Original Article – Urologic Oncology
Grand J Urol 2025;5(2):55-61
DOI: 10.5505/GJU.2025.36349

Urological Complications in Gynecological Oncology Surgeries: A Tertiary Center Experience

Jinekolojik Onkoloji Cerrahisinde Ürolojik Komplikasyonlar: Tersiyer Merkez Deneyimi

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Cite as: Çiftpınar T, Şahin G, Şahin S, Yılmaz A, Çetinkaya N. Urological complications in gynecological oncology surgeries: a tertiary center experience. Grand J Urol 2025;5(2):55-61

Submission date: 10 April 2025 **Acceptance date:** 02 May 2025 **Online first:** 05 May 2025 **Publication date:** 20 May 2025

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Abstract

Objective: The close proximity of the female genital system and the urinary system predisposes both systems to operative complications. We examined the causes and management of these complications, which are even more prevalent in oncological surgeries.
Materials and Methods: In total, 135 malignant cases operated on in the Gynecological Oncology clinic of Çam and Sakura City Hospital between December 2022 and April 2024 were retrospectively examined. Management of urological complications was carried out together with the urology clinic.
Results: A total of 10 urological complications developed in nine patients during the 16-month period. All of them were seen in surgeries performed by laparotomy. Four of the patients who underwent major oncological surgery had bladder damage, and the other four had ureter damage. In one patient, both bladder and ureter damage were observed. Eighty percent of complications were diagnosed intraoperatively. Bladder injuries developed during dissection and ureter injuries, which generally occurred during energy use and ligation. While damage to the bladder and mid-ureter was primarily repaired, a more difficult procedure such as ureteroneocystostomy was performed for distal ureter injuries. Defects in the bladder trigone were also difficult to treat.
Conclusion: The female genital and urinary systems, which are in close proximity to each other, make them prone to urinary complications during gynecological surgeries. Due to the nature of oncological surgery, the disrupted anatomy and the different biology of tumor cells may increase these complication rates. Therefore, every surgeon dealing with gynecological oncology must be familiar with urological anatomy and master the management of complications.

Keywords: urinary injury, gynecological oncologic surgery, urological complications, ureteral injury, bladder injury

Özet

Amaç: Kadın genital sistemi ile üriner sistemin yakın komşuluğu her iki sistem içinde operatif komplikasyonlara yatkınlık gösterir. Onkolojik ameliyatlarda daha da artan bu komplikasyonların sebeplerini ve yönetimini inceledik.
Gereçler ve Yöntemler: Çalışmaya Aralık 2022 ve Nisan 2024 ayları arasında Çam ve Sakura Şehir Hastanesi Jinekolojik Onkoloji kliniğinde opere edilen 135 malign vaka retrospektif olarak incelendi. Ameliyat esnasında gelişen ürolojik komplikasyonların yönetimi üroloji kliniği ile beraber yapıldı.
Bulgular: 16 aylık dönemde toplamda 9 hastada 10 ürolojik komplikasyon gelişti. Bu komplikasyonların hepsi laparotomi ile yapılan ameliyatlarda görüldü. Majör onkolojik cerrahi uygulanan 4 hastada izole mesane yaralanması, 4 hastada izole üreter yaralanması ve 1 hastada üreter ve mesane birlikte yaralanması görüldü. Üriner sistem hasarlarının %80'i intraoperatif olarak tanı alırken, mesane hasarları diseksiyon esnasında, üreter hasarları ise genelde enerji kullanımı ve ligasyon esnasında gelişti. Mesane ve mid-üreterdeki hasar primer olarak onarılırken, distal üreter yaralanmaları için üreteroneosistostomi gibi daha zor bir prosedür uygulandı. Mesane trigonundaki defektlerin tedavisi de zordu.
Sonuç: Birbiri ile yakın komşuluk içinde olan kadın genital ve üriner sistemi, jinekolojik ameliyatlar esnasında üriner komplikasyon oluşmasına yatkınlık sağlar. Onkolojik cerrahinin doğası gereği bozulan anatomi ve tümör hücresinin farklı biyolojisi bu komplikasyon oranlarını artırabilmektedir. Bu yüzden jinekolojik onkoloji ile uğraşan her cerrahın ürolojik anatomiye aşina olması ve komplikasyonların yönetimine hakim olması gerekmektedir.

Anahtar kelimeler: üriner hasar, jinekolojik onkolojik cerrahi, ürolojik komplikasyon, üreter hasarı, mesane hasarı

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Introduction

Due to the nature of oncological cases, morbidity and mortality in gynecological oncological surgeries are higher than in gynecological surgeries performed for benign reasons. In gynecological oncology surgeries, the gastrointestinal, urinary, and vascular systems can also be a part of the surgery. The close proximity of the genital and urinary systems increases the possibility of injury in these areas. Iatrogenic injuries may occur for reasons such as tumor tissue disrupting the nutrition in that area, changes to the anatomical structure, the radiotherapy used in adjuvant treatment destroying the tissues, and larger resections being made to perform maximal surgery. The incidence of urinary system complications in benign gynecological surgeries is reported as 0.3%-1.8% [1]. While most of the studies published in the literature describe the results of benign gynecological operations, very few of them belong to gynecological oncology cases [2]. Bladder and ureter injury rates in gynecological oncological cases range from 1.1% in simple hysterectomies performed for uterine cancers to 5.3% in radical hysterectomies [3]. Although it is difficult to determine the exact incidence because symptomatic cases are generally published, developing technology and increased surgical experience have led to a decrease in urological complications. In this study, we identified iatrogenically developing urological complications in gynecological oncological surgeries in our clinic and evaluated them in light of the literature.

Materials and Methods

In our study, patients who were operated on in our gynecological oncology clinic between December 2022 and April 2024 were retrospectively scanned. One hundred thirty-five oncology surgeries performed by the same gynecological oncologic surgeon between these dates were examined. One hundred ten surgeries were performed by laparotomy and the twenty five surgeries were performed by laparoscopy. No urological complications were seen in the laparoscopy group and all the urological complications were seen in laparotomy group. Ten urological complications that developed in 9 patients were examined. The patients' demographic data and disease findings were evaluated by scanning the files, archive records, and hospital operating system (HBYS). Intraoperative consultation was requested from the urology clinic in the management of complications. The age, previous surgeries, tumor type, surgery performed, and pathology reports of all patients were examined. Urological complications and their occurrence were analyzed **(Table 1).** The complications we encountered during surgeries

Table 1. Age, previous surgery, diagnosis, surgery type, urological complication and the way of occurence of the cases

	Age	Previous surgery	Diagnosis	Surgery	Urological complication	Way of occurence
Case 1	57	-	Adnexal mass (Clear cell CA)	Debulking (TAH BSO PPLND)	Bladder 3 cm full thickness incision	During bladder peritonectomy
Case 2	72	S/C Umblical herni	Adnexal mass (Endometrioid CA)	Debulking (TAH BSO PPLND) LAR Implant excison on liver	Ureter LigaSure injury	During LAR (left ureteral tumor invasion)
Case3	64	Gastric operation	Recurrent ovarian CA	Debulking total colectomy ileal resection	Bladder 2-4 cm. full thickness incision, Ureter LigaSure injury	During mass excision and bladder peritonectomy
Case 4	38	S/C	Endometrium CA	Debulking (TAH BSO PPLND)	Bladder serosal injury	Bladder is extended towards the fundus due to previous surgery
Case 5	60	Cholecystectomy Umblical herni	Endometrium CA	Debulking (TAH BSO PPLND)	Ureter ligation	During uterin artery ligation
Case 6	43	-	Cervix CA	Meigs operation	Ureter ligation	During vaginal cuff ligation
Case 7	51	-	Recurrent Cervix CA	Type1 hysterectomy	Bladder 2 cm full thickness incision	Due to adhesions related to radiotherapy
Case 8	61	S/C	Recurrent Cervix CA	Anterior exenteration	Shortening of the ureters, Ileal conduit and ureterocutanostomy couldn't be performed	Right ureter totally excised due to tumor invasion. Left ureter remained very short after releasing from the tumor
Case 9	51	Strassmann TAH BSO	Vaginal agenesis Uterin anomaly	Cervical stumph excision	Bladder 2 cm full thickness incision	During mass excision (dens adhesions due to previous surgery of rectum, bladder and sigmoid colon)

CA: carcinoma; LAR: low anterior resection; S/C: sectio cesarean; TAH BSO: Total abdominal hysterectomy bilateral salpingooopherectomy; PPLND: pelvic paraaortic lymph node dissection

Table 2. Distribution of urinary injuries according to the types of surgery performed in our clinic

Type of surgery	Number of surgery	Ureter injury	Bladder injury	Total injury
Debulking	56	3 (5.3%)	4 (7.1%)	7 (12.5%)
Interval debulking	19	-	-	0
Meigs radical hysterectomy	3	1 (33.3%)	-	1 (33.3%)
Exenteration	1	1 (100%)	-	1 (100%)
Diagnostic L/T	1	-	-	0
TAH BSO	23	-	-	0
USO/cystectomy	6	-	-	0
Stumph excision	1	-	1 (100%)	1 (100%)
L/T total	110	5 (4.5%)	5 (4.5%)	10 (9%)
L/S USO/cystectomy	3	-	-	-
TLH + LND	22	-	-	-
L/S total	25	0	0	0
Total	135	5	5	10

L/T: laparotomy; TAH BSO: total abdominal hysterectomy bilateral salpingooopherectomy; USO: unilateral salpingooopherectomy; L/S: laparoscopy; TLH: total laparoscopic hysterectomy; LND: lymph node dissection

were compared with general literature information, and similar and different features were evaluated. Ethical approval for the study was received from our hospital's Clinical Research Ethics Committee with decision number KAEK/27.12.2023-578.

Results

A total of 135 oncological surgeries were performed by the same surgeon in the 16 months between December 2022 and April 2024. Urological complications developed in a total of 9 (6.6%) patients, all of which were seen in laparotomy surgeries (9/110 = 8.1%). Of these 9 patients, 3 (5%) were among the 60 patients operated on due to adnexal mass/ovarian cancer, 2 (7.4%) were among the 27 patients operated on due to endometrial cancer, and 3 (42%) were among the 7 patients operated on due to cervical cancer, and one patient operated on due to a cervical mass.

A total of 10 urological complications were detected in 9 of 110 patients operated on via laparotomy. Bladder damage occurred in 5 (4.5%) of these operations, and ureter damage occurred in 5 cases (4.5%). While there is usually single-organ damage, in one case, both bladder and ureter damage occurred simultaneously. No urological complications were observed in 25 cases who underwent laparoscopic USO and hysterectomy due to endometrial hyperplasia, adnexal mass, and endometrial cancer. The distribution of cases with urological complications according to the type of surgery performed is shown in **(Table 2).**

While 1 of the bladder injuries developed only in the serosal layer, full-thickness damage occurred in the other 4 cases, including the serosal, muscular, and mucosal layers. While 4 of them were diagnosed intraoperatively, 1 could be diagnosed on the 5th postoperative day. The serosal damage occurred during the blunt dissection of the 11-cm mass sitting on the bladder due to adhesions from previous cesarean sections. It was sutured superficially with a 3/0 polyglactin suture. The first of the full-thickness injuries occurred during bladder peritonectomy after the resection of the tumor sitting on the bladder, and the other occurred during adhesiolysis in the stump excision of the patient who had previously undergone Strassman and hysterectomy surgery.

The patient diagnosed postoperatively was a patient with recurrent cervical cancer who had previously received chemoradiotherapy and undergone type 1 hysterectomy. Because of the left ureteral hydronefrosis CT scan was performed. We performed cytoscopy because of the urinary extravasation seen in tomography. A 2-cm defect in the posterior trigone was observed during cystoscopy in the bladder, which was thought to have been damaged during the excision of the abscess and tumoral tissue between the bladder and the uterus. Although the bladder and ureter were checked intraoperatively by the urology clinic, the diagnosis could only be made postoperatively. It was diagnosed by cystoscopy after extravasation developed on the 3rd day. This patient, who later developed renal failure, died due to septic shock on the 70th day. The last patient with bladder damage also developed ureter damage. During the excision of the 4-cm recurrent mass in the cuff, 2 separate incisions of 2 and 4 cm were made. During colectomy, the right mid-ureter damage caused by LigaSure was repaired primarily with 4/0 Vicryl. All full-thickness bladder defects were sutured in 2 layers with 2/0 and 3/0 polyglactin sutures.

Of the 5 patients with ureteral damage, 2 underwent primary ureter repair (ureteroureterostomy), 2 underwent ureteroneocystostomy (UNC), and 1 underwent permanent bilateral nephrostomy. While 4 of them were diagnosed intraoperatively, 1 was diagnosed with CT urography after hydronephrosis developed on the 6th postoperative day. The other primary ureter repair was performed during the surgery for the ovary, which was completely attached to the rectum and uterus during the colectomy. During low anterior resection, a full-thickness incision was made in the ureter at the point where it crosses the left iliac artery. In the mid-ureter damage caused by LigaSure during both colectomies, the damaged ureter ends were excised and anastomosed with polyglactin sutures under the guidance of a double J guide, and ureteroureterostomy was performed.

Ureteroneocystostomy was performed in both patients who underwent ligation of the right distal ureter. In the first patient, in whom polar artery variation was observed in the right kidney, the ureter, which was ligated during uterine artery ligation, was understood to have dilated during retroperitoneal lymph dissection. In the other patient who underwent UNC, the diagnosis was made on the 6th day. The diagnosis was made by CT urography due to the discharge of clear fluid (700-1000 cc per day from drain), hydronephrosis in the kidney, and an increase in the creatinine value in the drain. It was understood that the ureter was ligated while closing the vaginal cuff during radical hysterectomy. In the postoperative follow-up of the patientkidney loss developed, with the right kidney function decreasing to 7% in the 8th month although she had undergone nephrostomy.

The last patient is a patient with recurrent cervical cancer who underwent anterior exenteration for central recurrence. In this patient, the right ureter was completely excised due to tumor invasion, and the remaining ureter tissue after the tumor tissue was excised on the left, again due to tumor invasion. It was not long enough for ureterocutanostomy, so the patient underwent bilateral permanent nephrostomy.

The location of damage, type of damage, time of diagnosis, and treatment according to the complication that occurred are shown in **(Table 3).**

The average length of hospitalization was found to be 11 days (4-29). Patients who underwent ureteral repair were followed for at least 1 month with a double J stent catheter. The average follow-up period was 11 months (3-19). One of the patients died in the 2nd month after surgery due to complications related to cervical cancer. The patient with cervical cancer who underwent UNC developed renal failure in the 8th month after the surgery, while no complications related to the urological operation were observed in the other patients. The patients' hospitalization periods, postoperative follow-up, and prognoses are shown in **(Table 4).**

Discussion

Gynecological malignancy surgeries involving the pelvic, abdominal, and retroperitoneal regions are operations that may be complicated by iatrogenic urological injuries. In cancer surgeries, urological complications are the second most common type after bowel injuries [4]. Reasons such as anatomical proximity, the tumor distorting the anatomy or invading the tissue itself, the need for a larger resection to remove the entire tumor, and tissue adhesion due to radiotherapy may cause iatrogenic injury anywhere in the urinary tract extending from the kidney to the urethra. The type of gynecological tumor most frequently associated with urological damage was cervical cancer (42.8%) and ovarian cancer the least (5%), as in the literature. Costantini et al. experienced urological damage at a rate of 12.9%-48.5% in cervical cancer and 1.7%-25.4% in ovarian cancer, with a higher incidence of recurrences [5].

The most frequently damaged organ in iatrogenic urinary system injuries is the bladder [6]. The incidence is 0.2-1.8% in female pelvic surgery, 2.3% in radical hysterectomy, and 4.5% in cytoreductive surgery. Likewise, it is 4.5% in oncological laparoscopic and robotic surgeries [1]. In our cases, no urinary injury was observed in those surgeries performed by laparoscopy. In those performed by laparotomy, bladder and ureter injuries were seen at equal rates (4.5%). One of the patients had both bladder and ureter injuries in the same surgery.

The way the damage occurs, to which layer of the bladder it extends, its location, and most importantly the time of diagnosis completely affect the treatment.

Unlike ureteral injuries, iatrogenic bladder injuries are frequently diagnosed intraoperatively (80% of cases). Bladder injuries can be diagnosed by directly observing the incision, urine extravasation, the visibility of the catheter, or demonstration of leakage with saline/methylene blue [7]. In the postoperative period, diagnosis is made by imaging. In our cases, all but one bladder injury was diagnosed and treated intraoperatively. The bladder injury we noticed in the postoperative period was our most serious case in this group, a patient with recurrent cervical cancer. A defect in the posterior trigone was observed in the cystoscopy performed after postoperative renal pelvicaliectasis. Bladder repair was performed by relaparotomy, but healing of the edematous, fibrotic, and malnourished tissue led the patient to acute renal failure. Although the major factor in the poor prognosis of the patient, who died from septic shock after 2 months, is considered to be adhesions and tissue nutrition deterioration due to previously applied radiotherapy, the

Table 3. Type and location of the damage, time of diagnosis and treatment

	Location	Type of damage	Time of diagnosis	Treatment
Bladder	Bladder dome, full thickness 3 cm.	Sharp dissection	Intraoperative	Double layer primary suture
Bladder	Bladder dome, full thickness 2 and 4 cm.	Sharp dissection	Intraoperatifve	Double layer primary suture
Bladder	Bladder dome serosa	Blunt dissection	Intraoperative	Single layer primary suture
Bladder	Bladder trigon posterior 2 cm.	Dissection	Postoperative 3rd day	Double layer primary suture
Bladder	Bladder dome full thickness 2 cm.	Sharp dissection	Intraoperative	Double layer primary suture
Ureter	Left mid ureter	LigaSure injury	Intraoperative	Ureteroureterostomy
Ureter	Right mid ureter	LigaSure injury	Intraoperative	Ureteroureterostomy
Ureter	Right distal ureter	Ligation	Intraoperatif	UNC
Ureter	Right distal ureter	Ligation	Postoperative 6th day	UNC
Ureter	Bilateral ureters are short	Dissection	Intraoperative	Bilateral permanent nephrostomy

UNC: ureteroneocystostomy

Table 4. Hospitalization and follow-up process of urological complications according to surgical indications

Indication	Surgery	Urinary injury	Treatment	Hospitalisation	DJ stent time	Follow up time	Follow up result
Ovarian CA	Debulking	Bladder	Double layer primary suture	4 days	-	8 months	No complication
Ovarian CA	Debulking	Ureter	Ureteroureterostomy	8 days	6 weeks	3 months	No complication
Recurrent ovarian CA	Debulking	Ureter Bladder	Ureteroureterostomy Double layer primary suture	13 days	6 weeks	14 months	No complication
Endometrium CA	Debulking	Bladder	Single layer primary suture	5 days	-	10 months	No complication
Endometrium CA	Debulking	Ureter	UNC	7 days	4 weeks	15 months	No complication
Cervix CA	Meigs radical hysterectomy	Ureter	UNC	14 days	12 weeks	19 months	Right kidney postoperative 8th month 7% functional
Recurrent Cervix CA	Anterior pelvic exenteration	Ureter	Bilateral permanent nephostomy	13 days	-	11 months	Recurrency
Recurrent Cervix CA	Debulking (type 1 hysterectomy, recurrent mass excision)	Bladder	Double layer primary suture	29 days	-	2 months	Postoperative 70th day ex
Vaginal agenesis	Stumph excision	Bladder	Double layer primary suture	6 days	-	14 months	No complication

BOT: borderline ovarian tumor; TAH BSO: total abdominal hysterectomy bilateral salpingooopherectomy; LAR: low anterior resection; CA: carcinoma; DJ: double J stent

localization of the damage also appears as a negative factor in tissue healing.

In trigonal or infratrigonal injuries, the involvement of the ureter and urethra makes repair difficult [8]. In this case, the healing of the damage close to the trigone was delayed due to the effect of the patient's additional complications. Bladder injuries in other cases were close to the bladder dome and were treated at the time of surgery.

It is also important whether the damage is limited to the serosa, extends to the full thickness, or was caused by energy. Although it is more common in ureter damage than in the bladder due to energy use, the use of cautery in areas close to the bladder wall may cause fistula formation as a late complication [6]. Primary sutures can be applied in serosal injuries, and small lesions can also be treated conservatively with a Foley catheter. However, in cases of full-thickness damage, surgical intervention is necessary. No thermal damage to the bladder was observed in our cases. Generally, damage occurred during blunt and sharp dissection. While serosa damage was repaired with simple sutures, cases with full-thickness damage were sutured separately in 2 layers with polyglactin sutures in cooperation with the urology clinic. The mucosa and detrusor muscle were repaired with 3/0, and the serosa was repaired with 2/0 Vicryl. Bladder catheterization was performed after 1 week of cystogram control.

Conditions in which the normal anatomy is disrupted, such as previous abdominal surgery, radiotherapy, endometriosis, and large tumoral mass, are risk factors for ureteral damage [7]. Ureteral dilatation detected intraoperatively may be an indication that the ureter is ligated. In the postoperative period, pain, nausea/vomiting, and ileus may be the result of ureteral damage. Ureteral damage develops in 5% of cases undergoing oncological surgery [9]. The widespread use of laparoscopic interventions in gynecology has caused the emphasis on iatrogenic ureteric injuries to shift from urology to gynecology. While 64% of ureteral injuries are seen in laparoscopic gynecological cases, 11% are seen in urological cases, and the rest are seen in other open surgical procedures [10]. The risk is higher especially in laparoscopic radical hysterectomies. Hwang et al. found that the odds ratio of urological complication risk is 1.97 [11]. In our experience, no ureteral damage was observed in laparoscopic cases. The surgeon's experience in this regard is the most important factor. Ureter damage occurred in 4.5% of the patients who underwent laparotomy. Three of these cases were seen in debulking surgeries with widespread tumor burden, and 2 were seen in surgeries of patients with cervical cancer, which has a very close relationship with the ureter.

While most bladder injuries are intraoperative, only one-third of ureter injuries are recognized intraoperatively [12]. These injuries occur during dissection adjacent to the uterine artery, at the level of the uterovesical junction or infundibulopelvic ligament, and sometimes within or adjacent to the tumor tissue [8,13]. However, the most common injury is seen in the lower third. Especially, 63% of the ureteric injuries are seen in the distal 5 cm of the ureter [14]. While ureteroureterostomy is performed through end-to-end anastomosis in upper and middle

ureter injuries, UNC is performed in distal-end injuries. In our cases, ureteroureterostomy was performed in 2 cases with mid-ureteral damage, and UNC was performed in 2 cases with distal ureteral damage. In the last ureteric injury, since both ureters were quite short, we couldn't perform an ileal pouch, which is the safest procedure of pelvic exenteration. Such a continent urinary diversion improves quality of life if the ureteric length is sufficient [15]. While one patient who underwent UNC was diagnosed on the 6th postoperative day, the others were diagnosed intraoperatively and operated on.

There are more urological complications in radical hysterectomies than in other surgeries. The Meigs operation was performed in a late-diagnosed UNC patient with cervical cancer, and relaparotomy was performed on the 6th postoperative day. It was observed that the ureter was ligated at the bladder level during cuff suturing. If the diagnosis is made within 1-2 weeks postoperatively, it can be operated again [11]. In cases diagnosed after 1 week, if the injury is incomplete, it is more appropriate to postpone the operation for 6-8 weeks to ensure stent application or tissue healing [10].

The way the damage occurs and the degree of damage (whether it is complete or partial) are also important in the treatment [6]. Since there may be more damage than is visible in energy-related damage, how much damaged tissue should be excised is important. While surgical intervention is required for full-thickness damage, the patient can be followed with a stent for partial damage. In our patients, the damage to the mid-ureter was a full-thickness incision with ligation, and the damage to the distal ureter was a partial injury caused by suture ligation. We think that injuries caused by ligation are mostly due to rapid intervention during bleeding from the bone.

Since ureteral injuries progress more silently, symptoms may occur later. While treatment success is better in bladder injuries, post-treatment follow-up is important in ureter injuries. Regular follow-up is essential to ensure the continuity of the passage and to prevent late complications that may occur. However, we currently lack sufficient data regarding postoperative follow-up after ureteral injury repair [9]. While no problems were observed in the follow-up of the patients in whom we performed ureteroureterostomy, loss of kidney function developed in the cervical cancer patient in whom we performed UNC in the 8th postoperative month.

While this type of surgical approach may be effective in bladder and ureter injuries, the major risk factors are the presence of an oncological case and the surgeon's experience. Previous surgeries, radiotherapy, and distortion of anatomy also increase the risk of complications. The most important factor for ureteric damage, which has recently tended to increase in laparoscopic surgeries, is surgical experience. To reduce the risk of complications during the learning phase, it may be beneficial to undertake endoscopic surgery with an experienced team, especially in oncological cases. It is very important to detect complications early because, while injuries detected intraoperatively have the chance to be treated in the same surgery, morbidity and permanent damage may be greater in cases detected late. Careful intraoperative exploration and dissection, ectasias in the kidneys in the postoperative period, the quality and amount of drain fluid, deterioration of renal functions, chemical peritonitis, or ileus should be warnings for us.

Conclusion

Gynecological oncological surgeries and urological complications are closely related. Every surgeon dealing with gynecological oncology must be familiar with urological anatomy and master the management of complications. Preoperative multidisciplinary evaluation should be carried out thoroughly, and even the tumor-ureter relationship should be determined by radiology. If major surgery is to be performed, ureterolysis should be performed by monitoring the ureteral traces. Since it is not possible to completely eliminate complications, it is important to diagnose them early and manage them appropriately. Since there is no direct symptom that indicates urinary damage at an early stage, diagnosis is made when a complication is suspected. Careful dissection and vigilance can reduce urological complications in oncological cases.

Ethics Committee Approval: Ethical approval for this study was obtained from Basaksehir Cam and Sakura City Hospital Clinical Research Ethics Committee (Ethics committee approval number: KAEK/27.12.2023-578).
Informed Consent: An informed consent was obtained from all the patients.
Publication: The results of the study were not published in full or in part in form of abstracts.
Peer-review: Externally peer-reviewed.
Authorship Contributions: Any contribution was not made by any individual not listed as an author. Concept – T.Ç., G. Ş., S.Ş., N.Ç.; Design – T.Ç., G. Ş., S.Ş., N.Ç.; Supervision – T.Ç., G. Ş., S.Ş., N.Ç.; Resources – T.Ç., G. Ş., S.Ş.; Materials – T.Ç., G. Ş., S.Ş.; Data Collection and/or Processing – T.Ç., G. Ş., S.Ş.; Analysis and/or Interpretation – T.Ç., G. Ş., S.Ş., N.Ç.; Literature Search – T.Ç., A.Y.; Writing Manuscript – T.Ç., A.Y.; Critical Review – T.Ç., N.Ç.
Conflict of Interest: The authors declare that they have no conflicts of interest.
Financial Disclosure: The authors declare that this study received no financial support.

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