

Treatment approach in ovarian pathologies in children: A single center's experience

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Abstract

Objective: We aimed to retrospectively evaluate the pediatric patients followed up and treated for ovarian pathology by our Pediatric Surgery Clinic.

Materials and methods: In our study, cases with ovarian pathology followed up and treated in the Karaman Training and Research Hospital Pediatric Surgery Clinic between June.2013 and May.2022 were retrospectively analyzed. Data were obtained from the patient's medical files in the hospital's digital filing system. The cases included in the study were divided into three groups. These were classified as surgical or conservative follow-ups according to the type of treatment.

Results: We identified 62 patients with ovarian pathology from our hospital database. Surgical intervention was performed in 51 (82 %) of the patients and 11 (18 %) were followed up conservatively. The mean age of the patients was 11.9 years (4 days to 17 years) and there was no age difference between the treatment groups ($P>0.05$). Of 62 patients; non-neoplastic ovarian pathology (NNOP) was found in 37 (59.7%), neoplastic ovarian pathology (NOP) in 6 (9.7%), and ovarian torsion in 19 (30.6%). In group I, %70 (n=26) of patients underwent surgery.

Conclusions: It should be kept in mind that the cause of abdominal pain, especially in girls, may be ovarian pathology, and every patient with suspected ovarian torsion should be evaluated urgently.

Keywords: Children, ovarian mass, ovarian torsion.

Introduction

The incidence of adnexal masses in childhood is approximately 2.6 in 100000 girls per year. Malignant ovarian neoplasms are the most common genital system malignancies in the adolescent age group and constitute 1% of all childhood malignancies (1). The childhood age group are the most common abdominal masses in young girls. In neonates, the majority of masses are benign while in children and teenagers the risk of malignancy exists.



Ovarian cysts are the most common cause of intra-abdominal mass in the neonatal period, but they are almost never malignant and often don't require surgery (2).

Pathologies that cause a mass in the ovary in childhood are frequently asymptomatic. When complications occur secondary to pathology in the ovary, they become symptomatic with the finding of an acute abdomen, as well as the finding of a palpable mass in the ovarian lodge (3).

In this study, we aimed to retrospectively evaluate the pediatric patients followed up and treated for ovarian pathology by our Pediatric Surgery Clinic.



Figure 1: Torsioned mature cystic teratoma in a 10-year-old girl

Materials and methods

Our study analyzed cases with ovarian pathology followed up and treated in the Karaman Training and Research Hospital Pediatric Surgery Clinic between June.2013 and May.2022 were retrospectively analyzed. This study was conducted by ethics committee approval obtained from Karamanoğlu Mehmetbey University Faculty of Medicine (09-09/05.10.2022). The records of 62 patients managed for ovarian pathologies were examined between June 2013 and May 2022.

Data were obtained from the patient's medical files in the hospital's digital filing system. Classification of ovarian pathologies was based on the classification (4) accepted by the World Health Organization in 1973 and this classification was

modified by adding ovarian torsion. The cases included in the study were divided into three groups; NNOP (Group I), NOP (Group II), and ovarian torsions (Group III) (Figure 1). The main diagnoses of the patients were given as simple cysts, germ-cell tumors, stromal tumors, and epithelial tumors, as definitive diagnoses. Patients with a para ovarian cyst, corpus luteum cyst, ovarian endometriosis cyst, hemorrhagic or follicular cyst, and para tubal cyst were considered as NNOP. These patients, identified according to the type of treatment, were classified as surgical or conservative follow-ups. Patients' information was obtained from the hospital database. Patients' age, complaints, examination findings, characteristics of ovarian masses, post-treatment follow-up, and complications were investigated (Table 1).

Statistical analysis

SPSS-15 software (SPSS Inc., Chicago, Illinois, USA) was used for all statistical analyses. According to whether the distribution is normal or not, the mean value and standard deviation or median value and minimum and maximum values are used in numerical data. Frequency and percentage values were used for categorical data. Kaplan-Meier survival analysis was used for survival analyses.

Results

We identified 62 patients with ovarian pathology from our hospital database. Surgical intervention was performed in 51 (82 %) of the patients and 11 (18 %) were followed up conservatively. The mean age of the patients was 11.9 years (4 days to 17 years) and there was no age difference between the treatment groups ($p>0.09$, $p>0.05$) (Table 3). Of 62 patients; NNOP was found in 37 (59.7%), NOP in 6 (9.7%), and ovarian torsion in 19 (30.6%). Of the patients with ovarian torsion, 4 (21.1%) non-neoplastic and 2 (10.5%) neoplastic ovarian pathology caused torsion. These were studied as common cases. Torsion without cyst or tumor was detected in 13 (68.4%) patients. When the distribution of the patients by years is considered, it was observed that there was a significant increase in the number of patients in the last five years in all three groups ($p=0.03$, $p<0.05$) (Table 3). Of the patients with ovarian pathology who were included

Table 1: Initial complaints of the patients

Initial complaint	Surgery n (%)	Follow-up n (%)	Total	p-value
	51 (82%)	11 (18%)	62 (100%)	
Abdominal and groin pain	47/51 (92%)	9/11 (82%)	56/62 (90%)	p<0.05
Nausea/vomiting	14/51 (27%)	4/11 (36%)	18/62 (29%)	p>0.05
Menstrual irregularities	8/51 (16%)	5/11 (45%)	13/62 (21%)	p>0.05
Anorexia	8/51 (16%)	4/11 (36%)	12/62 (19%)	p>0.05
Constipation	7/51 (14%)	5/11 (45%)	12/62 (19%)	p>0.05
Weight loss	5/51 (10%)	5/11 (45%)	10/62 (16%)	p>0.05
Asymptomatic/randomise	2/51 (4%)	8/11 (73%)	10/62 (16%)	p>0.05
Enüresis	4/51 (8%)	4/11 (36%)	8/62 (13%)	p>0.05
Increasingly severe pain in the abdomen	6/51 (12%)	1/11(9%)	7/62 (11%)	p>0.05
Vaginal bleeding	4/51 (8%)	3/11(27%)	7/62 (11%)	p>0.05
Prenatal detection	3/51 (6%)	4/11 (36%)	7/62 (11%)	p>0.05

in this study, 64.5% (40) were identified in the hospital records for the last five years.

The most common reason for admission in the surgical treatment group was abdominal and especially accompanying inguinal pain (92%) (p<0.05, p<0.05) (Table 1). In this group, the physical examination finding was tenderness, especially in the lower abdominal quadrants, and the most common complication was torsion (37.3%). Considering all groups, the most common reason for admission to our clinic was abdominal pain and especially accompanying groin pain (90%).

Of 37 patients with NNOP (group I); surgery was applied to 26, and conservative treatment was applied to 11 of them. Ovarian-sparing methods such as cystectomy and partial oophorectomy were applied to the patients who underwent surgery in this group. In the histopathological examination of patients who underwent surgery; 11 simple cysts, 9 para ovarian cysts, 8 follicle cysts, 7 corpus luteum cysts, and 2 massive ovarian edema were detected.

In group II, the most common reason for admission to our clinic was abdominal pain (57.8%), and the physical examination finding was abdominal tenderness (63%).

Table 2: Distribution of the patients according to their histopathological diagnosis of the groups

Groups	Histopathological diagnosis	Number of cases
(Group I) Nonneoplastic ovarian pathologies	Simple cyst	11
	Para ovarian cyst	9
	Follicle cyst	8
	Corpus luteum cyst	7
	Massive ovarian edema	2
	Total	37 (59.7%)
(Group II) Neoplastic ovarian pathologies	Serous cystadenoma	3
	Mature cystic teratoma	2
	Dysgerminoma	1
	Total	6 (9.7%)
(Group III) Ovarian torsions	Torsion without underlying pathology	13
	Paraovarian cyst	2
	Mature cystic teratoma	2
	Dysgerminoma	1
	Serous cystadenoma	1
	Total	19 (30.6%)

Table 3: Comparison of clinical findings

	Surgery group (n=51)	Follow-up group (n=11)	p-value
The mean size of the ovarian pathology(cm)	10.7±1.45 (Median: 10.8)	5.1±0.78 (Median: 5.4)	p<0.001
Underwent computed tomography	42/51 (82.4%)	7/11(63.6%)	p<0.05
Increase in tumour markers (AFP,BHCG,CEA)	22/51 (43.1%)	3/11(18.2%)	p<0.05
The mean age of the three groups	13.9±3.2 (Median: 15.2)	11.9±8.8 (Median:11.2)	p>0.05
Significant increase in the number of patients in the last five years	21/51 (41.2%)	3/11 (27.3%)	p<0.05

The most common complication was ovarian torsion (30%). All patients in this group underwent surgical intervention. Oophorectomy or salpingo-oophorectomy was performed in four cases, while ovarian-sparing surgery was performed in 2 cases. In this group, 3 serous cystadenomas, 2 mature cystic teratomas, and 1 dysgerminoma were detected in the histopathological examination after surgery.

Over torsion and surgery were performed (group III); Thirteen (68.4%) patients with ovarian torsion did not have any cysts or tumors. Of the patients with ovarian torsion, 2 para ovarian cysts, 2 mature cystic teratomas, 1 serous cystadenoma, and 1 dysgerminoma were found pathologically after surgery.

The most common complaint of admission to our clinic was abdominal pain that started suddenly and was accompanied by vomiting, and the physical examination finding was tenderness, especially in the lower quadrants of the abdomen. Color Doppler Ultrasonography was performed in 14 (73.7%) of 19 patients who were diagnosed with ovarian torsion histopathologically by surgery. There was no bleeding in the ovary in 17 of the patients, and the ovary could not be evaluated in 4 patients. Ovaries were preserved after oophorectomy or salpingo-oophorectomy in 20 of these patients, and normal blood supply in 9 after ovarian detorsion. Radiological or histopathological findings of the groups were shown (Table 2).

The size of the mass due to ovarian pathology was the only feature that differed significantly in the surgical group, depending on the radiological imaging method (10.7cm surgery versus 5.1 cm in the conservatively followed group, p<0.001) (Table 3). Surgical intervention was performed in 88.2% of 42 patients who underwent computed tomography (p=0.04, p<0.05). Tumor markers were evaluated in 36.8% of all patients, and the abnormality was in the surgically operated group (p=0.03, p<0.05) (Table 3). Surgical interventions were cystectomy, salpingo-oophorectomy, and detorsion. After the surgical interventions, 36 (70.6%) of the ovarian pathologies were found to be benign, 13 (25.5%) isolated torsion, and 2 (3.9%) malignant. Malignant ovarian pathologies were larger than benign ones (15.4 cm versus 7.9 cm, P<0.05) (Table 3). Elective surgery was performed in 36 (62.1%) patients and emergency surgery was performed in 22 (37.9%) patients. Monthly follow-up periods ranging from 1-6 months were applied to the patients who were followed up, examined, and treated conservatively. According to the results of the examination during conservative follow-up, 20 (22.7%) of them were treated with hormonal suppression by requesting a Pediatric Endocrine consultation.

Discussion

Adnexal masses constitute 1-2% of tumors seen in the childhood age group. 60-70% of these originate from the ovary. Ovarian masses seen in childhood are heterogeneous; it is most commonly cystic and may be solid or mixed. (4). The incidence of neoplasia in ovarian masses in children is rarer than in adults; however, it constitutes 60-70% of all

genital area malignancies (5). In the literature, 54-70% of ovarian pathologies in the childhood age group are reported as neoplastic and 10-40% as malignant (6). In our study, neoplastic lesions of the ovary were found in 8 (12.9%), and non-neoplastic lesions in 41 (66.1%).

Since the pelvis is narrow and the ovaries are higher than the adult age group in childhood, ovarian pathologies can be detected clinically in an earlier period. In clinical studies, the most common complaint in different series was abdominal pain and vomiting (7). In addition, patients are admitted to the hospital with complaints of abdominal swelling, early puberty, increased body hair, or acute abdomen due to intestinal obstruction, volvulus, or torsion. It is not possible to distinguish benign or malignant based on clinical findings alone (8). Initial complaints (Table 1) and physical examination findings in this study are also consistent with this literature.

In the prenatal period, ovarian cysts are frequently detected in sonography performed at 31 and 32 weeks. The structure and size of the cyst are important for the follow-up and treatment of ovarian cysts in this period. While complex cysts containing septa, debris, and solid areas are removed by ovarian-sparing surgery after delivery, sonographic follow-up is sufficient for simple and small-sized cysts (9). In our study: in the postnatal follow-up of 13 cases with the sonographically detected prenatal ovarian cysts; surgical intervention was performed in 6 (46.1%) because of ovarian torsion, in 4 (30.8%) because the cyst was larger than 5 cm and its contents were complicated. In the remaining 3 (23.1%) patients, the cyst was found to regress with conservative follow-up.

Ovarian torsion is an important cause of acute abdomen that should be kept in mind in childhood. In these patients, two-thirds of the pathology is detected in the right ovary. The main reason for this is that the left ovary is close to the sigmoid colon and prevents it from moving in a narrow area in the pelvis (10). In our study, ovarian torsion was detected in 62% on the right and 38% on the left. After the detection of ovarian torsion in the surgical intervention, if the ovarian nutrition is

impaired after detorsion, oophorectomy or salpingo-oophorectomy is recommended.

In ovarian torsion caused by a cyst, cystectomy can be performed after detorsion of the ovary. Thus, in post-surgical follow-ups; the function of ovaries that appear to be necrotic may be the same as before (11). Even; some authors state that even the ovary, whose blood supply is completely impaired, is left in its normal anatomical position after detorsion and that the ovary may function with another surgical intervention 2-3 days later (12). This is especially important for adolescent girls. Preservation of the ovary is the most important consideration here, suggesting that the changes in the necrotic appearance of the ovary, some pathological changes due to the elevation of free oxygen radicals, and the related damage may improve after the addition of antioxidants to the treatment (13). Based on this information in the literature, we recommended vitamin E supplementation as an antioxidant for at least 2 months to our 19 patients who underwent surgical intervention due to ovarian torsion.

Eleven of our pediatric and adolescent patients with adnexal pathology were followed up conservatively and completely regressed with repeated ultrasound examinations. The largest self-healing cystic structure was 9 cm. This is consistent with previous reports, in the literature, spontaneous resolution of cysts up to 20 cm has been noted. Resolution of functional, non-ruptured cysts usually occurs within three months. (14) In our study, Intermittent sonographic follow-up in 11 (26.8%) of our non-neoplastic ovarian pathologies regressed completely in the last 3 months without surgery. In the surgical series in the literature, 57.9% of the cases have non-neoplastic ovarian pathological findings (15). In our study; cystectomy was performed in 4 (9.8%) patients with non-neoplastic ovarian pathology after detorsion due to ovarian torsion, and surgical intervention was performed in 26 (63.4%) patients. The findings in the literature were found to be compatible with our study.

Differential diagnosis should be made carefully from other diseases that cause abdominal pain with symptoms similar to ovarian pathologies and their

treatment should be planned at the most appropriate time (16-23).

Conclusions

It should be kept in mind that the cause of abdominal pain, especially in newborn and adolescent girls, may be ovarian pathology, and every patient with clinical suspicion of ovarian torsion should be evaluated urgently. Ovarian-sparing surgery should be performed whenever possible.

Conflict of interest

The authors report no conflict of interest.

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Ethical approval

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Contributions

Research concept and design: **MU**

Data analysis and interpretation: **MU, SA**

Collection and/or assembly of data: **MU, SA**

Writing the article: **MU**

Critical revision of the article: **MU, SA**

Final approval of the article: **MU, SA**

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