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Minimal access surgery compared to laparotomy for secondary surgical cytoreduction in patients with recurrent ovarian carcinoma: Perioperative and oncologic outcomes☆

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HIGHLIGHTS

- MAS SSCR for select ROC cases is associated with improved perioperative outcomes.
- CGR at SSCR was seen in 94% MAS, 91% LAP; optimal resection in 100% MAS, 96% LAP.
- MAS appeared to facilitate same-day discharge after SSCR for ROC.
- Oncologic outcomes after MAS are not inferior to LAP in select cases of HGS ROC.
- Continued investigation and validation of the role of MAS in SSCR are needed.

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ABSTRACT

Objectives. To assess the perioperative outcomes of minimal access surgery (MAS) in secondary surgical cytoreduction (SSCR) for recurrent epithelial ovarian cancer (ROC); to compare oncologic outcomes with laparotomy (LAP).

Methods. Using an institutional database, we identified all patients with ROC undergoing SSCR from 1/5/09–6/14/14. Selection for MAS or LAP was based on surgeon preference. To minimize selection bias, preoperative imaging was reviewed for all LAP cases. In this manner, we identified potential MAS candidates, who were used in the comparison. Intent-to-treat analyses were undertaken using statistical testing.

Results. 170 cases were identified (131 LAP, 8 LSC, 31 RBT). 68/131 (52%) LAP cases were deemed potential candidates for MAS. Feasibility analyses included 68 LAP and 39 MAS cases. Six (15%) MAS cases were converted to LAP. Median age, BMI, operative time did not differ significantly between the groups. Complete gross resection was achieved in 37/39 (95%) MAS, 63/68 (93%) LAP ($P = 1.0$). Median estimated blood loss was 50cm^3 (range, 5–500) MAS, 150 cm^3 (range, 0–1500) LAP ($P = 0.001$). Median length of stay was 1 day (range, 0–23) MAS, 5 days (range, 1–21) LAP ($P < 0.001$). Complications occurred in 3/39 (8%) MAS, 15/68 (22%) LAP ($P = 0.06$). The 2-year progression-free survival was 56.1% (SE 9%) MAS, 63.5% (SE 6%) LAP ($P = 1.0$). The 2-year overall survival was 92.2% (SE 5.4%) MAS, 81.4% (SE 5.5%) LAP ($P = 0.7$).

Conclusions. MAS for SSCR is feasible in properly selected cases. MAS is associated with favorable perioperative outcomes and similar oncologic outcomes, compared to LAP.

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1. Introduction

Despite initial treatment with radical debulking surgery and chemotherapy, the majority of patients with epithelial ovarian cancer will relapse [1]. Previous and ongoing clinical trials have sought to determine the role of surgical cytoreduction in the recurrent setting. While we await the results of the LAPTOP III, GOG 213 and SOCcer trials, it is generally accepted that secondary surgical cytoreduction (SSCR)

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may be beneficial for appropriately selected patients. Past studies have concluded that the goal of surgical treatment in recurrent ovarian carcinoma (ROC) is complete gross resection (CGR) [2–6]. Emphasis on quality of life and limited morbidity are paramount for patients with recurrent disease.

Minimal access surgery (MAS) is increasingly common in the treatment of gynecologic cancers. In primary endometrial cancer [7,8] and early-stage cervical cancer [9], MAS has demonstrated superiority with respect to short-term safety and length-of-stay endpoints, and has shown similar oncologic outcomes, compared to laparotomy (LAP). A multi-institutional study by Escobar and colleagues showed that MAS is a feasible approach in select cases of ROC [10].

Critics of MAS caution that a thorough peritoneal inspection may not be possible in the setting of ovarian cancer. The concern is that some disease may remain unidentified and unresected during MAS, resulting in compromised survival. The goals of this study were 1) to assess the perioperative outcomes of MAS in the SSCR of ROC, and 2) to compare oncologic outcomes between patients treated with MAS and those treated with LAP at our institution.

2. Methods

After obtaining IRB approval for this study, we used an institutional database to identify all consecutive patients who underwent SSCR for platinum-sensitive ROC at our institution from 1/5/09 to 6/14/14. Demographic, clinical, pathologic, and outcome data were collected. Patients were excluded if they had undergone resection without CGR intent, or had undergone resection to relieve a bowel obstruction; or had undergone extra-abdominal resection. Patients who had undergone primary cytoreductive surgery at an outside institution were not excluded. Perioperative complications were defined as any adverse event related to operative treatment, occurring within 30 days of surgery. CGR was defined as no visible gross residual disease, per the operative report. Optimal resection was defined as residual disease < 1 cm, per the operative report. The first disease-free interval (DFI) was calculated from the date of the last first-line chemotherapy dose to the date of first recurrence. Platinum-sensitive cases were defined as those with DFI > 6 months. Progression-free survival (PFS) was calculated from the date of SSCR to the date of second progression, death, or last follow-up. Overall survival (OS) was defined as the length of time from the date of SSCR to the date of death or last follow-up.

Planned laparoscopic and robotic-assisted laparoscopic cases were grouped together, comprising the MAS cohort. None of the MAS cases was planned as a laparoscopic assessment of resectability with an upfront plan to perform laparotomy if disease was deemed resectable. In all MAS cases the intention was to attempt cytoreduction by MAS. Intent-to-treat analyses were undertaken. Selection for MAS or LAP was based on surgeon preference rather than tumor and/or patient characteristics, and selection was highly dependent on the individual surgeon's experience with MAS. In an attempt to minimize selection bias when comparing MAS and LAP outcomes, preoperative imaging was retrospectively reviewed for all LAP cases. This enabled identification of cases that would have been amenable to MAS by surgeons who were technically comfortable with that approach. These potential MAS cases were used in the perioperative comparison analysis. Only preoperative CT scanning was used in our series. Fusion imaging with additional positron emission tomography (PET) was not utilized, nor was any other additional imaging utilized. Intraoperative imaging modalities, such as ultrasound to assist in tumor localization, were not utilized in any of the cases. We assessed oncologic outcomes only for the high-grade serous (HGS) cases.

Patient-, treatment-, and disease-specific parameters were compared between the cohorts, using the Chi-squared or Fisher's exact test for categorical variables and the Wilcoxon rank-sum test for continuous variables. PFS and OS were estimated using the Kaplan-Meier method, and comparison between the cohorts was done using the Log-rank test.

3. Results

We identified 170 patients with platinum-sensitive epithelial ovarian cancer who had undergone SSCR for intra-abdominal recurrence. Of these, 39 were treated with MAS and 131 with LAP. Of the 39 MAS patients, 31 had undergone robotic-assisted surgery and 8 had undergone conventional laparoscopy. Of the 131 LAP cases, 68 were identified as potential candidates for MAS, following retrospective review of preoperative images by one of the surgeons. Thirty-two of the MAS and 55 of the MAS-candidate LAP cases had HGS histology; these cases were used in the comparison of oncologic outcomes. Patient selection and distribution are shown in Fig. 1.

Patients were excluded from MAS candidacy based on the following: carcinomatosis (19 of 63 (30%) patients); perihepatic disease (26 of 63 (41%) patients); and tumor in inaccessible sites (9 of 63 (14%) patients). Other reasons for exclusion were: tumor size (5 of 63 (8%) patients); a large hernia (1 patient); a previously created colostomy (1 patient); an open wound with a history of entero-cutaneous fistula1 patient); and lack of an available CT for review (1 patient) (Table 1). The 9 patients with disease located in anatomic sites that were considered inaccessible had paraesophageal, retrocrural, periportal, paraspinous, retropancreatic, sciatic nerve, iliac vessel, and hepatic metastases.

3.1. Perioperative comparison

The clinicopathologic and perioperative characteristics are described in Table 2. The median age and body mass index (BMI) were the same between the MAS and LAP cohorts. The median operative time was 186 min (range 56–482 min) and 213 min (range 64–539 min) in the MAS and LAP groups, respectively ($P = 0.2$). The median estimated blood loss (EBL) was 50 cm^3 (range 5–500) and 150 cm^3 (range 0–1500) for MAS and LAP, respectively ($p = 0.001$). The median length of stay was 1 day (range 0–23) and 5 days (range 1–21) for MAS and LAP, respectively ($p = 0.001$). Eleven of 39 (28%) MAS cases were discharged home the same day, compared to 0 of 68 (0%) LAP cases ($p < 0.0005$). In the MAS cohort, the median number of lesions was 1 (range 1–10), compared to 2 (range 1–20) in the LAP cohort ($p < 000.5$). The median size of the largest lesion was 2.5 cm (range 1.4–6) and 4 cm (range 1.1–12) ($p < 0.0005$) in the MAS and LAP cohorts, respectively. Bowel resection was performed in 9 (23%) MAS and 22 (32%) LAP cases ($p = 0.38$). Complications within 30 days were noted in 8% of MAS and 22% of LAP cases ($p = 0.06$). CGR was achieved in 37/39 (95%) MAS and 63/68 (93%) LAP cases ($p = 1.0$). Six of 39 (15%) MAS cases were converted to laparotomy. Of these, 4 (66%) were converted due to dense adhesions and 2 (33%) because of

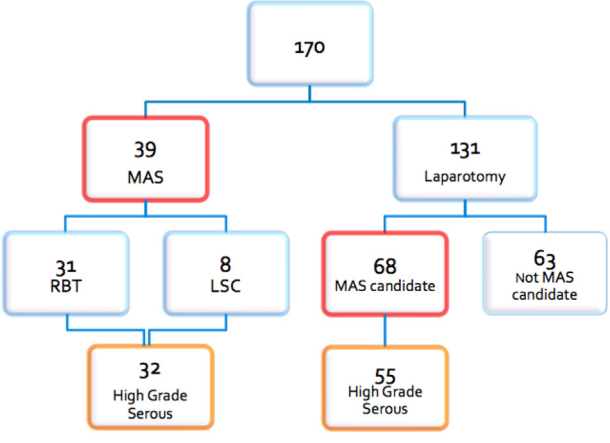

Fig. 1. Patient distribution.

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