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Simplified Approach for Ovarian-Adnexal Reporting and Data System MRI Risk Stratification System

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Besides ultrasonography, magnetic resonance imaging (MRI) is a problem-solving modality for the evaluation of ovarian lesions [1]. The Ovarian-Adnexal Reporting and Data System (O-RADS) MRI Risk Stratification System was published in 2022, and these guidelines are now available for radiologists. Despite efforts to prepare user-friendly guidelines, radiologists encounter a complex table of information for matching and diagnosing ovarian lesions [1-3].

Compared to the risk-oriented approach to ovarian lesions presented in recent guideline tables, a lesion-oriented flowchart would be more practical for radiologists [4,5]. Therefore, we summarized the findings of the guidelines in the form of an algorithm to explain how to approach ovarian lesions simply (Fig. 1). To apply this algorithm, it is necessary to be familiar with the guideline details [1] and lexicon [6], along with sufficient experience in diagnosing ovarian lesions.

In premenopausal women, the size of the lesion is important, and those with lesions having a maximum diameter of 3 cm should be evaluated for benign lesions. If the ovarian lesion is not typical, is larger than 3 cm, or is found in a postmenopausal woman, fat content should be evaluated.

Only large volume-enhancing lesions that contain fat have an intermediate risk of malignancy and are labeled as O-RADS4. A precise definition of large-volume lesions has not been mentioned in the published O-RADS MRI guidelines [1]. However, in the lexicon, the larger solid portion is described as an "enhancing component of an adnexal lesion that does not fit into the categories of papillary projection, mural nodule, or irregular septation/wall" [6]. Any amount of fat within an ovarian lesion is not enhanced, and any solid component with enhancement within a fat-containing lesion may represent malignancy. Fat-containing lesions below 5 cm that do not exhibit any malignant findings are followed by ultrasound [7].

MRI mainly plays a role in the assessment of lesions with solid components. In patients with a uterus, the risk of malignancy is determined according to the pattern of the curve on dynamic contrast-enhanced (DCE) MRI. In patients who do not have the uterus for any reason, on the other hand, the pattern of solid component enhancement is determinative. While a steady rate of enhancement implies a low risk of malignancy, the shoulder and plateau patterns indicate a moderate to high risk of malignancy that is indistinguishable. If the time-intensity curve is not available on DCE MRI, comparing the enhancement of the solid component of the lesion with the myometrium at 30–40 seconds is helpful.

The role of non-contrast MRI, diffusion-weighted imaging (DWI), and apparent diffusion coefficient (ADC) maps in the characterization of ovarian lesions is increasing day by day, especially in situations where DCE-MRI is not available in that setting, or the patient has a special clinical condition [8,9]. In the absence of a uterus for any reason, perfusion, kidney failure, or pregnancy, any high signal intensity at b = 1000 and low signal intensity in the ADC map can suggest a possibly malignant mass equivalent to O5 (O5EQ). On the other hand, low signal intensity at b = 1000 and high signal intensity in the ADC map are considered possibly benign (O3EQ) [8].
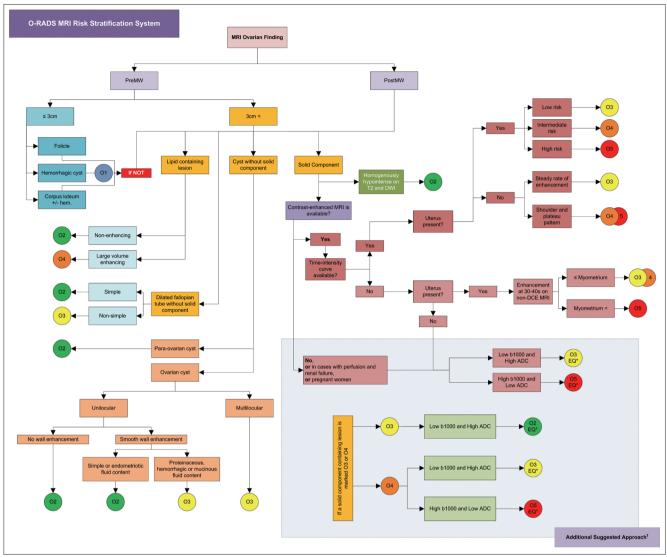
Fig. 1. Simplified flowchart for approaching ovarian lesions based on the O-RADS MRI risk stratification system. *Based on the scoring system modified with additional DWI criteria, †Adapted from Hottat et al. Ultrasound in Obstetrics & Gynecology 2021;57:478-487 [8]. ADC = apparent diffusion coefficient, DCE = dynamic contrast-enhanced, DWI = diffusion-weighted imaging, EQ = equivalent, hem = hemorrhage, O = O-RADS score, O-RADS = Ovarian-Adnexal Reporting and Data System, PostMW = postmenopausal women, PreMW = premenopausal women

In general, lesions with a solid component that are labeled O3 or O4 according to the O-RADS MRI Risk Stratification System could be re-evaluated with the application of the additional suggested approach [8]. Low signal intensity at b = 1000 and high signal intensity in the ADC map, within the solid component, downgrade the lesion from the O3 and O4 classes to O2EQ and O3EQ, respectively. Furthermore, any high signal intensity at b = 1000 and low signal intensity in the ADC map upgrades the O4 lesion to O5EQ.

Availability of Data and Material

All data generated or analyzed during the study are included in this published article.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

Author Contributions

Conceptualization: all authors. Resources: all authors. Software: Alireza Mohamadian. Visualization: Alireza Mohamadian. Supervision: Behnaz Moradi. Writing—original draft: Alireza Mohamadian. Writing—review & editing: Behnaz Moradi.

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