

# FOLLICULAR OVARIAN CYSTS: IMPACT ON OVULATORY FUNCTION AND REPRODUCTIVE PROSPECTS

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## Abstract

Follicular cysts are the most common type of functional ovarian cyst and arise when a dominant follicle fails to rupture at the expected point in the menstrual cycle, most often as a result of excessive follicle-stimulating hormone drive or an absent or blunted luteinizing hormone surge. Although the majority of these cysts are asymptomatic and resolve spontaneously, their presence raises persistent clinical questions about their effect on ovulatory regularity, the outcome of assisted reproduction cycles, and long-term reproductive prospects, particularly when surgical intervention is considered. This review synthesizes evidence on the pathophysiology of follicular cyst formation, standardized ultrasound classification of physiologic versus pathologic adnexal findings, the measurable effect of baseline follicular cysts on clinical pregnancy outcomes during in vitro fertilization, and the impact of cystectomy on ovarian reserve markers. Randomized and systematic-review evidence indicates that hormonal treatment does not accelerate the resolution of established functional cysts and that small cysts, below approximately 14 mm, do not meaningfully compromise IVF cycle outcomes, whereas surgical stripping of larger or recurrent cysts, especially when bilateral, carries a demonstrable risk to ovarian reserve as reflected by anti-Müllerian hormone decline. These findings support individualized, biomarker-guided management that favors conservative observation over reflexive hormonal or surgical intervention whenever clinically appropriate, in order to preserve ovulatory and reproductive potential.

**Keywords:** Follicular ovarian cyst; ovulatory dysfunction; ovarian reserve; anti-Müllerian hormone; in vitro fertilization; O-RADS; reproductive prognosis

## Introduction

Follicular cysts develop when a growing ovarian follicle fails to rupture and release an oocyte at the expected point in the menstrual cycle, instead continuing to accumulate fluid under ongoing hormonal stimulation. This failure of rupture is most commonly attributable to excessive follicle-stimulating hormone drive or to an absent or insufficient luteinizing hormone surge, conditions that allow granulosa cells within the unruptured follicle to continue producing estradiol and to sustain the cystic structure beyond its normal lifespan [1]. Functional cysts of this kind are common findings on pelvic ultrasound in women of reproductive age, and the great majority are self-limiting: available data indicate that 70 to 80 percent of follicular cysts resolve spontaneously without intervention, typically within one to three menstrual cycles [1].





Despite this generally benign natural history, follicular cysts remain a frequent source of clinical uncertainty, particularly in two situations: when a cyst is identified incidentally during controlled ovarian stimulation for in vitro fertilization, raising the question of whether to proceed with or cancel the treatment cycle, and when a cyst is large, persistent, or recurrent and surgical removal is being weighed against continued observation. Both situations require an evidence-based understanding of how the presence of a follicular cyst, and its clinical management, affect ovulatory function and downstream reproductive prospects.

## 2. Pathophysiology and Disruption of Ovulatory Patterns

The mechanistic basis for the association between follicular cysts and disrupted ovulation lies in the sustained, dysregulated estrogen output of the unruptured follicle. Continued granulosa cell activity within a follicular cyst leads to persistently elevated estradiol levels, which in turn interfere with the normal hypothalamic-pituitary feedback signals required to generate a coordinated luteinizing hormone surge in subsequent cycles; this excess estradiol production has been described as a direct cause of decreased menstrual frequency through disruption of normal cyclical feedback [1]. This creates a self-reinforcing pattern in which anovulatory or irregularly ovulatory cycles predispose to further functional cyst formation, and existing cysts in turn suppress the hormonal conditions required for the next ovulatory event to proceed normally.

This pathophysiological picture explains why follicular cysts, even though structurally simple and histologically benign, are clinically relevant beyond their physical presence: their principal reproductive impact operates through transient endocrine disruption of the ovulatory cycle rather than through mechanical or structural damage to ovarian tissue, a distinction that is important both for patient counseling and for choosing between observation and intervention.

## 3. Diagnostic Classification: Distinguishing Physiologic Structures from Pathology

Accurate ultrasound classification is a prerequisite for sound reproductive counseling, since not every anechoic adnexal finding in a reproductive-age woman represents pathology. The consensus O-RADS (Ovarian-Adnexal Reporting and Data System) ultrasound guideline explicitly recommends that physiologic structures such as a dominant follicle or corpus luteum in a premenopausal patient be described and reported as such rather than labeled a "cyst," specifically to avoid unnecessary patient concern and inappropriate follow-up [2]. Under this system, a true simple follicular cyst with a smooth thin wall, posterior acoustic enhancement, and no internal echoes falls into the O-RADS 2 category, corresponding to a malignancy risk below 1 percent; simple cysts up to 5 cm in premenopausal women require no follow-up at all, while those measuring 5 to 10 cm warrant a single reassessment at 8 to 12 weeks rather than immediate intervention [2].

This standardized framework is directly relevant to reproductive counseling because it establishes clear, size- and appearance-based thresholds below which observation alone is appropriate, reducing the likelihood that a physiologic or simple functional structure is mistakenly treated as a pathological mass requiring escalation to hormonal suppression or surgery, either of which carries its own, separately documented implications for ovulatory and reproductive function discussed below.





#### 4. Effect of Hormonal Treatment and Cyst Size on Reproductive Outcomes

A longstanding assumption in clinical practice has been that suppressing ovarian activity with combined oral contraceptives accelerates the resolution of an existing functional cyst and thereby protects ovulatory recovery. This assumption is not supported by controlled evidence. A prospective randomized trial of women with cysts detected after ovulation induction found resolution in 76 percent of patients managed by observation alone compared with 72 percent of those given oral contraceptive therapy, a difference that was not meaningful, and reported that all persistent cysts in both groups had resolved by the second cycle without any additional treatment [3]. This finding was subsequently corroborated at the systematic-review level: a Cochrane review concluded that oral contraceptives are not an effective treatment for functional ovarian cysts, whether spontaneous or induced, across the randomized trials available for analysis [4]. Together, these two independent bodies of evidence indicate that hormonal suppression does not meaningfully shorten the time to spontaneous ovulatory recovery relative to expectant management.

The clinical significance of a coexisting follicular cyst for assisted reproduction has been directly examined in women undergoing in vitro fertilization with a follicular cyst identified at baseline. This cohort study found no statistically significant difference between the cyst group and the control group in clinical pregnancy rate, live birth rate, or miscarriage rate, indicating that the presence of a follicular cyst alone does not necessarily compromise IVF success [5]. Using receiver operating characteristic curve analysis, the authors identified 14 mm as an optimal diameter threshold, concluding that cycles can proceed without hesitation when the cyst measures less than 14 mm, while pregnancy rates showed a modest, non-statistically-significant decline in cysts measuring 21 mm or larger [5]. Higher antral follicle count and lower luteinizing hormone level on the day of the ovulation trigger were identified as independent predictors of successful clinical pregnancy, and serum estradiol level measured on trigger day was found to play a crucial role in determining pregnancy outcomes [5].

#### 5. Cystectomy and Ovarian Reserve: Implications for Reproductive Prospects

When surgical removal of an ovarian cyst is undertaken, the stripping technique used to excise the cyst wall carries a demonstrable cost to ovarian reserve. The strongest evidence for this effect comes from the endometrioma literature specifically, rather than from simple functional cysts, and should be extrapolated to other cyst types with appropriate caution; nonetheless, given that the surgical technique itself, not the cyst contents, is the presumed mechanism of injury, it provides the most direct available quantification of surgical risk to reserve. A contemporary critical appraisal of systematic reviews on endometriotic cystectomy found that stripping adversely affects anti-Müllerian hormone and antral follicle count in both the short and long term, with declines detectable up to 9 to 18 months after surgery, and with unilateral cystectomy producing an average decline of 39.5 percent in anti-Müllerian hormone compared with 57.0 percent following bilateral procedures [6]. The same appraisal identified anti-Müllerian hormone as substantially more sensitive to this surgical damage than antral follicle count, and recommended it as the preferred biomarker for counseling and monitoring women of reproductive age both before and after cyst surgery [6].

Notably, this body of evidence found that the underlying presence of a cyst itself, as distinct from its surgical removal, does not consistently demonstrate an independent adverse effect on ovarian reserve,





with good-quality evidence challenging the assumption that the cyst alone reduces reproductive potential [6]. This distinction has direct clinical relevance for reproductive prognosis counseling: the principal threat to future ovulatory and reproductive function arises predominantly from the surgical intervention itself, particularly when bilateral, rather than from the cyst's mere presence, reinforcing the case for conservative management whenever a cyst does not meet clear O-RADS-based or clinical criteria for surgical removal [2, 6].

## 6. Limitations of the Current Evidence Base

The evidence synthesized in this review is limited in several respects that should temper its clinical application. First, the most rigorous quantitative data on surgical risk to ovarian reserve derive from endometrioma cystectomy rather than from simple follicular cyst removal specifically, and the magnitude of reserve loss may differ for a thinner-walled functional cyst; dedicated prospective data isolating simple functional cysts from other cyst histologies remain comparatively scarce. Second, the randomized evidence on hormonal management, while consistent, is drawn from trials of modest size conducted over an extended period, and larger contemporary trials would strengthen confidence in the finding of clinical equivalence between observation and oral contraceptive therapy [3, 4]. Third, the IVF outcome data reflect a single-center cohort and would benefit from external replication before the proposed 14 mm threshold is adopted as a fixed decision rule across all clinical settings [5].

## 7. Conclusion

Follicular ovarian cysts influence reproductive potential principally through transient disruption of the normal ovulatory hormonal cascade rather than through structural damage, and the large majority resolve spontaneously without lasting consequence. Standardized ultrasound classification helps distinguish physiologic and simple functional structures from lesions warranting closer follow-up, and current evidence indicates that hormonal suppression does not accelerate cyst resolution, that small follicular cysts, particularly those below 14 mm, do not meaningfully impair clinical pregnancy outcomes during in vitro fertilization, and that surgical cystectomy, especially bilateral stripping procedures, carries a measurable and biomarker-detectable risk to ovarian reserve that can persist for well over a year after surgery. These findings support an individualized, reserve-guided approach to the management of follicular cysts in women of reproductive age, prioritizing observation and biomarker monitoring over reflexive hormonal or surgical intervention in order to protect long-term ovulatory function and reproductive prospects, while further prospective research specific to functional cyst histology is still needed.

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