Reconstruction of the obliterated vesicourethral junction is both complex and difficult. Here, we report an innovative method using a mobilized bulbar urethra as a continent valve. Three patients with major problems at the vesicourethral junction underwent continent valve reconstruction. In cases 1 and 2, in which there were problems at the anastomosing site after radical prostatectomy, the bladder wall was closed, wedge resection of the midline pubic bone was performed, and a fully mobilized bulbar urethra was implanted submucosally into the anterior bladder wall. In case 2, augmentation cystoplasty using an ileal segment was required due to the small capacity of the bladder. In case 3, in which there was posterior urethra disruption associated with pelvic fracture, the bulbar urethra was implanted into the bladder wall in the same manner as in cases 1 and 2 without pubectomy. The postoperative follow-up periods were 48, 36, and 12 months, respectively. In all patients, urinary management was achieved by self-catheterization postoperatively, and the patients were satisfied with their status. This newly devised continent valve construction using a bulbar urethra is effective for reconstruction of the obliterated vesicourethral junction, which markedly improves patients’ quality of life.

Key words bulbar urethra, continent valve, continent vesicostomy, post-prostatectomy stricture, vesicourethral junction stricture

1. INTRODUCTION

Obliterated vesicourethral junction after radical prostatectomy is a devastating problem and its repair is challenging for urologic surgeons. Successful repair in four patients with this complication has been achieved with urethral patency. However, all of the patients were incontinent, and some required an artificial urinary sphincter. We reported reconstructive surgery without an artificial urinary sphincter to solve vesicourethral stenosis, which is associated with prostatectomy or urethral disruption using a mobilized bulbar urethra as a continent valve.

2. CASE REPORT

The following procedures were approved by the ethical committee of Shinshu University School of Medicine.

2.1. Patients
2.1.1. Case 1

A 60-year-old male patient underwent radical prostatectomy with resection of a large retrovesical mass at age 40. The bladder neck was anastomosed to the urethral stump. Pathological diagnosis of the mass was adenocarcinoma, probably originating from the seminal vesicle. The patient suffered frequent local recurrence at the lumen of the anastomosing site, which required several transurethral resections. The anastomosing site became stenotic and transurethral resection was hardly applicable to the tumor of the anastomosing site, and he had severe difficulty on urination. We excised the anastomosing site with the tumor and reconstructed the vesicourethral junction.

2.1.2. Case 2

A 71-year-old male patient underwent radical prostatectomy for prostate cancer 13 years previously (pT3, N1) and received adjuvant hormonal therapy at another hospital. After prostatectomy, he suffered anastomosing stricture at the vesicourethral junction, which was first managed by gradual dilatation with metal sounds. He underwent internal urethrotomy or transurethral resection of scar tissues more than 15 times. After resection of the scar tissue, he suffered total incontinence. A few months later, severe difficulty on urination began and finally urinary retention occurred. During follow-up, the patient’s serum prostate specific antigen (PSA) level remained below the level of detection and the

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Fig. 1  Surgical illustration of case 1. (a) The bulbar urethra was fully mobilized through the perineal approach. (b) The pubic bone was resected using a Gigli saw. (c) The vesicourethral junction containing the tumor was removed. (d) The opening of the bladder wall was closed and the bladder was fixed to the pubic bone. (e) The mobilized bulbar urethra was withdrawn into the pelvis beyond the crus penis. (f) The mucosa of the anterior wall (asterisk) was exposed and opened (dotted circle). (g,h) The end of the urethra was anastomosed to the anterior wall in a submucosal tunnel.

Fig. 2  Surgical photographs of case 1. The arrow shows the bulbar urethra. The asterisk shows the mucosa of the anterior bladder wall. The arrowheads indicate covering muscle layer over the distal part of the bulbar urethra.
resected scar tissues contained no malignancy. The patient was referred for reconstruction of the devastated vesicourethral stricture.

2.1.3. Case 3

A 20-year-old man was referred for repair of posterior urethral disruption associated with pelvic fracture. Urination had been managed by suprapubic catheter since the age of 13 following a traffic accident.

2.2. Surgical technique

The patient was placed in the high lithotomy position and the bulbar urethra was fully mobilized through the perineal approach (Fig. 1a). The proximal end was transected and its stump was ligated just before the stricture site. A retropubic space was developed by separating the bladder from the adhesion to the pubis of the previous operation through a lower abdominal midline incision. The pubic bone surface was fully exposed and the suspensory ligament was detached from the inferior aspect of the pubis. Wedge resection of the pubic bone was then performed using a Gigli saw (Fig. 1b). After opening the bladder wall, the anastomosing site was removed with the tumor in case 1 (Fig. 1c) and the scar tissue was left in case 2. The bladder wall opening was closed (Fig. 1d) and the mobilized bulbar urethra was withdrawn into the pelvis beyond the crus penis through a created subcutaneous tunnel (Fig. 1e). The anterior bladder wall mucosa was exposed (Figs 1f and 2a). The bulbar urethra was implanted into a 3-cm submucosal tunnel created in the anterior bladder wall (Figs 1g,h and 2b). As the bladder capacity was small (~150 mL) in case 2, augmentation cystoplasty was also performed. In case 3, after mobilization of the bulbar urethra through a perineal incision, we found that the prostate was fibrotic and a large-caliber metal sound was hard to insert through the bladder neck through a suprapubic and cystotomy incision (Fig. 3a).

As it seemed impossible to anastomose the bulbar urethra into the prostatic apex, we implanted the bulbar urethra directly into the bladder wall submucosally. Fortunately, the bulbar urethra could easily reach the anterior bladder wall without pubectomy (Fig. 3b).

3. RESULTS

In all cases, the operation time was within 5 h and no transfusion was required. The patients required hospitalization for approximately 4 weeks postoperatively because they required an indwelling transurethral catheter. The postoperative follow-up periods were 48, 36, and 12 months, respectively. All patients could easily perform self-catheterization with a 12 Fr. catheter from the external meatus. There have been no complications. In case 2, the augmented bladder could hold more than 400 mL of urine. The anastomosing site observed by flexible cystoscopy was healthy and urinary continence was confirmed by cystography in all patients.

4. DISCUSSION

Despite precise anatomical knowledge and technical developments in radical prostatectomy for prostate cancer, postoperative anastomosing stricture is still relatively common. However, it can usually be managed successfully with one graduated dilatation. Obliterative vesicourethral stricture is a major problem, requiring frequent dilatations and multiple rounds of transurethral scar tissue resection. Wessells et al. reported successful repair in four patients with anatomical obliteration of the vesicourethral junction after radical prostatectomy, including primary excision with end-to-end anastomosis, penile fasciocutaneous flap, and free graft urethroplasty with rectus muscle flap or anterior bladder tube with the omental pedicle flap. Nevertheless, none of the patients were continent and some were supported with an artificial urinary sphincter.

In our technique, the fully mobilized bulbar urethra is implanted into a submucosal tunnel on the bladder...
and can act as a continent valve due to the flap valve principle. This innovative procedure requires considerable expertise to deal with or remove the stricture site. Further, pubectomy and closure of the bladder wall are mandatory. However, our technique would be much easier except in cases in which it is necessary to deal with the stricture site and perform pubectomy as in case 3. Our technique may be advantageous for catheterization from the urethral meatus and its indication may be extended to patients with severe post-prostatectomy incontinence when an artificial urinary sphincter is not readily available. Fortunately, the size of the bulbar urethra in our patients was suitable for submucosal implantation into the bladder wall. However, it may be necessary to reduce the size by tapering the cavernosal tissue of the bulbar urethra for embedding into the bladder wall in some cases. Unfortunately, we could not predict the necessity for an augmentation cystoplasty preoperatively in case 2. Therefore, making a thorough estimation of the bladder capacity preoperatively is essential and a continent vesicostomy using an appendix or ileal segment with augmentation cystoplasty might be another option.5

All three patients reported here are satisfied with their postoperative status, indicating that this innovative technique using the bulbar urethra as a continent valve is an acceptable option and its indication could be extended to patients with complex problems at the vesicourethral junction.

Disclosure

The authors have nothing to disclose.

REFERENCES