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Robotic-Assisted Cytoreductive Surgery After Neoadjuvant Chemotherapy: a Case Control Study

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Introduction

Traditionally, the surgical intervention for advanced ovarian cancer is primary debulking by laparotomy, requiring a large incision. The goal is to remove the primary organ and all visible tumor, resulting in no residual disease at the end of surgery. While minimally invasive surgery (MIS) has become the new standard for endometrial cancer based on randomized clinical trials, it is less clear what role MIS will have for ovarian cancer, given the complexity of the disease. The MISSION trial (NCT02324595), a phase II clinical trial, suggested that MIS can achieve complete cytoreduction after neo-adjuvant chemotherapy [1].

The objective of this study is to identify peri-operative outcomes of MIS (robotic platform) in women with ovarian cancer after neo-adjuvant chemotherapy, and to compare the outcomes to those of laparotomy patients.

Materials and Methods

- An institutional review board-approved, retrospective chart review of interval cytoreductive surgery for stage IIIC-IV ovarian cancer performed at the University of Florida from January 2016 to January 2018 was completed.
- The primary endpoint was optimal or complete cytoreduction. Follow up was at least 30 days.
- The secondary endpoint was perioperative outcome. Factors analyzed: operative time, conversion, to open surgery, hospital stay, complications, and readmission.
- Our exclusion criteria included diagnostic procedure, prior primary tumor debulking, non-epithelial carcinoma, and no response to neo-adjuvant chemotherapy.

References

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2. Siegel RL et al. Cancer statistics, 2018. *CA: A Cancer Journal for Clinicians.* 2018;68:7–30.
3. Vergote I et al. Neoadjuvant chemotherapy or primary surgery in stage IIIC or IV ovarian cancer. *N Engl J Med.* 2010; 363:943-53.

Results

Twelve cases met inclusion criteria. Both patient groups had 6 cases each and were similar in terms of age at diagnosis, body mass index, ASA score, CA 125 level, tumor histology, stage, and number of chemotherapy treatments. Estimated blood loss was significantly higher in the laparotomy group (150±61 vs 92±38; p=0.04). Primary and secondary endpoints are shown in the table. Follow up was 35 ± 17 weeks and 26 ± 15 weeks for laparotomy and robotic group respectively. Three cases recurred in the laparotomy group and 2 in the robotic group.

Outcomes	Robotic n=6	Open n=6	p-value
Intraoperative complication	0	0	-
Estimated blood loss, mL (mean ± SD)	92 ± 38	150 ± 61	0.04
Operative time, minutes (mean ± SD)	232 ± 69	218 ± 108	0.8
Conversion	0	-	-
Hospital stay, days (mean ± SD)	2 ± 1.5	9 ± 12	0.2
Postoperative complication, no. of patients (%)	1 (17)	3 (50)	0.2
Readmission	0	0	-
Cytoreduction complete at the end surgery			
Optimal, no. of patients (%)	6 (100)	4 (67)	0.12
Suboptimal, no. of patients (%)	0	2 (33)	
Residual disease on pathology, , no. of patients (%)	6 (100%)	5 (83%)	0.3

Discussion

Ovarian cancer is the most lethal gynecologic cancer [2]. Optimal cytoreduction can be achieved via MIS after neoadjuvant chemotherapy. It appears safe and feasible when compared with standard laparotomy. Achievement of complete debulking is comparable with results from a phase III clinical trial performed via laparotomy [3]. The feasibility to perform complex and widespread surgery, such as resection of large or small bowel, diaphragm stripping, splenectomy, partial cystectomy, and pelvic and para-aortic lymph node dissection may place some limitations on MIS. Adequate patient selection may help to identify optimal candidates for MIS interval debulking. Patients with a positive response to neoadjuvant chemotherapy may need less invasive surgery to accomplish complete or optimal cytoreduction.

Conclusion

Robotic-assisted surgery appears safe and feasible in patients with advanced ovarian cancer, after neo-adjuvant chemotherapy. Outcomes are similar to standard laparotomy. Robotic surgery is associated with lower blood loss. Prospective and randomized clinical trials are needed to confirm outcomes, refine patient selection criteria, and assess survival.