



Introduction of staging laparoscopy in the management of advanced epithelial ovarian, tubal and peritoneal cancer: Impact on prognosis in a single institution experience

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HIGHLIGHTS

- S-LPS does not appear to have a negative prognostic impact on AEOC patients.
- S-LPS may be helpful to avoid unnecessary laparotomies and surgical complications.

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ABSTRACT

Objective. To evaluate the prognostic impact of routinely use of staging laparoscopy (S-LPS) in patients with primary advanced epithelial ovarian cancer (AEOC).

Methods. All women were submitted to S-LPS before receiving primary debulking surgery (PDS) or neoadjuvant treatment (NACT). The surgical and survival outcome were evaluated by univariate and multivariate analysis.

Results. Among 300 consecutive patients submitted to S-LPS no complications related to the surgical procedure were registered. The laparoscopic evaluation showed that almost half of the patients (46.3%) had a high tumor load. One-hundred forty-eight (49.3%) women were considered suitable for PDS and the remaining 152 (50.7%) were submitted to NACT. The percentages of complete (residual tumor, RT = 0) and optimal (RT < 1 cm) cytoreduction of PDS and interval debulking surgery (IDS) were 62.1% and 57.5%, 22.5% and 27.7%, respectively, $p = 0.07$. The post-operative complications of NACT/IDS group were lower than PDS group ($p = 0.01$). The median progression free survival in women with RT = 0 at PDS was 25 months (95% CI, 15.1–34.8), which was statistically significant longer than in all other patients, irrespective of the type of treatment they received ($p = 0.0001$). At multivariate analysis, residual disease ($p = 0.011$) and performance status ($p = 0.016$) maintained an independent association with the PFS.

Conclusions. Including S-LPS in a tertiary referral center for the management AEOC does not appear to have a negative impact in terms of survival and it may be helpful to individualize the treatment avoiding unnecessary laparotomies and surgical complications.

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Introduction

Most of epithelial ovarian cancer cases (AEOC) are diagnosed at advanced stage of disease, when large intra-peritoneal diffusion has already occurred [1]. Primary debulking surgery (PDS) followed by combination platinum-based chemotherapy is considered the standard approach to

these patients, and residual tumor (RT) after primary surgery is one of the most important prognostic factors [2–4]. However, many of AEOC women do not undergo PDS due to several reasons, either patient's characteristics and surgeon's training/philosophy. These patients are submitted to neo-adjuvant chemotherapy (NACT) followed by interval debulking surgery (IDS) [5].

The EORTC-NCIC randomized trial has recently raised a large debate in the gynecologic oncology community, regarding the best treatment option to offer to AEOC patients [6]. In fact, it has shown that NACT followed by IDS significantly decreases post-operative morbidity, while retaining similar survival outcomes than PDS [6]. In the meantime the results from the EORTC-NCIC trial have been matured; we have adopted a laparoscopic model to assess the intra-abdominal diffusion of disease in primary AEOC cases, to definitively guide the management

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of these patients toward PDS or NACT. Although there is a considerable literature supporting the role of staging laparoscopy (S-LPS) to predict the chances of optimal cytoreduction [7–12], the impact of such strategy on survival outcomes has been never evaluated. The aim of this study was to analyze the PFS and OS of AEOC women undergoing S-LPS as a routinely procedure in the management of AEOC over a period of 5 years at our Institution.

Patients and methods

After obtaining an Institutional Review Board approval, we used the Gynecologic Oncology Database of the Catholic University of the Sacred Heart (CUSH) of Rome to identify all patients with International Federation of Gynecology and Obstetrics (FIGO) stages IIIC and IV ovarian, fallopian tube, or primary peritoneal carcinoma, who received their primary treatment at our institution, between January 2006 and December 2010. This specific study period encompassed the time since when we started to systematically utilize S-LPS in AEOC patients until to reach at least two years of follow-up. Pre-operative evaluation of the patients consisted of complete physical and gynecological examination, assessment of Ca125 serum levels, ECOG performance status (ECOG-PS), chest-abdomino-pelvic CT-scan and sonography. Presence of ascites was defined as $\geq 500 \text{ cm}^3$ at CT scan. Exclusion criteria included prior attempt of surgical cytoreduction at another institution and histology consistent with non-epithelial ovarian malignancies or borderline tumors. Poorest ECOG-PS (i.e.: ≥ 2) and/or ASA (American Society of Anesthesiology) score (i.e.: ≥ 3) and/or pre-operative imaging predicting sub-optimal cytoreduction were not considered a priori criteria to abort surgery and treat women with NACT.

Briefly, the characteristics required to define a positive appraisal for each laparoscopic features were the following [8]: massive peritoneal involvement and/or a miliary pattern of distribution for *peritoneal carcinomatosis* (score 2); wide spread infiltrating carcinomatosis, and/or confluent nodules to the most part of the *diaphragmatic surface* (score 2); large infiltrating nodules and/or an involvement of the root of the *mesentery* supposed on the basis of limited movements of the various intestinal segments (score 2); tumor diffusion along the *omentum* up to the large stomach curvature (score 2); possible large/small *bowel* resection (excluding recto-sigmoid resection) and/or extended carcinomatosis on the ansa (score 2); obvious neoplastic involvement of the *gastric wall* (score 2); and *liver surface* lesions larger than 2 cm (score 2).

According to the CUSH algorithm (Fig. 1), all women were submitted to S-LPS and, in line with our previously published data [8–10], the decision to proceed with PDS or NACT was performed on the basis of our laparoscopic scoring system (Fig. 2). Thus, only patients with histologically proven ovarian cancer were treated with NACT.

By summing the scores relative to all parameters, a laparoscopic value for each patient (total predictive index value – PIV) was calculated. Moreover, since the PIV reflects a continuum of progressive tumor diffusion and a cut-off value of 8 has been demonstrated to be a limit for optimal cytoreduction [8], women were also stratified into two different groups: high tumor load (HTL) for $\text{PIV} \geq 8$, and mild-low tumor load (LTL) for $\text{PIV} < 8$.

Type and extent of surgical procedures were recorded according to the surgical complexity score groups by Aletti et al. [13], considering the intermediate and high score groups (i.e.: score > 3) as major surgical procedures. Pelvic and/or para-aortic lymphadenectomy were carried out depending on surgeon's decision or intraoperative randomization according to the protocol "LION" (ClinicalTrials.gov Identifier: NCT00712218). Residual disease (RT) was classified as follows: none grossly visible tumor (complete cytoreduction), $\leq 1 \text{ cm}$ (optimal cytoreduction), $> 1 \text{ cm}$ (sub-optimal cytoreduction). Operative time was calculated starting from the skin incision to the end of all surgical procedures. The decision of performing blood transfusion was made intra- and/or postoperatively according to the hemodynamic conditions

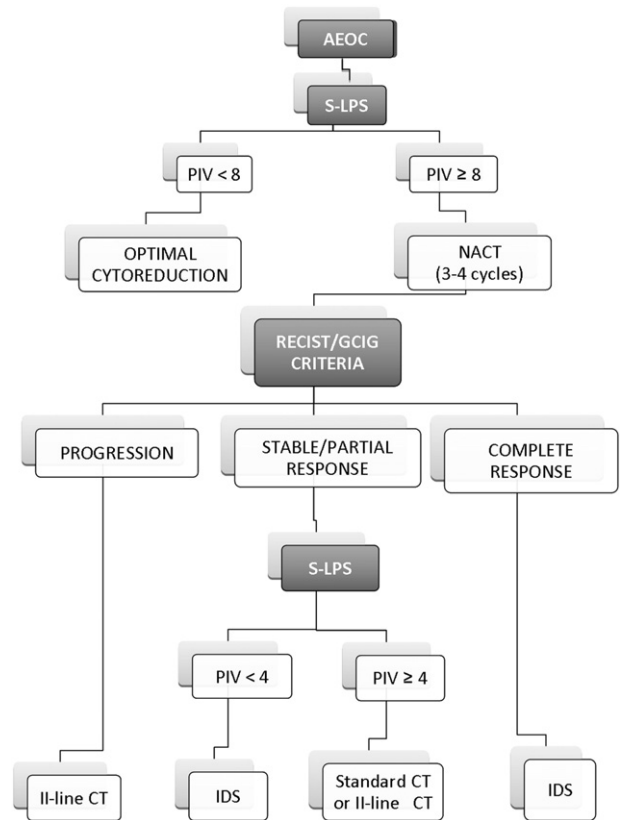


Fig. 1. Catholic University of the Sacred Heart (CUSH) algorithm. AEOC: advanced epithelial ovarian cancer; S-LPS: staging laparoscopy; PIV: laparoscopic Predictive Index Value; NACT: Neoadjuvant chemotherapy; IDS: Interval debulking surgery; CT: Chemotherapy.

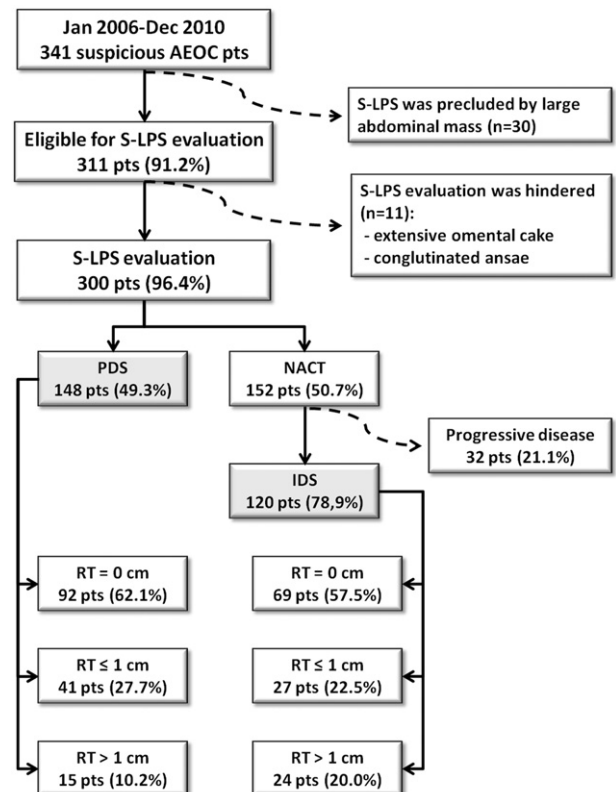


Fig. 2. Catholic University of the Sacred Heart (CUSH) algorithm applied to AEOC patients.

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