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Retrospective analysis of urogynecological symptoms of patients undergoing gynecological oncology surgery

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ABSTRACT

Objectives: Treating gynecological cancer with radical surgery, pelvic radiotherapy, and systemic chemotherapy may lead to pelvic floor dysfunction.

Materials and Methods: Lower urinary tract symptoms are common after surgery for gynecological cancer. We used the Urogenital Distress Inventory (UDI)-6, Incontinence Impact Questionnaire (IIQ)-7, and International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF) to compare the severity of urinary incontinence and quality of life between patients who underwent staging surgery for gynecological caner and those who underwent hysterectomy for benign disease. In total, 50 patients with cancer and 50 patients with benign disease were included in the patient and control groups, respectively.

Results: There were no significant differences between the groups in terms of preoperative IIQ-7, UDI-6, and ICIQ-SF scores. There was a significant difference between the groups in scores 1 and 12 months after surgery. Postoperative IIQ-7, UDI-6, and ICIQ-SF scores were significantly increased compared to preoperative scores, although there were no significant differences between preoperative and postoperative scores in the control group. Incontinence was present after surgery in 15 (43.2%) and 4 (21.1%) patients in the test and control groups, respectively. In multivariate analyses of variance, surgery for cancer was an independent risk factor for urinary incontinence.

Conclusion: Genitourinary symptoms should be evaluated in cancer patients undergoing staging procedure. The quality of life of patients should be assessed in terms of incontinence in the postoperative period.

Keywords: Hysterectomy; quality of life; urinary incontinence

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INTRODUCTION

After breast cancer, gynecological cancers are a leading cause of morbidity and mortality in women. The treatment of gynecological cancers includes radical surgery, pelvic radiotherapy, and systemic chemotherapy, which may lead to pelvic floor dysfunction.[1] Lower urinary tract symptoms are common after surgery for gynecological cancer, with a frequency of 12.2-51%.[2] These symptoms significantly affect the quality of life of patients.

Urinary incontinence (UI), which is characterized by objective, unintentional loss of urinary control, makes it difficult to maintain hygiene and leads to social, emotional, sexual, and economic problems.[3] It is affected by multiple factors and leads to an impaired quality of life for patients. An understanding of UI and its risk factors is essential to preventing and treating UI. The role of surgery in the treatment of urinary dysfunction is not clear. Multiple mechanisms may be involved in bladder dysfunction, including impaired blood flow to the nerve fibers of the pelvis plexus during bladder dissection.[4] In patients with gynecological cancers, the supporting tissues of the cervix, such as the vesicouterine and cervicouterine ligaments, are separated from the cervix by the removal of the uterus.[5] Relaxation of the pubococcygeus muscle and inadequate urethral closure lead to the development or exacerbation of stress incontinence.[6] In cases of damage to the hypogastric nerve (sympathetic system) during hysterectomy, the pelvic nerve (parasympathetic system) dominates and leads to urinary trapping and urgency.[7]

In this study, we used scores on the Urogenital Distress Inventory (UDI)-6, Incontinence Impact Questionnaire (IIQ)-7, and International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF) to confront the severity of UI and quality of life between patients who underwent stating procedure for gynecological cancer and those who underwent hysterectomy for benign disease.

MATERIALS AND METHODS

This trial was conducted between January 1, 2016, and December 31, 2021, at the Gynecological Oncology Clinic Muğla Sıtkı Koçman University. We enrolled patients who underwent staging surgery (total hysterectomy, bilateral salpinoophorectomy, and pelvic and paraaortic lymphadenectomy with or without infracolic omentecomy) for endometrial or ovarian cancer by laparoscopy or laparotomy and those who underwent total hysterectomy and bilateral salpingoophorectomy for benign disease. Patients diagnosed with incontinence after anamnesis and physical examination were excluded. The UDI-6, IIQ-7, and ICIQ-SF were administered 1 week before surgery to patients and during routine clinical visits to controls.

We excluded patients who did not complete the questionnaires or were lost to follow-up, who had mental disorders, who were unable to communicate, who experienced incontinence due to other causes (e.g., neurogenic bladder, psychogenic incontinence, drug use), who had a history of urogynecological surgery, and who underwent urogenital procedures or experienced intraoperative complications.

Preoperative examination findings and questionnaire scores were recorded. The questionnaires were administered face to face to patients who presented for follow-up, and patient confidentiality was maintained. Age at the time of operation; gravidity and parity; body mass index; previous surgeries; comorbidities; drug use; smoking; alcohol consumption; and preoperative, 1-month postoperative, and 12-month postoperative UDI-6, IIQ-7, and ICIQ-SF scores were recorded.

The validated Turkish transcription of the aforementioned questionnaires were used. The severity, frequency, type, and influence on quality of life of UI were evaluated with the ICIQ-SF. The UDI-6 was used to appraise the type and impact on quality of life of UI. The IIQ-7 was utilized to assess the psychosocial effects of UI. Maximum scores on the ICIQ-SF, UDI-6, and IIQ-7 are 24, 18, and 21, respectively. Increasing scores indicate worse quality of life and symptoms.

Statistical Analysis

An SPSS (version 18.0; IBM, Armonk, NY, USA) was employed for statistical analyses. Descriptive analyses of the data are presented in the tables. The Shapiro-Wilk test was employed to evaluate the normality of the data distribution. Parametric and non-parametric tests were used to evaluate normally and non-normally distributed variables, respectively. Independent-samples Student's t-test, Mann-Whitney U test, and chi-squared test (Pearson chi-squared and Monte-Carlo chi-squared) were used to compare independent groups. $P<0.05$ was taken to indicate statistical significance.

RESULTS

This study included 50 patients with cancer (test group) and 50 patients with benign disease (control group). Demographic data were similar in the two groups (Table 1). The most common surgical indications in the test and control groups were endometrial cancer and fibroids, respectively.

None of the study patients had intraoperative or postoperative complications. Table 2 presents the adjuvant treatments used in this trial. No significant differences between the groups in terms of preoperative IIQ-7, UDI-6, or ICIQ-SF scores were found (Table 3). However, there were significant differences in the

questionnaire scores between the groups 1 and 12 months after surgery.

Although IIQ-7, UDI-6, and ICIQ-SF scores increased significantly after surgery in the test group, there were no significant differences between preoperative and postoperative scores in the control group (Table 4). UI incontinence developed in 15 (43.2%) and 4 (21.1%) patients in the test and control groups, respectively (Table 5). In multivariate analyses of variance, surgery due to cancer was an independent risk factor for UI (hazard ratio: 5.35, 95% confidence interval: 1.2-23.5, p=0.02; Table 6).

Table 1. Demographic characteristics of the study participants

Variable	Test group (n=50)	Control group (n=50)	*p*-value
Age	54.1±11.1	53.8±10.05	0.91
Number of deliveries	2.34±1.06	2.28±1.32	0.86
Indication			<0.001
Endometrial cancer	34 (68.0%)	-	
Ovarian cancer	16 (32.0%)	-	
Fibroids	-	14 (28.0%)	
EIN	-	13 (26.0%)	
CIN	-	8 (16.0%)	
AUB	-	15 (30.0%)	
Type of delivery	47	45	0.91
Vaginal	38 (80.9%)	36 (80.0%)	
Cesarean	9 (19.1%)	9 (20.0%)	
BMI	27.4±3.6	27.9±4.24	0.33
BMI			0.41
<30	36 (72.0%)	33 (66.0%)	
≥30	14 (28.0%)	17 (34.0%)	
Menopause			0.41
Postmenopausal	32 (64.0%)	34 (68.0%)	
Premenopausal	18 (36.0%)	16 (32.0%)	
Sexually active			0.38
Yes	43 (86.0%)	45 (88.0%)	
No	7 (14.0%)	5 (12.0%)	
Smoking			0.30
Yes	39 (78.0%)	42 (84.0%)	
No	11 (22.0%)	8 (16.0%)	
Alcohol			0.50
Yes	47 (94.0%)	46 (92.0%)	
No	3 (6.0%)	4 (8.0%)	
Diabetes mellitus			0.79
Yes	41 (82.0%)	42 (84.0%)	
No	9 (18.0%)	8 (16.0%)	
Hypertension			0.46
Yes	41 (82.0%)	38 (76.0%)	
No	9 (18.0%)	12 (24.0%)	
Surgery type			<0.001
Laparoscopy	20 (40.0%)	44 (88.0%)	
Laparotomy	30 (60.0%)	6 (12.0%)	

BMI: body mass index; EIN: endometrial intraepithelial neoplasia; CIN: cervical intraepithelial neoplasia; AUB: abnormal uterine bleeding

DISCUSSION

This case-control trial included patients who underwent staging surgery by laparoscopy or laparotomy for endometrial or ovarian cancer and those who underwent total hysterectomy and bilateral salpinoophorectomy for benign disease. We evaluated the short- and long-term risk of developing UI, its effects on quality of life, and its association with previous surgeries

Table 2. Comparison of the endometrial and ovarian cancer groups in terms of cancer stage, brachytherapy, radiotherapy + brachytherapy, radiotherapy + chemotherapy, chemotherapy, omentectomy, pelvic lymph node dissection, and paraaortic lymph node dissection

	Endometrial cancer	Ovarian cancer	*p*-value
Stage			0.001
1	25 (78.1%)	7 (21.9%)	
2	6 (100.0%)	0 (0.0%)	
3	3 (25.0%)	9 (75.0%)	
Brachytherapy			0.005
Yes	12 (35.3%)	0 (0.0%)	
No	22 (64.7%)	16 (100.0%)	
Radiotherapy + brachytherapy			0.03
Yes	8 (23.5%)	0 (0.0%)	
No	26 (76.5%)	16 (100.0%)	
Radiotherapy + chemotherapy			0.45
Yes	2 (5.9%)	0 (0.0%)	
No	32 (94.1%)	16 (100.0%)	
Chemotherapy			<0.001
Yes	1 (2.9%)	13 (81.3%)	
No	33 (97.1%)	3 (18.8%)	
Omentectomy			0.60
Yes	23 (67.6%)	11 (68.8%)	
No	11 (32.4%)	5 (31.3%)	
Pelvic lymph node dissection			
	24.7±11.8	25.68±8.92	0.78
Paraaortic lymph node dissection			
	22.4±10.4	20.5±9.61	0.52

Table 3. Comparison of IIQ-7, UDI-6, and ICIQ-SF scores between the test and control groups before surgery and 1 and 12 months after surgery

	Test group	Control group	*p*-value
IIQ-7 (preoperative)	4.06±1.93	4.30±1.76	0.51
IIQ-7 (1 month postoperative)	8.64±4.96	4.36±1.69	<0.001
IIQ-7 (12 months postoperative)	12.8±4.96	4.42±1.61	<0.001
UDI-6 (preoperative)	4.04±1.57	4.50±1.18	0.10
UDI-6 (1 month postoperative)	7.14±5.25	4.56±1.12	<0.001
UDI-6 (12 months postoperative)	10.6±6.68	4.54±1.14	<0.001
ICIQ-SF (preoperative)	7.14±4.11	8.46±4.59	0.13
ICIQ-SF (1 month postoperative)	11.7±6.14	8.52±4.59	0.004
ICIQ-SF (12 months postoperative)	16.02±6.87	8.56±4.57	<0.001

IIQ-7: incontinence impact questionnaire-7; UDI-6: urogenital distress inventory-6; ICIQ-SF: international consultation on incontinence questionnaire-short form

and adjuvant treatments based on UDI-6, IIQ-7, and ICIQ-SF questionnaires administered 1 week before surgery and during follow-up visits. We excluded patients who underwent radical hysterectomy for cervical cancer (CC). Although nerve-sparing surgery is performed on patients with CC, radical hysterectomy affects bladder function via a combination of intraoperative trauma to the bladder, anatomical displacement following the removal of the uterus and its supporting ligaments, and damage to the pelvic nerves during paravaginal dissection.[8]

Surgery for cancer was an independent risk factor for UI. Our results are in line with those of a previous study by Neron et al.[9] that evaluated postoperative pelvic floor dysfunction in patients who underwent surgery for gynecological malignancies and benign disease. Patients who underwent hysterectomy for cancer had an increased risk for incontinence than those who underwent hysterectomy for benign disease. Because the vaginal cuff is not fixed when a hysterectomy is performed for cancer, pelvic floor dysfunction may result. Incontinence develops more commonly in cancer patients because of bladder dysfunction due to nerve damage.[10]

There were significant differences in the type of operation between the test and study groups. Laparoscopy was performed

Table 4. IIQ-7, UDI-6, and ICIQ-SF scores in the test group and control group before surgery and 1 and 12 months after surgery

Test group				
	Preoperative	**1 month postoperative**	**12 months postoperative**	***p*-value**
IIQ-7	4.06±1.93	8.64±4.96	12.8±4.96	<0.001
UDI-6	4.04±1.57	7.14±5.25	10.6±6.68	0.03
ICIQ-SF	7.14±4.11	11.7±6.14	16.02±6.87	<0.001
Control group				
IIQ-7	4.30±1.76	4.36±1.69	4.42±1.61	0.126
UDI-6	4.50±1.18	4.56±1.12	4.54±1.14	0.604
ICIQ-SF	8.46±4.59	8.52±4.59	8.56±4.57	0.082

IIQ-7: incontinence impact questionnaire-7; UDI-6: urogenital distress inventory-6; ICIQ-SF: international consultation on incontinence questionnaire-short form

Table 5. Frequency of incontinence and its types after the operation in the test and control groups

	Test group	**Control group**	***p*-value**
Incontinence			
Yes	15 (43.2%)	4 (21.1%)	
No	35 (56.8%)	46 (78.9%)	
Type of incontinence			0.317
SUI	9 (64.3%)	3 (60.0%)	
Urge	2 (14.3%)	0 (0%)	
Mixed	3 (21.4%)	1 (20%)	

SUI: stress urinary incontinence

Table 6. Univariate and multivariate analyses of group, brachytherapy, external beam radiotherapy + brachytherapy, chemotherapy + radiotherapy, chemotherapy, and surgery type

Parameter	**Univariate analyses**			**Multivariate analyses**		
	Hazard ratio	**95% CI**	***p*-value**	**Hazard ratio**	**95% CI**	***p*-value**
Group	5.4	1.6-17.6	0.002	5.35	1.2-23.5	0.02
BRT	2.2	1.5-2.8	0.01	1.13	0.7-3.7	0.99
EBRT	5.0	1.28-19.4	0.02	2.43	0.47-12.4	0.28
KTRT	4.15	0.24-69.5	0.33	1.29	0.06-25.0	0.86
KT	3.85	1.15-12.8	0.03	1.62	0.3-6.9	0.51
Surgery type (LS or LT)	1.7	0.6-4.9	0.31	1.8	0.3-4.12	0.79

CI: confidence interval; EBRT: external beam radiation therapy; KTRT: chemoterapy + radiotherapy; KT: chemotherapy; LS: laparoscopic; LT: laparotomic

in 88.0% and 40.0% of patients in the control and test groups, respectively. In multivariate analyses of variance, operation type was not evaluated as an independent risk factor for UI. Skorupska et al.[11] evaluated the effects of hysterectomy type on postoperative UI in 392 women and found that hysterectomy, but not the type of surgery, was a risk factor for UI.

In the test group, IIQ-7, UDI-6, and ICIQ-SF scores were significantly higher 1 and 12 months after surgery than preoperative scores, whereas in the control group there were no significant differences between preoperative and postoperative scores. Ziętek-Strobl et al.[12] evaluated the effects of surgery according to surgical indication and adjuvant treatment on genitourinary symptoms based on preoperative and 6-month postoperative IIQ-7 and UDI-6 scores and found an increase in scores, similar to our study. Similarly, Nakayama et al.[13] compared the quality of life of patients who underwent surgery and adjuvant treatment for ovarian cancer and those who underwent hysterectomy for non-oncological causes 3, 6, 9, and 12 months after surgery.

Christiansen et al.[14] found no significant change in UI scores during long-term follow-up among women who underwent hysterectomy for benign causes.

Nosti et al.[15] evaluated pelvic floor dysfunction in patients who underwent surgery for endometrial cancer and found that postoperative incontinence was common and negatively affected quality of life. Urinary system dysfunction commonly occurs in patients treated for ovarian cancer.[10] Similar to previous studies, incontinence developed after surgery in 15 (43.2%) and 4 (21.1%) patients in our test and control groups, respectively, with a significantly higher rate in the former group than the latter one. This may be due to the effects of combined cancer treatments on the urinary system.[16]

Stress, urge, and mixed UI developed in 9 (64.3%), 2 (14.3%), and 3 (21.4%) patients in the test group, respectively. Stress and mixed UI developed in 3 (60.0%) and 1 (20.0%) patients in the control group, respectively. There were no significant differences between the groups in terms of type of incontinence. In a meta-analysis by Duru et al.[17], urodynamic studies after hysterectomy in 80 patients showed no significant differences between types of incontinence. The lack of difference between types of incontinence may be due to the separation of the uterus and cervix from the pelvic floor support tissues due to the operation, malfunction in the urethral sphincter mechanism after damage to the distal branches of the pudendal nerves, or changes in the urethra and bladder neck support.[18]

Radiation kills cells by delivering high-energy particles to the cancer; however, damage to adjacent normal tissue, such as the bladder or gastrointestinal tract, is ineluctable.[16] The bladder is at risk during radiation therapy for gynecological malignancies. The urinary complications of radiation therapy include dysuria, hematuria, stress UI, urge UI, and radiation cystitis.[19] Chemotherapy uses cytotoxic drugs to induce apoptosis in tumor cells. Adverse effects of chemotherapy on the urinary system include urinary tract infections, glomerulonephritis, and renal failure due to drug toxicity, which may lead to UI.[20]

Patients who received BRT and radiotherapy had higher scores than other patients. Herwig et al.[21] investigated late urinary effects after treatment of stage 1 endometrial cancer. UI was more common in patients who received combined BRT and radiotherapy than in patients who received BRT only, similar to our results. Oplawski et al.[10] examined the effects of combination therapy for endometrial or ovarian cancer on urinary system dysfunction and quality of life. Patients who underwent surgery for endometrial cancer had a 2-fold higher risk for UI if they received BRT compared to those who received adjuvant chemotherapy. These results are similar to those of the present study. Questionnaire scores were significantly higher among patients who received BRT only than those who received chemotherapy only. Similarly, in our study, Zafarnia et al.[22] found that genitourinary symptoms had a greater effect on UI and quality of life in patients who received RT than in patients who received chemotherapy.

In total, 13 (81.3%) of the 16 patients with ovarian cancer received chemotherapy, whereas 3 (18.8%) did not receive additional adjuvant treatment. UI was more common and quality of life was worse among patients who received chemotherapy than those who did not receive chemotherapy. Oplawski et al.[10] examined the effects of adjuvant chemotherapy and surgery on urinary system dysfunction and quality of life among patients with ovarian cancer. UI was more common and quality of life was better, as evidenced by higher UDI-6 and IIQ-7 scores, among patients who received adjuvant chemotherapy than those who underwent surgery for ovarian cancer only.

Study Limitations

This study has a few limitations, including a small sample size and short follow-up duration. Yet this single-center case-control study included patients who underwent surgery by a single surgeon, which indicates the usefulness of our study.

Conclusion

Genitourinary symptoms should be evaluated in patients undergoing staging surgery for cancer, in particular those who plan to receive adjuvant treatment after the staging surgery. Such patients should be monitored for the development of urinary incontinence.

ETHICS

Ethics Committee Approval: The study was approved by the Local Research Ethics Committee of Muğla Sıtkı Koçman University (220096/86).

Informed Consent: Informed consent was obtained.

Peer-review: Externally peer-reviewed.

Contributions

Surgical and Medical Practices: İ.A.Ö.; Concept: B.S., K.G., İ.A.Ö.; Design: B.S., K.G.; Data Collection or Processing: B.S., K.G.; Analysis or Interpretation: B.S., K.G.; Literature Search: B.S.; Writing: B.S., İ.A.Ö.

DISCLOSURES

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