



Different approaches for para-aortic lymph nodes dissection in patients with ovarian cancer: A comparative study

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Abstract

Objectives: Para-aortic lymph nodes dissection in patients with ovarian cancer is very important in diagnosis and prognosis. Transmesenteric and retrocaecal approaches are commonly used to remove malignant para-aortic lymph nodes.

Patients and Methods: This study is a retrospective randomized controlled study and included 100 cases with operable ovarian cancer with pathologically enlarged para-aortic lymph nodes. These patients were subdivided into two groups; 1st group included 50 cases subjected to direct trans mesenteric para-aortic lymph nodes dissection, and the other group included 50 cases subjected to the retro- Caecal (retroperitoneal) approach to dissect para- aortic lymph nodes.

Comparison between the two groups regarding operative time, blood loss, complications and number of lymph nodes dissected was done.

Results: In this study there were no statistically significant differences among patients in both groups regarding age, parity, stage, histopathological subtype.

The mean number of harvested lymph nodes in the 1st group was 3.6 ± 1.36 lymph nodes, while in the 2nd group it was 2.9 ± 1.36 lymph nodes. Operative time was statistically different in both groups. Also, the amount of blood loss was statistically significantly different in both groups. Complications related to lower para-aortic lymph nodes dissection were present in the 2nd group only; 2 cases with ureteric injury (partial cut) were reported.

Conclusion: Transmesenteric approach for para aortic lymph nodes dissection in patient with ovarian cancer is better than the retrocaecal approach it is associated with shorter operation time, less blood loss, more harvested lymph nodes and less complications. But both approaches could be used safely

Keywords: para-aortic lymph nodes, ovarian cancer, transmesenteric, retrocaecal

Introduction

Ovarian cancer is the most common fatal gynecological cancer in developed countries, surgery and chemotherapy are the main lines of treatment ^[1].

Ovarian cancer has many histological subtypes and risk factors including genetic predisposition and familial history. The epithelial subtype is the commonest, although other subtypes are present, like germ cell tumour, sex cord stromal and mesenchymal subtypes. Many risk factors are associated with ovarian cancer, like older age group, null parity and genetic predisposition, so it may be seen in association with cancer colon, breast cancer and endometrial cancer ^[2].

This type of malignancy is difficult to predict or diagnose because there is no specific screening tool or specific symptoms and patients are usually presented with common vague nonspecific symptoms. Tumour markers including Cancer Antigen 125 (Ca 125) are widely used blood test to predict, diagnose and follow patients with ovarian cancer, other markers like carcino embryonal antigen (CEA), alfa feto protein and inhibin are used. Based on the current knowledge, many models have been tried to be used as a screening tool for ovarian cancer but fail to achieve the optimal success ^[3].

Ultrasound is usually the 1st tool used to diagnose ovarian cancer, followed by other more sophisticated and advanced radiological modalities including CT, MRI and PET CT. Detection of malignant lymph nodes with different accuracy is done by all of these modalities. Ultrasonic criteria are used to diagnose ovarian cancer as a part of the Risk of malignancy index (RMI) calculation with menopausal status and cancer antigen 125 (CA 125). Which includes: presence of multiple cysts, solid areas, bilateral lesions, ascites and metastases. Also, based on the International Ovarian Tumors Analysis Group (IOTA), there are some malignant criteria that may be used to diagnose ovarian cancer based on ultrasound examination. Also like irregular solid tumour, presence of ascites, presence of at least 4 papillary structures and strong blood flow. Also, we have some sonographic criteria to diagnose malignant changes in lymph nodes like LNs with cystic appearance or hyperechoic punctuations are highly suspicious of malignancy. LNs with a hyperechoic hilum should be considered as benign. Sometimes we may need more investigative radiological tools to perform radiological staging like CT scan or to confirm the radiological findings like the origin and nature of the tumour, like MRI and PET CT ^[4].

Surgical treatment of ovarian cancer is the corner stone in the management including, pelvic and para-aortic lymph nodes dissection followed by chemotherapy. Sometimes we may start with neoadjuvant chemotherapy followed by debulking surgery in more advanced stages [5].

Para-aortic lymph node affection is an important and independent factor affecting prognosis and management plans in patients with ovarian cancer. Lymph nodes affection in ovarian cancer determines the extent of the cancer and the survival rate [6].

In retroperitoneal Pelvic and para-aortic lymph nodes dissection in gynecological cancers including ovarian cancer, the landmarks for lymph nodes dissection starting from deep circumflex iliac vein distally till left renal vessels cranially and midpoint of common iliac vessel is the landmark between pelvic and para –aortic areas in Lymphadenectomy procedures. Para aortic lymph nodes dissection is a very important step in surgical treatment of patients with ovarian cancer, and it is very important to choose the appropriate approach to complete the dissection and removal of the affected lymph nodes. More lymph nodes and fewer complications are usually the aim [7].

Suspicious or bulky lymph nodes should be removed during the surgical procedure, and sometimes complete Lymphadenectomy should be performed especially in the pelvic group to complete cytoreductive surgery [8].

Ovarian cancer recurrence after primary treatment may occur in the intra-peritoneal compartment or in the retroperitoneal compartment; retroperitoneal recurrence involves retroperitoneal lymph nodes including para-aortic lymph nodes and sometimes isolated para–aortic lymph nodes. Recurrence may be seen and sometimes needs secondary cytoreductive surgery to increase disease free survival rate [9].

Aim of the study

Was to compare two approaches for para-aortic lymph nodes dissection (Trans mesenteric and retro-caecal). To determine which approach is better in para-aortic lymph nodes dissection in ovarian cancer based on operative time, blood loss, complications and lymph nodes harvested.

Patients and Methods

This study is a retrospective comparative study, which included 100 cases with operable ovarian cancer with pathologically enlarged para-aortic lymph nodes. The operability was based on pre- operative assessment by an anesthesia team, so all patients could tolerate this procedure, also preoperative patient assessment by the surgical team using history, clinical examination and different imaging modalities to assess patient's performance regarding hazards versus benefits from the surgical procedure (obesity, co- morbidities, previous surgical procedures and hospital resources were important factors to select our patients). These patients were randomly subdivided into two groups; the 1st group included 50 cases subjected to direct transmesenteric para-aortic lymph nodes dissection, and the other group included 50 cases subjected to the retro- Caecal (retroperitoneal) approach. Comparison between the two groups regarding operative time, blood loss, complications and number of lymph nodes dissected was done.

After approval by the ethics committee of the faculty of medicine, University of Alexandria, written informed consents were signed by the patients.

In this study, para-aortic lymph nodes dissection in the area between the common iliac artery bifurcation and the left renal vein.

The procedures included in this research were performed by the same team.

In this study, para-aortic lymph adenectomy was performed on patients with pathologically enlarged lower para-aortic either detected by pre- operative imaging or intra- operative palpation before dissection.

Transmesenteric dissection was performed through midline abdominal incision packing of small intestine, traction of caecum and traction of pelvic colon to expose the lower para aortic region, then traction of the peritoneum using forceps, incision was performed craniocaudally, dissection of loose areolar tissue to reach the aorta, dissection directly on the enlarged lymph node, closure of the peritoneum at the end of the procedure. Figure 1

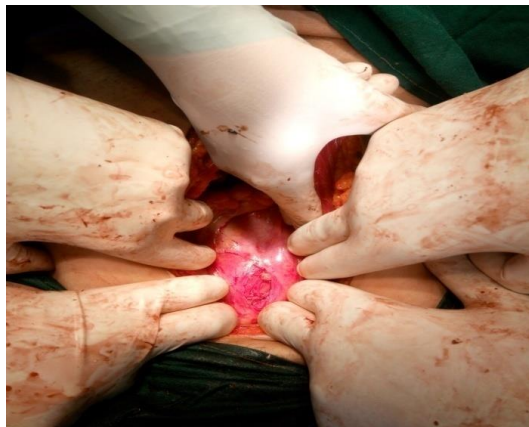


Fig 1: Transmesenteric approach for para-aortic lymph adenectomy

Retro-caecal dissection was performed as continuation of right pelvic lymph adenectomy, continuation of the dissection across the Rt common iliac artery, retraction of the caecum was done, till we reached the lower para aortic region then dissection of para aortic lymphnodes was done. Figure 2

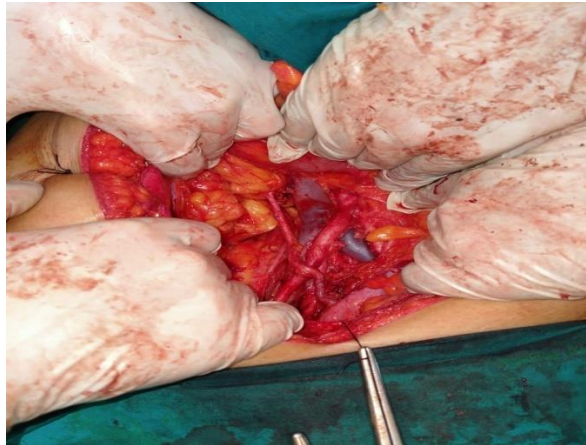


Fig 2: the retro-caecal approach for para-aortic lymph adenectomy

Inclusion criteria

Patients should be fit for surgery, operable ovarian cancer (either primary surgery or cytoreductive surgery), positive para-aortic lymph nodes for malignancy by one or more of the imaging modalities and patients should accept to share in the research

Exclusion criteria

Unfit patients for surgery, advanced or in operable cancers and patients refuse to share in the research

Statistical analysis of the data

Statistical analysis was performed by a specialized person who is oriented well by different statistical rules that were used in this research.

Data was fed to the computer using IBM SPSS software package version 24.0.

Qualitative data was described using numbers and percent. Comparison between different groups regarding categorical variables was tested using the Chi-square test.

Quantitative data were described using mean and standard deviation for normally distributed data.

For normally distributed data, comparison between two independent populations was done using an independent t-test.

Significance test results are quoted as two-tailed probabilities. Significance of the obtained results was judged at the 5% level.

Results

In this study there were no statistically significant differences among patients in both groups regarding age, parity, stage, histopathological subtype.

The mean number of harvested lymph nodes in the 1st group was 3.6 ± 1.36 lymph nodes (range was 1 – 6 LNs), while in 2nd group it was 2.9 ± 1.36 lymph nodes. (range was 1-5 LNs). The t-test was 2.01 and p value was 0.018, which is statistically significant. Table 1

Table 1: Comparison between the two studied groups regarding number of lymph nodes harvested

Number of lymph nodes harvested	1 st group	2 nd group
	“n=50”	“n=50”
range	1-6	1-5
mean±S.D.	3.6 ± 1.36	2.9 ± 1.361
t-test	2.01	
p value	0.018*	

*significant at level 0.05

Operative time was statistically different in both groups. In 1st group, the lymph nodes dissection time was 24-56 minutes with a mean of 40.04 ± 9.27 minutes, while in 2nd group the range of time was 28-72 minutes with a mean of 50.8 ± 14.639 minutes. The t-test was 4.21 and p value was 0.0041. Table 2

Table 2: Comparison between the two studied groups regarding operative time, starting from the beginning of peritoneal dissection, till closure of the peritoneum

Operative time (min.)	1 st group	2 nd group
	"n=50"	"n=50"
Range in minutes	24-56	28-72
Mean±S.D.	40.04±9.27	50.8±14.639
.t-test	4.21	
p value	0.0041*	

*significant at level 0.05

Also, the amount of blood loss was statistically significantly different in both groups. In the 1st group, the range of blood loss was 20-350 ml with a mean of 197.1±103.2, and in the 2nd group, the range was 50-600 ml and the mean was 297.52±170.223 t-test was 6.98 and p value was 0.001. Table 3

Table 3: Comparison between the two studied groups regarding blood loss was assessed by aspirated blood estimation (suction of the blood from the surgical field starting from peritoneal incision till the end of dissection and closure of the peritoneum in 1st group.

Blood loss (ml)	1 st group	2 nd group
	"n=50"	"n=50"
Range	20-350 ml	50-600 ml
Mean ± S. D.	197.1±103.2	297.52±170.223
t-test	6.98	
p value	0.001*	

*significant at level 0.05

Complication related to lower para-aortic lymph nodes dissection was present in 2nd group only ; 2 cases with ureteric injury (partial cut) was reported, direct closure by urological surgeon and insertion of Doubl J stent in the ureter and to be removed latter on by the urological surgeon. P value was 0.62, it is not significant. Table 4

Table 4: Complication related to lower para-aortic lymph nodes dissection was present in 2nd group only ; 2 cases with ureteric injury (partial cut) was reported, direct closure by urological surgeon and insertion of Doubl J stent in the ureter and to be removed latter on by the urological surgeon

Complication	1 st group		2 nd group	
	"n=50"		"n=50"	
	No.	%	No.	%
No complication	50	100.0	48	96.0
ureteric injury (partial cut)	0	0.0	2	4.0
X ²	0.125			
p	0.621 N.S.			

N.S. = Not significant

In our study, lymph nodes dissected from 39 patients (39%) were confirmed to be malignant after final histopathological examination. Most of them were with serous adenocarcinoma (73% of them). Figure 3 & 4

**Fig 3:** dissection and removal of enlarged lymph nodes

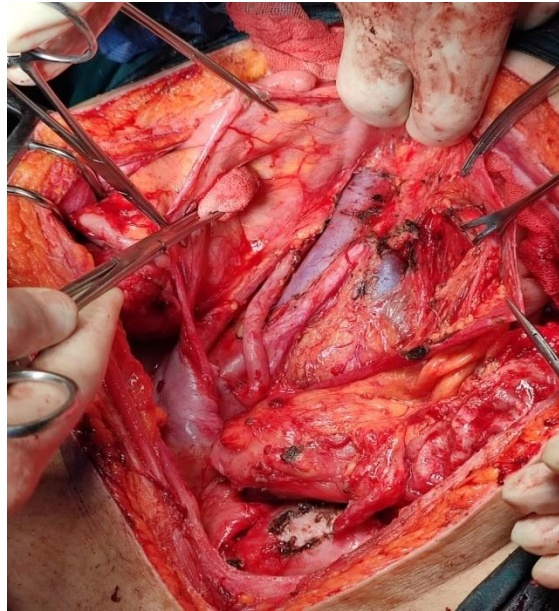


Fig 4: after lymph nodes removal and haemostasis

Discussion

Ovarian cancer is a common lethal malignancy; efforts should be directed to improve its management and patient's survival. Para-aortic lymph nodes dissection is a very important step in its management; we should choose the appropriate approach to perform this crucial step in the surgical management. The retro caecal versus the transmesenteric approaches this is what we elaborated in this research.

Both approaches are comparable in many points, but the transmesenteric approach has more advantages and fewer disadvantages than the retro-caecal approach.

Researches that compare different approaches to para-aortic lymph nodes dissection especially in low resource countries like Egypt is not commonly done that is why our research is very important as an operative step in management of this lethal cancer.

This research included 100 patients with operable ovarian cancer; para-aortic lymph nodes dissection was performed to all patients. Patients were randomly distributed to two groups based on the approach of para-aortic lymph nodes dissection to assess the appropriate one.

In this study, both groups are the same in certain points like age, parity, medical co-morbidities, stage and histopathological subtypes.

Para-aortic lymph nodes affection with malignancy was diagnosed pre-operatively using different imaging techniques.

In our research there were some differences between both groups regarding number of lymph nodes dissected, operative time and blood loss. The transmesenteric approach was associated with more lymph nodes harvested, less blood loss, shorter operative time and fewer complications in comparison to the retrocaecal approach may be due to difficulty in dissection and need more caution during dissection. Ureter also passes in the field and needs more caution to protect it during dissection but in transmesenteric approach, we dissect directly over the affected lymph node, so less liability for complications.

Malignancy was proved in 39% of patients. Most of them were with serous adenocarcinomas.

In a study performed by Bacalbasa N *et al*; the operative time was 130 min (range = 90–160 min), the median blood loss was 350 mL (range = 100–550 mL), malignant para-aortic lymph nodes were present in 22% of patients. (10)

And in a study performed by Komiyama S *et al*; the median operating time was 6.3 hours but they performed extended para-aortic lymph nodes dissection that reached above left renal vessels. The median blood loss was 675 gm. Presence of malignant lower para-aortic lymph nodes was seen in 7.1% of cases.(11)

Laparoscopic surgeries for the management of gynecological cancers. these are commonly performed in developed countries. This includes para-aortic lymph nodes dissection, but in developing countries conventional surgeries are commonly used.

A few number of cases are the main limitation of our research and more trials of laparoscopic lymph adenectomy are needed, but lymph adenectomy through conventional laparotomies is still preserved in difficult cases as a basis for this important surgical procedure.

Points of strength in our research: large number of population, low complications rate, comparative study and strict inclusion and exclusion criteria.

Points of weakness in this research: retrospective study and it performed in a single institute. So we recommend more research on this point and it should be multicentric and prospective.

Conclusions

Transmesenteric approach for para aortic lymph nodes dissection in patients with ovarian cancer is better than the retrocaecal approach. It is associated with shorter operation time, less blood loss, more harvested lymph nodes and fewer complications. But both approaches could be used safely in para aortic lymph nodes dissection in ovarian cancer patients with pathologically enlarged para- aortic lymph nodes.

Compliance with Ethical Standards**Authors Contribution**

Not applicable due to single author.

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Not applicable, all procedures are funded by the author himself and the department of obstetrics and gynecology, faculty of medicine, Alexandria University

Study registration

Research is registered in faculty of medicine, Alexandria University in June 2021/0305177

Disclosure of Interests

The author declares that he has no conflict of interests.

Ethical Approval

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Also this research is approved by Ethics committee in faculty of medicine, Alexandria University in June 2021 with the serial number 0305200

Informed consent

Informed consent was obtained from all individual participants included in the study

Data sharing

Data available on request from the author, the data that support the findings of this study are available from the corresponding author upon reasonable request.

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