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Comparison of Laparoscopy and Laparotomy Results for Benign Ovarian Tumors

Benign Over Tümörlerinde Laparoskopi ve Laparotomi Sonuçlarının Karşılaştırılması

Jule Eriç Horasanlı[1], Gülnur Eren [1], Mehmet Sinan İyisoy[2]

[1]Necmettin Erbakan University, Meram Faculty of Medicine, Department of Gynecology and Obstetrics , Konya, Turkey
[2]Necmettin Erbakan University, Department of Medical Education and Informatics, Konya, Turkey

Abstract

Aim: To present the data obtained from our hospital by comparing operative characteristics and surgical outcomes of patients who underwent laparoscopy or laparotomy due to benign ovarian cysts.

Material and Method: In this retrospective study, 443 patients who underwent cystectomy, oophorectomy or hysterectomy salpingo-oophorectomy surgeries were compared comprising two groups laparoscopy or laparotomy. Data from patient files were analyzed in terms of age, cyst size, postoperative hemoglobin, postoperative white blood cell count, operating time, hospital stay and presence of surgical site infection.

Results: Frequency of postoperative surgical site infection was significantly higher in the laparotomy group. The risk of surgical site infection was RR(relative risk) =4.5(1.74–11.67) times in those who underwent laparotomy compared to laparoscopy. Duration of hospitalization was lower in the laparoscopy group for all operation subtypes (oophorectomy, cystectomy, and hysterectomy salpingo-oophorectomy). Cyst sizes of the patients who underwent hysterectomy salpingo-oophorectomy were significantly larger in the laparotomy group. Operating time of the patients who underwent laparoscopic hysterectomy salpingo-oophorectomy was significantly longer than that of thrlaparotomic group, while no significant difference was found in the oophorectomy and cystectomy groups in terms of operating time. The need for blood transfusion was significantly less frequent in the laparoscopy group for all operation types except the hysterectomy salpingo-oophorectomy group, which was not statistically significant.

Conclusions: Hospital stay, surgical site infection, need for blood transfusion, and operating time was less in patients who underwent laparoscopy. Hence, laparoscopic surgery methods can be safely recommended for rapid and effective treatment of benign ovarian cysts.

Keywords: Ovarian Cyst, Laparoscopy, Laparotomy

Öz

Amaç: Bu çalışmada amacımız, iyi huylu over kisti nedeniyle laparoskopi veya laparotomi uygulanan hastaların ameliyat özellikleri ve ameliyat sonuçları karşılaştırılarak hastanemizde elde edilen verileri sunmaktır.

Gereç ve Yöntem: Bu retrospektif çalışmada over kistleri nedeniyle kistektomi, ooferektomi ve histerektomi salpingooferektomi yapılan 443 hasta laparoskopi ve laparotomi olmak üzere iki grupta karşılaştırıldı. Hasta dosyalarındaki veriler yaş, kist boyutu, ameliyat sonrası hemoglobin, ameliyat sonrası beyaz küre sayısı, ameliyat süresi, hastanede kalış ve ameliyat yeri enfeksiyonu açısından analiz edildi.

Bulgular: Ameliyat sonrası cerrahi alan enfeksiyonu sıklığı laparotomi grubunda anlamlı olarak daha yüksekti. Laparatomi yapılanlarda cerrahi alan enfeksiyonu riski laparoskopiye göre RR (relatif risk)=4.5 (1.74-11.67) kattı. Tüm operasyon türleri (ooferektomi, kistektomi ve histerektomi salpingo-ooferektomi) için laparoskopi grubunda hastanede kalış süresi daha düşüktü. Histerektomi salpingo-ooferektomi yapılan hastaların kist boyutları laparotomi grubunda anlamlı olarak daha yüksekti. Histerektomi salpingo-ooferektomi yapılan hastaların hastanede kalış süreleri laparoskopi grubuna göre anlamlı olarak daha uzun omasına rağmen, ooferektomi ve kistektomi hastalarında anlamlı fark bulunmadı. Histerektomi salpingo-ooferektomi grubu hariç tüm operasyon türleri için laparoskopi grubunda kan transfüzyonu ihtiyacı anlamlı olarak daha düşüktü. Histerektomi salpingo-ooferektomi grubundaki yükseklik ise istatistiksel olarak anlamlı değildi.

Sonuç: Laparoskopik tedavi uygulanan hastalarda hastanede kalış süresi, kesi yeri enfeksiyonu, kan transfüzyonu gerekliliği, ameliyat süresi daha azdı. Benign over kistlerinin tedavisinde laparoskopik metodlar etkili ve hızlı bir tedavi için güvenle önerilebilir.

Anahtar Kelimeler: Over Kisti, Laparoskopi, Laporotomi

Corresponding *(İletişim)*: Jule Eriç Horasanli, Necmettin Erbakan University, Meram Faculty of Medicine, Department of Gynecology and Obstetrics , Konya, Turkey
E-mail *(E-posta)*: juleesen@gmail.com
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INTRODUCTION

Ovarian cysts are common gynecological benign tumors, the prevalence of which has gradually increased in recent years, along with changes in social life and eating habits. They are likely to affect female fertility functions and pose severe health risks on women.[1-2] Ovarian cysts are a common gynecological problem composed of two main categories, physiological and pathological.[1] The physiological type comprises follicular cysts and luteal cysts. The pathological type includes benign, malignant and borderline malignant ovarian tumors.[2] Complicated ovarian cysts can lead to torsion, infarction, and acute severe pain in the case of bleeding.[3] In a prospective study investigating the prevalence and age distribution of ovarian cysts, 85% were benign, 13% were malignant, and 2% were borderline malignant.[4]

Surgical methods have long been used as the primary treatment of ovarian cysts. However, conventional laparotomy adversely affects the ovary's functionality by causing physical trauma and various stress responses in patients. These effects can result in delayed postoperative recovery.[5]

Laparoscopy is commonly used to diagnose and treat acute and chronic gynecological surgery. Due to recent continual technological advancements and the development of minimally invasive techniques, laparoscopic surgery has been more widely preferred resulting in less trauma, faster recovery, and minimal complications.[6] Good results were obtained in the dissection of ovarian cysts, and patients who underwent laparoscopy recovered faster than patients who underwent laparotomy.[7] An advantage of laparoscopic ovarian surgery is that it can be used safely and effectively for different indications of gynecological problems.[8] Other advantages of laparoscopy over laparotomy include more minor scars, shorter operating times, faster recovery, less adhesion, lower costs, relatively less postoperative pain, and fewer post-operative complications with shorter hospital stays.[9]

This study aimed to compare these methods for benign ovarian cysts by retrospective evaluation of operative characteristics and surgical outcomes of two groups of patients who underwent laparoscopy or laparotomy.

MATERIAL AND METHOD

This retrospective study was conducted with female patients over 18 who underwent cystectomy, salpingo-oophorectomy, or hysterectomy salpingo-oophorectomy due to benign ovarian cysts between 2015 and 2020. Ethical board approval was retrieved (Ethical Approval No: 2021-3134). All procedures comply with principles stated in the Declaration of Helsinki Patient records were collected from the hospital's online system regarding their age, cyst size, postoperative hemoglobin (Hb), postoperative white blood cell (WBC) counts, operating time, hospital stay, and presence of surgical site infection. The postoperative blood count control time was taken at the second postoperative hour.

Superficial Surgical Site Infection

Occurs within 30 postoperative days and involves only skin or subcutaneous tissue of the incision where the patient has at least one of the following: a) purulent drainage from the superficial incision, b) organisms isolated from an aseptically obtained culture of fluid or tissue from superficial incision, c) at least one of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness, or heat, and superficial incision is deliberately opened by the surgeon, culture-positive or not cultured (a culture-negative finding does not meet this criterion), and d) diagnosis of superficial incisional surgical site infection by the surgeon or attending physician.[10]

Inclusion criteria

Patients diagnosed with an ovarian cyst and treated with surgical techniques were included. Only benign cases were selected in the study.

Exclusion criteria

Patients with suspected or known malignant cysts, those with missing records, and those with CA 125 (Cancer Antigen 125) greater than 35 U/ml were excluded.

Surgical approach and technique

Surgical methods were the same in all cases. Laparotomy or transverse or vertical incision and the length of the incisions were variable.

Laparoscopy

10-mm trocar was applied to umbilicus to insert laparoscope. Two additional 5-mm trocars were applied to the right and left lower quadrants to enter surgical instruments. The laparoscopic operation was performed with loop sutures (Ethicon, Somerville, NJ), endoscopic stapler, or bipolar-tripolar coagulation.[11]

Statistics Descriptive statistics were used for the variables. Numeric variables were expressed as mean and standard deviation, or median, Q1 and Q3. Nominal variables were expressed as frequency and percentage. A patient's data was first characterized by its main surgery type: laparotomy or laparoscopy, then by its subtype: cystectomy, salpingo-oophorectomy, or hysterectomy salpingo-oophorectomy. T-test, Mann-Whitney U test, and 2- way ANCOVA tests were used when analyzing numeric variables. Analyses of numerical outcomes were adjusted for age. Chi-square test was used to analyze nominal variables. Analyses were conducted using SAS University Edition 9.4 software. Type 1 error rate was determined as 5%.

RESULT

There were 443 retrospective female patients enrolled. Sociodemographic characteristics like age, number of abortions, and number of vaginal or cesarean deliveries are summarized in **Table 1**. Operation indications are listed in

Table 3. We mean the ages of both groups with subtypes of operation and found no difference in mean ages on hysterectomy salpingo-oophorectomy and salpingo-oophorectomy groups. (**Table 2**). However, the mean ages of patients who underwent laparoscopic cystectomy were significantly lower (p=compared 0.0084) than that of the laparotomic cystectomy group. Of the patients with a previous history of open surgery, 66.21% (n= 145) were treated with laparotomy, and 54.46% (n=122) were treated with laparoscopy (p=0.01). The frequency of postoperative surgical site infection was also higher in the laparotomy group (p= 0.0006) with a RR of 4.5, % 95 confidence interval CI(1.74–11.67). Postoperative WBC counts were lower (although not always statistically significant) in the laparoscopic cystectomy, hysterectomy, salpingo-oophorectomy, and salpingo-oophorectomy groups (p<0.0001, p=0.055, p=0.22, respectively). Postoperative Hb values of the patients who underwent salpingo-oophorectomy were higher in the laparoscopy group (p= 0.058) when preoperative Hb values were adjusted. Postoperative Hb values of the operation group subtypes were similar (p=0.22 and p=0.99). Duration of hospital stay was lower in the laparoscopy group for all the subtypes (salpingo-oophorectomy p< 0.0001, cystectomy, p= 0.0006, hysterectomy, salpingo-oophorectomy, p< 0.0001). Operating time in the laparoscopic hysterectomy salpingo-oophorectomy group was significantly longer than that of the laparotomic group. At the same time, no significant difference was found in the salpingo-oophorectomy and cystectomy surgery groups (p=0.017,p=0.658,p=0.510, respectively). Cyst sizes of the patients who underwent hysterectomy salpingo-oophorectomy were significantly larger in the laparotomy group (p=0.005) while no differences were detected in the other two operation groups (p=0.152,p=0.507). The need for blood transfusion was significantly less frequent in the laparoscopy group for all operation subtypes (p=0.21) (**Table 4**).

Table 1. Sociodemographic characteristics

	Laparoscopy (n=224)	Laparotomy (n=219)	p
Age	38.46±11.54	44.52±10.73	**<0.001**
Number of abortions	0(0-1)	0(0-1)	0.004
Number of normal deliveries	1(0-2)	2(0-3)	0.004
Number of cesarean deliveries	0(0-0)	0(0-1)	0.010
Previous laparotomy history	122 (54.46%)	145 (66.12%)	0.012

Data are given as the mean±Standard deviation, median (25th, 75th percentile), and frequency (%). Significant p values are given in bold.

Table 2. Types of operation

Operation Type	Laparoscopy (n=224)	Laparotomy (n=219)
Cystectomy	128 (57.14 %)	59 (26. 94 %)
Salpingooophorectomy	22 (9.8 %)	42 (19. 17 %)
Hysterectomy Salpingooophorectomy	74 (33.03 %)	118(53. 88 %)

Data is given as frequency (%).

Table 3. Surgery Indication

	Laparoscopy n=224	Laparotomy n=219	Total
Ovarian Cyst	215(95.98%)	210(95.89%)	425(95.94%)
Ovarian Cyst Rupture	2(0.89%)	4 (1.83%)	6(1.35%)
Ovarian Torsion	7(3.13%)	5(2.28%)	12(2.71%)
Total	224(100.00%)	219(100.00%)	443(100.00%)

Data is givenas frequency (%).

Table4. Operation characteristics and complications

	Laparoscopy (n=224)	Laparotomy (n=219)	p
Operating Time	104.11±37.68	106±38.16	0.581
Hospital Stay	41.04±17.76	64.71±24.49	<0.001
Surgical Site Infection	5 (2.23 %)	22 (10.05 %)	<0.001
Number of Transfused Patients	22 (9.87 %)	30 (13.70 %)	0.211
Cyst Sizes	5.47±3.21	5.80±3.19	0.288
Postoperative Hb	11.30±1.42	11.07±1.51	0.1034
Postoperative Wbc	10.94±3.82	13.04±4.44	<.0001

Data is given as themean±Standard deviation or frequency (%). Significant p values are given in bold.

DISCUSSION

Benign ovarian masses are a common health problem for women, and laparoscopic surgery is the most preferred method for their treatment. Laparoscopy has significant advantages over laparotomy, such as improved cosmetic results, less postoperative pain, and faster recovery. Operative laparoscopy is widely recognized for the treatment of gynecological disorders.[12]

Ovarian cysts frequently cause symptoms, such as menstrual disorders and infertility, which severely adversely affect women's physical and mental well-being. Surgical treatment is the primary treatment for ovarian cysts. Despite being very effective for managing ovarian cysts, conventional laparotomy results in poor postoperative prognosis due to larger incisions, slower wound recovery, and more frequent postoperative infections and complications.[13] With appropriate preoperative evaluation, laparoscopic surgery can be technically feasible, safe, and advantageous, with minimal morbidity, and can replace laparotomy in managing most adnexal masses through reproductive ages.[14]

Operative laparoscopy has many potential advantages over laparotomy.[8] The most crucial concern for ovarian cysts is the high risk caused by aspiration of cysts for ineffective diagnosis and spread of the cysts. Advantages of laparoscopic surgery include less postoperative pain, shorter postoperative hospital stay, lower risk of incisional infection, and a faster return to work.[15]

The development of adhesions following gynecological procedures is another critical concern. The laparoscopic approach provides improved well-being and a positive contribution to fertility with reduced adhesions and pelvic pain. The laparoscopic technique also provides perfect cosmetic outcomes.[16] Pittaway et al. compared

laparoscopic adnexal excision with conventional laparotomy and concluded that the laparoscopic technique might offer significant benefits when performed by a laparoscopist experienced in advanced techniques.

Significant differences were reported in the operating time, estimated blood loss, duration of hospital stay, and recovery time.[17] Bateman et al. concluded that postoperative recovery time in the endoscopic operation of ovarian cysts caused by endometrioma was lower than that of laparotomy, while laparotomy provided faster recovery in the treatment of advanced-stage endometriosis.[18]

Hysterectomy operations conducted via laparoscopy and laparotomy were compared in a study conducted in which perioperative blood transfusion and hospital stay were found similar in both groups, while operating time was significantly longer in the laparoscopy group. It was observed that laparotomy was frequently preferred in patients with a history of previous surgery.[19] Tsolakidis et al. conducted by (n=482 women) showed that laparoscopic surgery resulted in fewer adverse surgical incidents (surgical injury or postoperative complications, including fever or infection), less postoperative pain, and shorter hospital stay when compared to laparotomy.[9] In our study, postoperative hospital stay was significantly shorter in the laparoscopy group. Consistent with our finding, Lehmann-Willenbrock et al.[20] reported that risk of postoperative surgical site infection was lower in the laparoscopy group.

Obtaining access to peritoneal cavity in laparoscopic surgery is more difficult in patients with previous abdomino pelvic surgery, since it can become a cumbersome, time-consuming, and occasionally hazardous procedure.[21] Laparoscopic surgery is widely accepted as the prefered method of treatment for many gynecological problems, including those seen in patients with previous history of surgery. The fact that due to intraabdominal adhesions, these patients are mostly vulnerable to complications during laparoscopic surgery does not harm this preference. [22] It was observed that laparotomy was more frequently preferred for patients with a history of previous surgery and larger cyst sizes. Laparoscopy is less preferred in patients with a previous history of laparotomy.

Our study found that the length of hospital stay, the number of incisional infections, the need for blood transfusion and the duration of surgery were shorter in patients who underwent laparoscopic procedures.

Limitations

Several limitations of the study exist. This was a retrospective study, therefore, subjects were not randomized to the surgical type of approach. Operation types performed were not uniform among groups. Lack of histopathological results and some inadequate findings of postoperative follow-up were other limitations.

CONCLUSION

Laparoscopy or laparotomy are choices for operative treatment of benign ovarian cysts. Minimal invasive methods have now replaced laparotomy in the surgical treatment of ovarian cysts. Advantagesof operative laparoscopy includes allowing for the examination of the whole abdomen and less postoperative discomfort due to smaller incisions. Compared to laparotomy, laparoscopic surgery resultedfewer intraoperative and postoperative complications, shorter hospital stays, and less frequent adhesion development. Laparoscopic surgery methods can be safely recommended for fast and effective treatment of benign ovarian cysts with cystectomy, oophorectomy or hysterectomysalpingo-oophorectomy.

ETHICAL DECLARATIONS

Ethics Committee Approval: This investigation was approved by the University Medical Faculty Ethics Committee (Ethical Approval No: 2021-3134

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

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