

Original Research Article

Role of staging laparoscopy to evaluate feasibility of performing optimal cytoreductive surgery in epithelial ovarian cancers

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ABSTRACT

Background: The main stay of treatment for epithelial ovarian cancers is surgical cytoreduction. CT scan and staging laparotomy are methods used to assess feasibility to carry out optimal cytoreduction. We evaluated the role of staging laparoscopy in assessing operability for optimal cytoreduction as well as avoidance of unnecessary laparotomies.

Methods: Between September 2014-2016, 23 patients of epithelial ovarian cancer underwent staging laparoscopy as part of evaluation method to check feasibility to carry out optimal cytoreductive surgery. The findings were correlated with clinical findings as well as CT scan findings. The impact of laparoscopy to predict operability was studied as well as its use to avoid unnecessary laparotomies.

Results: Laparoscopy could correctly evaluate the nature of abdominal mass in 91.3% patients. It picked up omental and peritoneal deposits in 87% and 95.7% patients respectively as compared to 60.9% and 39% picked up on CT scan. More importantly laparoscopy could diagnose mesenteric and small bowel deposits in 34.8% of patients which were never reported on CT scan. The overall impact was reduction in unnecessary laparotomies.

Conclusions: Laparoscopic evaluation is a useful adjunct prior to performing a formal laparotomy in epithelial ovarian cancer cytoreductive surgery.

Keywords: CT scan, Cytoreductive surgery, Ovarian cancer, Staging laparoscopy

INTRODUCTION

Epithelial ovarian cancer (EOC) is the leading cause of death in gynaecologic malignancies. Ovarian cancers are usually diagnosed in an advanced stage, when tumour has spread from the ovaries into the abdominal cavity or into the liver parenchyma or pleural cavity (FIGO stage III or IV respectively).¹

The mainstay of treatment for advanced invasive epithelial ovarian cancer is Cytoreductive surgery (CRS), followed by platinum-based combination chemotherapy, which is associated with the best survival outcomes. However, CRS is not possible in all the patients at initial surgery. The presence of residual tumour after primary

debulking surgery is the most important prognostic factor in patients with advanced ovarian cancers.¹ In up to 60% of cases, residual tumour of more than 1 cm is left behind, stressing the necessity of accurately selecting those patients who should be treated with primary debulking surgery and those who should receive neo-adjuvant chemotherapy.^{2,3}

To increase the rate of CRS and to limit peri-operative morbidity, neo-adjuvant chemotherapy with interval cytoreductive surgery has emerged as an alternative to primary surgery.⁴

This does not seem to compromise survival. Therefore, the issue is how to best evaluate the optimal resectability

of advanced ovarian cancer. Despite improvements in CECT, MRI and PET-CT resectability of intra peritoneal disease remains difficult to determine therefore addition of laparoscopy evaluation can be useful.⁵⁻⁷

METHODS

This is a review of prospectively collected data of patients, who underwent staging laparoscopy for advanced epithelial ovarian cancers at Vydehi Institute of Medical Sciences and Research Centre, Bangalore during the period of September 2014 to September 2016.

The objectives of the study were to assess whether diagnostic laparoscopy could accurately stage the extent of spread of epithelial ovarian cancer in abdominal cavity and prevent unnecessary laparotomies and failed attempts to perform optimal cytoreduction.

Inclusion criterion

Patients diagnosed with advanced epithelial ovarian cancers who were planned for primary CRS are included in this study.

Exclusion criterion

- WHO performance status of ≥ 3
- Large immobile pelvic tumour leading to conclusions that complete CRS is not feasible
- Intrahepatic metastatic disease of $>$ one centimeter
- Para-aortic lymphadenopathy larger than one centimeter above the level of the renal veins
- Fixed and large volume nodal disease
- Confluent peritoneal deposits on subdiaphragmatic peritoneum as seen on CT scan
- Extensive small bowel mesentery involvement as noted by air fluid levels and cut off on CT scan

Collection of data

The diagnosis of ovarian cancer was mainly clinical and CT based corroborated with CA 125 levels. Histological proof was not insisted upon to consider for surgical exploration. In situations of doubt preoperatively, frozen section facilities were employed.

All patients underwent conventional disease staging evaluation consisting of medical history complete physical and gynaecological examination, assessment of CA 125 levels, Chest X-ray, Contrast enhanced abdominopelvic CT scan. All patients were initially reviewed by the surgical oncology departmental staff for planning overall treatment strategy. This was many times done in conjunction with the staff of Medical oncology division as well.

The decision to consider patients for initial surgical approach were based on inclusion and exclusion criterion

as mentioned above. Importance was given mainly to performance status, gross ascites and omental caking and fixed abdominopelvic masses while trying to avoid upfront surgery. Once a decision to operate was made up the patients underwent a two port laparoscopy using umbilical and accessory port to assess the disease extent in general peritoneal cavity and pelvis.

After a thorough exploration of all areas in general peritoneal cavity, note was made of Peritoneal carcinomatosis index score and also the involvement of critical areas which would make optimal cytoreduction not achievable. These were, large fixed pelvic masses with gross involvement of bladder and rectum deep down in pelvis, frozen pelvis, extensive small bowel mesenteric deposits, large confluent sub-diaphragmatic peritoneal deposits which might prevent optimal cytoreduction unachievable. No attempts were made to perform sub optimal cytoreduction in any of these patients and interval cytoreduction would be planned after 3-4 cycles of upfront platinum based chemo therapy.

RESULTS

A total of 23 patients were included in the study. The mean age of the studied cases were 53.8 (SD10.4) in years. The age ranged from 25 years to 72 years. Ca 125 levels were low (<35 U/ml) in 2 cases, mildly elevated (35-200 U/ml) in 2 cases, significantly elevated (201-1000 U/ml) in 12 cases, and were very high (>1001 U/ml) in 7 cases. All cases belonged to stage IIIc ovarian cancer as per FIGO classification. 15 of total cases underwent neoadjuvant chemotherapy (65.2%) and 8 underwent cytoreductive surgery (34.8%) (Table 1).

Table 1: Diagnostic and treatment details.

Variable	Value	
	Positive	%
CA 125 (U/ml)		
<35	2	8.7
35-200	2	8.7
201-1000	12	52.2
>1001	7	30.4
CECT Findings		
Abdominal Mass	21	91.3
Ascites	14	60.9
Omentum	14	60.9
Peritoneum	9	39.1
Diagnostic laparoscopic finding		
Abdominal Mass	15	65.2
Ascites	20	87.0
Peritoneal deposits	22	95.7
Mesentery/small bowel deposits	8	34.8
Treatment		
Neo adjuvant chemotherapy	15	65.2
Cytoreductive surgery	8	34.8

During staging laparoscopy 22 patients had peritoneal deposits out of which 15 patients had extensive sub diaphragmatic deposits. So these patients were subjected to neoadjuvant chemotherapy followed by Interval debulking surgery. Eight of 23 patients had mesentery and small bowel deposits. These patients required extensive small bowel resection and hence were subjected to neoadjuvant chemotherapy. The mean peritoneal cancer index score was 18.35 (SD 6.5). The range of the peritoneal cancer index was minimum 8 to maximum 30 in the study cases. We identified following parameters as the main causes of unresectability i.e., extensive bulky carcinomatous bowel/mesentery, bulky diaphragm disease which we could investigate quite

easily by laparoscopy. Staging laparoscopy was also considered for comparison of diagnostic values of other investigative modalities employed. Diagnostic comparison was done for different modes of evaluation using sensitivity, specificity, Positive Predictive Value (PPV), and Negative Predictive Value (NPV). CECT had a 93%, 70%, and 41% sensitivity in detecting abdominal mass, ascites and peritoneal metastases respectively. CECT had specificity and PPV 100% to detect ascites and peritoneal metastases. There was statistically significant difference in diagnostic ability of CECT in detecting of ovarian tumours as compared to staging laparoscopy ($p < 0.05$) (Table 2).

Table 2: Diagnostic reliability of CECT in evaluation of ovarian tumours with staging laparoscopy as gold standard.

	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
Detection of mass				
CECT	0.93 (0.90 to 0.98)*	0.13 (0.02 to 0.47)*	0.67 (0.45 to 0.83)*	0.5 (0.09 to 0.91)*
Detection of ascites				
CECT	0.7 (0.48 to 0.85)*	1 (0.44 to 1.0)	1 (0.78 to 1.0)	0.33 (0.12 to 0.65)*
Detection of peritoneal metastasis				
CECT	0.41 (0.23 to 0.61)*	1 (0.26 to 1.0)	1 (0.7 to 1.0)	0.71 (0.01 to 0.31)*

*p value < 0.05

DISCUSSION

Laparoscopy has been recommended as the standard surgical approach in patients with suspicious adnexal masses. The use of laparoscopy to stage diagnosed ovarian cancers, to assess feasibility in performing optimal cytoreduction is not clearly defined yet.^{8,9} A large scale study was carried out in advanced ovarian cancers in which the decision to perform primary cytoreduction or neoadjuvant chemotherapy was made with the help of laparoscopy. Their study showed no disadvantage in terms of patients overall survival.¹⁰ In this study after staging laparoscopy of the 23 patients, 15 patients were sent for neoadjuvant chemotherapy followed by interval debulking surgery (65.2 %). 8 of 23 patients underwent optimal cytoreductive surgery with a complete cytoreductive score - 0 (34.8%).

As far as very large abdominal masses are concerned, we deem the role of laparoscopy limited due to an incomplete and/or inadequate exploration of the peritoneal cavity that could lead to a lower prognostic value of the procedure. The occurrence of port-site metastases has raised concern about the use of laparoscopic surgery for procedures associated with malignant disease.¹¹ The actual incidence of port-site metastases estimates range from 0% to 1.2%.¹² Disadvantages of laparoscopy are absence of a direct tactile evaluation by palpation and the presence of fixed

masses and carcinomatous adhesions hindering the visualization of certain anatomical spaces.

CONCLUSION

This study suggests that staging laparoscopy helps in assessing the chances of obtaining optimal cytoreduction and should be considered in the treatment advanced ovarian cancer patients. It is largely feasible and safe; it may be helpful to individualize the treatment avoiding unnecessary laparotomies and surgical complications. With obvious benefits and very few complications to it, staging laparoscopy in our opinion should be routinely performed prior to considering full scale laparotomy as a staging procedure in advanced epithelial ovarian cancers.

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REFERENCES

1. Elattar A, Bryant A, Winter-Roach BA, Hatem M, Naik R. Optimal primary surgical treatment for advanced epithelial ovarian cancer. *Cochrane Database Syst Rev.* 2011;8:CD007565.
2. Gerestein CG, Nieuwenhuyzen-de Boer GM, Eijkemans MJ, Kooi GS, Burger CW. Prediction of 30-day morbidity after primary cytoreductive surgery for advanced stage ovarian cancer. *Eur J Cancer.* 2010;46:102-9.
3. Vergote I, Trope CG, Amant F, Kristensen GB, Ehlen T, Johnson N, et al. Neoadjuvant chemotherapy or primary surgery in stage IIIC or IV ovarian cancer. *N Engl J Med.* 2010;363:943-53.
4. Vergote I, Trope CG, Amant F, Kristensen GB, Ehlen T, Johnson N, et al: Neoadjuvant chemotherapy or primary surgery in stage IIIC or IV ovarian cancer. *N Engl J Med.* 2010;363:943-53.
5. Fagotti A, Fanfani F, Ludovisi M, Lo VR, Bifulco G, Testa AC, et al. Role of laparoscopy to assess the chance of optimal cytoreductive surgery in advanced ovarian cancer: a pilot study. *Gynecol Oncol.* 2005;96:729-35.
6. Fagotti A, Ferrandina G, Fanfani F, Ercoli A, Lorusso D, Rossi M, et al: A laparoscopy-based score to predict surgical outcome in patients with advanced ovarian carcinoma: a pilot study. *Ann Surg Oncol.* 2006;13:1156-61.
7. Brun JL, Rouzier R, Uzan S, Darai E. External validation of a laparoscopic based score to evaluate resectability of advanced ovarian cancers: clues for a simplified score. *Gynecol Oncol.* 2008;110:354-9.
8. Manolitsas TP, Fowler JM. Role of laparoscopic in the management of adnexal mass and staging of gynecologic cancers. *Clin ObstetGynecol* 2001;44:495-521.
9. Canis M, Rabischong B, Houille C, Botchorishvili R, Jardon K, Safi A, et al. Laparoscopic management of adnexal masses: a gold standard? *Curr Opin Obstet Gynecol.* 2002;14:423-8.
10. Vergote I, De Wever I, Tjalma W, Van Gramberen M, Decloedt J, Van Dam P. Neoadjuvant chemotherapy or primary debulking surgery in advanced ovarian carcinoma: a retrospective analysis of 285 patients. *Gynecol Oncol.* 1998;71:431-6.
11. Canis M, Rabischong B, Botchorishvili R, Tamburro S, Wattiez A, Mage G, et al. Risk of spread of ovarian cancer after laparoscopic surgery. *Curr Opin Obstet Gynecol.* 2001;13:9-14.
12. Wexner SD, Cohen SM. Port site metastases after laparoscopic colorectal surgery for cure of malignancy. *Br J Surg.* 1995;82:295-8.

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