ABSTRACT

Objective: To discuss the indications and the results of the patients treated with ureterocutaneostomy (UCN) for urinary diversion in our center.

Material and methods: Between March 2008 and November 2012, 27 patients (19 males and 8 females) were treated with UCN in our clinic. Patients’ ages ranged between 56-78 years. Radical cystectomy was performed on 21 of these patients. The patients underwent transureteroureterostomy and UCN or unilateral or bilateral side-by-side UCN on the abdominal wall. Double-J stents were placed inside the ureters and changed every 12 weeks. Comorbidities and American Society of Anesthesiologists (ASA) scores were noted.

Results: The patients had invasive bladder cancer (n=24), multiple tumors within and outside of a diverticulum and intractable recurrent bleeding (n=1), recurrent hemorrhage (n=1), and bladder contracture (n=1). As comorbidities, hypertension (n=14), chronic obstructive pulmonary disease (n=11), diabetes mellitus (n=10), coronary artery disease (n=8), chronic renal failure (n=1), and Crohn’s disease (n=1) were detected. The ASA score was 3 or greater in 14 patients. During follow-up period, 3 patients experienced pyelonephritis, and one of them had a strictured ureteral orifice.

Conclusion: UCN can be used as a method of urinary diversion in selected patients.

Key words: Invasive bladder cancer; ureterocutaneostomy; urinary diversion.

Introduction

Bladder cancer ranks fourth in frequency among all tumors in men, and it is the second most frequently seen genitourinary tumor. In the United States of America in the year 2010, nearly 70,500 newly diagnosed cases of bladder cancer were detected with resultant 14,680 deaths.[1] At the time of the diagnosis, in nearly 75-85% of the patients with bladder cancer superficial disease (Ta, T1, CIS) is found.[2] Majority of these tumors are not life-threatening, and can be treated with conservative methods. Whereas, 20-25% of the cases are muscle-invasive tumors at the time of the first diagnosis. In 75% of the superficial bladder tumors recurrences develop, while 10-20% of them later on become muscle-invasive. Since at the time of the first diagnosis, 50% of the cases with muscle-invasive bladder cancer (MIBC) have nodal or metastatic disease, while 43% of them had superficial bladder cancer which differentiated into MIBC during follow-up period.[3]

Urinary system diversion was defined by Simon in 1852[6], and became a standard mode of treatment after popularization of the ileal conduit procedure by Bricker in 1950.[7] Urinary diversion (UD) is not only used as a post-cystectomy procedure, but it can be also employed for neurogenic bladder abnormalities or its congenital anomalies. Whether it is used with the indication of bladder tumor or for above-mentioned reasons, in every case of UD, cystectomy cannot be performed. Three alternative anatomical regions namely abdominal wall, urethra or rectosigmoid colon have been used for UD.[8] Type of UD is primarily determined by general health state of the patient, disease-specific health state, and patient’s expectations for a better quality of
life. Although orthotopic ileal neo-bladder seems to be a nearly ideal approach, it has some disadvantages. Presence of locally advanced disease (urethral or bladder neck involvement), long-term complications, expectations for a better quality of life or comorbidities which may complicate the surgical process make ileal conduit or ureterocutaneostomy a rational option. In a study performed in 2008 where complications related to incontinent UD s were evaluated, extra advantages of UCN have been demonstrated over ileal, and colonic conduits during 16 months of follow-up.\[^{10}\] In a more comprehensive study performed in the same year, authors reported lesser long-term complication rates for ileal conduits, when compared with all continent abdominal pouches, and orthotopic neobladder procedures.\[^{10}\]

Herein, our aim is to discuss justifications, and outcomes of UCN chosen as an UD procedure for our patients with various indications.

**Material and methods**

Between March 2008 and November 2012, 27 patients (19 males and 8 females; age range, 56-78 years) were treated with UCN in our clinic. Before the operation patients signed a detailed consent form which explicitly informed the patients about phases of the operation, its probable progression, and complications Radical cystectomy (RC) could be applied in our 21 patients. One patient underwent only UCN because of a contracted bladder. RC was planned in 5 patients because of frozen pelvis, but it couldn’t be applied (Table 1).

The patients underwent transureteroureterostomy and UCN or unilateral or bilateral side-by-side UCN on the abdominal wall. Double-J stents were placed inside the ureters and changed every 12 weeks on an ambulatory basis under the local operative room conditions. Comorbidities and American Society of Anesthesiologists (ASA) scores were noted (Tables 1, 2).

**Statistical analysis**

For necessary statistical procedures Statistical Package for the Social Sciences (SPSS) v 11.0 (SPSS, Inc., Chicago, III., USA) was used.

**Results**

Mean ages of the male, and female patients were 69.7±5.2, and 72.1±4.5 years for male, and female patients, respectively. The patients had invasive bladder cancer (n=24), multiple tumors within and outside of a diverticulum and intractable recurrent bleeding (n=1), recurrent hemorrhage (n=1), and bladder contraction (n=1). As comorbidities, hypertension (n=14), chronic obstructive pulmonary disease (n=11), diabetes mellitus (n=10), coronary artery disease (n=8), chronic renal failure (n=1), and Crohn’s disease (n=1) were detected. Preoperatively 14 patients had ASA score ≥3. The patients died because of progression of the bladder tumor (n=3), and comorbidities (n=4). Adjuvant therapies (RT, and CT) were administered after radical cystectomy because of local residual disease (n=6) or frozen pelvis (n=5). The disease progressed in 11 patients. During the follow-up period episodes of pyelonephritis developed in 3, and ureteral stenosis in one patient.

**Discussion**

Standard curative cystectomy in the treatment of muscle-invasive bladder cancer consists of total extirpation of bladder, together with macroscopically visible, and removable all tumor foci of the prostate, distal ureters, and related lymph nodes.\[^{38}\] In the current literature, surgical modifications, and adaptations have been described within the frame of improving patients’ quality of life, but refraining from interruption of the tumoral control. Among them, preservation of striated sphincter muscle, anterior, and membranous urethra so as to enable construction of an orthotopic neo-bladder can be enumerated. Besides, preservation of pelvic autonomic, and sensory nerves, and even partial sparing of prostate, and seminal vesicles have been recommended to maintain fertility, potency, and continence.\[^{8,11}\] In women, standard pelvic exenteration encompasses total extirpation of bladder, urethra, adjacent vaginal wall, uterus, distal ureters, and related lymph nodes.\[^{38}\] Among these adaptations, in women, preservation of urethra, and its autonomic nerves might be considered in order to make future neobladder applications possible.\[^{11,12}\] However in recent studies removal of uterus, and vaginal wall so as to provide support for the future construction of orthotopic neo-bladder has been debated.\[^{39}\] Even though favourable impact of extended PLND on survival of MIBC patients, actual incidence rates of improvement it provides, and standard boundaries of PLND have not been precisely established.\[^{8,13,14}\] Type of the urinary diversion is important in that it determines patient’s way of life after radical cystectomy. Ideally, maintenance of the integrity of urinary tract by reconstructing a pouch with similar characteristics of the patient’s normal bladder localized in its original is desired. For UD various intestinal segments, and techniques have been used (refluxive, non-refluxive, continent or incontinent). Serious, and life-threatening intraoperative problems can be encountered. Therefore improvement in the quality of life of the patient should be weighed against these disadvantages, and ideal method should be determined for each individual patient. In the latest guidelines, studies evaluating norms including quality of life, continence, physical integrity of the patient after UD have been reviewed. In the determination of the quality of life criteria, preoperative stage of the disease, patient’s age, and his /her expectations, socioeconomic state, functional capacity of the bladder, experience of the operating team, and
potential surgical complications have been reported as important factors. In the light of these review articles, each patient was told that any type of UD could not be randomly offered to every patient, and among all UDs, UCN had been asserted to have minimal rates of surgical complications (LE:3). Some contraindications have been determined for the preference of relatively more complicated methods of UD which can be enumerated as extremely severe neurological or psychiatric diseases, shorter life expectancy, impaired hepatic or renal functions, surgically positive margins involving urethra or other regions of the urinary tract (LE:2b).[8] Some relative contraindications related to orthotopic reconstruction of neobladder exist which may include delivery of higher doses of preoperative RT; complex urethral stenosis, extremely severe urinary incontinence secondary to urethral sphincter insufficiency (LE:2b).[15-18]

In our clinic, the most frequently used types of UD are priorly ureterocutaneostomy, followed by predominantly Studer type orthotopic neobladder procedures, and finally UCN. When 27 cases of UCN performed within an indicated period were generally reviewed, it appears that this method had been resorted to, because of locally advanced disease, intestinal, and general health problems which might affect intraoperative survival, and induce risks of serious complications. (Tables 1, 2). In these patients, we didn’t take every risk to apply UD method using a bowel segment, as a priority survival of the patient, and nearly ideal quality of life have been pursued.

Points to be considered as for patient’s care, and cooperation following ureterocutaneostomy may differ somewhat from other methods of UD. In patients whose intestinal segment can not be excised which discards the possibility of intestinal anastomosis, oral alimentation is initiated more rapidly, and without any problem when compared with other types of UD. Thanks to implantation of a double J-stent with an appropriate caliber into ureter, stricture of ureteral orifice can be prevented. However, cutaneous contracture is one of the important handicaps of UCN. In a series performed in our clinics, in only one patient stricture of the ureteral orifice developed which was opened with local intervention. Although absence of an ileal segment between the skin, and the renal unit facilitates development of pyelonephritis, in our experience, thanks to attentive monitoring, replacement of a double-J catheter at every 2 months, in only 3 patients pyelonephritis developed. Change of a double J stent can be easily realized under local, and sterile conditions by delivering a soft, flexible catheter through the stent.

In conclusion, UCN is the preferable mode of UD in patients which is not amenable to radical cystectomy because of frozen pelvis secondary to MIBC with resultant shorter life expectancy, in cases whose operation should be rapidly terminated due to the deteriorated health state, and those with decreased life expectancy due to associated comorbidities or inability to use intestinal segments owing to related problems.

### Table 1. ASA score profiles, and comorbidities encountered in patients who had undergone ureterocutaneostomy operations with (+) or without (-) concurrent radical cystectomies

<table>
<thead>
<tr>
<th>Treatment modality</th>
<th>Patients (n)</th>
<th>Frozen pelvis</th>
<th>Comorbidities</th>
<th>ASA score ≥3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radical cystectomy (+)</td>
<td>21</td>
<td>0</td>
<td>COPD (8), DM (6)</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CAD (6), HT (10)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>CRF (2)</td>
<td></td>
</tr>
<tr>
<td>Radical cystectomy (-)</td>
<td>6</td>
<td>5</td>
<td>COPD (3), DM (4)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CAD (2), HT (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Crohn (1)</td>
<td></td>
</tr>
</tbody>
</table>

ASA: American Society of Anesthesiologists; COPD: chronic obstructive pulmonary disease; DM: diabetes mellitus; CAD: coronary artery disease; HT: hypertension; CRF: chronic renal failure

### Table 2. Types of ureterocutaneostomy, and patient profiles

| Treatment modality | Patients (n) | Frozen pelvis | Preoperatively functional solitary renal unit | Comorbidities | ASA score ≥3 |
|--------------------|--------------|---------------|-----------------------------------------------|---------------|
| TUU + UC           | 8            | 1             | 0                                             | COPD (3), DM (2) | 4            |
|                    |              |               |                                               | CAD (2), HT (4) |              |
| UC                 | 19           | 4             | 6                                             | COPD (8), DM (8) | 10           |
|                    |              |               |                                               | CAD (6), HT (10), CRF (2), Crohn (1) |              |

TUU: transureteroureterostomy; UC: ureterocutaneostomy; ASA: American Society of Anesthesiologists; COPD: chronic obstructive pulmonary disease; DM: diabetes mellitus; CAD: coronary artery disease; HT: hypertension; CRF: chronic renal failure
Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.


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6. Simon J. Ectopia vesicae (absence of the anterior walls of the bladder and pubis abdominal parietis); operation for directing the orifices of the ureters into the rectum; temporary success; subsequent death; autopsy. Lancet 1852;ii:568. [CrossRef]