# Laparoscopy or Laparotomy for Large and Benign Adnexal Masses?

## Büyük Benign Adnexial Kitleler için Laparoskopi mi, Laparotomi mi?

Surgery of Adnexal Masses

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**Özet**

Amaç: Günümüzde benign adnexial kitlelerin laparoskopik olarak çıkarılması altın standart olarak kabul edilmişse de çıkarılacak kitlenin maximum boyutu konusunda net görüş yoktur. Bu nedenle adnexial kitlenin boyutu ve operasyon şekli arasındaki ilişkiyi incelemeyi amaçladık. Gereç ve Yöntem: Mayıs 2010-Ekim 2011 Etlik Zübeyde Hanım Eğitim ve Araştırma Hastanesi Endoskopik Cerrahi Kliniğinde opere edilen 158 hasta verileri retrospektif olarak incelendi. Hastalar adnexal kitlelerin boyutlarına göre iki gruba ayrıldı: Grup I, adnexial kitlenin boyutu 10 cm ve üzerinde olan, Grup II adnexial kitlenin boyutu 10 cm.den küçük olan hastalardan oluşuyordu. Hastaların demografik özellikleri, komplikasyonlar, kitlenin boyutu, lokalizasyonu, operasyon şekli, frozen ve patoloji sonuçları değerlendirildi. Bulgular: Grup I'de incelenen 28 hastada ortalama adnexial kitle boyutu 11,2 cm (10-14 cm, std:18,32 ) idi. Bu grupta 25 (%89,3) hasta laparoskopi ile opere edildi. Grup II'de 130 hasta mevcut iken ortalama kitle boyutu 6,7 cm ( 3,5- 9,5 cm, std: 1,4) idi. Bu grupta 129 (%99,2) hasta laparoskopi ile opere edildi (p<0.05). Malign tümör patolojisi ve torsiyon grup I'de istatistiksel olarak daha yüksekti (p<0.001). Grup I'de dermoid kist, grup II'de endometriotik kist en sık görüldü. 10 cm'den küçük adnexial kitleler önemli oranda bilateral olup benign patoloji mevcuttu. Tartışma: Bu çalışmada 10 cm. ve üzerindeki adnexial kitlelerin laparoskopik yöntemle başarılı bir şekilde çıkarılabileceğini gösterdik. Daha da büyük kitle boyutları ile yapılacak çalışmalar ile laparoskopik cerrahinin başarısı ortaya konabilir.

**Anahtar Kelimeler**

Adnexial Kitle; Laparoskopi; Laparotomi

**Abstract**

Aim: Today laparoscopy is the gold standard approach to treating benign adnexal masses. The maximum size of the ovarian mass that can be operated on using laparoscopy, as opposed to laparotomy, is unclear. In this study we aimed to evaluate the relationship between the adnexal mass size and the surgery type. Material and Method: 158 women who were operated on at Endoscopic Surgery Clinic in Etlik Zübeyde Hanım Education and Research Hospital from May 2010 to October 2011 were included in the study. The patients were divided into two groups: group I had an adnexal mass size ≥10 cm while group II had an adnexal mass size <10 cm. The demographic data, adnexal mass diameter, location, operation type, frozen section, final pathology of mass, and complications were evaluated. Results: There were 28 patients in group I and 130 patients in group II. The mean size of the masses in group I was 11.2 cm (10-14 cm, std:18.32) and 25 (89.3%) patients were operated on by laparoscopy. In group II the mean size of the masses was 6.7 cm (3.5- 9.5 cm, std: 1.4) and 129 (99.2%) patients were operated on by laparoscopy. The malign tumour pathology was statistically higher in group I (p<0.001) and torsion was also higher (p<0.001). Whereas dermoid cyst was the most common pathology in group I, in group II it was endometriotic cyst. Discussion: We showed that large adnexal masses can be operated on successfully by laparoscopy. Surgeons should be alert to unexpected maligancy of tumours.

**Keywords**

Adnexal Mass; Laparoscopy; Laparotomy

DOI: 10.4328/JCAM.4178 Received: 04.12.2015 Accepted: 29.12.2015 Printed: 01.05.2016 J Clin Anal Med 2016;7(3): 381-384
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## Introduction

Adnexal masses are relatively common in women of all ages. Today laparoscopy is preferred over laparotomy to treat adnexal masses [1,2]. The small incisions, less post-operative pain, short hospital stay, earlier recovery and improved quality of life in the post-operative period make this approach much more favorable. The tumour size is a criterion for the operation. However, the maximum size of the adnexal masses for laparoscopy is unclear. The size of the tumour in benign adnexal masses is the most common cause of laparoscopy failure [3].

The most important problem of treating adnexal masses with laparoscopy is finding unexpected ovarian cancer. The higher potential of malignancy for large adnexal masses should be considered before the surgery. The adnexal masses should be evaluated by ultrasonography or other methods for excluding malignancy [4].

We reported the cases for which we planned the laparoscopic management of benign adnexal masses of different sizes. We investigated the feasibility and safety of laparoscopy of large adnexal masses, safety of frozen and final pathology, and operative complications. Before the operation, we excluded from the study all women with adnexal masses that were suspected to be malignant.

## Material and Method

After excluding cases with suspected malignancy, 158 women with adnexal masses of different sizes were evaluated for laparoscopic management at Endoscopic Surgery Clinic in Etlik Zübeyde Hanım Education and Research Hospital from May 2010 to October 2011. All women had preoperative ultrasound examination to evaluate the uterus, adnexal, and pelvic region. The evidence of a malignancy was cause for exclusion from the study. High levels of Ca125, above 35 IU/ml, were reviewed by gynecologic oncologists. The protocol of the study was approved by the Local Ethics Committee of our hospital. The women were given detailed information about the surgery and they provided informed consent.

The protocol was the same for all women. Laparoscopy was performed under general anesthesia. After pneumoperitoneum was created, a 10 mm laparoscope was placed directly at the umbilicus. Then, according to the size of the mass, two or three 5 mm ancillary trocars were inserted in the lower abdomen and, if needed, one 5 mm ancillary trocar at palmer point. After the evaluation of the pelvis and the abdomen, any fluid in the pelvis or washing fluid was aspirated and sent for cytological examination. Intrabdominal cystic drainage in an endobag was done for very large masses before the masses were removed. The procedures involved cystectomy or oophorectomy depending on the patient's age, the mass size, and suspicious appearance on imaging studies. All adnexal masses were placed into endobags and were sent for immediate frozen evaluation, and management decisions were dependent on the frozen section findings. In the event of malignancy, surgical staging for laparotomy for ovarian cancer was carried out by gynecologic oncologists in our hospital.

Demographics, indication for surgery, type of procedure, intraoperative and postoperative complications, conversions to another surgery, and pathological findings were recorded in a prospectively maintained database. The largest diameter determined by preoperative imaging studies was defined as the mass size. The torsion of the mass, complications, and final pathology were investigated according to the mass size.

For the statistical analysis of this study, continuous variables were expressed as mean±standard deviation (SD) and categorical variables as number and percentage. The Kolmogorov-Smirnov test was used to assess normal data distribution. Student t-test and Chi Square test were used. P values were considered significant at the 0.05 level. All of the statistical analyses were performed using SPSS Statistics version 21.0 software.

## Results

The results of 158 women who had planned laparoscopic management of adnexal masses of different sizes were evaluated. The characteristics of patients and masses are shown in Table 1. In both groups the main complaint was pelvic pain (21.75% vs 78.60%, p<0.001). 25 (89,3%) patients in group I were operated on by laparoscopy, whereas 129 (99.2%) patients in group II were operated on by laparoscopy (p<0.05).

Table 1. Characteristics of the adnexal masses

| | Mass size ≥ 10 cm (N:28) | Mass size <10cm (N:130) | p value |
|---|---|---|---|
| Age (years) (mean ±Std) | 24.9 ± 8.8 | 26.8 ± 8.25 | >0.05 |
| Size (cm) (mean ±Sd) | 11.2 ± 18.32 | 6.7 ± 1.4 | <0.05 |
| Ca 125 U/ml (mean ±Std) | 28.01±18.32 | 34.75±30.57 | 0.2 |
| Right (n, %) | 10 (35.7) | 51 (39.2) | 0.8 |
| Left (n,%) | 13 (46.4) | 53 (40.8) | 0.6 |
| Bilateral (n,%) | 5 (17.9) | 26 (20) | 0.8 |
| Benign (n, %) | 26 (92.8) | 129 (99.2) | 0.006 |
| Malignant (n, %) | 1 (3.6) | - | |
| Borderline (n, %) | 1 (3.6) | 1 (0.8) | <0.05 |
| Torsion (n,%) | 5 (17,9) | 8 (6,8) | <0.05 |
| Laparoscopy (n,%) | 25 (89.3) | 129 (99.2) | <0.05 |
| Conversion to laparotomy (n, %) | 3 (10.7) | 1 (0.8) | <0.001 |
| Complication (n, %) | 2 (7.1) | 1 (0.8) | <0.05 |

The main operative procedure was cystectomy in both groups (87.5% vs. 91.5%, p>0.05 ). The operative details are shown in Table 2.

The final histopathological results of the groups are shown in Table 3. A benign pathological condition was found in 26

Table 2. Operative details

| Main procedure | Group 1 (n=28) (n, %) | Group 2 (n=130) (n, %) | p value |
|---|---|---|---|
| Cystectomy | 24 (85.7) | 119 (91.5) | >0.05 |
| Unilateral salpingo-oophorectomy | 1 (3.6 ) | 6 (4.6) | >0.05 |
| Salpenjectomy | 1 (3.6) | 1 (0.8) | <0.05 |
| Endometriotic nodul coterization | 1 (3.6) | 3 (2.3) | >0.05 |
| Cystectomy, appendectomy | 1 (3.6) | 1 (0.8) | <0.05 |
| USO[1], infracolic omentectomy, appendectomy, PABPLND[2] | 1 (3.6) | 0 | - |
| TAH[3], BSO[4], infracolic omentectomy, appendectomy PABPLND | 1 (3.6) | 0 | - |

[1]Unilateral salpingo-oophorectomy; [2]Paraaortic bilateral pelvic lenfatic dissection, [3]Total abdominal hysterectomy, [4]Bilateral salpingo-oophorectomy.

Table 3. Histopathological findings of the groups

| Histopathological diagnosis | Group I (n=28) (n, %) | Group II (n=130) (n, %) | p value |
|---|---|---|---|
| Endometriotic cyst | 4 ( 14.3 ) | 63 ( 48.5 ) | <0.001 |
| Dermoid cyst | 9 ( 32.1 ) | 19 ( 14.6 ) | <0.05 |
| Serous cystoadenoma | 3 ( 10.7 ) | 15 ( 11.5 ) | >0.05 |
| Mucinous cystoadenoma | 1 ( 3.6 ) | 3 ( 2.3 ) | >0.05 |
| LMP[1] tumour | 1 ( 3.6 ) | 1 ( 0.77 ) | <0.05 |
| Paraovarian cysts | 7 ( 25 ) | 18 ( 13.8 ) | <0.05 |
| Granulosa cell tumour | 1 ( 3.6 ) | 0 | - |
| Others[2] | 2 ( 7.1 ) | 10 ( 7.7 ) | >0.05 |

[1]low malign potential, [2]functional cyts

(92.8%) patients in group I and in 129 (99.2%) patients in group II (p<0.05). There were one malignant and two low malign potential (LMP) results after the frozen section of all patients. Surgical debulking of malignant tumour and fertility sparing surgery for LMP tumours were performed by immediate laparotomy. Diagnosis by frozen section was in agreement in all of the final pathology of cases. The characteristics of the malign masses are shown in Table 4. None of the malign cases was bilateral. Two LMP tumours were located on the left ovarian side, while the malign tumour was on the right ovarian side.

Table 4. Characteristics of the malign masses

| | Granuloza cell tumour | Borderline serous tumour | Borderline musinous tumour |
|---|---|---|---|
| Age (years) | 47 | 24 | 30 |
| Ca 125 (IU/ml) | 26 | 22.07 | 38 |
| Localization | Right ovarian | Left ovarian | Left ovarian |
| Diameter(cm*cm) | 10*10 | 10*12 | 9.6*6.8 |
| Frozen | Granulosa cell tumour | Borderline serous tumour | Borderline musinous cystadenom |

In group I, one bowel injury related to use of a Veress needle occurred, and the primary suturation of the intestinal injury was performed. Also, a patient from group II whose frozen result was LMP had a bowel injury during the laparotomy done for surgical staging; Hartmann colostomy was applied for this patient. One patient from group II who had an LMP tumour had febrile morbidity controlled by antibiotics.

The median length of hospital stay was 1 day (range 1-2 days) for women who underwent laparoscopy and 4 days (range 3-9 days) for those converted to laparotomy.

## Discussion

The laparoscopic approach is suitable and beneficial for women with benign adnexal masses. Reduced operative blood loss, fewer postoperative complications, shorter hospitalizations, less pain, and earlier recovery are the advantages of laparoscopic management of adnexal masses [4]. Most surgeons agree that laparoscopy has the potential to treat completely and successfully both benign and malignant adnexal pathology while decreasing unnecessary morbidity among patients [5]. But the maximum size of the mass that is suitable for laparoscopy is unclear.

There are several studies about the outcome of laparoscopic resection of large adnexal masses [6-9]. In these studies, the main procedure was cystectomy. Ghezzi et al. [4] operated on 186 patients with large adnexal masses with a conversion rate to laparotomy of 6.5%. In total they had 25 (13.5%) malignant and LMP tumours but there were no strict criteria excluding malignancy in this study. Gowri et al. reported a rate of 46% [10] for laparoscopic management of benign adnexal masses. Although it has been reported that larger adnexal masses have a higher risk of malignancy, many large adnexal masses are benign. The expectance of higher malign potential of large adnexal masses restricts the choice of operative approach. If we consider only the size of adnexal mass for operative approach, many women will have laparotomy unnecessarily. Ghezzi et al. [4] reported that if they had strictly followed a 10 cm threshold for performing open surgeries, 155 of 161 women in their cohort with benign adnexal masses would have undergone midline laparotomy when their mass could have been successfully resected laparoscopically. In our study, conversion to laparotomy from laparoscopy was 3.2% across all patients; in the large masses group it was 10.7%. In two of three patients the operations were performed laparoscopically, but after reviewing the frozen section results, gynecologic oncologists preferred to continue by laparotomy.

In the laparoscopic management of adnexal masses, the main problem is unexpected malignancies. Analysis of all the available information from the history, examination, imaging studies, and tumour markers sometimes is not enough to predict the malignancy of the adnexal mass. Before the operation, it is important to exclude malignancy. Leng et al. reported the rate of unexpected malignancy as 0.77% [11]. Marana et al. reported this rate as 0.75% [12]. Although we analyzed all the patients to exclude malignacy before the operation, we encountered unsuspected ovarian cancer in 1.9% of all patients: in the larger adnexal masses group this rate was 7.1% (n=2); for adnexal masses below 10 cm it was 0.76% (n=1) (p<0.001).

A large adnexal mass may be the cause of some problems such as rupture of the cyst during the insufflation, trocar insertion; danger of iatrogenic spillage of malign cells; or difficulty of cystectomy without rupture of cyst [8]. It is reported that intraoperative spillage is primarily assosiated with cystectomy procedures of large ovarian cysts, whereas oophorectomy procedures carry a significantly smaller risk for spillage [13]. The presence of a dermoid cyst can result in cymic peritonitis if the cyst ruptures. But sufficient lavage in the abdomen during the operation can solve this problem. Port-site metastasis after laparoscopic removal of malignant adnexal tissue is another reported complication with a reported incidence of 1-16% [14]. In our study there was no capsular rupture. We performed cystic drainage in an endobag for large masses before the masses were removed.

Frozen section is very important for the operation—especially, a report from a specialised pathologist, which can result in conversion of the operation. Geomini et al. [15] reported that the accuracy of frozen section diagnosis was dependent on tumour size. In adnexal masses ≥ 10 cm, a benign result of the frozen section diagnosis is less reliable than in women with a tumour <10 cm [15]. In our study two patients in group I and one patient in group II had malignancy according to frozen section results (p<0.001). We suggest that all the masses should be investi-

gated by frozen section regardless of diameter. In our study, all the frozen results were correlated with final pathologies.

We conclude that the size of the adnexal mass is not a contraindication for laparoscopic surgery. Adequate evaluation before the surgery sometimes cannot exclude malignancy but the number of unnecessary laparotomies is decreased. In all cases of adnexal masses, an expert laparoscopist should be present and a specialised pathologist and gynecologic oncologist should be on call.

*Competing interests*

The authors declare that they have no competing interests.

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