report on the locularity. The aim of the study was to describe the sonographic features of the GCT.
Methods: Patients with a GCT that were preoperatively scanned by a strict protocol were retrospectively included in this analysis.
Results: Nineteen patients were included, three with a juvenile- and 16 with an adult-type GCT. Most GCTs were multilocular–solid (11/19 (58%)) or solid (7/19 (37%)); one mass was unilocular–solid. Some 58% (11/19) of the masses had more than five locules, and 37% (7/19) more than 10 locules. The masses were large with a mean largest diameter of 116 (37–242) mm. Only three tumors had papillary projections. All tumors showed increased vascularization; 95% (18/19) had a color score ≥ 3. The mean PI was 0.69 (0.7–1.8), the mean RI 0.46 (0.49–0.93) and the mean PSV 21.79 (4–52). Endometrial pathology was suspected only once on ultrasound but found in six of the 11 (54.6%) biopsies. The free fluid was suggestive of a hematoperitoneum in one case and ascites in four cases. In 12/15 masses the subjective impression of the sonologist was a malignant or a germ cell tumor.