

MODERN APPROACHES TO THE TREATMENT AND REHABILITATION OF BENIGN OVARIAN TUMORS AND TUMOR-LIKE LESIONS IN ADOLESCENT GIRLS

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Abstract. *This article analyzes modern approaches to the diagnosis, treatment, and rehabilitation of benign ovarian tumors and tumor-like lesions in adolescent girls. The clinical manifestations, diagnostic value of ultrasound examination, conservative and surgical treatment methods, and the role of organ-preserving surgery in maintaining reproductive potential are discussed. Particular attention is paid to preserving ovarian tissue and functional ovarian activity during treatment. The importance of postoperative rehabilitation, menstrual cycle monitoring, and long-term follow-up is also emphasized. Modern organ-preserving and minimally invasive approaches may contribute to improving treatment outcomes and preserving the reproductive health of adolescent patients.*

Keywords: *Adolescent girls, ovary, benign ovarian tumors, ovarian cysts, tumor-like lesions, ultrasound diagnosis, conservative treatment, laparoscopy, organ-preserving surgery, reproductive health.*

Introduction

Adolescence is a critical period of female reproductive development characterized by profound anatomical, physiological, and endocrine changes. During this stage, the hypothalamic–pituitary–ovarian axis undergoes progressive maturation, menstrual function becomes established, and the reproductive organs continue to develop. Consequently, ovarian disorders occurring during adolescence have specific clinical and therapeutic characteristics that differ from those observed in adult women. Benign ovarian tumors and tumor-like lesions represent an important group of gynecological conditions in adolescent girls, and their timely diagnosis and appropriate management are essential for preserving reproductive health and preventing potential complications.

The clinical presentation of ovarian tumors and tumor-like lesions in adolescents varies considerably depending on their morphological characteristics, size, localization, hormonal activity, and the presence of complications. Some lesions remain asymptomatic and are detected incidentally during routine ultrasonographic examinations, whereas others may manifest as lower abdominal or pelvic pain, menstrual irregularities, abdominal discomfort, or symptoms associated with a space-occupying lesion. Acute abdominal pain may indicate complications such as ovarian torsion, hemorrhage, or rupture, which require urgent diagnostic assessment and, in selected cases, emergency surgical intervention.

A comprehensive diagnostic approach is essential for determining the nature of an ovarian lesion and selecting an appropriate treatment strategy. Clinical examination and medical history should be complemented by pelvic ultrasonography and Doppler assessment.

Ultrasonography provides valuable information regarding lesion size, morphology, internal structure, wall characteristics, septations, solid components, and vascularization. In clinically appropriate cases, additional laboratory and biochemical investigations may be required to further characterize the lesion and exclude potentially malignant processes. The primary objective of diagnostic evaluation is therefore not only to identify an ovarian mass but also to assess its biological characteristics, determine the likelihood of complications, and establish an individualized management plan.

The choice of treatment depends on several factors, including the patient's age, clinical manifestations, lesion size and morphology, changes observed during follow-up, and the presence or absence of complications. In selected adolescents with small, asymptomatic, and clinically stable functional lesions, expectant management with periodic clinical and ultrasonographic monitoring may be appropriate. Conservative management can help avoid unnecessary surgical intervention and preserve normal ovarian tissue. However, persistent or enlarging lesions, symptomatic masses, and lesions associated with torsion, rupture, hemorrhage, or other complications may require surgical treatment.

Relevance

Benign ovarian tumors and tumor-like lesions are among the important gynecological conditions that may occur during adolescence. Their clinical significance is determined not only by the possibility of acute complications, such as ovarian torsion, rupture, hemorrhage, or compression of adjacent pelvic structures, but also by their potential influence on menstrual function and future reproductive health. The diagnostic and therapeutic management of ovarian lesions in adolescent girls requires particular attention because the ovaries are essential organs for both hormonal regulation and preservation of reproductive potential. Therefore, treatment strategies should be aimed at eliminating the pathological process while maintaining healthy ovarian tissue whenever clinically possible.

Aim

The aim of this study is to evaluate and improve modern approaches to the treatment and rehabilitation of benign ovarian tumors and tumor-like lesions in adolescent girls, with particular emphasis on individualized treatment selection, organ-preserving surgical techniques, prevention of complications, restoration of ovarian function, and preservation of future reproductive potential.

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Benign ovarian tumors and tumor-like lesions represent an important group of gynecological conditions that may occur during adolescence. Their clinical manifestations vary according to the histological type, size, localization, hormonal activity, and presence of complications. Some lesions may remain clinically silent and are detected incidentally during routine pelvic ultrasonography. Symptomatic patients may present with lower abdominal or pelvic pain, abdominal discomfort, menstrual irregularities, or a sensation of pelvic pressure.

Acute abdominal pain requires particular attention because it may indicate ovarian torsion, hemorrhage, or rupture of an ovarian lesion. In adolescent patients, the diagnostic process should begin with a detailed medical history and clinical examination, including assessment of menstrual characteristics and previous gynecological disorders. Ultrasonography is considered an important first-line imaging method because it allows evaluation of ovarian morphology, lesion size, internal structure, wall characteristics, septations, and vascularity.

Doppler examination may provide additional information regarding blood flow within the lesion and surrounding ovarian tissue. The differentiation between functional cysts, benign tumors, and lesions requiring further investigation is essential for selecting an appropriate management strategy. In complex or persistent cases, additional laboratory and imaging examinations may be indicated. A systematic diagnostic approach allows unnecessary invasive procedures to be minimized while facilitating timely treatment of clinically significant lesions.

The management of benign ovarian tumors and tumor-like lesions in adolescents should be individualized according to the patient's age, symptoms, lesion characteristics, and risk of complications. Conservative management may be appropriate for selected functional and clinically stable lesions, particularly when spontaneous regression is expected. Such patients require regular clinical assessment and follow-up ultrasonography to evaluate changes in lesion size and morphology. Persistent, symptomatic, enlarging, or complicated lesions may require surgical intervention. Modern surgical management increasingly emphasizes minimally invasive and organ-preserving techniques. Laparoscopic surgery provides an opportunity to remove pathological tissue while preserving healthy ovarian parenchyma whenever technically and clinically feasible. Cystectomy is generally preferable to extensive ovarian resection when the lesion characteristics allow preservation of functional tissue. In cases of ovarian torsion, timely surgical intervention is essential to minimize ischemic damage and maximize the possibility of ovarian preservation. The choice of operative technique should consider the size and location of the lesion, its relationship to normal ovarian tissue, and the possibility of malignancy. Excessive surgical manipulation should be avoided because preservation of ovarian reserve is particularly important in adolescent patients.

Preservation of future reproductive potential is one of the fundamental principles in the management of ovarian pathology during adolescence. The ovaries have both reproductive and endocrine functions, and unnecessary removal of ovarian tissue may potentially affect future fertility and hormonal regulation. Therefore, treatment planning should focus on preserving healthy ovarian parenchyma whenever oncological and clinical safety permits. Organ-preserving surgery requires careful preoperative evaluation of lesion morphology and the functional condition of the contralateral ovary. Laparoscopic cystectomy and other tissue-sparing procedures may be considered in appropriate benign lesions. Intraoperative assessment should be performed carefully to minimize damage to the ovarian cortex and vascular structures. In complicated cases, including torsion, preservation of viable ovarian tissue may remain an important objective when there is no clear indication for radical removal. The postoperative assessment of ovarian function should include evaluation of menstrual patterns and, when clinically indicated, appropriate hormonal and ultrasonographic parameters. Long-term follow-up is particularly important for adolescents because reproductive consequences may become clinically relevant years after the initial treatment. Psychological support should also be considered, as gynecological surgery during adolescence may cause anxiety regarding fertility and future pregnancy.

Rehabilitation following treatment of benign ovarian tumors and tumor-like lesions should be considered an integral part of patient management rather than an isolated postoperative stage. The primary objectives of rehabilitation include recovery from surgical intervention, restoration of normal daily activity, monitoring of menstrual function, prevention of complications, and preservation of reproductive health. The duration and intensity of rehabilitation depend on the type of treatment, surgical approach, lesion characteristics, and

individual clinical condition. After minimally invasive surgery, adolescents may generally return to normal activities more rapidly than after extensive surgical procedures, although recommendations should be individualized. Clinical follow-up should include assessment of postoperative symptoms, wound healing, menstrual cycle characteristics, and recurrence-related manifestations. Ultrasonographic monitoring may be performed when clinically indicated to assess ovarian morphology and identify persistent or recurrent lesions. Attention should also be given to psychological well-being because concerns regarding reproductive health may influence the patient's quality of life. Education about menstrual health, warning symptoms, physical activity, and the importance of scheduled follow-up can improve adherence to medical recommendations. Nutritional and lifestyle counseling may also be incorporated into rehabilitation when appropriate. Long-term follow-up is particularly valuable for patients who underwent extensive ovarian surgery or experienced complications such as torsion.

The optimization of care for adolescent girls with benign ovarian tumors and tumor-like lesions requires coordinated interaction among specialists. Pediatric and adolescent gynecologists play a central role in clinical assessment, treatment planning, and long-term reproductive follow-up. Ultrasonography specialists contribute to accurate characterization and dynamic assessment of ovarian lesions, while surgeons provide minimally invasive and organ-preserving treatment when surgery is indicated. In selected complex cases, consultation with an oncologist may be necessary to assess the risk of malignant pathology and determine the appropriate diagnostic pathway. Endocrinological evaluation may also be relevant when ovarian lesions are associated with menstrual or hormonal disturbances. A multidisciplinary model facilitates individualized decision-making and reduces the risk of both delayed intervention and unnecessary invasive treatment. Modern management should incorporate clinical findings, imaging characteristics, lesion dynamics, and the patient's reproductive priorities. Standardized follow-up protocols can improve continuity of care and facilitate early identification of recurrence or postoperative complications. Rehabilitation should be adapted to the patient's age, treatment method, psychological condition, and reproductive needs. Patient and family education is another important component because informed participation improves adherence to follow-up recommendations. The integration of minimally invasive surgery, advanced imaging, individualized monitoring, and reproductive-health-oriented rehabilitation may improve the overall quality of care.

Results

A total of 60 adolescent girls aged 12–18 years with benign ovarian tumors and tumor-like lesions were included in the study. The mean age of the patients was 15.2 ± 1.7 years.

Clinical, ultrasonographic, therapeutic, and rehabilitation outcomes were evaluated. The majority of patients were diagnosed following complaints related to pelvic discomfort or lower abdominal pain, whereas a smaller proportion of lesions were detected incidentally during routine ultrasonographic examination.

Lower abdominal or pelvic pain was the most frequent clinical manifestation and was observed in 34 patients (56.7%). Menstrual irregularities were identified in 19 patients (31.7%), while 17 patients (28.3%) reported a sensation of heaviness or discomfort in the lower abdomen.

Thirteen patients (21.7%) had no significant clinical symptoms and were diagnosed during ultrasound examination. Acute abdominal pain was observed in 8 patients (13.3%), requiring urgent evaluation because of the suspected risk of ovarian torsion, hemorrhage, or rupture.

Table 1. Clinical characteristics of the examined patients

Clinical characteristic	n	%
Lower abdominal/pelvic pain	34	56.7
Menstrual irregularities	19	31.7
Lower abdominal discomfort/heaviness	17	28.3
Asymptomatic course	13	21.7
Acute abdominal pain	8	13.3
Abdominal enlargement	6	10.0

Pelvic ultrasonography was performed in all 60 patients and represented the principal diagnostic imaging method. According to the ultrasound findings, functional cystic lesions were identified in 27 patients (45.0%), serous cystic lesions in 12 patients (20.0%), dermoid cysts in 8 patients (13.3%), endometriotic-type lesions in 5 patients (8.3%), and other benign ovarian lesions in 8 patients (13.3%).

Table 2. Morphological distribution of ovarian lesions

Type of ovarian lesion	n	%
Functional cystic lesions	27	45.0
Serous cystic lesions	12	20.0
Dermoid cysts	8	13.3
Endometriotic-type lesions	5	8.3
Other benign ovarian lesions	8	13.3
Total	60	100.0

The size of the detected lesions ranged from 2.1 to 11.4 cm. Lesions smaller than 5 cm were observed in 31 patients (51.7%), lesions measuring 5–8 cm were found in 21 patients (35.0%), and lesions larger than 8 cm were identified in 8 patients (13.3%). Larger lesions and those associated with significant symptoms or complications were more frequently considered for active treatment.

Treatment selection was based on the patient's age, clinical symptoms, lesion morphology and size, changes during follow-up, and the presence of complications. Conservative dynamic observation was selected for 24 patients (40.0%), predominantly those with clinically stable lesions considered suitable for follow-up. Surgical treatment was performed in 36 patients (60.0%). Whenever clinically feasible, an organ-preserving approach was prioritized.

Table 3. Distribution of treatment approaches

Treatment approach	n	%
Conservative management and dynamic observation	24	40.0
Laparoscopic cystectomy	25	41.7
Laparoscopic ovarian resection	7	11.7
Other surgical procedures	4	6.6
Total	60	100.0

Among the 36 patients who underwent surgery, organ-preserving procedures were performed in 32 patients (88.9%). More extensive surgical intervention was required in 4 patients (11.1%) because of lesion characteristics, localization, size, or associated complications.

Laparoscopic procedures were generally associated with an uncomplicated postoperative course and relatively rapid functional recovery.

Treatment effectiveness was assessed according to changes in clinical symptoms, menstrual cycle normalization, ultrasound findings, and preservation of ovarian tissue. Among the 24 patients managed conservatively, reduction in lesion size or complete regression was observed in 19 patients (79.2%) during follow-up. In 5 patients (20.8%), the lesion persisted and therefore continued clinical and ultrasonographic monitoring was required.

Among surgically treated patients, improvement or complete resolution of the main clinical symptoms was observed in 31 of 36 patients (86.1%). Stabilization of the menstrual cycle within 3–6 months after treatment was observed in 30 patients (83.3%). Follow-up ultrasonography demonstrated satisfactory preservation of ovarian tissue and ovarian morphology in 33 patients (91.7%).

Table 4. Main treatment outcomes

Outcome parameter	n	%
Reduction or resolution of clinical symptoms	31	86.1
Menstrual cycle stabilization within 3–6 months	30	83.3
Preservation of ovarian tissue	33	91.7
No recurrent pathological lesion during follow-up	32	88.9
Need for additional treatment	4	11.1

Postoperative complications were recorded in 5 patients (13.9%). Short-term postoperative pain was observed in 2 patients (5.6%), inflammatory changes at the surgical wound site in 1 patient (2.8%), temporary menstrual irregularity in 1 patient (2.8%), and transient functional ovarian changes in 1 patient (2.8%). No severe postoperative complications requiring emergency repeat surgery were observed in the analyzed sample.

The rehabilitation program included individualized recommendations regarding physical activity, menstrual cycle monitoring, gynecological follow-up, and ultrasound assessment when clinically indicated. During the first three months after treatment, most patients demonstrated progressive improvement in general well-being and resolution of the main clinical manifestations. Particular attention was paid to menstrual function and preservation of ovarian tissue, as these parameters are important indicators of reproductive health in adolescent girls.

Table 5. Rehabilitation outcomes during follow-up

Rehabilitation indicator	n	%
Improvement in general clinical condition	52	86.7
Regular menstrual cycle during follow-up	50	83.3
No persistent pelvic pain	51	85.0
Satisfactory ovarian ultrasound findings	53	88.3
Return to usual physical activity	55	91.7
Need for prolonged medical follow-up	8	13.3

The comparative assessment of treatment approaches demonstrated that conservative management was most appropriate for selected clinically stable and presumably functional lesions, particularly those without signs of acute complications. Surgical management was more frequently applied in patients with persistent, symptomatic, enlarging, or complicated lesions.

Within the surgical group, the predominance of organ-preserving procedures reflected the importance of maintaining functional ovarian tissue in adolescent patients.

Overall, the results indicate that individualized treatment based on lesion characteristics and clinical presentation may provide favorable short-term outcomes in adolescent girls with benign ovarian pathology.

The combination of appropriate ultrasound-based assessment, conservative monitoring in selected patients, minimally invasive organ-preserving surgery when indicated, and structured postoperative rehabilitation may contribute to symptom resolution, menstrual function recovery, and preservation of ovarian tissue.

The obtained findings also emphasize that treatment should not be limited to the elimination of the ovarian lesion. Long-term follow-up should include assessment of menstrual function, ovarian morphology, recurrence, and reproductive health. A multidisciplinary and individualized approach involving pediatric and adolescent gynecologists, ultrasound specialists, surgeons, and other relevant specialists may improve continuity of care and support favorable long-term outcomes.

DISCUSSION

The results of the present study demonstrate that benign ovarian tumors and tumor-like lesions in adolescent girls have diverse clinical manifestations and require an individualized approach to diagnosis and treatment. Lower abdominal or pelvic pain was the most common clinical symptom, while menstrual irregularities were also frequently observed. However, the presence of asymptomatic cases indicates that some ovarian lesions may remain clinically undetected and can be identified during routine ultrasonographic examination. The morphological distribution of the lesions showed a predominance of functional cystic lesions, followed by serous cystic lesions, dermoid cysts, and endometriotic-type lesions. This finding highlights the importance of ultrasound examination not only for detecting ovarian pathology but also for determining lesion size, structure, localization, and changes during follow-up.

An important finding of the study was the relatively high proportion of patients managed conservatively. In the observation group, regression or reduction in lesion size was recorded in 79.2% of patients. This supports the clinical value of dynamic observation in appropriately selected adolescent patients with stable lesions and without signs of acute complications.

Conservative management may help avoid unnecessary surgical intervention and preserve normal ovarian tissue. Surgical treatment was performed in 60.0% of the examined patients, with laparoscopic cystectomy representing the most frequently used surgical approach. Organ-preserving procedures were performed in 88.9% of surgically treated patients. The predominance of ovarian-sparing interventions is particularly important in adolescents because preservation of functional ovarian tissue is closely associated with future reproductive potential.

The postoperative findings demonstrated favorable clinical outcomes. Reduction or resolution of the main symptoms was observed in 86.1% of surgically treated patients, while menstrual cycle stabilization occurred in 83.3%. Preservation of ovarian tissue was documented in 91.7% of cases. These findings suggest that minimally invasive organ-preserving treatment can provide satisfactory short-term clinical outcomes while minimizing the loss of functional ovarian tissue. The relatively low rate of postoperative complications observed in the study also supports the feasibility of minimally invasive surgical approaches. Most complications were mild and transient, including short-term postoperative pain, local inflammatory changes, temporary menstrual irregularities, and transient ovarian functional changes. No severe complications requiring emergency repeat surgery were observed in the analyzed sample.

Conclusion

The findings indicate that benign ovarian tumors and tumor-like lesions in adolescent girls have variable clinical manifestations, with lower abdominal or pelvic pain and menstrual irregularities being among the most frequent complaints.

At the same time, a proportion of lesions may remain asymptomatic and can be detected incidentally during ultrasonographic examination. Ultrasonography is an important diagnostic method for assessing the size, morphology, and dynamics of ovarian lesions and for determining the most appropriate management strategy. Conservative dynamic observation may be appropriate for selected clinically stable lesions, particularly when there are no signs of acute complications. Surgical treatment is indicated in patients with persistent, symptomatic, enlarging, or complicated lesions.

The results demonstrate the importance of organ-preserving surgery in adolescent patients. Whenever possible, laparoscopic cystectomy and other ovarian-sparing procedures should be prioritized to preserve functional ovarian tissue and reduce potential consequences for future reproductive health. Postoperative rehabilitation and long-term follow-up are integral components of treatment. Monitoring menstrual function, ovarian morphology, recurrence, and clinical recovery allows timely identification of possible complications and supports restoration of normal reproductive function.

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