



Urinary Reconstructions in Patients with Locally Advanced Rectosigmoid Cancers, a Single Center Experience

Ogün Erşen^{1*}, Ümit Mercan¹ and Salim Demirci¹

¹Department of General Surgery, Faculty of Medicine, Surgical Oncology, Ankara University, Ankara, Turkey.

Authors' contributions

This work was carried out in collaboration among all authors. Author OE designed the study, wrote the first draft of the manuscript. Author ÜM performed the statistical analysis, wrote the protocol. Author SD managed the analyses of the study and literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JCTI/2020/V10i330130

Editor(s):

(1) Sri Lakshmi Hyndavi Yeruva, Hershey Medical Center, USA.

Reviewers:

(1) Terence Jackson, Cleveland Clinic Akron General, USA.

(2) K. Hemanth Gowda, Karnataka Veterinary, Animal and Fisheries Sciences University, India.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/61344>

Original Research Article

Received 12 July 2020
Accepted 18 September 2020
Published 10 October 2020

ABSTRACT

Urinary system resections due to rectosigmoid cancers are an issue where the number of experienced surgeons is low because they are not performed frequently. The selection and application of the type of reconstruction after resection are technical procedures that should be performed by experienced cancer surgeons and urologists.

Aims: It was aimed to present the urine reconstruction methods and results applied in local advanced rectal and sigmoid colon cancer surgeries performed by the same team for many years.

Study Design: Patients who were operated for rectosigmoid region tumor and had urinary resection-reconstruction between 2016-2020 were reviewed. The demographic data of the patients, clinicopathological notes, reconstruction types, postoperative urinary leakage and fistula rates were examined and noted.

Methodology: Retrospective patient document analysis using electronic hospital file system and clinical notes.

Results: 37 patients were included in the study within the criteria. 17 (46%) of the patients were male and 20 (54%) were female. The mean age of the patients was 58.6 ± 16 years. The most

*Corresponding author: Email: ogunersen@hotmail.com;

common reconstruction procedures were Ureteroneocystostomy and bladder reconstruction. The least used method was ureteroureterostomy uteretostomy. It was observed that urine leakage / fistula developed in 11 (29.7%) of 37 patients included in the study.

Conclusion: Although the rate of urological complications is also affected by the chosen technique, it may also be affected by factors such as the presence of preoperative hydronephrosis, multiorgan resections, and age.

Keywords: Urinary system resections; rectosigmoid cancers; cancer surgeons and urologists.

1. INTRODUCTION

Locally advanced colorectal tumors are most commonly invade the bladder, but may invade adjacent organs such as the uterus, vagina, ovaries, and small intestines. This situation necessitates multiorgan resection. It has been reported that curative multivisceral resection is not a risk factor for poor long-term outcomes in rectal cancers at T4 stage [1,2]. Large ureter and bladder resections may be required during curative resections of diseases such as rectal cancers, gynecological malignancies, intraperitoneal soft tissue sarcomas and peritoneal metastases of abdominal cancers. Due to the fact that such situations are rarely encountered, technical problems may occur due to lack of experience for surgeons. Ensuring urinary tract integrity after urinary system resections requires the teams to be prepared for such situations both in theory and practice. Especially long segment ureter resections can often be performed in cancer patients with peritoneal metastases, and patients with ovarian and rectal tumors are the most frequently required patients. This may cause deficiencies that are based on experience. In our study, we aimed to present the urinary reconstruction methods and their results applied in local advanced rectum and sigmoid colon cancer surgeries performed by the same team for many years.

2. PATIENTS AND METHODS

2.1 Patient Selection and Data Collection

All T4 rectal and sigmoid colon cancer patients who had undergone urinary tract resection between January 2016 and January 2020 in the Surgical Oncology Clinic of Ankara University Faculty of Medicine were included in the study. Patients who were treated with hyperthermic chemotherapy, who were immunosuppressive before surgery, who were taken to emergency surgery, who were diagnosed with ileus, who developed iatrogenic urinary system damage

during surgery, and who developed postoperative non-urinary surgical complications were excluded from the study. Patient data were accessed by scanning the electronic files of the hospital and clinical patient follow-up notes, surgery notes, clinical epicrisis were examined. The postoperative length of stay, leakage rates and durations, urinary symptoms, and morbidity of each case were evaluated retrospectively. This was ignored because there was no clear evidence in the literature that pelvic radiation predisposes increased rate of complications for urological patients [3]. The reconstruction methods applied to the patients were categorized under the titles ureteroureterostomy (transureteroureterostomy or regular), Ureteroneocystostomy, boari flap, Ureterostomy, bladder reconstruction, urethral reconstruction (Figs. 1 and 2).

2.2 Statistical Analysis

All numerical data are given as mean \pm standard error or percentages. Histogram graphics and Kolmogrov-Smirnov test were used to determine the normal distribution of numerical data. For statistical analysis, patients were divided into two groups as urinary leakage positive and urinary leakage negative. In comparison of demographic, operational and postoperative findings between the groups, Student T-test or Man-Whitney U test were used for numerical variables and X2 test or Fisher Exact Test for categorical variables. P values of 0.05 and below were considered statistically significant. Statistical analysis of the study was carried out in IBM SPSS version 23.0 program.

3. RESULTS

37 patients meeting the criteria were included in the study. Demographic distribution of the patients are summarized in Table 1. 17 (46%) of the patients were male and the mean age was 58.26 ± 16.34 . Primary tumors of the patients were most frequently located in the midrectum

(45.9%), the most common operation performed was low anterior resection (48.6%).

The number of patients with hydronephrosis detected during preoperative imaging or surgery was 19 (51.3%). Bilateral hydronephrosis was present in 6 (16.2%) of these patients. Percutaneous nephrostomy was performed preoperatively in 12 (32.4%) patients, 4 (10.8%) of which were bilarectal.

The most common reconstruction procedures were bladder reconstruction and ureteroneocystostomy (37.8%; 32.4% respectively). The least used methods were ureteroureterostomy, ureterostomy and urethral reconstruction. It was observed that 11 (29.7%) patients who underwent urinary reconstruction had also performed multiorgan resection (ascending colon, small intestine, prostate, uterus, ovary, vagina).

It was observed that urine leakage / fistula developed in 11 (29.7%) of 37 patients included in the study. It was observed that in 5 of 11 patients, urine leakage was stopped without being discharged from the hospital, 4 patients were followed up with abdominal drains and recovered with conservative methods and 2 of them were reoperated due to urinary problems.

Comparison of demographic, operational and postoperative variables between the patients with and without postoperative urinary leakage are summarized in Table 2. When patients with and without urinary leakage were compared, no significant difference was found between the two groups in terms of gender, age, and presence of preoperative nephrostomy. In patients with preoperative hydronephrosis, rates of urinary leakage were significantly higher ($p = 0.024$). When evaluated according to reconstruction types, leakage rates were found to be

Table 1. Demographic distribution of the patients

Variables	Total (n=37)
Age	58.26±16.34
Gender (male/female)	17/20
Tumor Location	
Rectosigmoid	5(13.5)
Upper Rectum	10(27)
Midrectum	17(45.9)
Lower Rectum	5(13.5)
Primary Operation	
Low Anterior Resection	18(48.6)
Ultralow Anterior Resection	17(45.9)
Abdominopelvic Resection	2(5.4)
Preoperative Hydronephrosis	
None	18(48.6)
Unilateral	13(35.1)
Bilateral	6(16.2)
Preoperative Percutane Nephrostomy	
None	25(67.5)
Unilateral	8(21.6)
Bilateral	4(10.8)
Urinary Reconstruction	
Ureteroureterostomy	1(2.7)
Transureteroureterostomy	4(10.8)
Ureteroneocystostomy	12(32.4)
Boari flap	4(10.8)
Ureterostomy	1(2.7)
Bladder reconstruction	14(37.8)
Urethral reconstruction	1(2.7)
Multiorgan Resection	11(29.7)
Duration of followup(medium,day)	16.6±10.3

Numerical variables are given as mean±standart error and n(%)

Table 2. Comparison of demographic, operational and postoperative findings between the patients with and without postoperative urinary leakage

Variables	Leakage (+) (n=11)	Leakage(-) (n=26)	P value
Age	57.28±15.74	59.62±13.45	0.462
Gender (male/female)	4/7	10/16	0.728
Preoperative hydronephrosis	7(63.6)	8(30.7)	0.024*
Preoperative percutane nephrostomy	4(36.3)	8(30.7)	0.126
Urinary reconstruction			
Ureteroureterostomy	0	1	-
Transureteroureterostomy	3	1	0.038*
Ureteroneocystostomy	6	6	0.047*
Boari flap	1	3	0.837
Ureterostomy	0	1	-
Bladder reconstruction	1	13	0.001*
Uretral reconstruction	0	1	-
Multiorgan resection	8(72.7)	3(11.5)	0.014*
ICU stay (day)	3.12±2.24	3.17± 2.68	0.913
Hospital stay (day)	16.79±8.45	10.91±6.30	0.001*

Numerical variables are given as mean±standart error and n(%). ICU: Intensive Care Unit

**Fig. 1. Suturing the bladder after symphysis pubis and radical bladder excision**



Fig. 2. Connecting both ureters and bladder with transureteroureterostomy and boari flap

significantly higher in transureteroureterostomy and ureteroneocystostomy techniques ($p = 0.038$; $p = 0.047$). The rate of leakage was found to be significantly lower in patients who underwent bladder reconstruction ($p = 0.001$). While there was no difference between the groups in terms of length of stay in the intensive care unit, the duration of hospital stay was significantly longer in patients with urinary leakage ($p = 0.001$).

4. DISCUSSION

In a systematic review performed by Mohan et al about multivisceral resection in patients with advanced colorectal cancer, it was revealed that the bladder was the most frequently involved organ (53.2%) and 54.1% of the pathology specimen results showed tumor invasion [4]. Bu bilgiler Kobayashi ve diğerleri çalışmasını da doğrular [5]. In our study, the most preferred repair method was bladder repair and ureteroneocystostomy. One of the reasons for the high rate of ureteroneocystostomy is the high rate of bladder resections involving trigon in rectal cancer.

Currently, it is generally accepted knowledge that performing cystectomy or ureteral resection in

the same operation in rectosigmoid cancers does not have a negative effect on mortality and survival [6]. It has been shown that en bloc total cystectomy for advanced colorectal cancer is associated with longer operative time, more blood loss, higher rate of postoperative complications, and longer hospital stay compared to en bloc partial cystectomy [7]. When the patients in our study were evaluated according to their hospital stay, the results were in line with this information. It was thought that the high length of stay and the standard deviation value in patients with leakage was due to the patients with high output fistula being treated for a long time inpatient.

The complication rates of en bloc bladder resection reported in the literature in patients with colorectal cancer vary between 18-47% [8-13]. Urinary problems are quite high even in colorectal cancer operations without urinary resection (15-25% after low anterior resection and up to 50% after abdominoperineal resection) [14]. In another study, the rate of urological complications was reported to be 24% ($n = 30$) in the retrospective analysis of 126 patients who underwent ureter reconstruction during surgery for rectal cancer [15]. In this study, complications were stated as anastomotic leak ($n = 11$),

anastomotic stricture (n = 10), fistula (n = 5), conduit / stoma problem (n = 5), and other (n = 3), eight patients required surgical revision. In our study, the rate of leakage after urinary reconstruction was found to be 29.7%, which is higher than the results of this study. In the clinic where this study was conducted, routine creatinine is checked from the drain fluids in the postoperative period in patients with urinary system intervention. It was thought that getting high results as urine leakage caused this situation. The end of leakage until 5 of the 11 leakage patients in this study are discharged supports this thesis. When these patients who did not show any symptoms and who were diagnosed biochemically, were excluded, the rate of leakage in our series can be calculated as 16% (n = 6). In addition, it is observed that the urinary anastomosis healing is impaired and the possibility of fistula increases in patients who have undergone multiorgan resection. It can be said that the high rate of total complications in this study is related to the patients who underwent multi-organ resection.

5. CONCLUSION

Consequently, urological reconstruction may be required after extensive surgical resection of locally advanced or recurrent colorectal cancer. Urological reconstructions should be performed by an experienced cancer surgeon or urologist. Although the rate of urological complications is also affected by the chosen technique, it may also be affected by factors such as the presence of preoperative hydronephrosis, multiorgan resections, and age. There is a need for prospective randomized studies on large series of urological reconstructions after rectosigmoid region cancer.

CONSENT

Written informed consent was obtained from all the patients.

ETHICAL APPROVAL

This study is planned after the approval of Ankara University Medical Faculty Ethical Committee.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Lehnert T, Methner M, Pollok A, Schaible A, Hinz U, Herfarth C. Multivisceral resection for locally advanced primary colon and rectal cancer: an analysis of prognostic factors in 201 patients. *Ann Surg.* 2002;235:217–25.
2. Nakafusa Y, Tanaka T, Tanaka M, Kitajima Y, Sato S, Miyazaki K. Comparison of multivisceral resection and standard operation for locally advanced colorectal cancer: analysis of prognostic factors for short-term and longterm outcome. *Dis Colon Rectum.* 2004;47:2055–63.
3. Stotland PK, Moozar K, Cardella JA, Fleshner NE, Sharir S, Smith AJ, Swallow CJ. Urologic complications of composite resection following combined modality treatment of colorectal cancer. *Annals of surgical oncology,* 2009;16(10):2759-2764.
4. Mohan HM, Evans MD, Larkin JO, Beynon J, Winter DC. Multivisceral resection in colorectal cancer: A systematic review. *Ann Surg Oncol.* 2013;20:2929–36
5. Kobayashi T, Kamoto T, Sugino Y, Takeuchi H, Habuchi T, Ogawa O. High incidence of urinary bladder involvement in carcinoma of the sigmoid and rectum: a retrospective review of 580 patients with colorectal carcinoma. *J Surg Oncol.* 2003; 84:209–14.
6. Liu Z, Chen G, Zhu Y, Li D. Simultaneous radical cystectomy and colorectal cancer resection for synchronous muscle invasive bladder cancer and cT3 colorectal cancer: Our initial experience in five patients. *Journal of research in medical sciences: the official journal of Isfahan University of Medical Sciences.* 2014; 19(10):1012.
7. Kondo A, Sasaki T, Kitaguchi D, Tsukada Y, Nishizawa Y, Ito M. Resection of the urinary bladder for locally advanced colorectal cancer: A retrospective comparison of partial versus total cystectomy. *BMC surgery,* 2019;19(1):63.
8. Oledzki J, Chwalinski M, Rogowski W, Sopyło R, Nowacki MP. Total cystectomies in the surgical treatment of rectal cancer with prior chemoradiation: Analysis of postoperative morbidity and survival. *Int J Color Dis.* 2004;19:124–7.
9. Carne PW, Frye JN, Kennedy-Smith A, Keatling J, Merrie A, Dennett E, et al. Local invasion of the bladder with colorectal

- cancer: surgical management and patterns of local recurrence. *Dis Colon Rectum*. 2004;47:44–7.
10. Winter DC, Walsh R, Lee G, Kiely D, O’Riordain MG, O’Sullivan GC. Local involvement of the urinary bladder in primary colorectal cancer: outcome with en bloc resection. *Ann Surg Oncol*. 2007; 14:441–6.
 11. Gao F, Cao YF, Chen LS, Zhang S, Tang ZJ, Liang JL. Outcome of surgical management of the bladder in advanced colorectal cancer. *Int J Color Dis*. 2007; 22:21–4.
 12. Li JC, Chong CC, Ng SS, Yiu RY, Lee JF, Leung KL. En bloc urinary bladder resection for locally advanced colorectal cancer: a 17-year experience. *Int J Color Dis*. 2011;26:1169–76.
 13. Luo HL, Tsai KL, Lin SE, Chiang PH. Outcome of urinary bladder recurrence after partial cystectomy for en bloc urinary bladder adherent colorectal cancer resection. *Int J Color Dis*. 2013;28:631–5.
 14. Chaudhri S, Maruthachalam K, Kaiser A, Robson W, Pickard R S, Horgan A F. Successful voiding after trial without catheter is not synonymous with recovery of bladder function after colorectal surgery. *Dis Colon Rectum*. 2006;49(7): 1066–1070.
 15. Stotland PK, Moozar K, Cardella JA, Fleshner NE, Sharir S, Smith AJ, Swallow CJ. Urologic complications of composite resection following combined modality treatment of colorectal cancer. *Annals of surgical oncology*, 2009;16(10):2759-2764.

© 2020 Erşen et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<http://www.sdiarticle4.com/review-history/61344>