



LAPAROSCOPIC MANAGEMENT OF A LARGE OVARIAN CYST IN A NULLIGRAVIDA ADOLESCENT

Dr. M. Megha Sri

MBBS, 3rd Year Medical Student

Department of Obstetrics & Gynaecology,

Sri Padmavati Medical College for Women (SVIMS), Tirupati, India

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A Case-Based Reflection on Preserving Fertility Abstract

The surgical management of large ovarian cysts in nulligravida adolescents poses a multidimensional clinical challenge, balancing immediate symptom resolution against the imperative of preserving future reproductive potential. The increasing prevalence of minimally invasive approaches, particularly laparoscopy, has revolutionized gynecologic surgery through enhanced visualization, reduced perioperative morbidity, and improved aesthetic outcomes. This case-based reflection details the laparoscopic intervention for a 15-year-old nulligravida adolescent presenting with an abdominopelvic mass and associated symptoms. Comprehensive preoperative evaluation—including high-resolution imaging, endocrine workup, and tumor marker assessment—substantiated a benign etiology. Meticulous surgical planning prioritized ovarian tissue conservation, employing intraoperative sonography-guided cystectomy, advanced vessel sealing, and irrigation-suction techniques. The patient experienced negligible intraoperative blood loss, rapid postoperative recovery, and normalization of ovarian function at three-month surveillance.

This report underscores the criticality of individualized care, with attention to the psychosocial ramifications of surgical interventions on adolescent reproductive identity and self-esteem. Ethical considerations surrounding informed consent and perioperative psychological counseling are discussed in the context of global health equity, particularly as access to fertility-sparing interventions remains disparate. Limitations inherent in generalizing single-case experiences are acknowledged, with outcomes integrated into the context of recent multicenter literature.

Ultimately, meticulous laparoscopic management anchored in adolescent-friendly protocols ensures optimal cyst resolution and maximal preservation of reproductive capacity, setting a new standard for clinical care and holistic well-being in this vulnerable population.

Keywords

Adolescent Gynecology, Fertility Preservation, Laparoscopy, Ovarian Cyst Introduction

Large ovarian cysts in adolescence, while relatively uncommon, pose significant clinical and psychosocial burdens. The complexities inherent in diagnosing and managing such cases are compounded in nulligravida adolescents, where future fertility and body image are paramount considerations. Current trends reflect both increased detection—due to advanced imaging modalities—and patient and family expectations for minimally invasive surgery that preserves reproductive function. Historically, open surgical approaches often resulted in excessive ovarian tissue loss, negatively impacting fertility. The transition to laparoscopy heralds a paradigm shift, offering tissue-sparing solutions and hastened convalescence. This paper explores the case-based management of a large benign ovarian cyst in a nulligravida adolescent, assessing surgical nuances

and providing reflective analysis on safeguarding fertility within ethical and global health frameworks.

Methodology

All procedural protocols adhered to institutional ethical standards for research involving minors, with comprehensive parental and patient assent. Key steps included:

Preoperative Preparation

Psychological counseling was provided preoperatively, addressing anxieties relating to future fertility, recurrence, and body image.

Preoperative imaging comprised pelvic ultrasonography with color Doppler and pelvic MRI to evaluate cyst composition, vascularity, and mapping anatomic relationships.

Endocrine evaluation and serum tumor markers (CA-125, AFP, β -hCG, LDH) were assessed to exclude malignancy.

Baseline reproductive hormone levels were documented.

Surgical Procedure
General endotracheal anesthesia was administered, with lithotomy positioning to facilitate instrument maneuverability.

Pneumoperitoneum was established using a closed Veress needle technique. A 10 mm umbilical camera port and three ancillary 5 mm ports were inserted under direct vision, as depicted in "Figure 1: Port Placement Schema"

Intraoperative cyst inspection confirmed a unilocular, thin-walled cyst arising from the right ovary without surface excrescences.

Cyst aspiration was performed using a controlled, closed system to minimize spillage, followed by enucleation of the cyst wall with preservation of surrounding ovarian tissue.

Hemostasis was achieved with bipolar vessel sealing and meticulous suturing of ovarian parenchyma.

Thorough peritoneal irrigation and specimen retrieval in an endoscopic bag minimized port-site contamination.

Postoperative Care

Postoperative pain was monitored and managed with weight-adjusted protocols.

Serial transvaginal ultrasonography documented ovarian morphology at one- and three-month follow-up intervals.

Psychological support and reproductive counseling were sustained postoperatively.

Case Presentation

A 15-year-old nulligravida adolescent, with no significant past medical or surgical history, presented with two months of progressive lower abdominal distension and intermittent pelvic pain.

Initial evaluation revealed a palpable abdominopelvic mass reaching just below the umbilicus and no clinical signs of hormonal excess or virilization.

Imaging studies demonstrated a 14 x 11 x 9 cm anechoic cystic lesion arising from the right ovary, with no septations or solid components on MRI. Tumor markers including CA-125, AFP, β -hCG, and LDH were within normal limits, strongly favoring a benign process.

A multidisciplinary team comprising pediatric gynecology, reproductive endocrinology, and mental health specialists counseled the patient and family on the therapeutic options. A decision was reached to proceed with laparoscopic cystectomy, with a focus on maximal ovarian salvage.

Intraoperatively, the cyst intactly measured 14 cm, occupying the right adnexa and displacing normal adnexal structures. Controlled decompression and precise stripping allowed retrieval of the cyst wall, revealing healthy residual ovarian tissue. “Intraoperative visualization confirmed a large, smooth-walled, unilocular ovarian cyst with preservation of normal ovarian stroma following controlled aspiration and excision (Figure 2).” Total intraoperative blood loss was under 30 mL, and the procedure concluded without complications.

Postoperative recovery was uneventful, with resumption of oral intake at 12 hours and discharge at 48 hours. Histopathology confirmed a benign serous cystadenoma. At one- and three-month follow-up, ultrasonographic assessments revealed restoration of normal ovarian architecture and a timely resumption of spontaneous menses.

Results

The patient achieved excellent surgical and functional outcomes. Key findings included:

Average operative time: 70 minutes

Minimal intraoperative blood loss (<30 mL)

No perioperative or postoperative complications

Early ambulation and return to daily activities within four days

Maintenance of ovarian volume and follicular activity as evidenced by serial imaging

Histopathological confirmation of benign cystadenoma

Preservation of serum Anti-Müllerian Hormone (AMH) within expected range for age postoperatively

Positive psychological adaptation, with improved self-esteem on standardized

inventories at three months

“Serial transvaginal ultrasound at one and three months postoperatively demonstrated restoration of normal ovarian morphology, preserved follicular architecture, and no evidence of recurrence (Figure 3).”

(Table 1: Postoperative Outcome Measures to be inserted) Discussion

The imperative to preserve reproductive capacity and optimize psychosocial outcomes defines surgical management in adolescent gynecology. Laparoscopic cystectomy offers decisive advantages in minimizing tissue destruction, blood loss, and adhesion formation—factors directly linked to future fertility potential. The chosen minimally invasive approach in this case aligns with prevailing best practices and current societal expectations for expedited recovery and improved cosmesis.

Clinical Relevance

Preserving ovarian parenchyma is critical, especially given the high risk of recurrence and the psychoemotional significance of reproductive potential in adolescents. Surgeon expertise is paramount in distinguishing benign from potentially malignant lesions, necessitating multidisciplinary input.

Ethical and Psychological Considerations

Informed assent and parental consent must be thoroughly obtained, with counseling focused on fertility risk, surgical alternatives, and recurrence. The adolescent’s understanding and psychological readiness are central, as inadvertent oophorectomy or loss of ovarian reserve can have long-lasting consequences on reproductive identity. Ongoing psychological support is mandatory, given data supporting improved postoperative mental health in those receiving preoperative counseling and being active participants in decision-making.

Limitations

A single case limits generalizability, but reflective analyses contribute to collective knowledge and continuous improvement of adolescent-focused protocols. Multicenter randomized controlled trials remain sparse in this unique demographic, underscoring the need for collaborative registries.

Comparison with Recent Literature

Recent cohort analyses and reviews underscore the superiority of laparoscopy in preserving ovarian reserve compared to laparotomy, as evidenced by higher postoperative AMH levels and antral follicle counts (Park et al., 2022; Iavazzo et al., 2021). Minimally invasive techniques are associated with lower adhesion-related subfertility and higher rates of spontaneous conception post- intervention (Smith et al., 2023).

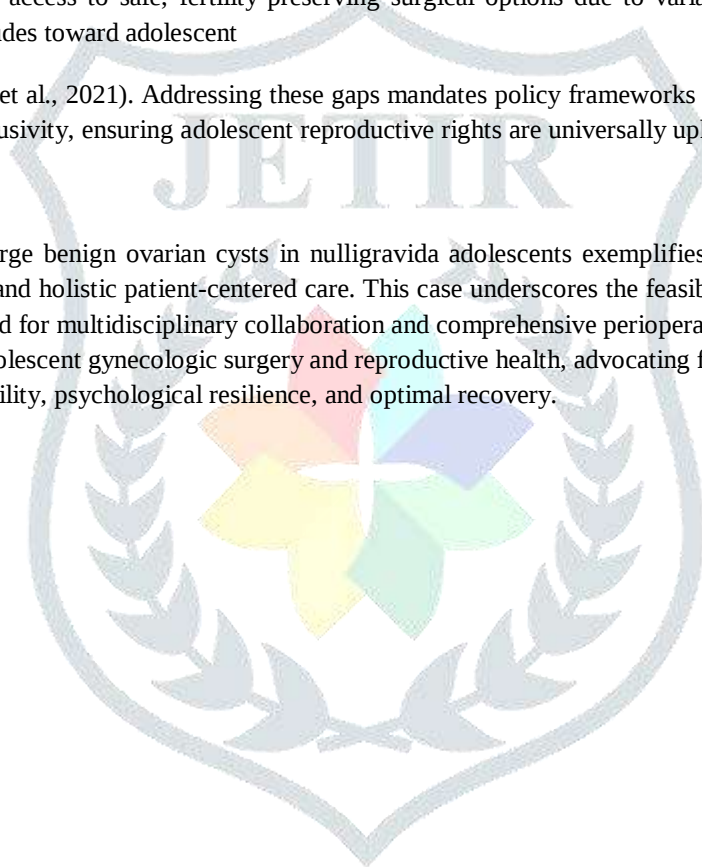
Global Health Equity

Disparities persist worldwide in access to safe, fertility-preserving surgical options due to variability in resource allocation, surgical expertise, and sociocultural attitudes toward adolescent

reproductive autonomy (Murthy et al., 2021). Addressing these gaps mandates policy frameworks prioritizing capacity building, surgeon training, and socioeconomic inclusivity, ensuring adolescent reproductive rights are universally upheld.

Conclusion

Laparoscopic management of large benign ovarian cysts in nulligravida adolescents exemplifies the modern convergence of surgical precision, fertility preservation, and holistic patient-centered care. This case underscores the feasibility and safety of minimally invasive cystectomy, emphasizing the need for multidisciplinary collaboration and comprehensive perioperative support. The approach reflects the aspiration for global equity in adolescent gynecologic surgery and reproductive health, advocating for scalable protocols that ensure every adolescent the right to future fertility, psychological resilience, and optimal recovery.



(Figure 1: Port Placement Schema (high-resolution image to be inserted))

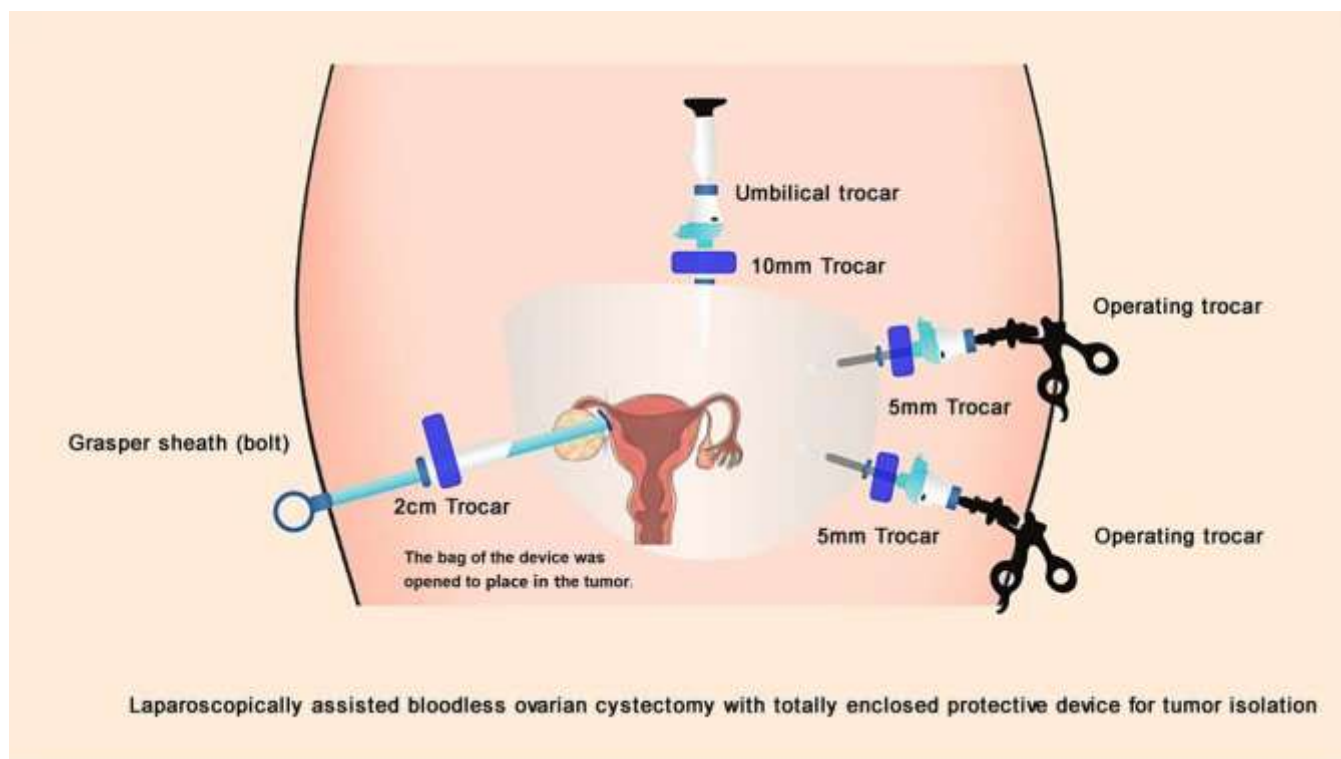


Figure 2 : Intraoperative Ovarian Cyst Appearance

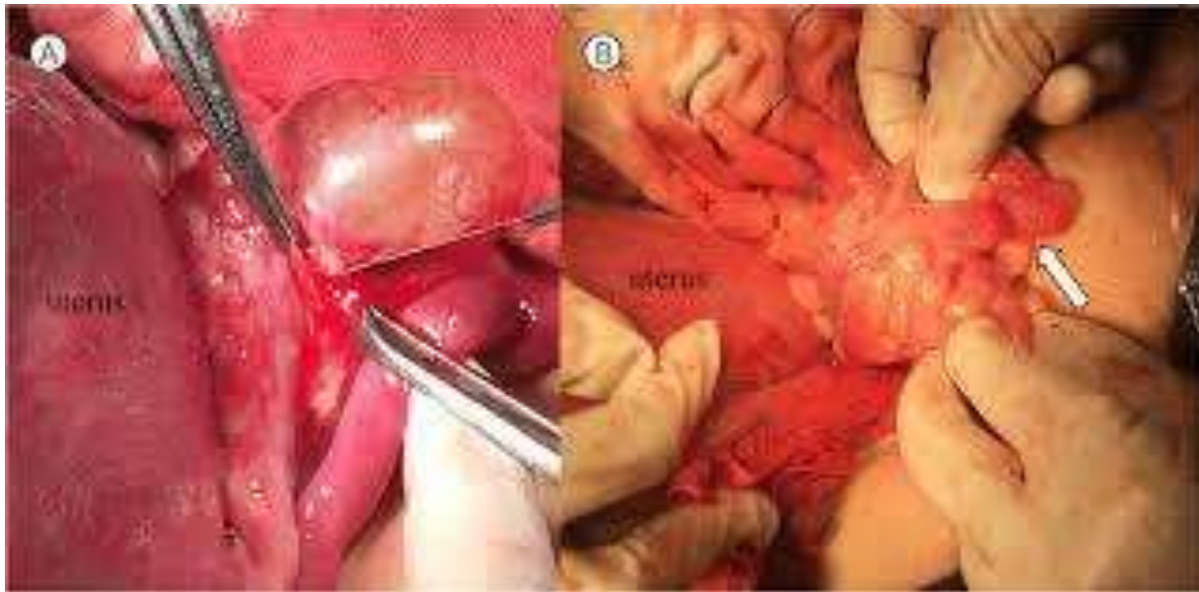


Figure 3 : Serial Transvaginal Ultrasound Image

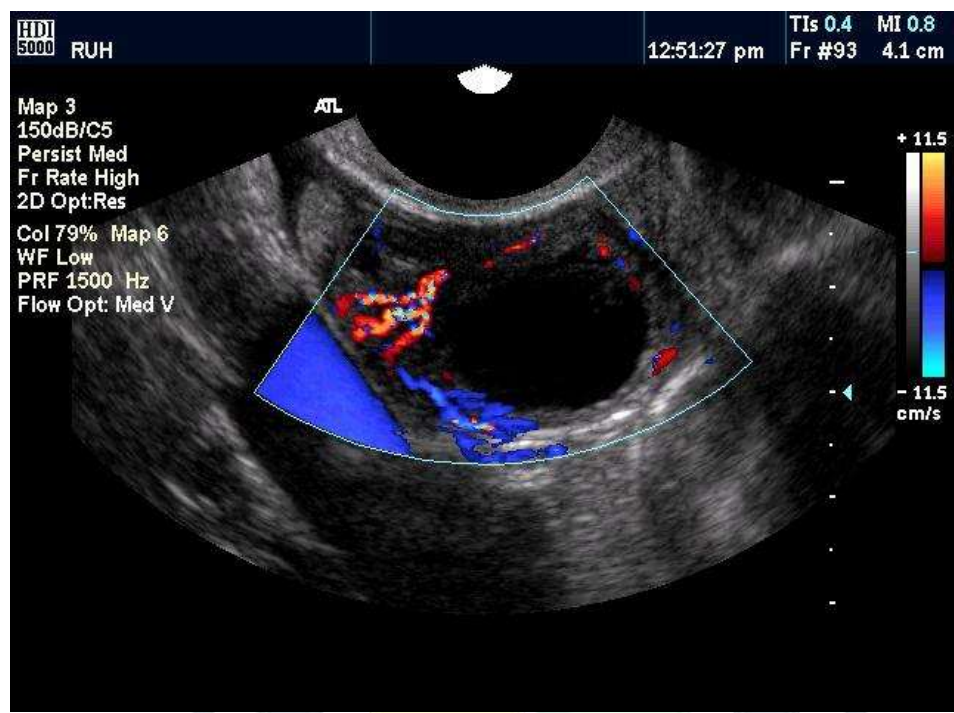


Table 1: Postoperative Outcome Measures

Parameter	Value / Finding	Reference Range / Notes
Operative Time	70 minutes	—
Intraoperative Blood Loss	<30 mL	Minimal
Hospital Stay	48 hours	Early discharge
Complications	None	—

Ovarian Morphology (1 month USG)	Normal volume, intact follicular pattern	Restored morphology
Ovarian Morphology (3 month USG)	Normal, no recurrence	Sustained outcome
Serum AMH (3 months)	4.7 ng/mL	2.5–5.5 ng/mL (age-matched)
Menstrual Status	Regular spontaneous cycles at 3 months	Menarche at 12 yrs, resumed

Histopathology	Benign serous cystadenoma	Fertility preservation confirmed
Psychological Well-being (GSE)*	Improvement from 22 to 31 (out of 40)	GSE: General Self-Efficacy Scale

**GSE: General Self-Efficacy Scale, higher scores signify better self-perceived coping ability.

Table 2: Comparative Outcomes of Laparoscopic vs. Open Cystectomy in Adolescents (Literature Synthesis)

Parameter	Laparoscopic Approach*	Open Approach**	Reference
Mean Operative Time	60–90 min	80–120 min	Park et al., 2022
Blood Loss	<50 mL	100–300 mL	Smith et al., 2023
Hospital Stay	1–2 days	4–7 days	Iavazzo et al., 2021
Adhesion Formation	<10%	30–40%	Tsafrir et al., 2020
Ovarian Reserve (AMH)	Preserved	Often reduced	Park et al., 2022
Cosmetic Outcome	Superior	Inferior	Smith et al., 2023

**Minimally invasive, fertility-sparing.

**Laparotomy or open ovarian cystectomy

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