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ORIGINAL ARTICLE

Comparative Study Between Laparoscopy and Laparotomy in Management of Ovarian Cancer

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Abstract

Background: **Cancer ovary is the most fatal malignancy of the female genital tract. Surgery and chemotherapy are the pillars of management. Laparoscopic surgical management of ovarian cancer increased in the last years.**

Aim of the work: **To compare the safety and morbidity of laparoscopy and conventional laparotomy in management of ovarian cancer.**

Patients and methods: **This retrospective and prospective study was conducted on ovarian cancer patients in Obstetrics and Gynecology Department in Armed Forces Hospitals (Al Maadi military hospital Gyne-oncology unit) during the period from January 2018 till November 2022. This study included 80 patients with ovarian cancer divided into two groups; A thorough laparoscopic surgical staging was performed on forty patients, and standard abdominal surgical staging was performed on another forty patients.**

Results: **No statistical significant difference between Laparotomy and Laparoscopy regarding demographic characteristics; age, parity, menopausal status, history of cancer, tumor characteristics; pathology and stages. Operation duration (minutes) was significantly longer in Laparotomy group 155.4 ± 12.3 than in Laparoscopy group 113.0 ± 6.5, $P < 0.001$. Intraoperative complications and postoperative complications were more frequently in laparotomy group. Postoperative hospital stay was significantly longer in Laparotomy group 5.2 ± 0.9 than in Laparoscopy group 2.3 ± 0.6, $P < 0.001$.**

Conclusion: **Laparoscopic surgery appears to have many benefits, including shorter hospital stays, fewer side effects, and improved quality of life, and for these and other reasons, Laparoscopic surgery became a corner stone in management of ovarian cancer not only for comprehensive surgery in selected cases but as a part of confirming diagnosis, staging and planning of treatment.**

Keywords: Laparoscopy, Laparotomy, Management, Ovarian cancer

1. Introduction

The most deadly tumour of the female genital system, carcinoma of the ovary is the sixth most common cause of cancer-related mortality in women. Most occurrences of ovarian cancer are discovered after the disease has progressed.[1]

The natural course of ovarian cancer is unknown, and there is little information to say if the interval between symptoms and diagnosis affects quality of life or overall survival. Getting diagnosed quickly can improve survival. It is known that early detection of symptoms may improve a woman's prognosis for ovarian cancer, though.[2]

The cornerstones of the management of ovarian cancer are surgery and chemotherapy. The major goal in the early stages is to determine the disease's stage and confirm whether adjuvant treatment is necessary. The standard course of treatment for advanced malignancies is radical cytoreduction without any remaining disease, followed by chemotherapy. Neoadjuvant chemotherapy and interval

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debulking surgery were the alternate management options when upfront surgery was not feasible. The most common surgical technique is open surgery. Laparoscopy has been demonstrated to be safe in specific circumstances with regard to postoperative complications and immediate mortality.[3]

Despite dramatic improvements in laparoscopic surgical techniques over the past few years, many surgeons continue to question the appropriateness of laparoscopy in the management of cancer of the ovary.[4]

The first report on laparoscopic staging of ovarian cancer was made in 1994.[5] Following that, other studies suggested that extensive laparoscopic staging of ovarian cancer was possible without affecting survival, supporting the benefits and safety of laparoscopic care in cases of early ovarian cancer.[6]

This work aimed to compare safety and morbidity between laparoscopy and laparotomy in management of ovarian cancer.

2. Patients and methods

This was a retrospective and prospective study. It was conducted on 80 female patients recruited for comprehensive staging management of cancer ovary (40 per group) in Obstetrics and Gynecology Department in Armed Forces Hospitals (Al Maadi military hospital gyne-oncology unit) during the period from January 2018 till November 2022. Data collected retrospectively for patients of ovarian cancer from January 2018 till October 2020 then patients were followed prospectively from November 2020 till November 2022.

The patients in the study had ovarian cancer cases that could be surgically treated with either a laparotomy or a laparoscopy, meaning they had no obvious signs of the disease spreading outside of the ovaries, no signs of distant metastasis, and no known clinically significant cardiopulmonary disease. Patients who had borderline or advanced ovarian cancer, concomitant cancer of another organ, or who were deemed surgically unfit were not included in the study.

2.1. Study procedures

In order to assess the safety and morbidity of laparoscopy vs conventional laparotomy in the therapy of ovarian cancer, the study comprised forty patients who received thorough laparoscopic surgical staging and forty patients who underwent traditional abdominal surgical staging.

2.2. Evaluation of patients

History taking, personal, menstrual, obstetric, contraceptive, past and family history of other cancers or chronic diseases; general, abdominal and vaginal examination; laboratory investigations (CBC, PT, PTT, INR, RBS, liver, renal functions and Hepatitis markers). Tumour markers results (CA 125, CEA, AFP, BHCG CA19-9 and other markers). Radiological data ultrasound, CT, MRI, Mammography data, PET scan, upper and lower GI endoscopy. Calculated RMI and IOTA simpe rules results.

All of the patients underwent thorough counselling before surgery regarding the therapeutic choices, risks associated with the procedure, and potential for conversion to a laparotomy.

2.3. Preoperative preparation

Two days prior to the procedure, the patient was admitted, and a laxative solution was administered to prepare the bowels. An enema was used to clean the lower colon the day before the procedure.

Antibiotic prophylaxis is given for all patients 1 h preoperatively. Compression devices and subcutaneous low molecular weight heparin is given to obese patients for prophylaxis against possible thromboembolic episodes.

2.4. Laparoscopic technique

Proper lithotomy positioning of the patient and a general anesthesia was introduced. Usage of uterine manipulator. A pneumoperitoneum was made using a 10-mm tracar and a Verres needle introduced into the umbilicus. The patient was subsequently placed in the Trendelenburg position and under direct view while two to three additional trocars were introduced. Look for adhesions, fluids, tumours, and metastatic deposits in the peritoneal cavity. The liver, gallbladder, small bowel, rectosigmoid colon, pouch of Douglas, and paracolic gutters were among the pelvic and abdominal organs examined. After peritoneal washing for cytology, the tumour was excised, and it was then placed in a bag for frozen section. A total hysterectomy, bilateral salpingo-oophorectomy, bilateral lymph node dissection of the pelvic and para-aortic areas, omentectomy, and appendectomy were all part of the surgical staging. For an infracolic omentectomy, the omentum along the transverse colon and stomach was detached. For effective hemostasis, liquefaction was utilised. The uterus and the removed omentum were removed vaginally after the successful hysterectomy. By inserting a 40-

mm round needle through a 10-mm port and a 1-0 Vicryl in a continuous running suture, the vaginal cuff was closed intracorporeally or vaginally.

2.5. Laparotomic technique

All surgical procedures used in laparotomy instances were identical to those used in minimally invasive laparoscopic operations, with the exception of a midline vertical abdominal incision.

2.6. Items evaluated

Intraoperative blood loss, operative time, intra and postoperative complications. Major surgical complications such as urinary tract injury (Bladder or ureter), vascular injury and intestinal injury. Other complications such as delayed recovery, anesthetic complications, wound infection, paralytic ileus and febrile complications. Postoperative analgesic needs, hospital stay duration and the period of time needed to start treatment with adjuvant chemotherapy.

2.7. Statistical analysis

Using the Windows 10 operating system, IBM SPSS Statistics 22 was used to conduct the statistical study. For continuous variables, descriptive data were expressed as averages and standard deviations; for categorical and dichotomous variables, they were expressed as counts and percentages (%).

One-way analysis of variance (ANOVA) with repeated measures was used to analyse the continuous variables (such as operating time and blood loss), and the χ^2-test was used to compare the categorical and dichotomous variables (such as parity). The cutoff point for statistical significance was set at 0.05. The 'Microsoft Office Excel 2007' programme was used to present the statistical findings as tables and graphs.

3. Results

Table 1 shows that: No statistical significant difference between Laparotomy and Laparoscopy regarding demographic characteristics; age, parity, menopausal status, history of another cancer and Family history of cancer.

Table 2 shows that: No statistical significant difference between Laparotomy and Laparoscopy regarding tumor characteristics; pathology and stages.

Table 3 shows that: Operation duration (minutes) was significantly longer in Laparotomy group 155.4 ± 12.3 than in Laparoscopy group 113.0 ± 6.5, $P < 0.001$.

Table 4 shows that: Intraoperative complications were more frequent in Laparotomy group than in Laparoscopy group, the differences were not significant. Intestine injury 5.0% vs. 0.0% respectively, $P = 0.494$). Bladder injury (5.0% vs. 2.0% respectively, $P = 0.999$). Ureter injury (5.0% vs. 2.0% respectively, $P = 0.999$).

Table 5 shows that: Postoperative complications were more frequent in Laparotomy group than in Laparoscopy group, the differences were not significant only. Paralytic ileus (5.0% vs. 0.0% respectively, $P = 0.494$). Surgical site infection (12.5% vs. 2.5% respectively, $P = 0.201$). Sepsis (7.5% vs. 2.5% respectively, $P = 0.615$).

Table 6 shows that: Postoperative hospital stay was significantly longer in Laparotomy group

Table 1. Comparison between Laparotomy and Laparoscopy regarding demographic characteristics.

Variables	Laparotomy (Total = 40)	Laparoscopy (Total = 40)	*P* value
Age (years)			
Mean ± SD	49.1 ± 14.3	46.4 ± 16.7	[a]0.439
Range	21.0–78.0	13.0–76.0	
Parity			
Nulli	4 (10.0%)	7 (17.5%)	[b]0.330
Multi	36 (90.0%)	33 (82.5%)	
Menopause			
Pre	17 (42.5%)	18 (45.0%)	[c]0.999
Post	23 (57.5%)	22 (55.0%)	
History of another cancer	1 (2.5%)	2 (5.0%)	[c]0.999
Family history of cancer	6 (15.0%)	7 (17.5%)	[b]0.762

Data presented as *n* (%) unless mentioned otherwise.
[a] Independent *t*-test.
[b] Chi square test.
[c] Fisher's Exact test.

Table 2. Comparison between Laparotomy and Laparoscopy regarding tumor characteristics.

Variables	Laparotomy (Total = 40)	Laparoscopy (Total = 40)	*P* value
Pathology			
Papillary serous cysadencarcinoma	26 (65.0%)	28 (70.0%)	
Mucinous cysadencarcinoma	4 (10.0%)	1 (2.5%)	
Endometrioid carcinoma	4 (10.0%)	6 (15.0%)	
Clear cell carcinoma	2 (5.0%)	1 (2.5%)	[a]0.736
Granulosa cell tumor	2 (5.0%)	2 (5.0%)	
Immature teratoma	2 (5.0%)	1 (2.5%)	
Dysgerminoma	0 (0.0%)	1 (2.5%)	
Stages			
Ia Ib	27 (67.5%)	26 (65.0%)	
Ic	3 (7.5%)	5 (12.5%)	
IIa	3 (7.5%)	4 (10.0%)	[a]0.855
IIIa	4 (10.0%)	4 (10.0%)	
IIIc	3 (7.5%)	1 (2.5%)	

Data presented as *n* (%).
[a] Fisher's Exact test.

Table 3. Comparison between Laparotomy and Laparoscopy regarding operation duration (minutes).

Measures	Laparotomy (Total = 40)	Laparoscopy (Total = 40)	*P* value
Mean ± SD	155.4 ± 12.3	113.0 ± 6.5	[a]<0.001[b]
Range	132.0–177.0	101.0–123.0	

[a] Independent *t*-test.
[b] Significant.

Table 4. Comparison between Laparotomy and Laparoscopy regarding intraoperative complications.

Complications	Laparotomy (Total = 40)	Laparoscopy (Total = 40)	*P* value
Intestine injury	2 (5.0%)	0 (0.0%)	§0.494
Bladder injury	2 (5.0%)	1 (2.5%)	§0.999
Ureter injury	2 (5.0%)	1 (2.5%)	§0.999

Independent *t*-test.
*Significant.

Table 5. Comparison between Laparotomy and Laparoscopy regarding postoperative complications.

Complications	Laparotomy (Total = 40)	Laparoscopy (Total = 40)	*P* value
Paralytic ileus	2 (5.0%)	0 (0.0%)	§0.494
Surgical site infection	5 (12.5%)	1 (2.5%)	§0.201
Sepsis	3 (7.5%)	1 (2.5%)	§0.615

Independent *t*-test.
*Significant.

Table 6. Comparison between Laparotomy and Laparoscopy regarding postoperative hospital stay (days).

Measures	Laparotomy (Total = 40)	Laparoscopy (Total = 40)	*P* value
Mean ± SD	5.2 ± 0.9	2.3 ± 0.6	[a]<0.001[b]
Range	4.0–7.0	1.0–4.0	

[a] Independent *t*-test.
[b] Significant.

5.2 ± 0.9 than in Laparoscopy group 2.3 ± 0.6, $P < 0.001$.

4. Discussion

Unfortunately, ovarian cancer cases are mostly diagnosed accidently and with advanced-stage disease. Due to complications of extended conventional surgeries and their morbidity and mortality to the patients, The use of laparoscopic surgery to treat gynaecological malignancies is steadily growing.

In comparison to open surgery, the majority of studies found that laparoscopy did not impair the prognosis for survival and recurrence. A surgical alternative for the management and thorough surgical staging of ovarian malignancies, laparoscopy has proved essential in the treatment of early ovarian cancer.[7]

In this study, baseline demographic characteristics were similar in both groups. The Mean age of laparotomy group was 49.1 years while it was 46.4 years for laparoscopy group. This is a decade younger than the median age reported in the Western literature.[8] The exact reason for this age difference is not known; however, this could be a reflection of the overall demographic profile of Egyptian population with a relatively younger population than the west which resembles results of the Indian study including 406 patients with advanced epithelial ovarian cancer and a median age 52 years.[9]

The most well-known neurotic sort was papillary serous sort 65% for laparotomy contrasted with 70% for laparoscopy bunch which goes with different examinations about histological kinds of epithelial ovarian malignant growth which recognize the 4 fundamental sorts of epithelial ovarian disease (papillary serous, mucinous, endometrioid and clear

cell) with serous sort as the most widely recognized one.[10]

In this review, albeit the laparoscopic bunch was related with lower intraoperative time, less intraoperative blood misfortune, lower intraoperative entanglements and lower postoperative complexities postoperative agony scores, prior diet resumption, emergency clinic stay and less opportunity to begin treatment with adjuvant chemotherapy which is like Lu et al.[11]

The precision of careful organizing is the main questioned point with respect to laparoscopic the executives of ovarian disease. Nearly to the people who have not, thorough careful arranging brings down the gamble of repeat in patients with careful stage I ovarian disease. The pelvis, mesentery, and peritoneum are accepted to be challenging to totally inspect during laparoscopy, which makes it hard to regulate chemotherapy accurately and restrains upstaging from working.[12] One can assess the accuracy of complete careful arranging by looking at the lymph hub yield and organizing rate between patients who went through laparoscopic and laparotomic medical procedure. For a situation control test of 34 individuals, there was no distinction in the lymph hub yield among laparoscopy and laparotomy. Moreover, no considerable distinction was found in the upstaging rates among laparoscopy and laparotomy in three relative meta examinations.[13]

The second contentious matter with the laparoscopic method is tumour rupture. Tumor rupture is a possibility in all surgical procedures, not only laparoscopic ones. According to several research, laparoscopic surgery and laparotomic surgical therapy both carry a similar risk of tumour rupture. According to a study, laparoscopy and laparotomy groups had equal rates of tumour rupture in ovarian cancer patients (10.5% vs. 12.1%, respectively; P141.000).[14]

According to other studies, both procedures had an 8% chance of tumour rupture.[15]

Uncertainty surrounds the clinical relevance of a tumour ruptured during surgery. More than 1500 patients participated in a significant multicenter retrospective research of cyst rupture, which showed that tumour rupture was a reliable predictor of disease-free survival. In contrast, a retrospective analysis of 394 patients found no change in survival. Prospective studies, however, failed to support these conclusions. In patients with early ovarian cancer, the prognostic significance of intraoperative tumour rupture needs to be more thoroughly investigated and supported by extensive randomised controlled trials (RCTs). 13 A laparoscopic bag should be used, controlled aspiration should be used, and the danger of rupture should be kept to a minimum in order to limit the likelihood of tumour contamination of the abdominal cavity.[16]

In this study, the intraperitoneal cavity was carefully irrigated with distilled water following surgery, and a splenic bag was used to contain any surgical leaks and to catch any bleeding that might occur inside the bag. Port-site metastases are the third hot topic. The frequency of port site metastatic implantation was less than 1%, according to a sizable number of cases undergoing transperitoneal laparoscopic therapy for malignant disease.[17]

The 1.96% port site metastatic recurrence incidence was equivalent to the wound recurrence rate after laparotomy, according to a study of 796 patients who received laparoscopic therapy for ovarian, fallopian tube, or primary peritoneal cancer.[18]

The rate of port-site metastases in ovarian cancer laparoscopic management was found to be almost same to that in laparotomy care.[6]

It is unknown where port-site metastasis actually started. Hematogenous dissemination, direct wound contamination and implantation, various pneumoperitoneal effects, insufflation gas effects, the 'chimney effect,' aerosolization of tumour cells, local immunological reactions, and surgical technique are some of the most common techniques.[17]

Metastasis at the port location was not seen in this investigation. In order to avoid touching the vaginal wall, the specimen was carefully removed, and then a pipe was put inside the vagina and completely irrigated before being sutured.

4.1. Conclusions

Laparoscopic surgery appears to have many benefits, including shorter hospital stays, fewer side effects, and improved quality of life, and for these and other reasons, Laparoscopic surgery becomes a corner stone in management of ovarian cancer not only for comprehensive surgery in selected cases but as a part of confirming diagnosis, staging and planning of treatment.

Disclosure

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Authorship

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Conflicts of interest

The authors declared that there were no conflicts of interest.

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