

# Comparative Study of Laparoscopic versus Laparotomic Surgery for Adnexal Masses

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## ABSTRACT

**Background & Objective:** Adnexal masses are among the most important neoplastic lesions observed in women. Considering different results of laparoscopy versus laparotomy for adnexal masses, this study compared the surgical consequences of laparoscopy and laparotomy of adnexal masses.

**Materials & Methods:** This prospective observational study was performed on females aged 10 to 75 years with adnexal mass referred to the gynecology clinic of Shohaday-e Tajrish Hospital (2019-2020) by convenience sampling. A total of 34 patients in the laparoscopy group and 29 patients in the laparotomy group were included in the study. SPSS 25 was used for data analysis.

**Results:** The mean duration of surgery and anesthesia in laparoscopic patients was significantly more than in the laparotomy patients ( $P < 0.05$ ). There were no significant differences between patients in the two groups in terms of complications during surgery ( $P = 0.62$ ). The mean of pre-discharge pain (based on scoring from 1 to 10) in laparoscopic patients was significantly lower than in the laparotomy group ( $3.5 \pm 1.2$  and  $6.7 \pm 1.0$ , respectively,  $P < 0.001$ ). The mean length of hospital stay after surgery was significantly lower in the laparoscopic group compared with the laparotomy group ( $29 \pm 9$  hours and  $44 \pm 7$  hours, respectively,  $P < 0.001$ ).

**Conclusion:** Although the use of laparoscopy in adnexal masses is associated with a longer duration of surgery and anesthesia, due to the shorter hospital stay, it can be concluded that the use of laparoscopy in adnexal masses is better than laparotomy.

**Keywords:** Adnexal mass, Laparoscopy, Laparotomy, Neoplastic lesions, Outcome assessment



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## Introduction

Adnexal masses, including any mass in the ovaries and fallopian tubes, are the most common problem affecting females of all ages (1). These masses are among the most important neoplastic lesions seen in women and may be benign or malignant (2). The incidence of adnexal mass in pregnancy is about 41 in 1500 pregnancies (3,4). These masses are often discovered accidentally, and they can be a benign or malignant tumor, distant site metastasis, or a non-neoplastic (5). Due to the high prevalence of cancer mortality among women with ovarian cancer and adnexal mass, this issue needs to special attention. Comprehensive physical examination and appropriate laboratory and radiographic examinations will be necessary for the initial diagnosis and evaluation of an

adnexal mass (1). The most common symptoms reported by affected women are abdominal or pelvic pain, increased abdominal size, bloating, frequent urination, and weight loss. The presence of any of these symptoms for more than two weeks or failure to respond to appropriate treatment necessitates further evaluation. Vaginal ultrasound is the standard method for assessing adnexal masses (2).

Literature indicated that due to the uncertainty of most lesions, the management of adnexal mass is still debated (1). Surgical approaches such as laparotomy for benign disease or laparoscopy for malign disease can be used. However, there still remains risk while performing these methods. Most studies have reported that the use of laparoscopy in adnexal masses is safe,

with low surgery costs, less bleeding and complications, and shorter hospital stays. However, due to the use of more tools in this method, the duration and cost of surgery may be higher, as mentioned in various studies (6). However, laparoscopy is a minimally-invasive surgery method with many advantages and is aesthetically prioritized due to making smaller incisions and fewer wounds. The lower risk of infection in this method resulted in faster recovery after surgery, as well as less post-operative pain and shorter hospital stay. In contrast, laparotomy is more common, and the operation is quicker and less expensive (7).

Pittaway *et al.* (8) compared the characteristics of 26 laparotomic and 64 laparoscopic Surgery of adnexal masses in 1994. The results showed that the duration of operation, bleeding rate, length of hospital stay, costs, and recovery time in the laparoscopic method were significantly less than laparotomy. But the rate of complications, adhesion, and blood transfusion was not significantly different. The results of another study in this field showed that the duration of laparoscopic surgery was longer. In contrast, the complications, efficiency, length of hospital stay, and cost of surgery were lower, although the cost of instruments was higher than the laparotomic method (9). Another study showed that the total length of hospital stay was lower in the laparoscopic method, and complications were higher in the laparotomy method. Also, the cost of laparoscopic surgery was lower than laparotomy. Finally, it has been suggested that the treatment of adnexal masses with laparoscopy can be done well with fewer complications and lower costs (10). Pulcinelli *et al.* (1) also reported that malignant or unspecified masses and benign masses were treated by laparotomy and laparoscopy, respectively. Also, post-operative complications (37% vs. 7%) and length of hospital stay (11 days vs. 5 days) in laparotomy were significantly higher than in laparoscopy. In a 2019 review study in China, Ye *et al.* (3) examined the treatment of ovarian tumors in pregnancy using laparoscopy and open surgery. They reported that the duration of laparoscopic surgery for adnexal masses was slightly longer than the open surgical procedure. However, the length of hospital stay and the amount of bleeding in this method is less than laparotomy. Due to the importance of the subject and the contradiction in the results of previous studies, the present study was conducted to compare the results and complications of laparoscopic surgery and laparotomy of adnexal masses.

## Materials and Methods

### Participants

This study was performed as a prospective cohort study on women with adnexal masses referred to the gynecology clinic of Shohadaye Tajrish Hospital in 2019-2020. Considering alpha at 0.05, beta at 0.2, P1 at 0.4, and P2 at 0.1, based on the following formula,

the required sample size in each group was estimated to be 29 patients.

$$n = \frac{(P_1(1 - P_1) + P_2(1 - P_2)) * (Z_{1-\frac{\alpha}{2}} + Z_{1-\beta})^2}{(P_1 - P_2)^2} = 29$$

Finally, 34 patients in the laparoscopic group and 29 patients in the laparotomy group were selected by convenience sampling method. Inclusion criteria were women aged 10 to 75 years who were candidates for laparoscopic surgery or laparotomy due to stable adnexal mass or suspected adnexal mass according to preoperative assessments (such as tumor markers and imaging). Exclusion criteria were metastasis or ascites.

### Procedure

The choice of surgical method was based on the physician's diagnosis, and the researchers did not interfere in its selection. Patient characteristics include demographic characteristics (age, BMI), patient history (history of previous pregnancies and deliveries, history of abdominal surgery), cause of the patient surgery (referral problem, one- or two-sided, ultrasound or MRI status, tumor markers), characteristics of surgery and anesthesia (type of surgery performed, duration of surgery and anesthesia, amount of bleeding during surgery, need for intraoperative blood transfusion, complications during surgery), pathology outcome and hospitalization characteristics (duration of hospitalization, cost of surgery and hospitalization) during and after the surgery, were collected using a form. Before discharge from the hospital, the amount of pain was recorded based on a score of 1 to 10 by asking the patient. Also, one week to 10 days after the surgical operation, return time to work was asked and recorded. Finally, all data collected from patients were compared between the two groups of laparoscopy and laparotomy.

### Statistical Analysis

SPSS was used software version 25 (SPSS Inc., Chicago, Ill., USA) for data analysis. Chi-square test, independent t-test, fisher's exact test, and Mann-Whitney U test were used to analyze the collected data. The significance level (P-value) was considered less than 0.05.

### Ethical Considerations

All patients' information was considered confidential. The study had ethical approve from the ethics committee of Shahid Beheshti University of Medical Sciences (SBMU) (IR.SBMU.MSP.REC.1399.762).

### Results

The mean age of patients in the present study was 36±8 years. There was no significant difference between patients in the two groups of laparoscopy and

laparotomy (36±7 years and 36±9 years, respectively,  $P=0.81$ ) in this regard. Also, the mean BMI was not significantly different between the two groups of laparoscopic and laparotomic patients (27±6 kg / m<sup>2</sup> and 29±4 kg / m<sup>2</sup>,  $P=0.21$ , respectively). The present study results showed no significant differences in terms of pregnancy history, history of abdominal surgery, clinical symptoms, location of the mass, and tumor markers between the two groups. The history of cesarean in laparoscopic patients was significantly higher than in laparotomy group ( $P=0.03$ ). Imaging findings were cystic in the laparotomy cases, while cystic and solid-cystic masses were in the laparoscopic group ( $P=0.001$ ). The cystectomy was performed in 79% and 70% of

subjects in the laparotomy and laparoscopic groups, respectively ( $P=0.012$ ). Complications were divided into intra-operative and post-operative. Also, in the patients of the laparoscopic group in our study, there were 3 cases of unwanted intraoperative cyst rupture (spillage), but it occurred in only one case of the laparotomy group. Although this difference was not significant, these complications can still be overcome due to the use of laparoscopic instruments and the degree of surgical proficiency. The results related to the duration of surgery and anesthesia, the amount of bleeding during surgery and the need for blood transfusion and complications during surgery are presented in [Table 1](#).

**Table 1.** Surgery duration, bleeding rate and complications during surgery in two groups of laparoscopy and laparotomy

| Variable                                  | Laparoscopy (34) | Laparotomy (29) | P-value |
|---|------------------|-----------------|---------|
| Surgery duration (minutes, mean±SD)       | 141 ± 41         | 120 ± 36        | 0.03    |
| Length of anesthesia (minutes, mean ± SD) | 179 ± 42         | 150 ± 36        | 0.005   |
| Bleeding (CC)                             | 15               | 300             | <0.001  |
| Blood transfusion (Number)                | 0                | 0               | -       |
| Intraoperative complications (%)          | 3                | 1               | 0.62    |

According to the results, the mean duration of surgery in all patients was 131±40 minutes. Also, the mean duration of anesthesia in all patients was 166±42 minutes. As shown in [Table 1](#), the duration of surgery and anesthesia of patients in the group of laparoscopic patients was significantly longer than in the group of laparotomy patients ( $P<0.05$ ). Bleeding during surgery was significantly lower in patients of laparoscopic group ( $P<0.001$ ). In this study, no patient needed a blood transfusion. Also, there was no significant difference between patients in the two groups of laparoscopy and laparotomy in terms of complications during surgery ( $P=0.62$ ). In the present study, the cost of surgery was significantly higher in patients in the laparoscopic group ( $P<0.001$ ), while the cost of hospitalization was not significantly different between

the two groups ( $P=0.81$ ). The pre-discharge pain score, length of hospital stay, and patient return time to work are summarized in [Table 2](#).

The mean pre-discharge pain in all patients scoring from 1 to 10 was 5±2, significantly lower in patients in the laparoscopic group than in the laparotomy group (3.5±1.2 and 6.7±1.0, respectively,  $P<0.001$ ). The mean length of hospital stay after surgery in patients in the laparoscopic group was significantly shorter than the laparotomy group (29±9 hours and 44±7 hours, respectively,  $P<0.001$ ). Return to work time in patients of the group of laparoscopic patients was significantly shorter than the group of laparotomy patients ( $P<0.001$ ).

**Table 2.** Pre-discharge pain score, length of hospital stays, and return to work in two groups: laparoscopy and laparotomy

| Variable                                  | Laparoscopy (34) | Laparotomy (29) | P-value |
|---|------------------|-----------------|---------|
| Pre-discharge pain score (mean ± SD)      | 3.5 ± 1.2        | 6.7 ± 1.0       | <0.001  |
| Length of hospital stay (hour, mean ± SD) | 29 ± 9           | 44 ± 7          | <0.001  |
| Return to work (day, mean ± SD)           | 6 ± 1            | 12 ± 1          | <0.001  |

## Discussion

Most adnexal masses are benign masses that are detected by ultrasound and followed up. However, in some cases with clinical symptoms or findings in favor of malignancy, surgery is required. Each of the two methods of laparoscopy and laparotomy is used in these patients, each of which has its own advantages

and disadvantages—the current study aimed at comparing the surgical characteristics of laparoscopy and laparotomy of adnexal masses. In most studies, it has been reported that the use of laparoscopy in adnexal masses is safe, associated with low surgery costs, less bleeding and complications, and shorter hospital stays

(1, 8, 10-14). However, due to the use of more tools in this method, the duration and cost of surgery may be higher, as mentioned in various studies (9, 13-16). Our study also showed that although laparoscopy of adnexal masses is associated with longer surgery time and higher cost, however, the blood loss is much lower in this method. In our study, there was no need for blood transfusions. Other studies have reported low laparoscopic complications. The amount of bleeding and the need for blood transfusions have also been reported to be low (8, 12, 13). In our study, the length of hospital stay of patients in the laparoscopic group was shorter, and patients in this group returned to work earlier. These benefits of minimal injury surgical methods have been mentioned in other studies. In general, it can be said that due to fewer post-operative complications and shorter hospital stay in the laparoscopic method, intra-operative complications can be reduced by the surgeon's experience. Therefore it can be used in the treatment of adnexal masses. However, the preferred approach should be determined based on the patient's condition and the type of disease.

### Conclusion

The findings of the present study showed that the use of laparoscopy in surgery of adnexal masses is

associated with longer operation time and anesthesia as well as higher operating costs. However, this procedure is associated with minor intra-operative bleeding, shorter hospital stay, and earlier return to work. Therefore, it can be concluded that laparoscopy in adnexal masses is better than laparotomy, and this method is recommended if there are suitable conditions.

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### Authors' Contributions

All authors designed the study, collected the research data, analyzed the data, revised the manuscript, and approved the final version.

### Conflict of Interest

The authors have declared no conflict of interest.

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