Original Article

Ovarian masses in children: A single center's experience

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Abstract

Aim: Although ovarian masses are rare in children, they differ forevery age group. We aimed to evaluate the management of patients diagnosed with ovarian masses in our clinic.

Material and Methods: The medical records of patients (age ≤ 18) who underwent operations for ovarian masses during the period 2009-2019were evaluated retrospectively. Demographic findings, presenting symptoms and signs, the results of radiological examinations, mass locations and sizes, tumor markers, histopathological diagnoses and cases'surgical intervention were recorded.

Results: The study included 51 patients with a total of 54 surgical interventions. There was a significant difference between tumor size and pathological diagnosis (p<0.048) between the pathological diagnosis and the surgical intervention for patients who required oophorectomy and did not require oophorectomy (p=0.02) and presenting symptoms and signs with pathological diagnoses (p=0.027). We found no difference in the patients' age of presentation and the pathological diagnoses (ovarian torsion, neoplastic or non neoplastic lesions) (p=0.542). We also found no difference between tumor markers and pathological diagnoses (p=0.253 for CEA, p=0.345 for αFP and p=0.129 for βHCG) or mass location (right or left side) with the pathological diagnoses (p=0.246).

Conclusion: : Ovary preservation surgery is important for ovarian masses in children, and we must be careful when performing surgery on these patients.

Keywords: Children; ovarian mass; oophorectomy

INTRODUCTION

Ovarian masses are uncommon lesions in children. The incidence of benign or malignant ovarian masses is reported to be 2.6:100.000, and it constitutes 1-2% of solid tumors seen at these ages (1). The incidence of the more rare ovarian masses during the neonatal period increases markedly with age. Many cystic, solid, benign or malignant ovarian cysts may develop from the antenatal period to the adolescent period. Childhood ovarian masses are the most common cysts and can be of solid or mixed type.

These masses' etiologies, clinical presentation, complaints, imaging findings, histopathological diagnoses, treatments are different in each period. Ovarian masses are usually asymptomatic and diagnosed by incidental ultrasound (2). They are most often symptomatic when complications exist torsion, hemorrhage or rupture),and the most common complaint is abdominal pain (2).

In our study, we aimed to retrospectively evaluate ovarian mass cases followed up and treated in our clinic.

MATERIAL and METHODS

In our study, the medical records of patients (age ≤ 18) who underwent operations for ovarian masses during the period 2009-2019 were evaluated retrospectively. Specific data were collected, including demographic findings, presenting symptoms and signs, the results of radiological examinations (ultrasonography [USG], computed tomography [CT] scans and magnetic resonance imaging [MRI] scans), location and size of mass and tumor markers (CEA, αFP or βHCG levels). We reviewed all operative reports and documented the cases' surgical interventions and histopathological diagnoses. Female patients underwent emergency or elective surgery due to intraabdominal ovarian masses were included in the study. Patients with non-ovarian pathology were not included in our study. We preferred open laparotomy as a surgical approach.

Statistical Analysis

All data were analyzed using SPSS Statistics for Windows, Version 22.0 (Armonk, NY: IBM Corp.). In summarizing

the statistical data, number, percentage, mean, standard deviation, minimum values and maximum values were used to summarize the measurement data. The Kolmogorov-Smirnov test was used to test the conformity of the measurement data to normal distribution. The Kruskal-Wallis test and the chi-square test were also used because the diagnoses and sizes were not normal; p <0,05 was considered statistically significant.

RESULTS

The study included 51 patients with a total of 54 surgical interventions. The patients' mean age at the time of surgery was 150 months (0.13-216), as shown in Figure 1.
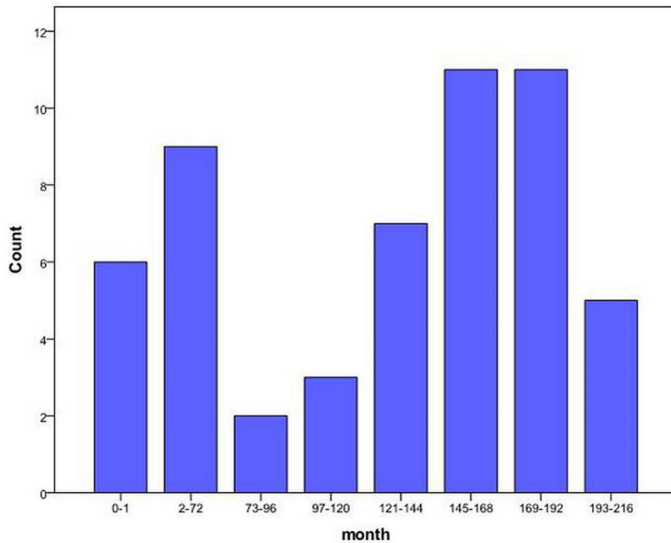

Figure 1. Distribution of patients by age (months)

Figure 2. Image of a giant (102x70mm) ovarian mass from a 9-year-oldpatient diagnosed with dysgerminoma

We found no difference in the age of presentation and the pathological diagnosis (p=0.542). Mass size was calculated by multiplying the width and length, and the mean mass size was 2857mm (60-30.000mm).

There was a significant difference between tumor size and pathological diagnosis (p<0.048). One patient had a giant (102x70mm) ovarian mass that was diagnosed as dysgerminoma (Figure 2). The primary presenting symptoms and signs of benign masses that led to hospital visits included abdominal pain in 31 (59.5%) patients and abdominal pelvic masses in 23 (40.5 %) patients. We found a significant difference in presenting symptoms and signs with the pathological diagnosis (p=0.027).

Thirty (56.6%) patients' lesions were located on the right side, and twenty-four (43.4%) patients' lesions were located on the left side. We found no difference in mass location (right or left side) with the pathological diagnosis (p=0.246). Comprasion and characteristics of the pateints and the masses were shown in Table 1.

Table 1. Comprasion and characteristics of the pateints and the masses	
	Number (n=54)
Ages of the patients	150 months (0.13-216)
Mass sizes	2857mm (60-30.000mm)
Primary presenting symptoms	59.5% abdominal pain (n=31) 40.5 % abdominal pelvic masses (n=23)
Mass side	56.6% Right side (n=30) 43.4% Left side (n=24)

USG was performed in 33 (61.5%) patients to define the size of the lesion and the gross morphologic nature of the tumor. Sixteen (30.8%) patients had USG and MRI scans, two (3.8%) patients had USG and CT scans, one (1.9%) patient had just a CT scan and one (1.9%) patient had just an MRI scan. In one patient (1.9%), no radiological examination could be performed.

Fifteen (27.7%) patients underwent emergent surgery due to suspected ovarian torsion. Oophorectomy was performed in only 4 patients who underwent surgery with the diagnosis of ovarian torsion. Similar to the majority of patients, torsion occurred mostly on the right side. Detorsion was sufficient for the other 11 patients. The other thirty-nine (72.2%) patients underwent elective surgery. Patients underwent a range of procedures, including ovarian cystectomy, tumorectomy and oophorectomy. Eighteen (46.1%) ovarian masses were non-neoplastic lesions and were diagnosed as simple ovarian cysts and complicated ovarian cysts. All such patients (100%) underwent cystectomy. Eighteen (46.1%) ovarian masses were benign tumors and diagnosed as mature or cystic teratoma and serous or mucinous cystadenoma. Tumorectomy was performed for 10 (55.5%) patients, and oophorectomy was performed for 8 (44.4%) patients. Three ovarian masses (7.6%) were malignant tumors and were diagnosed as dysgerminoma

and immature teratoma; all such patients underwent oophorectomy. There was a significant difference between the pathological diagnosis and the surgical intervention in patients who underwent oophorectomy and patients who did not need oophorectomy (p=0,02). Pathologic findings and surgical management were shown in Table 2.

Table 2. Pathologic findings and surgical management for 54 surgical interventions for an adnexal mass.			
Pathologic diagnosis		Number (%)	Operation
Ovarian torsion		15 (27.7)	Detorsion (n=11) Oophorectomy (n=4)
Non- neoplastic lesions	Simple ovarian cyst	5 (9.2)	Cystectomy (n=5)
	Compilacted ovarian cyst	13 (24.0)	Cystectomy (n=13)
Benign tumors	Mature teratoma	12 (22.2)	Tumorectomy (n=5) Oophorectomy (n=7)
	Cystic teratoma	2 (3.7)	Tumorectomy (n=2)
	Serous cystadenoma	3 (5.5)	Tumorectomy (n=3)
	Mucinous cystadenoma	1 (1.8)	Oophorectomy (n=1)
Maignant tumors	Dysgerminoma	2 (3.7)	Oophorectomy (n=2)
	Immature teratoma	1(1.8)	Oophorectomy (n=1)

Tumor markers were not available in all patients. Of the 54 cases, 32 (59.2%) were examined, and 22 (40.7%) were not. Tumor markers were high in 6 (18.7%) of these 32 patients. Three of these were compatible with ovarian torsion, two with malignant ovarian tumors and one with complicated ovarian cysts.

Only 6 (40%) of the patients with a preliminary diagnosis of ovarian torsion were examined. One was positive for αFP and CEA, and 2 were positive for αFP.

In 3 of our malignant patients, αFP (1354.9 μg/L) and CEA (4.6 μg/L) were high in one patient diagnosed with immature teratoma, whereas, in the two of the patients diagnosed with dysgerminoma, one had normal markers, and βHCG was high (17.6IU/L) in the other. However, no significant difference was found when tumor markers were compared separately with pathologic diagnoses (p=0.253 for CEA, p=0.345 for αFP and p=0.129 for βHCG). Pvalues of the comprasion of the statistical analysis resultswere shown in Table 3.

Table 3. P values of the comprasion of the statistical analysis results	
	P value
Age	p= 0.542
Mass size	p=0.048
Primary presenting symptoms	p=0.027
Mass side	p=0.246
Surgical intervention	p=0.02
Tumor markers	CEA, p=0.253
	αFP, p=0.345
	βHCG, p=0.129

DISCUSSION

Ovarian masses are rare in children and may be asymptomatic or symptomatic due to complications that may develop. The pediatric pelvis is shallow, and ovarian pathologies can be easily diagnosed earlier in children than in adults (2). This is possible because the anatomical structure of the ovarian mass does not have enough space in the pelvis, so when masses develop in the abdomen, they are accompanied by complaints of abdominal pain and abdominal masses (2). The most frequent other complications included hemorrhage and obstruction.

In this study, we summarized our approach to patients admitted to our clinic with a total of 54 ovarian masses in the last 10 years.

Childhood ovarian cysts can be seen at any age starting in the neonatal period, and it is possible to make an antenatal diagnosis with ultrasonography. In our study, there was no difference in our patients' diagnoses when compared with their ages. The incidence of malignancy was 4-20%, accounting for 1% of all pediatrics (3), and our three patients with malignancy were 9-11 years old. This result indicates that malignancy increases with age, as reported in the literature.

When mass size and diagnosis were compared, significant results were found, and the diagnosis of patients with large mass size was consistent with benign or malignant ovarian tumors. USG is the gold standard for ovarian mass diagnosis (4,5). CT or MRI was performed in suspected cases in our series.

The majority of the patients admitted to our clinic with ovarian masses had benign ovarian masses, and the prognosis for patients with malignant diseases is well predicted.

Although a surgical approach to ovarian masses is quite important in children, a minimally invasive method should always be the first choice, and unnecessary salpingo-oophorectomy should always be avoided.

In our cases, ovarian torsion accounted for approximately one-third of ovarian masses requiring surgical intervention. The majority of the torsion cases that presented acute abdominal manifestations were located on the right side, as in the literature (6). This is often confused with acute appendicitis in the differential diagnosis.

Nowadays, even in cases of ovarian torsion, detorsion alone is often sufficient for a significant portion of the cases, except in cases for which intervention comes too late. Therefore, the number of oophorectomies in ovarian torsion cases has decreased in other clinics, as in our study.

The most important guidelines in the management of malignant ovarian masses are good, safe USG and tumor markers. Based on these results, ovarian conservative surgery or oophorectomy can be decided. A deficiency in our study was that we could not access tumor markers for all patients. Therefore, we studied only the available markers. High tumor markers were found in 6 of these patients and, surprisingly, a tumor patient (dysgerminoma) was negative for our marker series.

Ovarian surgery can be performed with open or laparoscopic techniques. However, it is quiteimportant to have a pediatric oncologist and pathologist in the center because it is important for these juvenile female patients, who have important goals to accomplish and long life expectancies, to live healthy lives as fertile women.

Ovarian-preserving surgery is recommended in the literature (3), and long-term follow-up is also important for future fertility and ovarian function in this population.

CONCLUSION

As a result, considering the pathological diagnosis of ovarian masses, ovarian-preserving surgery should be preferred to increase the chances of fertility forthe child.

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