

# Can Extraperitonealization of Ileal Conduit Protect from Postoperative Bowel Complications in Patients Who Have Undergone Radical Cystectomy with the Diagnosis of Bladder Cancer?

## Mesane Kanseri Tanısıyla Radikal Sistektomi Uygulanan Hastalarda İleal Konduitin Ekstraperitonealizasyonu Postoperatif Bağırsak Komplikasyonlarından Koruyabilir mi?

Burhan Baylan , Berkay Eren 

Department of Urology, Afyonkarahisar Health Sciences University, Afyonkarahisar, Türkiye

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**Corresponding Author:** Burhan Baylan / Afyonkarahisar Health Sciences University, Department of Urology, Afyonkarahisar, Türkiye / baylanburhan@gmail.com  
ORCID ID: 0000-0002-5509-7140

### Abstract

**Objective:** Radical cystoprostatectomy is the most important treatment option in local control and standard surgical treatment in muscle-invasive bladder cancer, and also has serious complications that occur during the postoperative period. We have aimed to evaluate postoperative bowel complications with peritoneal closure-assisted ileal conduit extraperitonealization technique.

**Materials and Methods:** The data of 98 patients who underwent radical cystectomy and ileal conduit urinary diversion with the diagnosis of non-metastatic bladder cancer between 2015 and 2023 were retrospectively screened. The groups of patients who underwent extra-peritonealization of the ileal conduit with radical cystectomy and traditional radical cystectomy were evaluated comparatively in terms of perioperative outcomes and postoperative complications.

**Results:** Forty-five patients who underwent cystectomy with ileal conduit extraperitonealization technique and 53 patients who underwent ileal loop diversion with traditional cystectomy were evaluated comparatively. There was no statistically significant difference between the two groups in terms of demographic characteristics and duration of surgery. In the group that underwent cystectomy with extraperitonealization of the ileal conduit technique, the return of the normal gas pattern and the dwell time of the nasocacymic tube were statistically significantly shorter than the group that did not ( $p=0.017$ ,  $p=0.023$ ). The average length of hospital stay was 7.2 days in the extra-peritonealization group and 14.1 days in the group that did not undergo extraperitonealization, and this period was significantly shorter in the extraperitonealized group ( $p=0.013$ ). There were no complications requiring reoperation in the extraperitonealized group.

**Conclusion:** In radical cystectomy and ileal loop cutaneous urinary diversion, extraperitonealizing the ileal segment reduces postoperative intestinal complications.

**Keywords:** bladder cancer, cystectomy, ileal loop, extraperitonealization

### Özet

**Amaç:** Radikal sistektomi ve üriner diversiyon kas invaziv mesane kanseri için standart tedavi ve aynı zamanda ciddi komplikasyon potansiyeli olan majör cerrahidir. Peritoneal kapama yardımcı ileal loop ekstraperitonealizasyon tekniği ile yapılan cerrahi sonrası barsak komplikasyonlarının değerlendirilmesi amaçlanmıştır.

**Gereçler ve Yöntemler:** 2015-2023 yılları arasında metastatik olmayan mesane kanseri tanısı ile radikal sistektomi ve ileal loop üriner diversiyon operasyonu yapılan 98 hastanın demografik ve perioperatif verileri retrospektif olarak incelendi. Radikal sistektomi ile eş seanslı İleal loop ekstraperitonealizasyon yapılan ve geleneksel radikal sistektomi yapılan hasta grupları, perioperatif sonuçlar ve komplikasyonlar açısından karşılaştırmalı değerlendirildi.

**Bulgular:** İleal loop ekstraperitonealizasyon tekniği ile sistektomi yapılan toplam 45 hasta ve geleneksel sistektomi yapılan 53 hasta karşılaştırıldı. Demografik özellikler ve ameliyat süreleri açısından, iki grup arasında istatistiksel anlamlı farklılık görülmedi. İleal loop ekstraperitonealizasyon tekniği ile sistektomi uygulanan grupta, normal gaz paterninin geri dönüşü ve nazogastrik tüpün kalış süresi geleneksel sistektomi yapılan gruba göre istatistiksel anlamlı kısaydı ( $p=0.017$ ,  $p=0.023$ ). Ekstraperitonealizasyon yapılan grubun ortalama hastanede yatış süresi 7,2 gün, yapılmayan grupta ise 14,1 gün olarak saptandı ve ekstraperitonealizasyon yapılan grupta bu süre istatistiksel anlamlı kısaydı ( $p=0,013$ ). Ekstraperitonealizasyon yapılan grupta tekrar operasyon gerektirecek bir komplikasyon görülmedi.

**Sonuç:** Radikal sistektomi ve ileal loop kutanöz diversiyonda, ileal segmentin ekstraperitonealize edilmesi, postoperatif barsakla ilgili komplikasyonları azaltmaya yardımcı olur.

**Anahtar kelimeler:** mesane kanseri, sistektomi, ileal loop, ekstraperitonealizasyon

ORCID ID: B. Eren 0000-0002-1585-2578

## Introduction

Radical cystoprostatectomy is the most important treatment option in local control and standard surgical treatment of muscle-invasive bladder cancer [1]. In addition, radical cystoprostatectomy and urinary diversion have serious complications that occur during the postoperative period [2-4]. Intestinal complications including bowel obstruction is associated with serious mortality rates, and requires reoperation. Intestinal obstruction that may require reoperation can be seen during the early or late postoperative period [1,3].

Ten percent of the patients with urinary diversion performed using the ileal loop or gastric segment suffer from postoperative bowel obstruction that requires reoperation [5]. Mechanical ileus requiring reexploration has been reported at an incidence rate of 10.5 percent [6]. Studies have been conducted to improve early return of bowel functions with resultant decrease in bowel-related complications [7]. In a Cochrane review, the effect of prokinetic agents on intestinal complications was investigated. According to the results of the study, some drugs shortened bowel passage time by accelerating intestinal motility and also reduced the length of hospital stay [8]. Reyblat et al. investigated patients who developed neurogenic bladder after spinal cord injury and therefore underwent extraperitoneal augmentation enterocystoplasty. Compared to intraperitoneal surgery, bowel-related complications had been less frequently seen in the patient group in which extraperitoneal technique was applied [9].

Herein, we aimed to comparatively evaluate bowel complications after radical cystectomy performed using traditional cystectomy vs peritoneal closure-assisted ileal conduit extraperitonealization technique.

## Materials and Methods

Afyonkarahisar University of Health Sciences Clinical Research Ethics Committee has approved the conduction of this study with registration # 2023/153. The data of 98 patients who underwent radical cystoprostatectomy and ileal loop

urinary diversion surgery with the diagnosis of non-metastatic muscle-invasive bladder cancer between 2015 and 2023 were retrospectively analyzed. Patients were allocated to ileal conduit extraperitonealization (n=45) and traditional cystectomy and ileal loop diversion (n=53) groups. Groups were compared in terms of age, tumor characteristics, American Society of Anesthesiologists (ASA) score, body mass index (BMI). Patients with a history of abdominal surgery, radiotherapy with the indication of pelvic organ cancer, and inflammatory bowel disease were excluded from the study.

In our study, the duration of surgery, the amount of blood loss, blood transfusion rates and postoperative complications were evaluated. Postoperative surgical complications and adverse events of both groups were defined using the Clavien-Dindo complication classification.

### Surgical Technique

The peritoneal layer was incised up to the level of the common iliac artery before the dissection of lymph nodes. After the distal cutaneous and proximal ureteral anastomoses of the ileal loop segment were performed, the peritoneal layer was closed over and sutured to the ileal segment to achieve extraperitonealization.

### Statistical Analysis

Data analysis was performed using IBM SPSS Statistics ver. 25 (IBM Corporation, Armonk, NY, US) software package. The normality of the distribution of continuous variables and the assumption of homogeneity of variances were examined using the Shapiro-Wilk test and Levene's test, respectively. Descriptive statistics were presented as mean ± standard deviation or median (minimum-maximum) for continuous variables, and as the number of cases and percent values for categorical variables. Following goodness-of-fit tests, the statistical significance of intergroup differences in terms of continuous variables that did and did not comply with parametric test assumptions were evaluated by chi-square and Student's t-test vs Mann-Whitney U test, respectively.

**Table 1.** Demographic features

Characteristics	Ileal loop extraperitonealized group	Group without extraperitonealization	P value
N	45	53	
Age (Mean)	64,6±5,9	65,4±4,1	0,760
Gender			
Female (%)	9 (20%)	11 (20,7%)	
Male (%)	36 (80%)	42 (79,3%)	
BMI (kg/m <sup>2</sup> )	24,6±3,6	25,2±2,8	0,166
Average ASA score	2,3	2,6	0,276
Preoperative pathological tumor stage			
T1	12	15	
T2	33	38	

**Table 2.** Perioperative outcomes

Variables	Ileal loop extraperitonealized group (n=45)	Group without extraperitonealization (n=53)	P value
Operation duration	216 ±25,2	223±18,9	0,183
Calculated blood loss	290±146,7	314±123,9	0,426
Complication	4	16	
Clavien-Dindo Classification			
1	3 (surgical site infection)	4 (surgical site infection)	
2	1 (paralytic ileus)	7 (ileus)	
3		5 (mechanical obstruction and reoperation)	
Bowel-related complications			
Time to normal diet (days)	4,2±0,9	8,7±2,1	<b>0,010</b>
Nasogastric tube removal (days)	1,3±0,7	5,2±1,6	<b>0,023</b>
Time to normal stool discharge (days)	2,6±1	6,5±2,5	<b>0,017</b>
Length of hospital stay (days)	7,2±1,5	14,1±2,3	<b>0,013</b>

## Results

Patients who had undergone ileal conduit extraperitonealization technique (n:45) or traditional cystectomy and ileal loop diversion (n:53) were compared. Detailed demographic data of both groups are available in **Table 1**. Age, gender, BMI, ASA score or tumor characteristics were statistically comparable between both groups.

Both cohorts were statistically similar in terms of operation times. (216 minutes for extraperitonealization vs. 223 minutes for non-extraperitonealization group) (**Table 2**). Estimated blood loss and transfusion rates were similar between both cohorts. Postoperative bowel-related complications were observed in 7 patients in the traditional cystectomy group, and 5 patients in the group that underwent reoperation due to mechanical ileus. Extraperitonealization was associated with paralytic ileus in only one patient, and no complications requiring reoperation were observed. In the ileal conduit extraperitonealization group, the transition to normal diet was earlier than in the traditional cystectomy group. Along with gas and fecal discharge, the time to normal bowel motility was also shorter in the non-extraperitonealization group (2.6 vs. 6.5 days,  $p=0.017$ ). No delay in transition to oral diet or abdominal pain was observed in the group of patients who underwent extraperitonealization. The dwell time of nasogastric tube was significantly shorter in the extraperitonealization group ( $p=0.023$ ), and the average length of hospital stay for the extraperitonealized group was 7.2 days, significantly shorter than the non-extraperitonealization group.

## Discussion

Radical cystoprostatectomy has serious postoperative morbidity rates ranging between 20 and 64% [10-13]. Prolonged ileus and mechanical ileus, which are among the problematic postoperative and treatment resistant bowel complications seen in 20-30% of patients, [14,15]. Studies have been carried out by general surgeons to reduce the morbidity rates that develop as a result of intestinal complications.

In the metanalysis of postoperative ileus, Noble et al., demonstrated that gum chewing had reduced the duration of postoperative ileus [7]. Traut et al. found that prokinetic agents reduced rates of prolonged ileus and thus the length of hospital stay [8].

An extraperitoneal technique was described by Reyblat et al., to reduce bowel-related complications during augmentation enterocytostomy and this technique has been shown to facilitate early postoperative recovery [9]. The results of this study suggested that postoperative intestinal obstruction rates could be reduced by restructuring the pelvic floor. After removal of the bladder during radical cystectomy, a cavity is formed in the pelvis. The sigmoid colon and omentum cannot adequately fill this gap. In the empty space formed in the pelvis, the small intestine segments are compressed and cause obstruction. Preservation of the peritoneal structure can prevent the segments of the small intestine from being pinched in this area, reducing the likelihood of mechanical ileus requiring re-exploratory abdominal surgery.

Mandhani et al. reported shorter hospital stays, earlier recovery, and fewer bowel-related complications in a series of radical cystectomies performed using the technique involving

extraperitonealization of the orthotopic neobladder [16].

Dong So Park et al. described a technique in which the neobladder is extraperitonealized during radical cystectomy and orthotopic diversion. They also found that bowel-related complications were reduced using this peritoneal membrane preservation technique. They suggested that this technique is a feasible approach in selected patients and significantly reduces bowel-related complications [17].

Unlike the studies in the literature, our study investigated the effect of extraperitonealization of the ileal conduit on complication rates in patients undergoing cystoprostatectomy and ileal conduit urinary diversion. When the results of our study were examined, it was determined that the improvement in early bowel function was faster in radical cystectomies performed by extraperitonealizing the ileal loop segment compared to patients who did not undergo extraperitonealization. Refraining from the complication of mechanical ileus in the group of patients with extraperitonealized ileal loop conveys critical importance in terms of avoiding the indication of reoperation due to mechanical bowel obstruction.

## Conclusion

Although radical cystectomy and urinary diversion are the most important treatment options in non-metastatic muscle-invasive bladder cancer, it carries the potential risk for serious postoperative bowel complications. Postoperative bowel complications are reduced in patients in whom the ileal segment is extraperitonealized simultaneously with radical cystectomy and ileal loop cutaneous urinary diversion.

**Ethics Committee Approval:** The study protocol was reviewed and approved by the Afyonkarahisar University of Health Sciences Clinical Research Ethics Committee (ethics committee approval date and number: 03.03.2023/153).

**Informed Consent:** An informed consent was obtained from all the patients.

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