



Adnexal Mass Requiring Surgical Intervention in Adolescent Girls

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ABSTRACT

Adolescence starts with the beginning of physiologically normal puberty, and ends when an adult identity and behavior are admitted. This period of development corresponds roughly to the period between the ages of 10 and 19 years, which is compatible the World Health Organization's definition of adolescence. Most of the adnexal masses during this period are functional ovarian cysts and benign neoplasms, and conservative surgery is suggested in the case of a cystic mass smaller than 8 cm. In all adolescents with adnexal masses, the preoperative evaluation should include a comprehensive medical record, physical examination, and imaging methods such as ultrasonography and laboratory examinations. The aim of this study was to evaluate preoperative findings, surgical procedure and histopathologic findings of the adolescent patients who had surgery for adnexal mass in our clinic. Totally 41 patients were included into study. Age, menstrual history, complaints during admission, images of the masses that were detected with different modalities, laboratory findings, applied surgical procedure and pathology findings were recorded. Among the symptoms that lead patients to admit hospital, abdominal pain was the first that was in 23 patients (56.1%). As we evaluate type of operation, 12 patients (29.3%) had laparoscopy, 29 patients (70.7%) had exploratory laparotomy operation. Mini laparotomy was the most often used incision type in 17 patients (41.5%). 34 patients (82.9%) had only cystectomy as an organ preserving surgery and most common histopathologic diagnosis was functional cyst in 14 patients (34.1%). In conclusion; since most pelvic masses in the adolescent period have benign character, surgery in this period should be minimally invasive and organ preserving for future fertility concerns and avoid from premature menopause.

Key words: Adolescent, adnexal mass, conservative surgery

Adölesan Dönemdeki Kızlarda Cerrahi Müdahale Gerektiren Adneksiyal Kitle: 41 Olgunun Retrospektif Analizi

ÖZET

Adölesan dönem; fizyolojik olarak normal pubertenin başlamasından, yetişkin davranışların görüldüğü döneme kadar olan periyod olarak tanımlanır. Bu dönem Dünya Sağlık Örgütü tarafından 12-19 yaş arası olarak kabul edilmektedir. Bu dönemde görülen adneksiyal kitlelerin çoğu fonksiyonel ovarian kistler ve benign neoplazmalar olup, ultrasonografide 8 cm'den küçük kistik yapı görülmesi durumunda konservatif yaklaşım tavsiye edilmektedir. Adneksiyal kitle saptanan tüm adölesanlarda, preoperatif değerlendirme dikkatli bir anamnez kaydı, fizik muayene, ultrasonografi gibi görüntüleme yöntemleri ile laboratuvar çalışmalarını içermelidir. Çalışmamızda; kliniğimizde adneksiyal kitle nedeni ile opere edilmiş olan adölesan çağıdaki hastaların preoperatif bulguları, uygulanan cerrahi yöntemler ve çıkarılan materyallerin patolojik sonuçlarını değerlendirilmeyi amaçladık. Cerrahi müdahale uygulanan toplam 41 hasta çalışmaya dâhil edildi. Tüm hastaların operasyon sırasındaki yaşı, menstürel hikâyesi, hastaneye başvuru şikâyetleri, görüntüleme yöntemleri ile saptanan kist özellikleri ve laboratuvar sonuçları gibi preoperatif değerlendirmeleri ile yapılan operasyonun tipi, operasyonda uygulanan cerrahi yöntemler ve patoloji sonuçları gözden geçirildi. Hastaneye başvuru sırasında en sık saptanan şikâyet 23 hastada görülen karın ağrısı (%56,1) idi. Operasyon tipi olarak 12 hastaya (%29,3) laparoskopî yapılırken, 29 hastaya (%70,7) ise eksploratif laparotomi uygulandı. 17 hastada (%41,5) uygulanan mini laparotomi en sık tercih edilen insizyon tipi olarak tespit edildi. Operasyona alınan 41 hastanın 34'üne (%82,9) organ koruyucu cerrahi olarak sadece kistektominin yapıldığı ve en sık rastlanılan histopatolojik sonucun ise 14 hastada (%34,1) görülen fonksiyonel kistler olduğu saptandı. Sonuç olarak; adölesan çağıda saptanan pelvik kitlelerinin büyük çoğunluğunun benign olması nedeniyle bu dönemde yapılacak olan cerrahinin minimal invaziv ve gelecekteki fertilité ve olası erken menopoz problemi düşünülerek organ koruyucu şekilde yapılması önemlidir.

Anahtar kelimeler: Adölesan, adneksiyal kitle, konservatif cerrahi

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INTRODUCTION

Adnexal masses may result from benign or malignant lesions of ovarian, tubal, and paratubal origin, as well as pregnancy-related causes such as Mullerian anomalies, infectious causes, and ectopic pregnancy (1,2). In all adolescents with adnexal masses, the preoperative evaluation should include a comprehensive medical record, physical examination, and imaging methods such as ultrasonography (USG) and laboratory examinations (3-5). The incidence of adnexal masses that require surgery is low, since functional cyst and benign neoplasms are most frequently seen in the adolescence period (6-8). However, it is important that surgical intervention in this period is minimally invasive and organ protective, in order not to cause a negative outcome on early menopause and fertility (7,8).

The current study aimed to analyze the pathological results of preoperative findings, surgical methods, and excised materials in adolescent girls operated on in our clinic for adnexal masses.

MATERIALS AND METHODS

This retrospective study was carried out at the Department of Gynecology and Obstetrics at our university, was planned in accordance with the Second Declaration of Helsinki (revised in 2008) and was approved by the local ethics committee. The medical records of 158 patients who were admitted to the Department of Gynecology with a diagnosis of adnex, tubo - uterine and ovarian inflammatory - neoplasia between January 1, 2008 and August 31, 2012 were scanned using the "International Classification of Diseases (ICD)" codes. Forty - one patients below the age of 18 years, who underwent an operation, were included in the study, while 117 patients over the age of 18 who had medical treatment only, who were operated for ectopic pregnancy and had insufficient medical records were excluded from the study. All of the patients' preoperative evaluation information, such as age at the time of the operation, menstrual record, complaints at the time of admission to the hospital, cyst size determined by imaging methods, and laboratory findings, as well as the type of the operation, surgical methods, and pathological results were reviewed.

USG and magnetic resonance imaging (MRI) methods were used during the pre-operative evaluation. The adnexal mass size was calculated as the mean of the larg-

est two sizes measured via imaging methods. In laboratory examinations, the levels of tumor markers such as alpha-fetoprotein (AFP), cancer antigen-125 (Ca-125), and human chorionic gonadotropin (hCG) were recorded. Surgical intervention was separated into two groups, namely, exploratory laparotomy and laparoscopy, while exploratory laparotomy was categorized in itself as mini-laparotomy, classic laparotomy and median incision by means of transverse incision. Mini-laparotomy was defined as the 4-9 cm transverse incision performed 2-4 cm above the symphysis pubis. The surgical treatment was recorded as cystectomy, salpingo - oophorectomy (SOO), SOO - staging surgery and adnexal detorsion - cystectomy.

SPSS (Statistical Packages for Social Sciences) version 17.0 for Windows was used to create a database and evaluate the findings. All data were represented as mean \pm S.D. The Kolmogorov-Smirnov test was used for data distribution, while the independent samples t-test was used for the differences between numeric variables. p values <0.05 were considered statistically significant.

RESULTS

The average age of 41 patients included in the study was 14.48 ± 2.18 years and only two patients (4.87%) were in the premenarchial period. The most common cause of admission to the hospital was abdominal pain (56.1%) with 23 patients, followed by, abdominal enlargement (n= 10, 24.4%), abdominal pain - abdominal mass (n=5, 12.2%) and abdominal pain - irregular bleeding (n=3, 7.3%). Pre-operative USG was performed on all patients, while MRI was also performed due to the suspiciously malignant findings in the USG in three patients, and high level of tumor marker in six patients. Unilateral masses were detected in all patients by imaging methods and the average mass size was 8.63 ± 2.59 cm. Ca-125, one of the pre-operative tumor markers, was significantly high in 17 patients (41.5%), whereas AFP and hCG levels were normal in all patients.

Laparoscopy was performed on 12 patients (29.3%). Waiting-monitoring method was used in four of these patients, and the laparoscopy decision was made for eight patients, as there was no reduction in the mass size despite hormone treatment. The hallmark of the patients in this group was that they had an adnexal mass smaller than 8 cm, had benign findings, and normal tumor marker levels. Exploratory laparotomy was performed on the

Table 1. The type of the operation of the patients and the size of the excised mass

Operation type	n (%)	Average mass size \pm SD (min-max)
Mini-laparotomy	17 (41.5)	8.23 \pm 1.88 cm (4-10 cm)
Classic laparotomy	10 (24.4)	10.10 \pm 2.02 cm (6-12 cm)
Median incision	2 (4.9)	15.50 \pm 0.70 cm (15-16 cm)
Laparoscopy	12 (29.3)	6.83 \pm 1.26 cm (4-8 cm)

remaining 29 patients (70.7%). Mini-laparotomy was performed on 17 patients (41.5%), and it was the most preferred incision type. The average mass size was 6.83 \pm 1.26 cm in the laparoscopy group, while it was 9.37 \pm 2.65cm in the laparotomy group. The difference was considered statistically significant according to the independent samples t-test ($p=0.003$). The correlation between the size of the excised mass and the type of the operation is presented in Table 1.

Cystectomy only, as organ protective surgery, was performed on 34 (82.9%) of the 41 patients while cystectomy following over-detorsion was performed on two patients in the group with a 10 - 11 cm mass. SOO was performed on the remaining five patients (12.2%) due to the absence of healthy ovarian tissue in the mass; SOO-staging surgery was performed on two patients (4.9%) due to the suspected malignancy in frozen-section result. Cystectomy was performed on all of the 12 laparoscopy patients, while cystectomy was performed on 22 patients (75.86%) in the laparotomy group. The average mass size was 8.11 \pm 2.01 cm in the cystectomy cases, the mass size was 11.14 \pm 3.71 cm in SOO patients. The difference was considered statistically significant ($p=0.004$). The most frequent histopathological finding in this study was a functional cyst, which was observed in 14 patients. The histopathological diagnosis of two cases for which the result of the frozen section was suspicious with respect to malignancy, was Stage 1A1 dysgerminoma, and the definitive histopathological diagnosis of patients who underwent cystectomy

after ovary detorsion were dermoid cyst and serous cyst adenoma (Table 2).

The mean age of the dysgerminoma patients was 14.5 (ages of 14-15), the size of the mass was 9.5 cm (8-11 cm) and the tumor markers were normal. There were no operative and post-operative complications, such as bleeding that required blood transfusion, or fever and wound site infection in the patients.

DISCUSSION

The present study suggests that the most frequent histopathological finding, in accordance with the previous studies, originates from benign causes in adolescent patients who underwent pelvic mass surgery. It also indicates that minimally invasive and organ protective surgeries, instead of aggressive surgery, are possible in most cases not to cause fertility and early menopause problems in the future. Adolescence starts with the beginning of physiologically normal puberty, and ends when an adult identity and behavior are admitted. This period of development corresponds roughly to the period between the ages of 10 and 19 years, which is compatible the World Health Organization's definition of adolescence (9). Most of the adnexal masses during this period are functional ovarian cysts and benign neoplasms (1,6), and conservative surgery is suggested in the case of a cystic mass smaller than 8 cm (7). In addition, adnexal mass

Table 2. The mean mass size and the definitive histopathological results of the patients operated on for adnexal masses.

Histopathological type	n (%)	Average mass size \pm SD (min-max)
Functional cyst	14(34.1)	7.07 \pm 1.07 cm (6-8 cm)
Serous cyst adenoma	13(31.7)	10.00 \pm 1.15 cm (9-12 cm)
Dermoid cyst	8(19.5)	9.00 \pm 2.39 cm (4-11 cm)
Endometriosis	2(4.9)	4.50 \pm 0.70 cm (4-5 cm)
Mucinous cystadenoma	2 (4.9)	15.50 \pm 0.70 cm (15-16 cm)
Dysgerminoma	2 (%4.9)	6.50 \pm 0.70 cm (6-7 cm)

incidence requiring surgical intervention in the adolescence period is 2.6/100.000 (10), and approximately 9-11% of these operated patients are related to malign masses (1). The most frequent histopathological finding of 41 patients included in our study was functional ovarian cyst which was observed in 14 patients (34.1%), and only two patients (4.9%) had malignity (dysgerminoma).

The most frequent symptom of adnexal masses in the pediatric and adolescence period patients is abdominal pain. Mass effect, nausea, vomiting, precocious puberty, and vaginal bleeding are the other causes of admission to the hospital (1,6,11). Abdominal pain complaints in 23 patients were the most common cause of admission to the hospital in the current case, in accordance with the previous records. Even though the probability of ovarian malignity is low in adolescents, all patients with an adnexal mass should be examined thoroughly for malignity. In this sense, imaging methods such as USG, Doppler USG, computed tomography, and MRI, as well as tumor marker levels, may be useful to determine the origin of the preoperative adnexal mass and also the type of the therapy (4,5,12,13). In the current case, preoperative USG was performed on all patients. In the USG, three patients had suspiciously malignant findings such as papillary projection, solid component, and multiloculation, while MRI was performed on six patients as an additional imaging method due to high levels of the tumor marker. Furthermore, Ca-125, AFP, and hCG levels of all patients were observed and only Ca-125 levels were high in 17 patients. In accordance with the literature, Ca-125 level was high in 12 (92%) of 13 patients diagnosed with serous papillary cyst adenoma. Also, there was no statistically significant correlation between Ca-125 levels and the mass size ($p=0.970$).

Although definitive treatment for adnexal masses is surgical intervention, excessively aggressive treatment should be avoided during adolescence when functional cysts are the majority (1,7). Laparoscopy is regarded as an appropriate surgical method for pre-operative benign masses and well-selected cases (14-17). It has been demonstrated that laparoscopy was safer and effective compared to laparotomy in adolescents with benign cysts smaller than 8 cm (18). In the current study, the size of the adnexal mass was smaller than 8 cm in all of the laparoscopy patients, with benign findings and normal tumor marker levels. There are some studies comparing laparoscopy and mini-laparotomy in benign adnexal masses. Although there is no difference between the two methods in terms

of duration of operation, operative complications, and postoperative recovery, cyst rupture was more frequent during laparoscopy and there were post-operative pain and minor complications in mini-laparotomy operations (19, 20). In the current study, mini-laparotomy was performed on 17 patients and laparoscopy was performed on 12 patients. There were no post-operative complications in both groups; however, two laparoscopy patients had cyst rupture during the operation. The histopathological diagnosis of the patients with cyst rupture was mature cystic teratoma and functional cyst.

Conservative surgery should be performed in adolescent patients with an adnexal mass due to normal pubertal maturation and future fertility problems that may occur (11,14,21,22). Additionally, it should be considered that there is a 3 - 15% risk of ovarian neoplasia and torsion in the later stages of patients who undergo SOO surgery, and when malignancy is excluded, organ protective surgery should be performed (7). In the current case series, which consisted of 41 patients, cystectomy was detected as the most frequent surgical intervention in 34 patients (82.9%), a finding which is in line with the literature findings. SOO surgery was performed on five patients (12.2%) as there was no healthy ovarian tissue in the mass, and SOO - staging surgery was performed in two patients (4.9%) as malignancy was suspected in the frozen - section results. This study has certain limitations. It is a retrospective, concentric study with a decreased number of patients due to the fact that adnexal mass incidence requiring surgical intervention is low in adolescents.

In conclusion; it is important that surgical interventions in the adolescence period are minimally invasive, as pelvic masses are mostly benign during this period. Organ protective surgery should be performed in order to prevent patients from encountering fertility problems later on and to prevent the ovarian reserves from declining earlier.

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