Single Umbilical Stoma for Bilateral Ureterostomy after Radical Cystectomy

Abbas Basiri*, Mohammad Hossein Soltani, Nasser Shakhssalim, Hamid Reza Shemshaki, Pouria Rezvani, Milad Bonakdar Hashemi

Purpose: Cutaneous ureterostomy after radical cystectomy is less preferred compared with other permanent urinary diversions due to bilateral stomas. Single umbilical stoma for bilateral ureterostomy (SUSBU) may be a choice, in this study we reviewed the outcomes of SUSBU in seventeen patients who underwent radical cystectomy.

Methods and Materials: This was a case-series study conducted from April 2016 to Dec 2017. Seventeen male patients with confirmed PT2 bladder urothelial carcinoma who were not suitable for performing conduit or orthotopic urinary diversion, including those with high-risk patients underwent single umbilical stoma for bilateral ureterostomy after radical cystectomy. All patients were prospectively followed up for 24 months ± 2 months, this study was done in a teaching center mainly by senior residents.

Results: The mean age of patients was 68.6 ± 6.41 years. The mean length of operation time was 176.7 ± 15.1 minutes (from intubation to extubation from anesthesia). Sixteen patients were diagnosed with PT2 and one patient had a PT4 diagnosis. The decrease in hemoglobin level after surgery was 1.72 mg/dl ± 0.35 and creatinine increased by 0.15 ± 0.05 mg/dl. None of our patients had oliguria. One case developed constipation and no gas passing, with the suspicion of obstruction, underwent abdominal exploration, however, no obstruction or urine leakage was found and the patient was treated conservatively. One patient developed a fever during admission, in which atelectasis was identified as the cause. One patient underwent a second operation because of fascia dehiscence.

Conclusion: It seems that this technique is suitable for high-risk patients with acceptable operating time, surgical complications, and fast recovery after the operation and one ureterostomy bag instead of two one's comparing to bilateral cutaneous ureterostomy.

Keywords: umbilical stoma; radical cystectomy; single ureterostomy

INTRODUCTION

The treatment of invasive bladder cancer generally involves radical cystectomy followed by urinary diversion. Currently, cutaneous ureterostomy, ileal conduit, and orthotopic ileal neobladder reconstruction are the most frequently used methods. Although cutaneous ureterostomy is less preferred compared to other permanent urinary diversions, it is a more appropriate approach in elderly patients, patients with poor performance status, and cases for whom an intestinal segment cannot be used to form the internal reservoir 1. The efficacy of cutaneous ureterostomy is the same as other types of incontinent diversions 2. However, the ureter should have a sufficient length to be able to insert the stoma site in the lower quadrants of the abdominal wall. Moreover, due to proximity to the tumor tissue, the lower quadrants of the abdomen are at risk of both cancer seeding and irradiation, in cases in which radiotherapy is indicated. For classic cutaneous diversion, creating two stomas and bilateral ureterostomy is required. This is found to be unappealing by most patients. Therefore, a single umbilical stoma after radical cystectomy might be a choice to solve the above-mentioned problem. In the 1960s, Higgins reported his initial experience with umbilical cutaneous ureterostomies on six patients, showing safe and efficient results 3. However, the lack of data in this field is evident. Theoretically, this surgical method is associated with advantages such as less required length of the ureter, more distance from the tumor site, and a protective role of the umbilical skin for the ureteral epithelium.

In this case series, we have reported the results of a single umbilical stoma for bilateral ureterostomy (SUSBU) in 17 patients with bladder cancer.

MATERIALS AND METHODS

This was a case-series study conducted between April 2016 - Des 2017 at the urology departments of Labbafinejad (teaching hospital, 14 cases) and Erfan (private hospital, 3 cases), Tehran, Iran. All patients with confirmed PT2 urothelial carcinoma of the bladder who were unfit for undergoing conduit or orthotopic urinary diversion were consecutively included in this study. Baseline characteristics of the patients are presented in **Table 1**.

Surgical technique and post-operative care

A lower abdominal midline incision was made two centimeters below the umbilicus, dividing the rectus muscle

Urology and Nephrology Research, Center, Shahid Labbafinejad, Medical Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
*Correspondence: Urology and Nephrology Research, Center, Shahid Labbafinejad, Medical Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Email: basiri@unrc.ir
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Table 1. Basic characteristics of patients.

Case Number	Age	BMI	Hydro ureteronephrosis	Hb before surgery	Cr before surgery
1	63	26	NO	12.2	1.2
2	74	24.4	NO	11.9	0.95
3	69	23.2	NO	14.4	1.1
4	69	25.1	NO	14.4	1.5
5	69	23.3	YES	10.4	2.21
6	80	25.5	YES	11.4	1.35
7	62	25.7	NO	11.7	1.16
8	42	27.2	NO	13	1.19
9	71	25.1	NO	14	1.19
10	73	26.5	NO	11.1	1.08
11	66	22.4	NO	12.5	1.35
12	72	25.4	NO	13.8	1.63
13	70	21.7	YES	10.9	1.99
14	73	20.9	NO	12.7	2.77
15	69	27.2	NO	14.6	1.69
16	71	22.6	YES	12.8	2.76
17	74	21.2	NO	12.2	1.83

and separating the muscles and fascia. In the intra-peritoneal approach, the peritoneum was opened lateral to Uracus. Then posterior peritoneum was incised and the ureters were released only in 2-3 cm and divided from the distal tip near the bladder. In the extra-peritoneal approach, the peritoneum was separated from the posterior wall of the bladder and the ureters were exposed and divided retroperitoneally. After that, lateral pedicles of the bladder were coagulated and divided with Ligasure until receiving the base of the prostate. Then we have coagulated and divided the dorsal vein of the prostate in antegrade until receiving the urethra. After that, the prostate and bladder were removed retrograde with caution to the rectum.

Extended lymphadenectomy has been done with the area that contains common iliac bifurcation superiorly; the superior edge of iliac vein laterally and obturator nerve caudally.

Each ureter was sutured to the abdominal wall to decrease the chance of bowel obstruction. After incision of the umbilicus, the posterior rectus sheath was cranially incised to allow for one finger to pass easily (Figure 1). In the end, the bilateral ureters were raised to the level of the abdominal wall. The distal end of the ureters was pulled out 2 - 4 cm above the skin surface and then longitudinally incised at 2 cm from their terminal end. 4-0 vicryl was used to suture the incised ureter to the skin. Finally, 8F splint catheters or Double-J stents were inserted in both ureters and after wound closure; a collecting bag was placed on the skin, adjacent to the umbilicus (**Figure 1**).

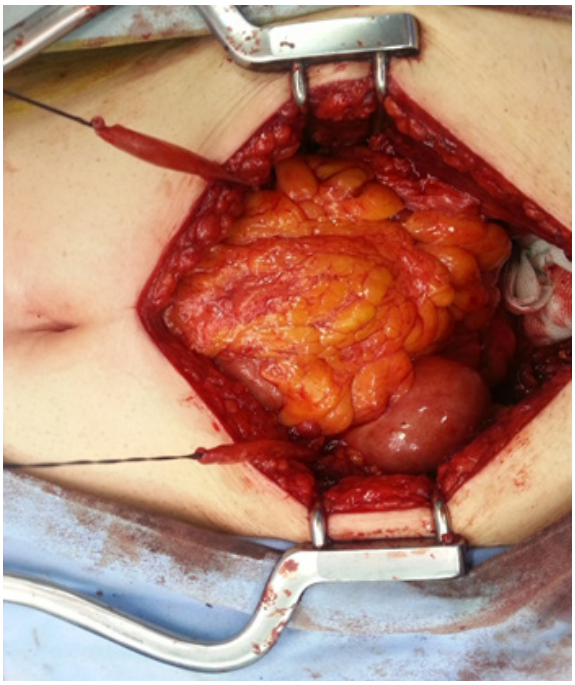

Figure 1. Both ureters were raised to the level of the abdominal wall.

On the first day after surgery, patients were mobilized and oral nutrition was initiated. Serum creatinine and hemoglobin level were checked daily. The drainage system and the Foley catheter were removed when the amount of drainage reached less than 50 ml per day.

The patients were initially visited following two weeks after discharge. They were recommended to change their catheters or Double-J stents monthly until three months post-surgery. Finally, after 24 months (man of follow-up), four patients who had hydro-uretero-nephrosis before surgery became stent-free. Regarding the other patients who did not show hydro-uretero-nephrosis (n=13), three patients were maintained on Double-J stents, seven patients became stent-free, and three cases were missed to follow-up.

Outcomes

Demographic data (age, gender, and BMI), tumor characteristics (including pathological stage, the status of receiving neoadjuvant chemotherapy and presence of hydro-nephrosis), pre and post-operative laboratory data (serum creatinine and hemoglobin level), operation time, need for transfusion and treatment-related complications were recorded. In this study, we did not use a specific questionnaire but patients were asked to express their satisfaction between the numbers one to four. 1; very bad, 2; bad; 3; good, 4; very good.

RESULTS

Seventeen patients with a mean age of 68.6 ± 6.41 years old were included in this study. All patients were male. The mean BMI of patients was 24.3 ± 2.4 kg/m^2. The mean duration of operation was 176.7 ± 15.1 minutes. Sixteen patients were diagnosed with PT2 and one had a PT4 diagnosis (case 6). Only one patient (case 6) received neoadjuvant chemotherapy before surgery. The mean decrease in serum hemoglobin after surgery was

Table 2. Data of the patients with benign prostatic hyperplasia

Case Number	Hospitalization (Day)	Operation time (Minutes)	Transfusion	Post-op Hb	Patients' creatinine at discharge	complications stage	Pathological	Satisfaction
1	3	165	No	11	1.51	No	PT2N0M0	Very good
2	3	130	NO	11	1.2	No	PT2N0M0	Very good
3	3	140	NO	13	1.3	NO	PT2N0M0	Good
4	3	240	NO	12.2	1.22	NO	PT2N2M0	Very good
5	4	155	YES	9.4	1.83	NO	PT2N0M0	Good
6	8	180	YES	10	1.0	YES / abdominal exploration	PT4N1M0	Bad
7	5	140	YES	8.9	1.11	NO	PT2N0M0	Good
8	6	225	NO	11	1.15	YES / Fever	PT2N0M0	Good
9	5	230	NO	12.7	2.15	No	PT2N0M0	Good
10	4	215	YES	9.7	1.06	No	PT2N0M0	Very good
11	3	155	NO	11.3	1.41	NO	PT2N0M0	Good
12	3	175	NO	11.6	1.55	NO	PT2N0M0	Very good
13	5	200	YES	9.6	1.90	YES / Purulent discharge from suture line	PT2N0M0	Bad
14	4	150	NO	10.3	3.1	NO	PT2N2M0	Good
15	4	165	NO	11.7	1.96	NO	PT2N0M0	Good
16	3	170	YES	10.9	2.97	NO	PT2N2M0	Good
17	3	170	YES	10.4	2.08	NO	PT2N0M0	Very good

1.72 ± 0.35mg/dl and seven patients (cases 5,6,7,10, 13,16,17) required whole blood or packed cell transfusion. The mean increase in the creatinine level after surgery was 0.15 ± 0.05 mg/dl. Overall, renal function remained stable during the entire follow-up period.

The mean length of hospital stay was 4.0 ± 1.0 days. None of our patients developed oliguria. One case (case number 6) developed constipation and no gas passing, with the suspicion of obstruction, underwent abdominal exploration, however, no obstruction or urine leakage was found and the patient was treated conservatively. One patient underwent a second operation due to fascia dehiscence (case number 7). During follow-up, one of the Double-J stents in case 5 had got removed accidentally, and efforts to insert another Double-J stent in the same orifice were unsuccessful. However, after administering diethylene-triamine pentaacetic acid (DTPA), no obstruction was seen.

One patient (case number 8) developed fever before discharge but the urine was sterile. Atelectasis was found to be the cause and he was treated with antibiotics and conservative management.

In case number 13, the patient was re-admitted because of purulent discharge from the suture line. Ultrasonography of the involved site revealed a 26cc collection in subcutaneous tissue. Several stitches were removed and after draining the collection, conservative treatment was given.

The patient satisfaction was subcategorized into four categories in which no patient-reported very bad; two patients report bad; nine patients reported good, and six patients reported very good. Overall, a high level of satisfaction was achieved.

We have not performed a comparative study between

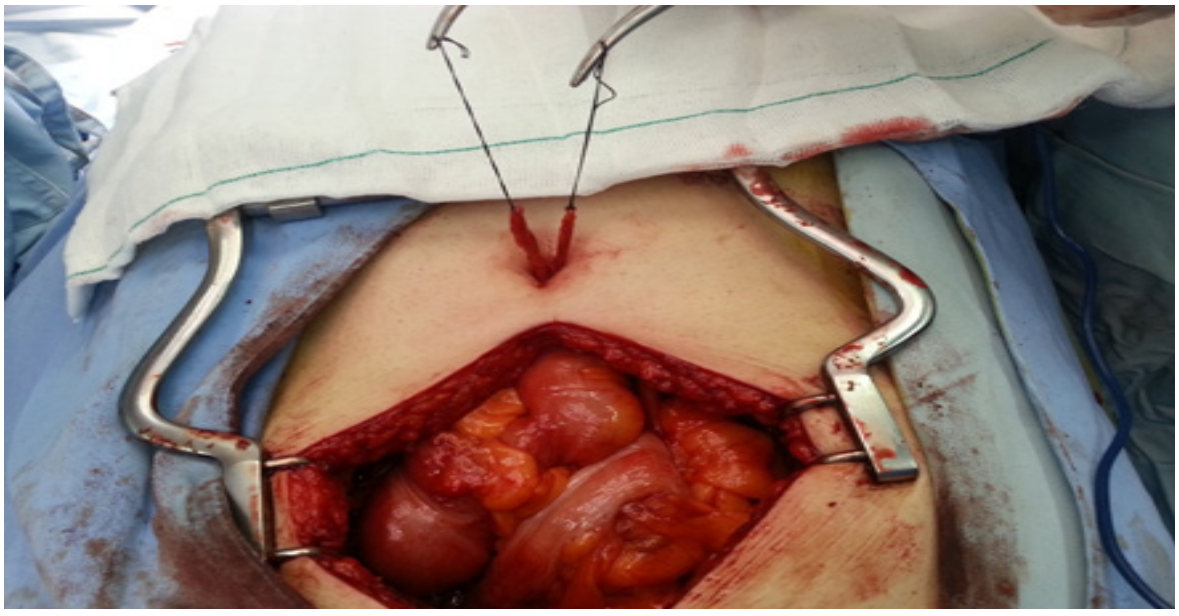

Figure 2. Release both ureters and bring them to the umbilical stoma.

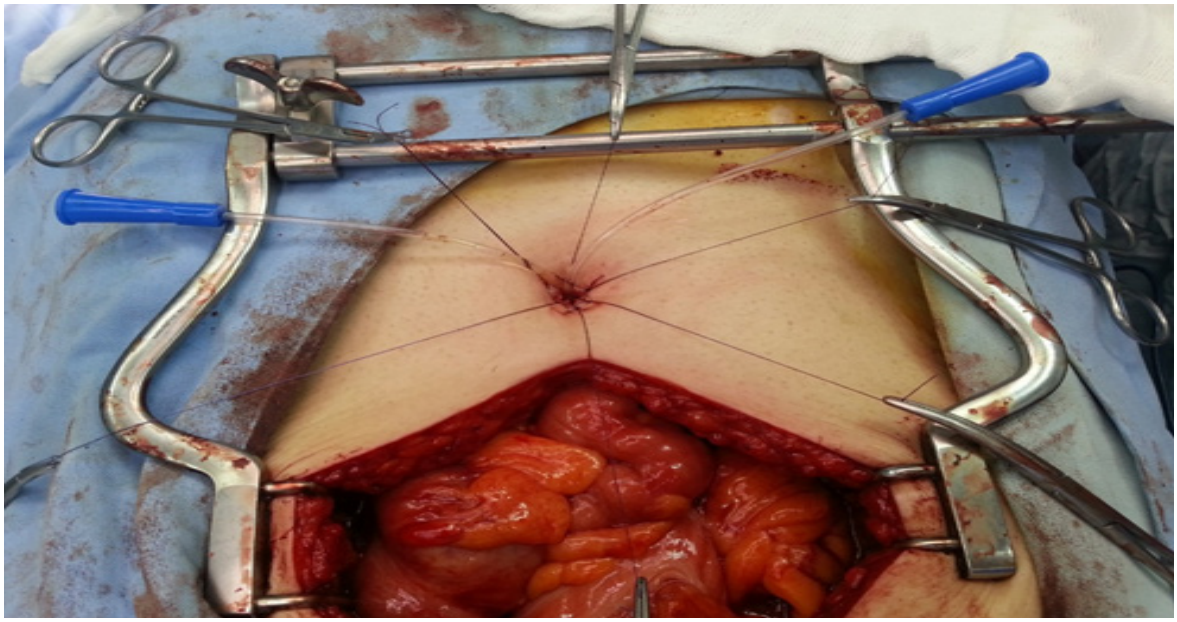

Figure 3. Two ureters were sutured with vicryl 4-0 to the skin..

the umbilical ureterostomy and conduit but in general, the complaints of patients with umbilical ureterostomy were not more than other patients with conduit. The location of the stoma was satisfactory for the patients and if the ureterostomy bag was installed correctly, urine leakage would not be more than other types of the stoma. Patients' stents were removed after three months routinely in patients who had hydroureteronephrosis (4 cases), in other patients who had not hydroureteronephrosis (13 cases), three patients have had J stent indefinitely, seven patients became stent free and 3 cases were missed in follow-up.

In our study, the follow-up period was 24 ± 2 months, which is a suitable duration to evaluate early complications such as wound infection, renal impairment, and bowel obstruction.

DISCUSSION

Currently, the most common procedure used for permanent urinary diversion is the ileal conduit and orthotopic ileal neobladder. However, this procedure utilizes intestinal segments, causing several major complications 4. In the complicated patients included in this study (i.e., advanced age, comorbidity, and low-performance status) we avoided using intestinal segments for urinary diversion. The simplest alternative method for permanent urinary diversion was introduced to be cutaneous ureterostomy.

Umbilical cutaneous ureterostomy is not indicated for all patients, since laparotomy involves a long midline incision. Moreover, the central position of the wound makes the process of making a pouch and also patient management difficult. However, this approach is

Figure 4. Single umbilical stoma after radical cystectomy

Figure 5. Patient became Stent free.

appealing for patients who suffer from an inadequate ureter length or those who are at high risk of tumor recurrence.

With SUSBU, our success rate was comparable to previous reports applying regular cutaneous ureterostomy 5, with only one patient requiring abdominal exploration. Surgical resection of a cancerous bladder with ureteral invasion or the presence of a concomitant ureteral lesion does not allow for an adequate ureteral length to be preserved and also disrupts the blood supply to the ureter. Also, in such cases, the usual site of cutaneous ureterostomy (lower quadrant of the abdominal wall) may be too remote to achieve 6. Almost half of the patients develop stenosis and require periodic dilation or chronic catheterization.

Alternatively, SUSBU does not involve a midline scar, and reconstruction is made easier compared to the urinary diversion using the intestine. With at least a 12cm ureteral length, SUSBU is feasible without excess tension 3. The achievement of this length is possible after release and dislocation of the kidney or after individually adjusting the tunnel to establish the most direct path between the kidney and the umbilicus.

Invasion of the bladder tumor into the ureteral orifice leads to a three-time higher tumor recurrence rate of the upper urinary tract after radical cystectomy, as well as poor survival outcome 7. Therefore, early detection of upper urinary tract tumor recurrence has a determinative role in a patient's survival outcome after cystectomy. Nearly half of the positive signals in computed topography and cytology are benign lesions, and the appropriate approach for follow-up is controversial. Thus, the application of ureteroscopy for the diagnosis of upper urinary tract tumor recurrence could be a better option. With SUSBU, it is feasible to use a ureteroscope for these patients appropriately and detect any upper urinary tract recurrence.

In short ureters and in obese people where the ureters are difficult to reach the skin, the umbilical stoma can be a suitable alternative another advantage is the use of umbilical skin as a protection of the ureteral mucus from external damage. However, this advantage should be considered carefully in cases with ureteral stenosis. We found no stenosis in our patients. Also in obese patients, the fat under the umbilicus eases the performance of this procedure.

There are limitations associated with this study; only seventeen cases have been described. Furthermore, the surgeons and surgical techniques are not entirely identical, influencing the outcome.

In our study, the follow-up period was 24 ± 2 months, which is a relatively optimal time to evaluate the early complications of surgery such as wound infection, renal impairment, and mechanical bowel obstruction.

Conclusively, the decision to perform umbilical cutaneous ureterostomy must be made on an individual basis, after considering the pros and cons for each patient. We suggest this approach as an alternative but not as a recommendation.

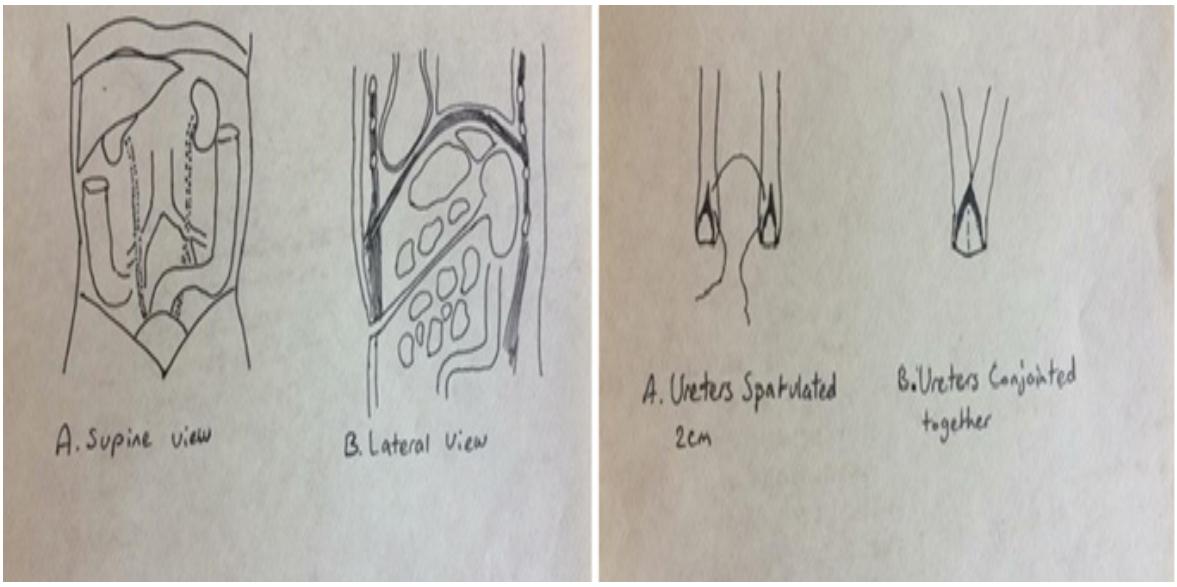

Figure 6. Schematic figures of procedures.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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