

# MEDICAL SCIENCES

## OVARIAN CYSTS - CURRENT APPROACHES

**Dragos F. Voicu**

MD, PhD.,

*Braila County Emergency Hospital*

*Associated Profesor*

*“Dunarea de Jos” University, Galati – Romania*

**Adrian Drăgan**

*Braila County Emergency Hospital– Romania*

### Abstract

Ovarian cysts represent a broad spectrum of adnexal lesions, ranging from benign functional cysts, to complex neoplasms with malignant potential. They are frequently encountered in clinical practice and often detected incidentally through imaging. Accurate diagnosis is essential to guide appropriate management, while avoiding unnecessary surgical intervention. Advances in imaging, including standardized risk stratification systems such as the Ovarian-Adnexal Reporting and Data System (O-RADS), have significantly improved diagnostic accuracy (1,2). Management strategies are increasingly individualized, based on patient age, symptomatology, cyst morphology, and malignancy risk. This review summarizes current evidence on the diagnosis, risk assessment, and treatment of ovarian cysts, emphasizing contemporary guidelines and studies published in the last 10 years.

**Keywords:** ovarian cysts, laparoscopy, risk stratification

### 1. Introduction

Ovarian cysts are among the most common gynecological findings, particularly in women of reproductive age. While most are benign and self-limiting, a minority may represent borderline or malignant disease. Differentiating between these entities remains a key clinical challenge. Recent developments in standardized ultrasound reporting systems and validated prediction models have improved diagnostic precision and optimized referral pathways [1–3].

### 2. Classification of Ovarian Cysts

Ovarian cysts are broadly classified into:

- functional cysts: follicular cysts and corpus luteum cysts, hormonally mediated and typically self-resolving.
- benign pathological cysts: endometriomas, mature cystic teratomas, serous and mucinous cystadenomas.
- borderline and malignant tumors.

Functional cysts usually regress spontaneously, whereas pathological cysts often persist and may require intervention depending on symptoms and imaging characteristics [3].

### 3. Diagnosis

#### a. Clinics

Symptoms range from asymptomatic incidental findings, to pelvic pain, bloating, menstrual irregularities, or acute abdomen due to torsion or rupture. Thorough history and physical examination are essential, although limited in sensitivity for malignancy [6].

#### b. Laboratory

Serum CA-125 is widely used as an adjunctive biomarker, particularly in postmenopausal women. Its specificity is limited, because elevations may occur in

benign conditions, such as endometriosis or pelvic inflammatory disease.

Advanced markers (HE4, multivariate index assays) may improve accuracy, but are not universally adopted [5,7].

#### c. Imaging

Transvaginal Ultrasound (TVUS) is the first-line imaging modality. Key features include cyst size, wall characteristics, septations, papillary projections, and vascularity [3,8].

O-RADS classification provides standardized ultrasound descriptors and stratifies adnexal lesions by malignancy risk. Validation studies show high sensitivity and specificity for guiding clinical decisions [1,2].

Magnetic Resonance Imaging (MRI) is recommended for indeterminate lesions. O-RADS MRI scoring further refines risk assessment using lesion composition, enhancement, and diffusion-weighted imaging [1,6].

#### d. Risk Prediction

International Ovarian Tumor Analysis (IOTA) simple rules and ADNEX models integrate clinical and sonographic features to estimate malignancy risk. These tools have been validated externally and assist in surgical referral decisions [3–4,7].

### 4. Management

#### a. Conservative treatment

Asymptomatic, simple cysts in premenopausal women, are managed expectantly. Most functional cysts resolve within 2–3 cycles. Follow-up imaging is recommended based on size, morphology, and patient age [2,5].

#### b. Medical therapy

Hormonal contraception reduces recurrence of functional cysts, but does not accelerate resolution of existing cysts [5].

#### c. Surgery

Indications for surgery include persistent, enlarging, symptomatic, or complex cysts and high-risk lesions. Laparoscopic cystectomy is preferred; laparotomy is reserved for large or suspicious masses [5,6].

d. Special Considerations

Postmenopausal Women: simple cysts <3 cm, with normal CA-125, may be observed. Complex or enlarging cysts require further evaluation [5].

Adolescents and Fertility Preservation - ovarian-sparing surgery is prioritized. Detorsion is recommended even if ovary appears ischemic, as functional recovery is common [7].

5. Complications

Ovarian torsion, rupture, and hemorrhage are major complications. Torsion is a surgical emergency requiring urgent intervention. Rupture management depends on hemodynamic stability [6].

AI-assisted imaging, advanced MRI, and biomarker integration are promising strategies to reduce diagnostic uncertainty and unnecessary surgery [1,6].

7. Conclusion

Ovarian cyst management relies on accurate imaging and validated risk stratification systems. Most cysts are safely managed conservatively, while surgery is reserved for symptomatic or high-risk lesions. Advances in imaging and predictive models continue to enhance individualized patient care [1–3].

AI-assisted imaging, advanced MRI, and biomarker integration are promising strategies to reduce diagnostic uncertainty and unnecessary surgery [1,6].

Table 1.

O-RADS Ultrasound Risk Stratification System

| O-RADS Category | Estimated Malignancy Risk | Typical Ultrasound Features                      | Repeat or alternative imaging |
|-----------------|---------------------------|--|-------------------------------|
| 0               | incomplete                | inadequate imaging                               |                               |
| 1               | 0%                        | Normal ovary                                     | routine care                  |
| 2               | <1%                       | simple cyst, unilocular, thin-walled             | no follow-up                  |
| 3               | 1–10%                     | multilocular smooth cyst <10 cm                  | follow-up ultrasound          |
| 4               | 10–50%                    | solid components, papillary projections          | specialist referral           |
| 5               | >50%                      | irregular solid mass, ascites, high Doppler flow | oncology referral             |

Table 2.

Management of ovarian cysts according to risk and patient characteristics

| Patient Group        | Cyst Type                        | Recommended Management             |
|----------------------|----------------------------------|------------------------------------|
| Premenopausal        | Simple cyst <5 cm                | Expectant management               |
| Expectant management | Persistent/complex cyst          | Follow-up or surgery               |
| Postmenopausal       | Simple cyst <3 cm, normal CA-125 | Conservative follow-up             |
| Postmenopausal       | Complex/enlarging cyst           | Surgical evaluation                |
| Adolescents          | Any cyst                         | Ovarian-sparing approach preferred |

Figure 1. Diagnostic and Management Algorithm for Ovarian Cysts

Clinical suspicion/incidental finding

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Transvaginal ultrasound

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Risk stratification (O-RADS/IOTA)

Low risk → Follow-up Intermediate risk → MRI → Repeat stratification

High risk → Gynecologic oncology referral

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Surgical management (laparoscopy/laparotomy)

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