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Functional ovarian cysts in childhood: A single-center experience in diagnostic and therapeutic practices

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Abstract

Objective: We aimed to evaluate the follow-up protocols of pediatric patients diagnosed with functional (developmental) ovarian cysts in our hospital and to compare our approach with findings in the literature.

Materials and methods: Medical records of 12,012 pediatric surgery outpatients from January 2018 to December 2023 were reviewed based on ICD-10 codes. Patient complaints, clinical history, laboratory and imaging findings, follow-up strategies, and treatment methods were analyzed.

Results: Among 3917 female patients, 17 were diagnosed with functional ovarian cysts, representing a prevalence of 0.15%. The mean age was 12.7 years. Seven patients were diagnosed incidentally, seven presented with abdominal pain, one with abdominal distention, one with a breast lesion, and one with menstrual irregularity. Hormonal tests (Follicular stimulating hormone (FSH), Luteinizing hormone (LH), estradiol, progesterone, prolactin) were fully performed in seven patients, partially in three, and not performed in seven. Thirteen patients had ovarian cysts; the mean diameter was 32.2 mm in the left ovary and 43.0 mm in the right ovary. Three patients had bilateral cysts. No medical treatment was given. Surgery was performed in four patients—one via laparotomy for a 20 cm cyst, and three via laparoscopy. One patient declined surgery. Eight patients were followed for an average of 1.5 years, with no additional interventions required.

Conclusion: Our pediatric surgery clinic has followed the classic algorithm for ovarian cysts. The most remarkable finding is that ultrasound results differ conspicuously in different centers. Our findings could be an appendix to the issue in the country.

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Introduction

Functional ovarian cysts are benign cysts that develop due to variability in hormone levels in the ovaries and can be considered naturally occurring as part of the menstrual cycle (1). Considering that 60-70% of issues discussed under adnexal masses originate from the ovary, they are encountered at a striking rate (2). Most ovarian masses are cysts, and about 97% are benign (2,3). Cysts can be classified into three groups: follicular, corpus luteum, and theca-lutein cysts (4,5). Each of these cysts has its unique characteristics (4).

Functional ovarian cysts can be found in the neonatal period, usually due to maternal gonadotropins (2,5). It is common to encounter functional ovarian cysts in 84% of children under two years old and 68% of those aged 2-12 years. Functional ovarian cysts are frequently seen in the perimenarchal period (2,5).

Functional ovarian cysts are a common cause of GnRH-independent (peripheral) precocious puberty and premature menarche, and should be considered in the differential diagnosis of girls presenting with early pubertal signs (6). Functional ovarian cysts can lead to abdominal pain, torsion, hemorrhage, menstrual irregularities, or an acute abdomen secondary to cyst rupture (4,7-9). Despite all these clinical features, most functional ovarian cysts are asymptomatic. Most of these cysts resolve spontaneously and do not require surgical or medical intervention (6,10).

We aimed to examine the follow-up protocols of functional (developmental) ovarian cyst patients in our hospital and evaluate their compatibility with the literature. We compared similar studies in our country by examining clinical self-evaluation findings.

Materials and methods

After the Non-interventional local ethical committee of Yozgat Bozok University approved the study (Date: 08.01.2025, Decision no: 2025-GOKAEK-251_2025.01.08_327), the files of 12,012 patients from January 2018 to December 2023 were evaluated in Yozgat Bozok University Health Education and Research Hospital. "Functional Ovarian Cysts" coded as Q50.1 in the ICD-10 system were sought among these patients. Those diagnosed with this code were included in the pre-check to decide whether the data in their data were suitable for the study. Pre-check criteria were code and file-data concordance and availability of the archives. The patients' complaints, history, laboratory and radiological findings, and follow-up and treatment procedures were evaluated. After data was fully documented, their compatibility with literature, and discordance, if present, were discussed to make a regional, endemic, and epidemic addition to country big data. A flowchart summarizing patient selection and clinical process is presented in Figure 1.

Results

Of 12,012 patients, 3917 females were examined, and seventeen of these 3917 patients were diagnosed. The prevalence was 0.15%, and the mean patient age was 12.7 years. Seven patients were diagnosed coincidentally. Seven patients had abdominal pain. One had abdominal distention, one had a breast lesion, and one was admitted for menstrual irregularity.

FSH, LH, estradiol, progesterone, and prolactin tests were performed in seven patients. None of these tests was performed for seven patients. Three patients were evaluated, and some of the hormone tests were performed. Thirteen patients had ovarian cysts; the mean diameter was 32.2 mm in the left ovary and 43.0 mm in the right ovary. Three patients had bilateral cysts. None of the patients were given medical treatment. Four patients with cysts were operated on; one of these patients had a 20 cm cyst operated on by laparotomy, and the others were operated on by the laparoscopic method. Another patient refused the operation. Only eight patients had an average follow-up of 1.5 years, and no further treatment modalities were needed for these patients. Findings were demonstrated in Table 1.

Discussion

In this study, we evaluated 17 female patients diagnosed with functional ovarian cysts among 3,917 examined outpatients. The mean age was 12.7 years, and most patients were diagnosed incidentally or presented with abdominal pain. Importantly, the majority of patients were successfully managed conservatively, and only four required surgical intervention. These findings emphasize the value of careful follow-up and avoidance of unnecessary procedures in children and adolescents.

Functional ovarian cysts in children are internal genital tumors that fall under the category of ovarian masses, are most frequently seen before the age of 15 but can occur at any age, and are often asymptomatic, with

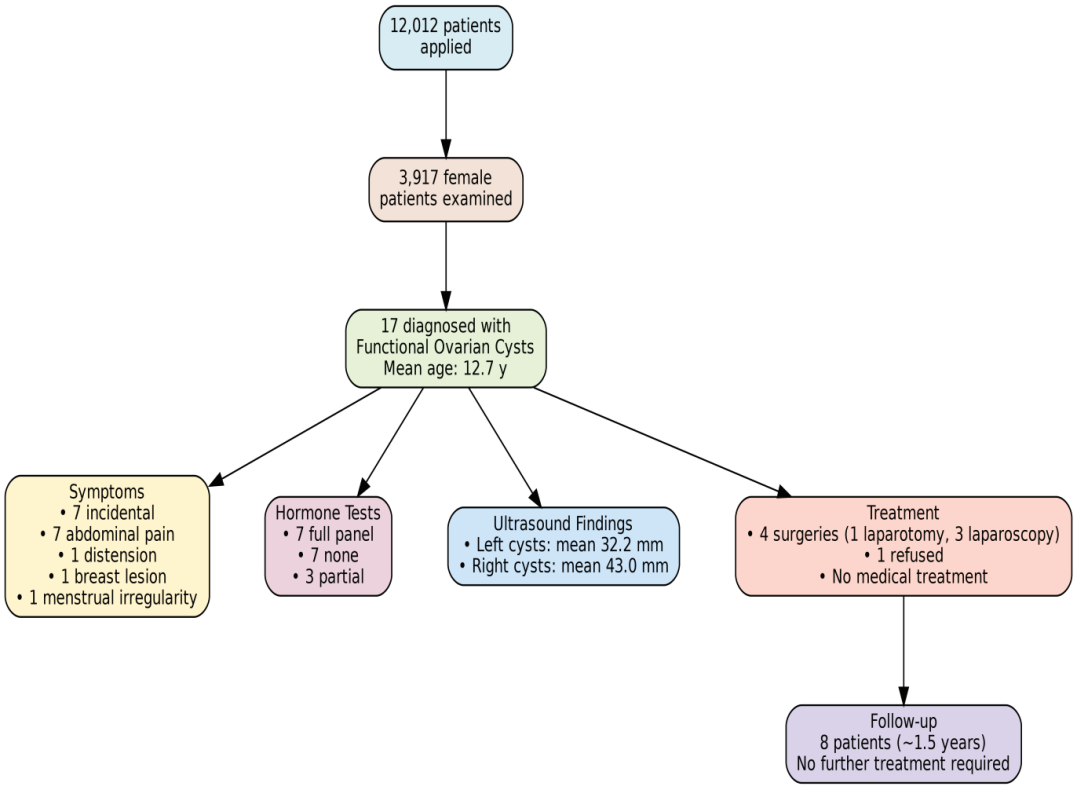

Figure 1: Flowchart illustrating patient selection and clinical process

a prevalence of 75-98% (3,11). One study included 76 adolescent patients hospitalized due to adnexal mass between 2008 and 2010 (12). In another study, most patients were identified as having functional ovarian cysts, with a mean age of 17.4 years (11). Our study demonstrated a slightly younger mean age, though still consistent with the adolescent age group.

In line with previous reports (3,5,11,12), most of our cases were incidental findings or presented with abdominal pain, while less common complaints included abdominal distension, breast lesion, and menstrual irregularity. This distribution supports the notion that functional ovarian cysts often present with non-specific or minimal symptoms, requiring a high index of suspicion for diagnosis. (3,5,11,12). In our study, incidental findings and abdominal pain were the most common presenting features. Patients with a feeling of abdominal bloating and breast mass constituted a minority in terms of symptom diversity.

In our series, most cases were detected during investigations for abdominal pain, whereas menstrual irregularities were less commonly reported, possibly reflecting lower awareness.

Functional ovarian cysts are benign, self-limiting lesions that usually regress spontaneously within a few menstrual cycles (13). They are broadly classified as follicular, corpus luteum, or theca-lutein cysts. In our cohort, most patients had elevated FSH and LH levels, suggesting a predominance of follicular cysts. Consistent with the literature, these cysts are typically unilateral, small, and resolve without intervention, while bilateral or solid features raise concern for malignancy (5,11,13,14). In our series, most cases were detected during investigations for abdominal pain, whereas menstrual irregularities were less commonly reported, possibly reflecting lower awareness.

Hormonal evaluations are naturally performed in suspected functional ovarian cysts (5,11,12). Although FSH, LH, estradiol, progesterone, and prolactin were measured in most of our patients, tumor markers such as Ca-125, which are sometimes included in the literature for malignancy risk assessment, were not routinely assessed (4,11,12). In our study, hormonal evaluations were usually performed, but tumor markers were not routinely assessed.

Ultrasonography remains the cornerstone of diagnosis, being safe, non-invasive, and widely available for adolescents (4,5,13,15). The detection of a unilocular, thin-walled ovarian cyst without solid components is typically consistent with functional ovarian cysts (11,12). In our study, TV-USG was not used, and MRI was not required, which reflects the sufficiency of ultrasonography in most pediatric cases (3).

Table 1: Clinical, hormonal, and imaging characteristics of pediatric patients with functional ovarian cysts

Case no	Age (years)	Complaint	FSH(mIU/mL)	LH(mIU/mL)	E2(pg/mL)	Progesterone (ng/mL)	Prolactin (ng/mL)	Pelvic USG ovariancyst size (mm)		Surgery	Follow-up Duration	Outcome
								Left	Right			
1	16	Incidental finding	-	-	-	-	-	-	-	No surgical intervention	-	No clinical change
2	14	Incidental finding	6.7	9.2	36.2	0.2	-	7	-	No surgical intervention	-	No clinical change
3	9	Incidental finding	3.7	4.26	38.48	0.1	7.95	8	-	No surgical intervention	1	Resolved without intervention
4	14	Abdominal distension	4.46	8.25	-	2.6	9.24	-	200	Right oophorectomy	2	Recovered
5	12	Abdominal pain	-	-	-	-	-	-	-	No surgical intervention	-	No clinical change
6	15	Incidental finding	4.99	6.62	53.43	0.32	16.79	70	6	Surgery declined by family	3	Resolved without intervention
7	2	Incidental finding	-	-	-	-	-	-	-	No surgical intervention	-	Resolved without intervention
8	13	Incidental finding	4.31	6.61	13.7	0.06	9.93	-	34	No surgical intervention	-	Lost to follow-up
9	2	Incidental finding	-	-	-	-	-	-	16	No surgical intervention	-	Lost to follow-up
10	16	Abdominal pain	6.06	3.41	32.8	0.32	36.5	6	22	Laparoscopic cyst excision	2	Recovered
11	16	Breast lesion	5.75	4.98	16.27	0.51	26.01	-	40	No surgical intervention	1	
12	14	Menstrual irregularity	-	-	-	-	-	70	16	Laparoscopic cyst excision	1	Recovered
13	10	Abdominal pain	3.52	0.79	28.29	0.64	20.79	-	-	Laparoscopic cyst excision	2	Recovered
14	15	Incidental finding	-	-	-	-	-	-	25	No surgical intervention	-	Lost to follow-up
15	11	Abdominal pain	-	-	-	-	-	-	60	No surgical intervention	-	Lost to follow-up
16	17	Abdominal pain	5.03	9.37	15.64	-	9.37	-	45	No surgical intervention	-	Lost to follow-up
17	16	Abdominal pain	4.05	9.2	73.5	-	-	-	9	No surgical intervention	2	Recovered

E2: Estradiol; FSH: Follicle-Stimulating Hormone; LH: Luteinizing Hormone

Management strategies include watchful waiting and, less commonly, oral contraceptive therapy (12,16). Consistent with previous reports, most cysts regress spontaneously within 2–3 months, and oral contraceptives have not been shown to accelerate resolution significantly (4,12). However, if the condition does not change after these periods, minimally invasive surgical procedures are recommended to avoid unnecessary surgeries (11,16). Surgery is indicated when cysts grow, show persistent features, or cause complications such as rupture and torsion (4). Laparoscopy or laparotomy can be chosen as the method. Laparoscopy is favored for patients with cysts larger than five centimeters (2). In our clinic, most patients were followed with a watchful waiting approach, and many unnecessary interventions were prevented by this method. Small and asymptomatic cysts are generally observed for several menstrual cycles. In one study, the resolution rate at the end of the first month was 55.5% in the watchful waiting group and 44.4% in the oral contraceptive group. In the same study, surgical evaluation was recommended if cysts did not disappear by the second month (12). In children and adolescents, the "watch and wait" approach is preferred for small cysts. Surgical planning can be considered for cysts that do not shrink within three months, are larger than 5 cm, or cause acute symptoms (1). In our series, 13 patients were managed conservatively, and only four required surgery, highlighting the importance of avoiding unnecessary intervention in this age group.

Functional ovarian cysts are generally harmless and disappear on their own. However, for cysts that grow, become symptomatic, or develop complications, surgical intervention may be necessary. While follow-up is recommended for women in the premenopausal period, more careful evaluation is required in the postmenopausal period due to the risk of malignancy (4).

Limitations

This study has several limitations. First, its retrospective design may have been affected by incomplete or non-standardized data entries in patient records. Second, the single-center setting and relatively small sample size limit the generalizability of the findings. Furthermore, the absence of standardized diagnostic and management protocols and the irregularity of follow-up periods may have influenced the outcomes. Therefore, our results should be interpreted with caution and confirmed in larger, prospective, multicenter studies.

Conclusions

In this single-center study, functional ovarian cysts were identified with a low prevalence among pediatric and adolescent patients. Most cases were detected incidentally, and the majority were safely managed with observation, while only a few required surgical intervention. These findings highlight the importance of conservative follow-up, and future multicenter studies are needed to confirm these results and inform clinical practice.

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Informed consent: Given the retrospective design of the study, the requirement for informed consent for publication was waived.

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Contributions

Research concept and design: AS, SUT

Data analysis and interpretation: AS, SUT

Collection and/or assembly of data: AS, SUT

Writing the article: AS, SUT

Critical revision of the article: AS, SUT

Final approval of the article: AS, SUT

All authors read and approved the final version of the manuscript.

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