The accurate diagnosis of a pelvic mass is a challenge to a gynecologist before the pelvic cavity is explored by laparotomy or laparoscopy, because of pelvic masses’ bizarre and atypical behavior. Pelvic masses are one of the most common clinical presentations. These masses represent a number of benign and malignant conditions. Treatment can be optimally planned if it is known beforehand whether an ovarian neoplasm is benign or malignant. The prognosis for...
women with ovarian cancer may be greatly influenced by appropriate first-line therapy.1-6

Used alone, the diagnostic accuracy of demographic, sonographic and biochemical variables is poor for clinical use. Jacobs et al.7 developed the risk of malignancy index (RMI) for referral of relevant patients to gynecologic oncology centers. The RMI 1 was the first diagnostic model in the assessment of patients with pelvic masses. The RMI was adjusted by Tingulstad et al.8 in 1996 (RMI 2) and again in 1999 (RMI 3).9 The three versions of the RMI have been validated retrospectively and prospectively in different clinical studies7-19 where a cut-off value of 200 showed the best discrimination between benign and malignant pelvic masses, with high sensitivity and specificity levels (sensitivity 51-90%, specificity 51-97%). Recently RMI 4 was introduced by Yamamoto et al.20 Four RMIs had some different characteristics. RMI 1 was the first version as developed by Jacobs et al.,7 and gave an ultrasound score (U) of 0 when none of the ultrasound features were present, resulting in an RMI 1 of 0 regardless of the cancer antigen (CA) 125 level. But, RMI 2-4 had not ultrasound score of 0. Postmenopausal status is defined as more than 1 year of amenorrhea, or age 50 years or older among women who had prior hysterectomies, and scores M = 3; premenopausal status scores M = 1. Serum CA 125 (U/mL) is entered directly into the equation. The ultrasounds were performed by gynecologic oncologists, general gynecologists, or residents.

The main advantage of four RMIs is that it is a simple scoring system that can be applied directly into clinical practice without the introduction of expensive or complicated methods (such as computed tomography scan, magnetic resonance imaging, and whole-body positron emission tomography). The RMIs can be applied in less specialized centers. The RMI 1 was the first diagnostic model that combined demographic, sonographic and biochemical data in the assessment of patients with pelvic masses.

The purpose of the present study was to assess ability of the RMI 1 to discriminate between benign and malignant pelvic masses.

### Materials and Methods

This is a retrospective study. The clinical data were obtained from consecutive 547 women with pelvic masses scheduled for laparotomy or laparoscopy at the Department of Obstetrics and Gynecology of a single institution between January 2007 and December 2010. Preoperative serum CA 125 levels, ultrasound findings, and menopausal status were noted. In all cases, ultrasound was performed transvaginally with a 6.0 MHz transducer (Acuvix XQ, Medison, Korea); an abdominal scan was also conducted when indicated.

As proposed by Jacobs et al.,7 in 1990, the RMI 1 is defined as the multiplied value of the ultrasound score (U), menopausal status (M) and serum CA 125 level: RMI 1 = U × M × CA 125.

Multilocularity, solid areas, bilaterality, ascites and intrabdominal metastases score one point each. A total of 2 or more points gives U = 3, 1 point gives U = 1, 0 points gives U = 0. Postmenopausal status is defined as more than 1 year of amenorrhea, or age 50 years or older among women who had prior hysterectomies, and scores M = 3; premenopausal status scores M = 1. Serum CA 125 (U/mL) is entered directly into the equation. The ultrasounds were performed by gynecologic oncologists, general gynecologists, or residents.

The histopathologic diagnosis was regarded as a definitive outcome. When a gynecological cancer was found, it was staged according to the International Federation of Gynecology and Obstetrics (FIGO) classification.21

The sensitivity was defined as the percentage of patients with malignant disease having a positive test result. The specificity was defined as the percentage of patients with benign disease having a negative test result. The positive predictive value was defined as the percentage of patients with a positive test result having malignant disease and the negative predictive value was defined as the percentage of patients with a negative test result having benign disease.

Statistical analyses were performed using the Statistical Packages for the Social Sciences Version 14.0,1 (SPSS Inc., Chicago, IL, USA). The χ²-test was used to test differences in distribution of menopausal status, and the ultrasound score. The Mann–Whitney U-test was applied in the cases where the assumptions of the 2-sample t-test do not hold (when testing differences in distribution of CA 125 among women with benign and malignant pelvic masses). A receiver operating characteristic (ROC) curve was created to show the relation between sensitivity and specificity of the CA 125, menopausal status, the ultrasound score, and the RMI.