OC01.04

A practical approach to preoperatively assess ovarian pathology: combining pattern recognition and mathematical models

T. Bourne[1,2], D. Timmerman[1], J. Zhang[3], L.I. Valentin[4], D. Paladini[5], C. Van Holsbeke[1], A.A. Lissoni[6], L. Savelli[7], J. Veldman[1], A. Testa[8], F. Amant[1], S. Van Huffel[9], L. Ameye[9]

[1]Department of Obstetrics and Gynecology, University Hospitals, Leuven, Belgium; [2]Department of Obstetrics and Gynaecology, Imperial College London, Hammersmith Campus, London, United Kingdom; [3]Ultrasound Department, Chinese PLA General Hospital, Beijing, China; [4]Department of Obstetrics and Gynecology, Malmö University Hospital, Lund University, Malmö, Sweden; [5]Department of Obstetrics and Gynecology, Università degli Studi di Napoli Federico II, Naples, Italy; [6]Clinica Ostetrica e Ginecologica, Ospedale S. Gerardo, Università di Milano, Monza, Italy; [7]Reproductive Medicine Unit, Department of Obstetrics and Gynecology, University of Bologna, Bologna, Italy; [8]Istituto di Clinica Ostetrica e Ginecologica, Università Cattolica del Sacro Cuore, Rome, Italy; [9]Department of Electrical Engineering (ESAT), Katholieke Universiteit Leuven, Leuven, Belgium

Objective: To reflect clinical practice and develop descriptors to select “easy to classify” masses where models are not needed to predict malignancy (e.g. endometriomas, dermoid cysts, advanced cancers) and to assess the performance of the Risk of Malignancy Index (RMI) and two logistic regression models (LR1 and LR2) on the residual difficult masses.

Methods: Six descriptors were used to categorise “easy masses”:1) unilocular with ground glass echogenicity in premenopausal women: endometrioma, 2) unilocular with mixed echogenicity and acoustic shadows in premenopausal women: benign teratoma, 3) unilocular anechoic tumor with regular walls and max diameter of lesion < 10cm: simple cyst/cystadenoma, 4) remaining unilocular tumors with regular walls: benign cyst, 5) tumor with ascites and color score 3 or 4 in postmenopausal women: cancer, and 6) age >50 and CA125>100: cancer. For remaining masses where descriptors didn’t apply, RMI, LR1 and LR2 were used to classify them by applying previously suggested test result cut-offs (for RMI cut-off 200, for LR1 and LR2 calculated risk cut-off 10%).

Results: 1938 patients with an adnexal mass from 19 centers were collected (malignancy rate 28%). The six descriptors applied to 902 patients (47%): sensitivity of 98% (236/242) and specificity of 98% (648/660). Of the residual 1036 masses, 803 had CA-125 measurements. The sensitivity of RMI was 41% (105/254), LR1 90% (229/254), and LR2 88% (223/254). The specificity of RMI, LR1 and LR2 was 90% (492/549), 68% (372/549) and 67% (368/549), respectively. The area under the ROC curve for RMI, LR1 and LR2 was 0.75 (95% CI, 0.72-0.79), 0.88 (95% CI, 0.86-0.91) and 0.85 (95% CI, 0.82-0.88), respectively.

Conclusions: Easy-to-use descriptors accurately identify almost half of tumors. In residual tumors, LR1 and LR2 perform significantly better than RMI in terms of area under the ROC curve, but at the predetermined risk cutoff of 10% they have relatively low specificity.