Front Line Ovarian Cancer: Turning up the heat on immunotherapy

Moderators: Leslie Randall, MD, and Dan Veljovich, MD

May 14, 6:00 p.m. CST

Avelumab in combination with and/or following chemotherapy vs chemotherapy alone in patients with previously untreated epithelial ovarian cancer: Results from the phase 3 javelin ovarian 100 trial

J.A. Ledermann[a,b], N. Colombo[c], A.M. Oza[d], K. Fujiwara[e], M.J. Birrer[f], L.M. Randall[g], E.V. Poddubskaya[h,i], G. Scambia[j], Y.V. Shparyk[k], M.C. Lim[l], S.M. Bhoola[m], J. Sohn[n], K. Yonemori[o], R.A. Stewart[p], X. Zhang[q], F. Zohren[r], C. Linn[s] and B.J. Monk[t]. *[a]University College London, London, United Kingdom, [b]UCL Cancer Institute and UCL Hospitals, London, United Kingdom, [c]University of Milan-Bicocca and Istituto Europeo di Oncologia, Milan, Italy, [d]Princess Margaret Cancer Centre, Toronto, ON, Canada, [e]Saitama Medical University International Medical Center, Hidaka, Japan, [f]University of Alabama at Birmingham, Birmingham, AL, USA, [g]Virginia Commonwealth University, Richmond, VA, USA, [h]Clinical Center Vitamed, Moscow, Russian Federation, [i]I.M. Sechenov First Moscow State Medical University, Moscow, Russian Federation, [j]Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, Italy, [k]Lviv State Oncological Regional Medical and Diagnostic Center, Lviv, Ukraine, [l]National Cancer Center, Goyang-si, Korea, Republic of (South), [m]Arizona Oncology Associates, Phoenix, AZ, USA, [n]Severance Hospital, Yonsei University Health System, Seoul, Korea, Republic of (South), [o]National Cancer Center Hospital, Tokyo, Japan, [p]Pfizer Oncology, San Diego, CA, USA, [q]Pfizer Oncology, Pfizer Inc., New York, NY, USA, [r]Pfizer Oncology, Cambridge, MA, USA, [s]Pfizer Inc., Taipei, Taiwan, [t]Arizona Oncology, (US Oncology Network), University of Arizona College of Medicine, Creighton University School of Medicine at St. Joseph's Hospital, Phoenix, AZ, USA*

Objective: This randomized, open-label, phase 3 trial (JAVELIN Ovarian 100; NCT02718417) evaluated avelumab in combination with and/or following chemotherapy versus chemotherapy alone in patients with previously untreated epithelial ovarian cancer (EOC).

Method: Patients with stage III–IV EOC (post debulking surgery or candidates for neoadjuvant chemotherapy) were randomized 1:1:1 to receive 6 cycles of chemotherapy (carboplatin AUC 5 or 6 intravenously, IV, every 3 weeks, Q3W with paclitaxel 175 mg/m^2 Q3W or 80 mg/m^2 weekly—investigators' choice) followed by avelumab maintenance (10 mg/kg IV every 2 weeks, Q2W; chemotherapy → Ave), chemotherapy with avelumab (10 mg/kg IV Q3W) followed by avelumab Q2W maintenance (chemotherapy with → Ave), or chemotherapy followed by observation (chemotherapy → O, control). The primary endpoint was progression-free survival (PFS) by blinded independent central review per Response Evaluation Criteria in Solid Tumors v1.1.

Results: A total of 998 patients were randomized. At interim analysis (data cutoff September 7, 2018), median follow-up for PFS (95% CI) was CTx → Ave, 11.1 months (95% CI 10.3–12.2); CTx + Ave → Ave, 11.0 months (95% CI 10.5–11.9); and CTx → O, 10.2 months (95% CI 9.5–10.8). In both avelumab arms, PFS was not improved versus control, prespecified futility boundaries were crossed, and the trial was stopped. Hazard ratios (95% CI) for PFS in avelumab arms versus control were 1.43 ((95% CI 1.051–1.946) for CTx → Ave and 1.14 ((95% CI 0.832–1.565) for CTx+Ave → Ave. Median PFS was 16.8 months (95% CI 13.5–NE) for CTx → Ave, 18.1 months (95% CI 14.8–NE) for CTx+Ave → Ave, and NE (18.2–NE) for CTx → O. Subgroup analyses based on baseline characteristics and biomarkers (PD-L1, CD8, and *BRCA*) did not identify subsets with clear benefit in either avelumab arm. Overall survival data were immature, and median values were not reached. Objective response rates were 30.4% (95% CI 25.5–35.7) for CTx → Ave, 36.0% (95% CI 30.8–41.4) for CTx+Ave → Ave, and 30.4% (95% CI 25.6–35.7) for CTx → O. No new safety signals were observed. In the CTx → Ave, CTx+Ave → Ave, and CTx → O arms, grade ≥3 treatment-emergent adverse events of any causality occurred in 66.5%, 70.8%, and 62.6%, respectively.

Conclusion: This first phase 3 trial of a checkpoint inhibitor in patients with previously untreated EOC did not meet its primary endpoint of improving PFS in either avelumab arm. No new safety signals were identified. Translational analyses to further understand the role of checkpoint inhibitors in this setting are ongoing.

Randomized double-blind placebo controlled trial of primary maintenance vigil immunotherapy (VITAL study) in stage III/IV ovarian cancer: Efficacy assessment in BRCA1/2-wt patients

R.P. Rocconi[a], J.K. Chan[b], M. Barve[c], D. Tewari[d], J.N. Bottsford-Miller[e], M. Tang[f], P. Aaron[g], G. Wallraven[h], E. Bognar[h], L. Manning[h], J. Nemunaitis[h], D. Shanahan[g], B. Slomovitz[i], T.J. Herzog[j], B.J. Monk[k] and R.L. Coleman[l]. *[a]Mitchell Cancer Institute, University of South Alabama, Mobile, AL, USA, [b]California Pacific Medical Center, San Francisco, CA, USA, [c]Mary Crowley Cancer Research Center, Dallas, TX, USA, [d]Southern California Permanente Medical Group, Irvine, CA, USA, [e]Billings Clinic, Billings, MT,*

USA, [f]Biostatistical Consultant, Dallas, TX, USA, [g]Gradalis, Inc, Dallas, TX, USA, [h]Gradalis, Inc., Dallas, TX, USA, [i]University of Miami, Sylvester Comprehensive Cancer Center, Miami, FL, USA, [j]University of Cincinnati Cancer Institute, University of Cincinnati, Cincinnati, OH, USA, [k]Arizona Oncology (US Oncology Network), Phoenix, AZ, USA, [l]The University of Texas MD Anderson Cancer Center, Houston, TX, USA

Objective: Despite advances, overall prognosis for advanced epithelial ovarian cancer (EOC) remains poor. Considering elevated TGFβ expression correlates with poor prognosis in ovarian cancer, this study aims to determine whether a maintenance vigil could provide improvement in relapse-free survival. Vigil is an autologous tumor cell vaccine constructed from autologous harvested tumor tissue transfected with a DNA plasmid encoding GMCSF and bi-shRNA-furin, thereby creating TGFβ expression control.

Method: A randomized double-blind placebo-controlled trial of vigil versus placebo was performed in advanced-stage front-line ovarian cancer patients. Relapse-free survival (RFS), safety, and proportion of recurrences were endpoints. Patients who achieved complete clinical response were randomized (1:1 to placebo—control group—or vigil—vigil group) after completion of front-line surgery and chemotherapy. All patients received 1 × 10e7 cells/ml of vigil or placebo intradermally once a month for up to 12 doses.

Results: Ninety-one patients were randomized (vigil group *n* = 46; control group *n* = 45); 62 patients were tested for *BRCA1* or *BRCA2* status. The vigil group showed no added overall toxicity compared to the control group, and no grade 4/5 toxicities were observed. Grade 2/3 toxic events were observed in 18% of the control group patients (most common bone pain, fatigue) compared to 8% of the vigil group patients (most common nausea, musculoskeletal pain). From time of randomization, median RFS for all 91 patients was favorable in the vigil group (HR = 0.69, *P* = 0.088). Stratified by *BRCA* status, an advantage in RFS was seen in the *BRCA1* and *BRCA2*wt patients in the vigil group (19.4 months) compared to the control group (8 months) (HR = 0.51, 90% CI 0.26–1.01, one-sided *P* = 0.050) from time of randomization and HR of 0.49 (90% CI 0.25–0.97, one-sided *P* = 0.038) from time of surgery (**Figure 1**). Median time from surgery to randomization was 208.5 days (6.9 months) in the vigil group versus 200 days (6.6 months) in the control group. Of the *BRCA1* and *BRCA2*wt vigil-treated patients, 62.5% were relapse-free compared to 29% of placebo at time of analysis (September 17, 2019, median follow-up of 34.3 months for all *n* = 91 patients).

Conclusion: Front-line use of vigil immunotherapy as maintenance in stage III–IV ovarian cancer is well tolerated and showed trend in RFS clinical benefit. Specifically, *BRCA1* and *BRCA2*wt disease showed statistically significant benefit.

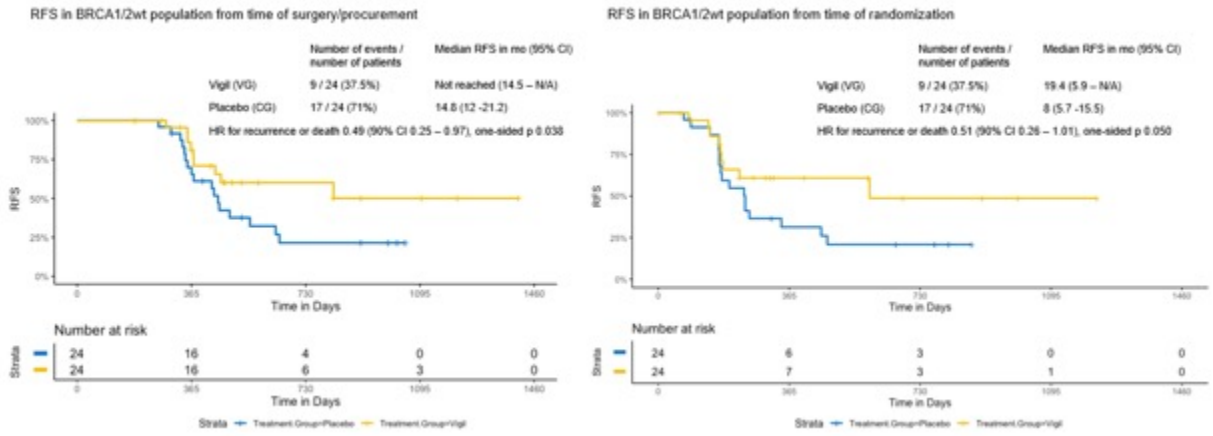

Fig. 1.

Phase II OVARIO study of niraparib + bevacizumab therapy in advanced ovarian cancer following front-line platinum-based chemotherapy with bevacizumab

M.M. Hardesty[a], T. Krivak[b], G.S. Wright[c], E. Hamilton[d], E.L. Fleming[e], D. Gupta[f], E. Keeton[f], J. Chen[f], A. Clements[g], H.J. Gray[h], G.E. Konecny[i], R.G. Moore[j] and D.L. Richardson[k]. *[a]Alaska Women's Cancer Care, Anchorage, AK, USA, [b]Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, The Western Pennsylvania Hospital, Pittsburgh, PA, USA, [c]Florida Cancer Specialists and Research Institute, New Port Richey, FL, USA, [d]Medical Oncology, Tennessee Oncology, Sarah Cannon Research Institute, Nashville, TN, USA, [e]Division of Gynecologic Oncology, Norris Cotton Cancer Center, Dartmouth-Hitchcock Medical Center, Lebanon, NH, USA, [f]TESARO: A GSK Company, Waltham, MA, USA, [g]Department of Gynecologic Oncology, Riverside*

Methodist Hospital, Columbus, OH, USA, [h]Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, University of Washington, Seattle, WA, USA, [i]University of California, Los Angeles, Los Angeles, CA, USA, [j]Division of Gynecologic Oncology, Department of Obstetrics and Gynecology, Wilmot Cancer Institute, University of Rochester Medical Center, Rochester, NY, USA, [k]Division of Gynecologic Oncology, Stephenson Cancer Center, University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA

Objective: Niraparib improves progression-free survival (PFS) in newly diagnosed and recurrent ovarian cancer (OC) in patients after platinum-based chemotherapy in all biomarker-defined subgroups. OVARIO (NCT03326193) is a single-arm study evaluating niraparib + bevacizumab treatment in advanced OC after response to first-line platinum-based chemotherapy + bevacizumab.

Method: All patients with newly diagnosed FIGO stage IIIB–IV OC who had a complete or partial response (CR or PR) after first-line platinum-based chemotherapy + bevacizumab were eligible. Patients receiving neoadjuvant chemotherapy, as well as primary debulking surgery, were eligible. All patients underwent tissue testing for homologous recombination deficiency or proficiency (HRd or HRp) at enrollment. Bevacizumab dosage was 15 mg/kg every 3 weeks up to 15 months, including time on first-line chemotherapy. Niraparib, 300 or 200 mg once daily, based on baseline body weight and platelet count, was started within 12 weeks of completing first-line treatment and continued for 3 years or until progressive disease (PD) or unacceptable toxicity. The primary endpoint is PFS at 18 months from treatment initiation. An interim analysis of PFS at 6 months from treatment initiation was performed after all patients had had 2 scans after starting treatment.

Results: Enrollment was completed at 105 patients. Median age and body weight were 60 years and 68 kg, respectively. Most patients received neoadjuvant chemotherapy (63%), were stage III (79%), and had serous histology (95%). Overall, 49% of patients had pre-existing hypertension, and 47% of patients were HRd, including HRd-*BRCA*mut and HRd-*BRCA*wt. Starting dose was 200 mg in 78% of patients. At 6 months, the PFS rate was 89.5%. Grade ≥3 related treatment-emergent adverse events included thrombocytopenia, anemia, and hypertension, similar to the AVANOVA trial, which used the same combination.

Conclusion: Safety of the niraparib + bevacizumab combination was consistent with the known side effects of each drug as monotherapy, and the combination did not appear to cause cumulative toxicities. Median PFS in advanced OC following first-line platinum-based chemotherapy + bevacizumab has not been reached.

A pilot study of nivolumab in combination with front-line neoadjuvant dose-dense paclitaxel and carboplatin chemotherapy in patients with high-grade serous ovarian cancer

C.F. Friedman[a], A. Snyder[b], N.R. Abu-Rustum[a], V. Broach[a], C.L. Brown[a], Y. Bykov[a], K.A. Cadoo[a], D.S. Chi[a], S. Cohen[a], K.T. Eid[a], G.J. Gardner[a], R.N. Grisham[a], A. Holland[a], T.J. Hollmann[a], A. Iasonos[a], M.M. Leitao Jr.[a], K. Long Roche[a], R.E. O'Cearbhaill[a], W.P. Tew[a], S. Weissblum[a], A.G. Wibmer[a], Q. Zhou[a], O. Zivanovic[a], C. Aghajanian[a] and D. Zamarin[a]. *[a]Memorial Sloan Kettering Cancer Center, New York, NY, USA, [b]Merck & Co., Inc., Whitehouse Station, NJ, USA*

Objective: In patients with epithelial ovarian cancer (EOC), increased intratumoral T cells are associated with a better prognosis, generating a rationale for combining chemotherapy with PD-1 blockade, such as nivolumab. In this study, we investigated the combination of nivolumab with neoadjuvant carboplatin and weekly paclitaxel for the upfront treatment of EOC. The primary objective was to measure safety and tolerability as determined by the rate of dose-limiting toxicities (DLTs). Secondary objectives included the complete gross resection rate (CGR), chemotherapy response score (CRS), progression-free survival (PFS), overall survival, and a range of translational parameters.

Method: Patients with FIGO stage 3–4 EOC who were judged to be candidates for neoadjuvant chemotherapy with interval debulking surgery (IDS) were eligible. Patients were treated with IV weekly paclitaxel (80 mg/m^2), with carboplatin (AUC6) and nivolumab (360 mg) given q3 weeks. Three to six cycles were allowed prior to surgery, for a total of 6–8 cycles. After completion of chemotherapy, maintenance nivolumab could be continued for 1 year. Adverse events were graded as per CTCAE v4.0. The CRS (from 1 to 3) was graded at time of IDS as previously published. Multiplexed immunofluorescence (IF) was performed on pre- and post-treatment tumor samples.

Results: A total of 21 patients were enrolled; median age was 64 years (range 38–77 years); the majority were white (81%) with high-grade serous histology (90%) and stage IV disease (67%). One patient was replaced given G3 infusion reaction with cycle 1. Therapy was well tolerated; two patients (9.5%) had DLTs that delayed IDS, including G4 pneumonitis and G4 myositis. Other grade 3–4 adverse events attributed to nivolumab included rash (10%), fever (5%), and fatigue (5%); 19% of

patients had G2 hypothyroidism; 90% achieved an optimal CGR; 35% had a CRS of 3. Median PFS has not been reached; 71.9% of patients are progression free at 1 year with a median follow-up of 14.3 months (6.3–19.8). All patients remain alive. Treatment was associated with tumor microenvironment conversion to an "inflamed" phenotype, with a significant increase in percentage CD8+ T cells (P = 0.0002) (**Figure 1**).

Conclusion: In a high-risk population of EOC patients, the addition of nivolumab to upfront chemotherapy led to promising PFS and favorable changes in the tumor microenvironment.

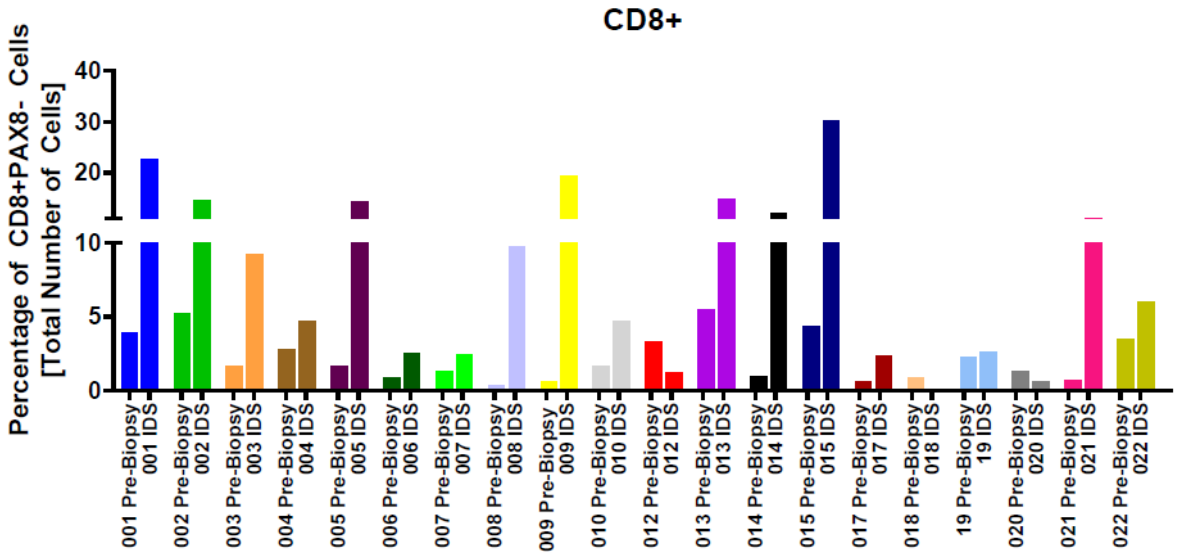

Fig. 1.

Heated intraperitoneal chemotherapy (HIPEC) use for ovarian cancer in the United States increases after publication of clinical trial and is associated with higher short-term cost and morbidity

L.M. Charo, J. Jou, P.S. Binder, C.C. Saenz, M.T. McHale, R.N. Eskander and S.C. Plaxe. *UCSD Rebecca and John Moores Cancer Center, La Jolla, CA, USA*

Objective: The goals of this study were (1) to determine whether trends in use of heated intraperitoneal chemotherapy (HIPEC) in ovarian cancer treatment increased after "HIPEC in Ovarian Cancer" was published in January 2018, and (2) to compare associated rates of hospital-based outcomes, including length of stay, intensive care unit (ICU) admission, complications, and costs, in ovarian cancer patients who underwent surgery with or without HIPEC.

Method: We queried Vizient®, an administrative claims database covering approximately 400 U.S. hospitals, for all ovarian cancer patients who had surgery from January 2016 to June 2019 using ICD-10 diagnosis and procedure codes. Sodium thiosulfate administration was used to identified HIPEC cases. Case mix index (CMI), a weighted metric of Medicare Severity-Diagnosis Related scores, reflects hospital clinical complexity. Student t tests and relative risk were used to compare continuous variables and complications, respectively.

Results: A total of 92 ovarian cancer patients had HIPEC at 31 unique hospitals, and 16,417 patients had surgery without HIPEC at 229 hospitals. Of the 96% HIPEC patients, 96% occurred after publication (**Figure 1**). During the index admission, HIPEC patients had a longer median length of stay (8.9 vs 4.9 days, $P < 0.001$) and a higher percentage of ICU admissions (63% vs 11.1%, $P < 0.001$), CMI (2.8 vs 2.2, $P = 0.002$), and complication rates (RR = 2.71, $P < 0.001$). Direct costs for the index admission (S22,256.96 vs S12,031.56, $P < 0.001$) and direct cost index (observed/expected costs) (1.88 vs 1.11, $P < 0.001$) were also greater in the HIPEC patients. No inpatient deaths or 30-day readmissions were identified after HIPEC in this cohort.

Conclusion: Use of HIPEC for ovarian cancer increased in the United States after publication of a prospective clinical trial, although the number of patients remains modest. Incorporation of HIPEC was associated with increased cost, hospital and ICU

length of stay, and complication rates. Further studies are needed to evaluate long-term outcomes, including morbidity and survival.

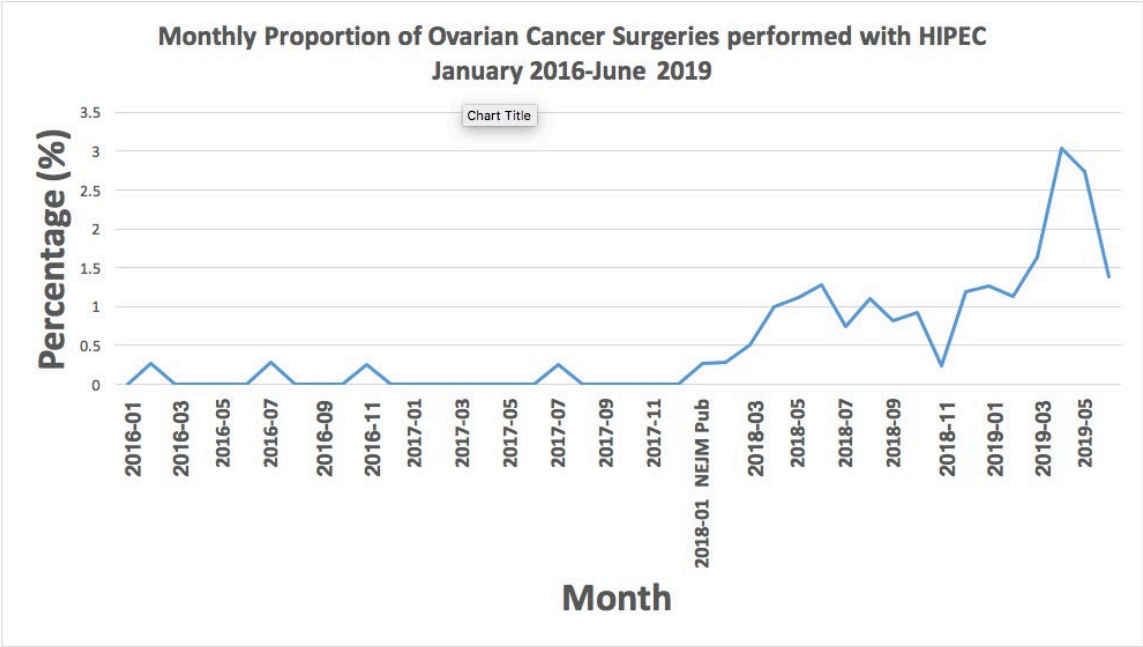

Fig. 1. Monthly rates of heated intraperitoneal chemotherapy (HIPEC) used in ovarian cancer surgery from January 2016 to June 2019. Rates of HIPEC use in ovarian cancer surgery increased after January 2018, the month that van Driel et al.'s "HIPEC in Ovarian Cancer" was published in the New England Journal publication (NEJM Pub).

Comparison of outcomes with utilization of hyperthermic intraperitoneal chemotherapy with paclitaxel and cisplatin versus cisplatin alone at interval debulking surgery in women with epithelial ovarian cancer

M.P. Horowitz[a], L. Moulton Chambers[a], M. Gruner[a], A.B. Costales[b], M. Morton[a], A.M. Chichura[c], P.G. Rose[a], C.M. Michener[c] and R. DeBernardo[c]. [a]*The Cleveland Clinic Foundation, Cleveland, OH, USA,* [b]*Baylor College of Medicine, Houston, TX, USA,* [c]*Cleveland Clinic, Cleveland, OH, USA*

Objective: The aim of this study was to investigate perioperative adverse outcomes in women with epithelial ovarian cancer (EOC) receiving interval debulking surgery (IDS) with hyperthermic intraperitoneal chemotherapy (HIPEC) with paclitaxel/cisplatin versus single-agent cisplatin.

Method: Women with primary EOC who underwent IDS with HIPEC with either paclitaxel/cisplatin or single-agent cisplatin were identified from a single-institution prospectively maintained HIPEC registry. Patient demographic and perioperative outcomes data were recorded. Univariate analysis was performed between the 2 cohorts.

Results: Among 39 women with EOC undergoing IDS with HIPEC, paclitaxel/cisplatin was administered in 24 patients (61.5%) and 15 (38.5%) received cisplatin alone. There were no differences in age (P = 0.10), ASA score (P = 0.61), stage (P = 0.99), disease location (P = 0.99), preoperative cycles of chemotherapy (P = 0.54), or days since last chemotherapy (P = 0.23). There was no difference in intensive care unit admission (20.8% vs 13.3%, P = 0.69), operative time (6.0 vs 6.0 hours, P = 0.61), or length of stay (5.0 vs 5.0 days, P = 0.28). Incidence of minor (25.0% vs 26.7%), moderate (8.3% vs 20.0%), and severe postoperative complications (12.5% vs 6.7%) (P = 0.74) were not different for those who received paclitaxel/cisplatin versus cisplatin alone. There was no significant difference in incidence of cellulitis (4.2% vs 6.7%, P = 0.99), ileus (8.3% vs 20.0%, P = 0.35), readmission (4.2% vs 13.3%, P = 0.55), reoperation (4.2% vs 6.7%, P = 0.99) or venous thromboembolism (4.2% vs 6.7%, P = 0.99). Median follow-up duration was significantly longer for paclitaxel/cisplatin versus cisplatin (16.1 vs 6.8

months, $P = 0.003$). However, 1-year recurrence-free survival (70.1% vs 66.5%, $P = 0.99$) and overall survival were not significantly different (90.2% vs 100.0%, $P = 0.99$).

Conclusion: Addition of paclitaxel does not significantly increase the incidence of adverse postoperative outcomes compared to cisplatin alone in women with advanced EOC undergoing IDS with HIPEC. Although disease outcomes from this prospective registry are immature, oncologic outcomes are no different at 1 year of follow-up. Data collection is ongoing to determine whether addition of paclitaxel to cisplatin will decrease recurrence and death women with EOC receiving IDS with HIPEC.

Comparison of outcomes with utilization of hyperthermic intraperitoneal chemotherapy (HIPEC) at time of minimally invasive interval debulking surgery versus laparotomy

L. Moulton Chambers[a], M.P. Horowitz[a], A.B. Costales[b], M. Gruner[a], A.M. Chichura[c], M. Morton[a], M. Yao[c], P.G. Rose[a], R. DeBernardo[c] and C.M. Michener[c]. *[a]The Cleveland Clinic Foundation, Cleveland, OH, USA, [b]Baylor Scott & White Memorial Hospital, Temple, TX, USA, [c]Cleveland Clinic, Cleveland, OH, USA*

Objective: The aim of this study was to compare perioperative outcomes in women with advanced epithelial ovarian cancer (EOC) undergoing interval cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (HIPEC) via minimally invasive interval debulking surgery (MIIDS) or laparotomy.

Method: We performed a retrospective, single-institution study of women with advanced EOC who underwent IDS with HIPEC from 2017 to 2019. Univariate analysis was performed between the 2 cohorts.

Results: A total of 43 women were identified; 8 (18.6%) underwent MIIDS + HIPEC and 35 (81.3%) laparotomy + HIPEC. MIIDS included single-port ($n = 6$), robotic ($n = 1$), or multiport laparoscopy ($n = 1$). The majority of the patients had stage III disease ($n = 27$, 67.5%) and serous histology ($n = 40$, 93.0%). Median age of patients in the MIIDS group was 71.2 years versus 63.6 years in laparotomy ($P = 0.03$); there was no difference in ASA score or medical comorbid conditions ($P > 0.05$). The majority of patients in the MIIDS cohort underwent HIPEC with cisplatin alone ($n = 6$, 75.0%) versus the laparotomy cohort in which most received cisplatin with paclitaxel (62.9%, $n = 22$, $P < 0.001$). All patients who underwent MIIDS and laparotomy had optimal cytoreduction with no difference in rate of R0 resection (65.5% vs 71.9%, $P = 0.25$). There was no difference in intensive care unit admissions (25% vs 14.3%, $P = 0.46$), estimated blood loss (150 vs 275 cc, $P = 0.13$), or operative time (5.5 vs 6.0 hours, $P = 0.58$), but need for intraoperative pressor support was decreased for MIIDS versus laparotomy (37.5% vs 80.6%, $P = 0.02$). There was no difference in 30-day adverse major and minor events for MIIDS versus laparotomy, but length of stay was decreased for MIIDS (3 vs 4 days, $P = 0.01$) (**Table 1**). While time between chemotherapy cycles was significantly decreased for MIIDS versus laparotomy (44.5 days vs 60.5 days, $P = 0.001$), time to starting chemotherapy was not significantly affected (27 days, range 25–32 days, vs 32 days, range 27–42 days; $P = 0.25$)

Conclusion: Our data demonstrate that HIPEC with MIIDS is safe and effective and has a comparable incidence of adverse perioperative outcomes to laparotomy. Rate of achieving R0 cytoreduction was equivalent for both. MIIDS with HIPEC is associated with shorter hospitalization and decreased time between chemotherapy treatments than laparotomy. An MIIDS approach should not prevent surgeons from utilizing HIPEC where indicated for management of advanced EOC.

Table 1. Short-term perioperative outcomes in women with advanced epithelial ovarian cancer (EOC) undergoing interval cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (HIPEC) via minimally invasive interval debulking surgery (MIIDS) or Laparotomy (LAP).

	MIIDS ($n = 8$)	**LAP ($n = 35$)**	***P* value**
Major Adverse Events			
ICU admission	2 (25.0)	5 (14.3)	0.46
Reoperation	0 (0.0)	2 (5.7)	0.99
Venous Thromboembolism	0 (0.0)	2 (5.7)	0.99
Anastomotic Leak	0 (0.0)	3 (8.6)	0.99
Death	0 (0.0)	0 (0.0)	0.99
Minor Adverse Events			

Readmission	1 (12.5)	2 (5.7)	0.47
Ileus	1 (12.5)	4 (11.4)	0.99
Cellulitis	1 (12.5)	1 (2.9)	0.34
Pelvic Abscess	0 (0.0)	0 (0.0)	0.99
Blood Transfusion	4 (50.0)	11 (34.4)	0.41
Discharge Status			0.99
Home	6 (75.0)	22 (68.0)	
Home Health	1 (12.5)	3 (9.4)	
Home Therapy	0 (0.0)	1 (3.1)	
Skilled Nursing Facility	1 (12.5)	6 (18.8)	

Data presented as *n*(%)

Hyperthermic intraperitoneal chemotherapy at the time of minimally invasive interval debulking surgery

M. Morton[a], A.M. Chichura[b], L. Moulton Chambers[a], M.P. Horowitz[a], A.B. Costales[b,c], P.G. Rose[a], R. DeBernardo[b] and C.M. Michener[b]. [a]*The Cleveland Clinic Foundation, Cleveland, OH, USA,* [b]*Cleveland Clinic, Cleveland, OH, USA,* [c]*The University of Texas Medical School at Houston, Houston, TX, USA*

Objective: Hyperthermic intraperitoneal chemotherapy (HIPEC) has been demonstrated to significantly increase overall survival in patients with advanced epithelial ovarian cancer. This video aims to demonstrate the utilization of HIPEC in the setting of minimally invasive surgery for interval debulking of ovarian cancers.

Method: After completion of optimal cytoreduction, inflow and outflow tubing is placed via the single port or umbilical port incision. The round outflow tubing is introduced into the abdomen and placed in the upper quadrants over the liver bed and along the diaphragm. The bifurcation of the inflow Y tubing is placed over the outflow tubing and introduced into the lower quadrants and pelvis. A 0 PDS on a CT-1 needle is then used to secure inflow and outflow tubing. This suture is continued in a running fashion to perform a temporary closure of the skin and fascia to achieve a seal during HIPEC to prevent spillage. If additional laparoscopic port sites are used, these are also temporarily closed. HIPEC is then performed in the standard fashion. The solution is circulated for 90 minutes with a goal outflow temperature of 42°C. After completion of HIPEC, the abdomen is irrigated via the tubing with normal saline. After evacuation of the fluid, the tubing is removed, and the incision is closed in the standard fashion.

Results: Optimal cytoreduction was achieved in all patients using a minimally invasive approach. There was no difference in overall complications, total estimated blood loss, or intensive care unit admissions for patients who underwent minimally invasive HIPEC compared to traditional HIPEC. Minimally invasive HIPEC patients had a significantly reduced length of hospital stay, with a median length of stay of 3 days.

Conclusion: HIPEC is feasible at the time of minimally invasive interval debulking and can decrease overall length of stay without an increase in complications.
