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Analysis of Ovarian Pathology in Children: Ten-years Experience

Çocuklarda Over Patolojilerinin Analizi: On Yıllık Deneyim

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Abstract

Objective: In this study, we aimed to analyze whether laparoscopy is a feasible and safe surgical option for ovarian pathologies in children.

Method: Our study included 43 patients who were followed up and treated for ovarian pathology in our clinic between January 1, 2012, and January 1, 2022. The clinical information and data for the patients were reviewed retrospectively. The patients were divided into 2 groups: Laparoscopy and the laparotomy group. Demographic data of the patients, complaints at presentation, localization of the mass, laboratory hormone levels and surgical findings, histopathological diagnoses, treatment methods, and treatment results were evaluated.

Results: In the study, 43 female patients with a mean age of 9.6 years (1 month-15 years) were evaluated. It was the most common on the right side (58%). The most common symptom was abdominal pain (70%). Thirteen (30%) patients had acute abdomen findings. For surgical intervention, laparoscopy was performed in 22 (51%) patients and laparotomy was performed in 19 (44%) patients. Unilateral oophorectomy or salpingo-oophorectomy was performed in 28 (65%) of the patients as surgical treatment. Twenty-three (53%) of the ovarian pathologies were neoplastic, and 20 (47%) patients were non-neoplastic. Pathological diagnoses of ovarian pathologies 19 (44%) patients had ovarian torsion and 14 (33%) patients had teratoma. The operation time was shorter in the laparoscopy group ($p<0.05$). Tumor size was smaller in the laparoscopy group and larger in the conventional laparotomy surgery group ($p<0.05$). There was no significant difference between the laparoscopy group and the laparotomy surgery group in terms of age, tumor size, malignancy status, the presence of neoplastic mass, laterality, and tumor markers ($p>0.05$). While 42 of 43 patients survived, one patient with immature teratoma died from tumor-associated metastasis.

Öz

Amaç: Bu çalışmada, çocuklarda over patolojilerinde laparoskopinin uygulanabilir ve güvenli bir cerrahi seçenek olup olmadığını incelemeyi amaçladık.

Yöntem: Çalışmamıza 1 Ocak 2012-1 Ocak 2022 tarihleri arasında kliniğimizde over patolojisi nedeniyle takip ve tedavi edilen 43 hasta dahil edildi. Hastaların klinik bilgileri ve verileri retrospektif olarak incelendi. Hastalar laparoskopi ve açık grup olarak 2 gruba ayrıldı. Hastaların demografik verileri, başvuru yakınmaları, kitlenin lokalizasyonu, laboratuvar hormon düzeyleri ve cerrahi bulguları, histopatolojik tanıları, tedavi yöntemleri ve tedavi sonuçları değerlendirildi.

Bulgular: Çalışmada yaş ortalaması 9,6 (1 ay-15 yaş) olan 43 kadın hasta değerlendirildi. En sık sağda (%58) görüldü. En sık semptom karın ağrısıydı (%70). On üç (%30) hastada akut karın bulguları vardı. Cerrahi girişim için 22 (%51) hastaya laparoskopi ve 19 (%44) hastaya laparotomi uygulandı. Hastaların 28'ine (%65) cerrahi tedavi olarak unilateral ooferektomi veya salpingo-ooferektomi uygulandı. Over patolojilerinin 23'ü (%53) neoplastik, 20 (%47) hasta neoplastik değildi. Over patolojilerinin patolojik tanıları 19 (%44) hastada over torsiyonu, 14 (%33) hastada teratom vardı. Ameliyat süresi laparoskopi grubunda daha kısaydı ($p<0,05$). Tümör boyutu laparoskopi grubunda daha küçük, konvansiyonel açık cerrahi grubunda daha büyüktü ($p<0,05$). Laparoskopi grubu ile laparatomi grubu arasında yaş, tümör boyutu, malignite durumu, neoplastik kitle varlığı ve tümör belirteçleri açısından anlamlı fark yoktu ($p>0,05$). Kırk üç hastanın 42'si hayatta kalırken, immatür teratomlu bir hasta tümör ilişkili metastaz nedeniyle kaybedildi.

Sonuç: Over patolojilerinin büyük çoğunluğu benign olmasına rağmen malign kitleler oluşabileceğinden cerrahi mümkün olduğunca erken yapılmalıdır. İyi huylu olduğu düşünülen lezyonlarda mümkün olduğunca

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Abstract

Conclusion: Although the majority of ovarian pathologies are benign, since malignant masses may occur, surgery should be performed as early as possible. In lesions that are thought to be benign, ovarian-sparing surgery should be performed as much as possible. Laparoscopy is a feasible and safe surgical option for ovarian pathologies even, in malignant patients.

Keywords: Children, laparoscopy, ovary, pathology

Öz

yumurtalık koruyucu cerrahi yapılmalıdır. Laparoskopi, malign hastalarda bile over patolojileri için uygulanabilir ve güvenli bir cerrahi seçenektir.

Anahtar kelimeler: Çocuklar, laparoskopi, over, patoloji

Introduction

Ovarian pathologies can be cystic, complex, or solid. Ovarian cysts may be physiological, secondary to polycystic ovarian syndrome or infections. Most neoplasms in puberty or adolescence are benign. Many of these may be in the form of cystadenomas, mature teratomas, and serous cystadenomas. Malignant ovarian tumors are rare in children (1,2).

Ovarian pathologies are detected more frequently with the widespread use of imaging methods. While asymptomatic cases can be detected by routine ultrasonography, most of them are detected with complications. Adnexal masses are evaluated according to age, clinical symptoms, size, and complexity of the mass (3).

Detection of these pathologies in children, early intervention, and, if possible, the preservation of the ovary are important for future fertility. Since the ovarian pedicle is long in children, ovarian pathologies tend to be more torsioned compared to adults (1,2).

Ovarian pathologies can be treated with laparotomy surgery as well as frequently with laparoscopy. In this study, we aimed to analyze whether laparoscopy is a feasible and safe surgical option for ovarian pathologies in children.

Materials and Methods

In our study, 43 patients who were followed up and treated for ovarian pathology in our clinic between January 1, 2012 and January 1, 2022 were included in the study. The ethics committee of the study was accepted by the Dicle University Local Ethics Committee (ethics committee date: 14.04.2022, number: 127). Consent was obtained from all the patients included in the study.

Ultrasonography was performed primarily in symptomatic patients. Computed tomography examination was also performed in patients with an ovarian mass. In addition, complete blood count, biochemistry and alpha-fetoprotein (AFP), beta HCG, and Ca-125 levels were checked.

Regardless of the diagnosis of the patients in the preoperative period, laparoscopy was planned for patients with low tumor size (<8 cm), and laparotomy surgery was planned for patients with high tumor size (>8 cm). In only 2 patients, laparoscopy was terminated and converted to laparotomy surgery. Laparoscopy was started with 11.5 thoracoport-assisted single incision laparoscopic (SILS), starting from the umbilical incision. While 50% of the laparoscopy group was completed with SILS, additional ports were needed in the other half and additional ports were entered.

The clinical information and data for the patients were reviewed retrospectively. Demographic data of the patients, complaints at presentation, localization of the mass, laboratory hormone levels and surgical findings, histopathological diagnoses, treatment methods, and treatment results were evaluated.

Inclusion Criteria

Patients whose data were correct and consistent in retrospective patient file scanning were included in our study.

Exclusion Criteria

Patients with incomplete and inconsistent data in retrospective patient file screening were excluded from the study. In addition, patients who were noted as ovarian pathology on ultrasound but who had duplication cysts and mesenteric cysts during surgery were excluded from the study.

Statistical Analysis

Statistical analysis of quantitative and qualitative data, including descriptive statistics and frequency, was performed for all items. Continuous data are expressed as

mean ± standard deviation. The continuous variables were investigated using Shapiro-Wilk test to determine whether the data had a normal distribution. Continuous, normally distributed variables were compared using Student's t-test. Non-parametric tests were chosen when the data did not fit the normal distribution. The categorical variables were assessed by the chi-square test or Fisher's Exact test, as needed. Analyses were performed using SPSS Statistics for Windows, Version 21.0 (IBM Corp., Armonk, NY, USA). All p-values were two-sided and p≤0.05 was considered statistically significant.

Results

A total of 43 female patients were evaluated in the study, and the mean age was 9.6 years (1 month-15 years). Twenty-five (58%) of the ovarian masses were on the right side and 18 (42%) were on the left side. No bilateral ovarian mass was found. Thirty (70%) patients had abdominal pain, and 13 (30%) had abdominal distension. As physical examination findings, 30 (70%) patients had abdominal tenderness and a palpable mass. Thirteen (30%) patients had acute abdomen findings. In our study, AFP beta HCG, CEA, and Ca-125 were measured, and among these markers, AFP was increased in one of the 5 patients with malignant ovarian tumors, beta HCG in one, and Ca-125 in one. Of the ovarian pathologies, 23 (53%) were neoplastic, 20 (47%) patients were non-neoplastic, with 18 having ovarian torsion and 2 having cystic components. Unilateral oophorectomy or salpingo-oophorectomy was performed in 28 (65%) of the patients as surgical treatment. Ovarian sparing surgery was performed in 7 patients (16%). The ovaries of four (9%) patients were autoamputee. Four (9%) patients underwent ovarian detorsion. Pathological diagnoses of ovarian pathologies were primary ovarian torsion in 18 (42%) patients, mature teratoma in 14 (32%) patients, serous cyst adenoma in three (7%) patients, dysgerminoma (malignant) in two (5%) patients, yolk sac (malignant) in one (2%), dystrophic calcification in one (2%) patient, hematoma in one (2%) patient, mature adipose tissue in one (2%) patient, immature teratoma in one (2%) patient (malignant), and adenocarcinoma in one (20%) patient (malignant) (Table 1).

Laparoscopy was performed in 22 (51%) patients and laparotomy was performed in 19 (44%) patients for surgical intervention in patients with ovarian pathology. Two (5%) patients were started with laparoscopy and converted to laparotomy. The operation time was shorter in the laparoscopy group (p<0.05). Tumor size was smaller in the laparoscopy group compared to laparotomy (p<0.05). Tumor size was 5.7±3.4 in the laparoscopy group and 10.7±47.2 in the laparotomy group which was statistically significant (p<0.05).

There was no significant difference between the laparoscopy group and the conventional laparotomy surgery group in terms of age, malignancy status, the presence of neoplastic mass, laterality, and tumor markers (p>0.05) (Table 2).

While 42 of 43 patients were alive in our study, one patient with immature teratoma had metastasized. Although chemotherapy procedures were initiated, she died during the treatment phase due to malignant tumor metastasis.

Table 1. Patient characteristics

		n=43	%
Side	Right	25	58.
	Left	18	42.
Symptoms	Abdominal pain	30	70
	Distension	13	30
Findings	Tenderness	30	70
	Acute abdomen	13	30
Surgical approach	Laparoscopy	22	51
	Laparotomy	19	44
	Converted to laparotomy	2	5
Surgical procedure	Oopherectomy/salpingo-oophorectomy	28	65
	Ovarian-sparing surgery	7	16
	Autoamputed ovary	4	9
	Ovarian detorsion	4	9
Neoplasia	Neoplastic	23	53
	Non-neoplastic	20	47
Neoplastic	Benign	18	78
	Malignant	5.	22
Non-neoplastic	Ovarian torsion	18.	90
	Cystic component	2.	10
Histopathological diagnosis	Ovarian torsion	18	42
	Mature teratoma	14	32
	Immature teratoma	1	2
	Serous cyst adenoma	3	7
	Disgerminoma	2	5
	Yolk sac	1	2
	Dystrophic calcification	1	2
	Hematoma	1	2
	Adenocarcinoma	1	2
	Mature adipose tissue	1	2
Mortality	No	42	98
	Yes	1	2

Table 2. Comparison of laparoscopy and laparotomy surgery group

	Laparoscopy (n=22)	Laparotomy (n=21)	p-value
Age (year)	8.4±5.2	10.6±4.3	>0.05
Operation time (min)	55.6±18.2	75.2±21.8	**<0.05**
Tumour size (cm)	5.75±3.43	10.70±47.2	**<0.05**
Right	12	13	>0.05
Left	9	9	
Neoplastic	10	13	>0.05
Non-neoplastic	12	8	
Malignant	2	3	>0.05
Benign	10	8	
Oopherectomy	14	14	>0.05
Ovarian sparing surgery	3	4	
High AFP	3	2	>0.05
High B-hCG	0	1	>0.05
High CEA	0	0	>0.05
High Ca-125	1	0	>0.05
Mortality	0	1	>0.05

AFP: Alpha-fetoprotein

Discussion

While benign pathologies are common in children and adolescents, malignant adnexal masses are less common in this age group. In our study, more benign pathologies were observed. Abdominal pain is seen in 57-69% of patients with ovarian pathologies. In our study, similar to the literature, abdominal pain was observed in 70% of the patients. Ovarian torsion is more common on the right side. Therefore, patients mostly present with right lower quadrant pain and are confused with acute appendicitis (2-6).

Tumor markers may increase in malignant germ cell tumors and epithelial tumors. It is used in the follow-up of patients. These hormones are usually normal in ovarian cysts. However, these values should not be neglected in malignant tumors. AFP, beta HCG, Ca-125, CA-19.9, and CEA values should be checked in patients with suspected malignancy (2). In our study, in 5 patients with malignant ovarian tumors, AFP increased in one, beta HCG in one, and Ca-125 in one.

In the study of Xac et al. (5), the mean size of benign masses was 7.3 cm, and the mean size of malignant tumors was 14 cm. In our study, the mean size of benign neoplastic tumors was 8.4 cm, and the mean size of malignant ovarian tumors was 10.6 cm.

The main goal of ovarian masses and torsions should be to perform ovarian-sparing surgery in the early period. Banlı-Cesur et al. (2) in the study, 24% of ovarian masses were treated with oophorectomy. Oophorectomy was performed in 52% of them due to ovarian torsion (2). In a study, 85-100% of patients were treated with oophorectomy (7-9). In our study, 28 (65%) patients underwent unilateral oophorectomy or salpingo-oophorectomy as surgical treatment. Ovarian sparing surgery was performed in 7 (16%) patients. Although our main goal in surgery is surgery to protect the ovary, irreversible ovarian damage has occurred due to the high number of patients with late diagnoses due to the socio-economic status in our region. Therefore, our oophorectomy rate is higher than in the literature.

There is a rare association between malignant lesions and ovarian torsion. This rate varies between 1-6%. Ovarian torsion is mostly associated with germ-cell tumors (10-13). It was determined as 2.7% in one study. Malignant ovarian tumors were seen in 4 (3.5%) of 114 patients (2,7). In our study, 5 malignant ovarian tumors were seen. One of them (20%) presented with ovarian torsion.

The rate of neoplastic ovarian cysts in the literature ranges between 50-70% (8-13). In our study, 23 (54%) of 43 patients were neoplastic. Of these, 18 (78%) were benign and 5 (22%) were malignant.

In studies conducted in adults, ovarian cancers are mostly of epithelial origin. In children, ovarian tumors are usually germ-cell tumors. Mature teratomas from germ cell tumors are common in children because they are slow

and frequently growing tumors (1). In our study, mature teratoma was observed at a rate of 32%. While 42 of 43 patients were alive in our study, the patient with immature teratoma died due to malignant tumor metastasis during the treatment process.

In the study of Xac et al. (5), 61% of ovarian masses were switched to laparoscopy, 25% to laparotomy, and 6.8% to laparoscopy from laparotomy. In our study, laparoscopy was performed in 51%, laparotomy was performed in 44%, and laparoscopy was started in 2 of our patients and switched to laparotomy. Our laparoscopy rate is lower than in the literature. We think that the reason is due to the large solid mass measurements. Regardless of the diagnosis of the patients in the preoperative period, laparoscopy was planned for patients with low tumor size, and laparotomy surgery was planned for patients with high tumor size. Laparoscopy was started with 11.5 thoracoport-assisted SILS, starting from the umbilical incision. While 50% of the laparoscopy group was completed with SILS, additional ports were needed in the other half and additional ports were entered. In the SILS group, the surgical scar was only in the navel, that is, it was the scarless method. Therefore, the patients were quite satisfied in this respect. In our study, when malignant patients and benign patients were compared according to the type of surgery performed (laparoscopy vs traditional laparotomy surgery), no difference was observed. From this point of view, we believe that laparoscopy can be safely performed even on malignant patients.

Conclusion

Although the majority of ovarian pathologies are benign, since malignant masses may occur, surgery should be performed as early as possible. In lesions that are thought to be benign, ovarian-sparing surgery should be performed as much as possible. Laparoscopy is a feasible and safe surgical option for ovarian pathologies, even in malignant patients.

Ethics

Ethics Committee Approval: The ethics committee of the study was accepted by the Dicle University Local Ethics Committee (ethics committee date: 14.04.2022, number: 127).

Informed Consent: Consent was obtained from all patients included in the study.

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Authorship Contributions

Surgical and Medical Practices: S.A., Concept: S.A., M.H.O., Design: S.A., S.M.Ö.O., F.S., M.H.O., Data Collection or Processing: E.B., B.A., S.M.Ö.O., F.S., M.H.O., Analysis or Interpretation: E.B., B.A., S.M.Ö.O., F.S., Literature Search: E.B., B.A., Writing: S.A., E.B., B.A., S.M.Ö.O., F.S., M.H.O.

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