



Urologic surgery in gynecologic oncology: A large single-institution experience

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Abstract

Objective: The increasing tendency to a tailored treatment in gynecologic oncology has required the extension of the intervention to other non-gynecological structures, as the urinary district. Moreover the role of the urological surgery in gynecologic oncology is still not completely explored. The objective of the study is to evaluate the occurrence of urological procedures in gynecologic oncology surgery.

Methods: Patients admitted to the Division of Gynecologic Oncology, Catholic University of Sacred Heart, Rome, Italy, between January 2009 and December 2012, were retrospectively analyzed. Clinical charts identified the occurrence of urological procedures in major gynecological surgery.

Results: A total of 728 patients were analyzed for the study. A total of 204 urologic procedures were carried out in 83 patients. In all patients, preoperative hydronephrosis appears to be the only statistically significant predisposing factor to urological procedures. At multivariate analysis, stratifying data for different neoplasm, recurrence was the only adjunctive significant variable for ovarian cancer, as well as neo-adjuvant treatment and recurrence for cervical cancer.

Conclusions: This study has identified preoperative factors influencing the needing of urological procedures in different gynecologic neoplasms, allowing a proper planning of surgical treatment, tailored on each patient.

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Introduction

In the last decades, the treatment of gynecological tumors has evolved toward a multimodal approach, including different combinations of chemotherapy, radiotherapy and surgery, in order to obtain an improved oncological outcome.

Radical surgery, which is a milestone in the treatment of such malignancies, may require tailoring the extension of

the intervention to other non-gynecological structures.^{1–5} In this context, one of the most important districts connected with major gynecologic oncology surgery is the urological one. The close anatomical proximity of the female genital tract with renal excretory pathways may hesitate into accidental operative injuries to the urethra, bladder and ureters and combinations of these during gynecological surgery. Moreover, the complete eradication of the tumor may require the partial or total removal of urological structures and, therefore, necessitate reconstructive urological procedures. In addition, the presence of genito-urinary fistula represents an indication for major palliative surgery.

Taking into account these considerations, an appropriate and integrated surgical strategy seems to be crucial for the treatment of gynecological cancers. In this context,

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urological procedures appear often complementary to the treatment, with both intent, demolitive and reconstructive.^{6,7} Nevertheless, the role of the urological surgery in gynecologic oncology has not been completely encoded yet.

The purpose of this study was to clarify the relevance of urologic procedures and to identify preoperative factors that may predict the need of urological interventions in major gynecologic oncologic surgery.

Material and methods

Clinical charts of gynecological cancer women consecutively admitted at the Division of Gynecologic Oncology, Catholic University of Sacred Heart, Rome, Italy, between January 2009 and December 2012, were retrospectively analyzed. Only patients submitted to major gynecological oncologic surgery for primary ovarian (stage III and IV sec. FIGO) and cervical cancer (all stages) and recurrent gynecological tumors (ovarian, cervical and endometrial cancer) were considered for this study. Urological procedures considered for the analysis were cystoscopy with or without intra-operative placement of ureteral stents, partial or total nephrectomy, bladder resection, ureterectomy, ureteral re-implantation with or without bladder psoas hitching⁸ and cystectomy with urinary diversion.⁹

Patients' demographics, pre-operative, surgical, and postoperative data were collected. BMI (kg/m²) was evaluated according to the standard World Health Organization (WHO) criteria. Pre-operative elevated creatinine serum levels (greater than 1.5 mg/dl) hydronephrosis and presence of nephrostomy were considered. Patients with primary cervical and ovarian cancer have been stratified according to neo-adjuvant therapies such as chemotherapy and/or radiotherapy.

All surgeries were carried out by laparotomy or laparoscopy and included radical hysterectomy for cervical cancer and cytoreductive surgery for ovarian cancer and recurrent tumors. Adjunctive major procedures were considered in the case of pelvic and/or para-aortic lymphadenectomy, bowel resection, diaphragmatic stripping/resection, omentectomy, peritonectomy, and urological surgery. A team of 5 well-trained gynecological oncology surgeons performed all surgeries. Operative time was calculated starting from the skin incision to the end of all surgical procedures.

Major surgical complications were also analyzed according to Dindo's classification,¹⁰ with particular interest toward early and late (within 6 months from surgery) urinary complications. Mild urinary complications included urinary infection or voiding dysfunctions.

Statistical analysis

Baseline differences between groups were analyzed using the Chi square test and Mann–Whitney test, as appropriate. Univariate analysis and logistic regression analysis

were carried out in order to identify the predictive factors for the need of the presence of urologist in the operating room. Median values have been chosen as cut-off for statistical analysis for two reasons: to have an equal distribution of the population in each group and to correlate each cut-off value to a clinical significance. Probability (P) values were considered to be statistically significant at the 0.05 levels. The logistic regression analysis was used to reduce potential confounding factors and to assess the role of independent variables with a *p* 0.05 at univariate analysis.¹¹

The logistic model was performed considering significant variables in univariate analysis. The SPSS statistical software program (SPSS Inc., Chicago, IL) was used.

Results

In the study period, 728 women underwent radical surgery for primary ovarian (40.7%), and cervical cancer (41.4%) and recurrent gynecological tumors (17.9%), as shown in Table 1. Elevated creatinine serum levels, presence of hydronephrosis, and/or preoperative nephrostomy were found in 16 (2.2%), 43 (5.9%) and 34 (4.7%) cases. Generally, these features were statistically more frequent in cervical cancer with respect to ovarian and endometrial cancer, in both primary and recurrent disease (*p* 0.141, *p* 0.02, *p* 0.001).

Laparoscopic or laparotomic approach depending to surgeon's background and/or surgical protocol enrollment and/or on the clinical subject's ability to sustain a long-stay of pneumoperitoneum. Intra-operative procedures, excluding urologic surgery, are shown in Table 1. A total of 574 cases (78.8%) had radical hysterectomy and 453 (62.2%) pelvic and/or aortic lymphadenectomy. Additional procedures, including bowel resection, diaphragmatic surgery, omentectomy and peritonectomy were performed in 454 of 728 women (62.4%).

A total of 204 urologic procedures were carried out in 83 patients (11.4%) (Table 2).

The most frequent gynecological tumor associated with urologic surgery was cervical cancer, both at the time of primary and recurrent disease (respectively 12.9% cervical vs. 1.7% ovarian cancer, *p* = 0.0001; 48.5% cervical vs. 21.2% endometrial and 25.4% ovarian cancer, *p* = 0.015). Moreover, the rate of women submitted to urologic interventions was significantly higher in recurrent disease (39 of 129, 30.2%) than at primary diagnosis (44 of 599, 7.3%) (*p* = 0.0001). In particular, in the recurrence group, about one of two (48.5%) cervical cancer women and about one of four endometrial (21.2%) and ovarian cancer patients (25.4%) needed urologic surgery.

Total urologic procedures were classified in 123 (60.3%) major interventions and 81 (39.7%) minor procedures. Based on timing of surgery, minor interventions, such as cystoscopy and ureteral stent positioning, represented more than half of the urologic procedures required during primary surgery (60 of 81 procedures, 74.0%). On

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