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Retroperitoneal Ureterocystoplasty in Bilaterally Functioning Kidneys

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INTRODUCTION

Augmentation cystoplasty is an effective method of treatment in bladders with low volume and capacity. Various techniques such as enterocystoplasty and gastrocystoplasty are used in order to increase bladder volume and to lower its pressure.⁽¹⁾ Given the metabolic disorders due to the use of gastrointestinal segments, on the one hand, and mucus secretion and increasing risk of malignancy, on the other hand, applying other methods have been strongly taken into consideration. One of these methods is using the ureter for augmentation. The ureter is considered as a suitable and ideal option, because it is lined with urothelial cells, does not secrete mucus, and is not accompanied with the risk of malignancy.⁽²⁻⁴⁾ We are present our experience in 3 patients whose ureter was used in their augmentation retroperitoneal ureterocystoplasty.

CASE REPORT

Three patients, 2 men and 1 woman, with neurogenic bladder and bilaterally functioning kidneys were selected for augmentation ureterocystoplasty. All of the patients had urinary incontinence, a small-capacity noncompliant bladder, and high-grade reflux

on voiding cystourethrography. Urodynamic study was performed in all of the three patients. Their bladder capacities were 100 mL, 70 mL, and 55 mL. Detrusor instability was present in 2 patients.

TECHNIQUE

A lower midline incision was made from the umbilicus to the pubic symphysis. The peritoneum was mobilized cephalad. Mobilization of the ureters was done extraperitoneally for 8 cm to 9 cm (both ureters in 2 patients and 1 ureter in 1), while taking care to preserve ureteral vascularization. The distal ends of the ureters were incised longitudinally, and the medial borders were sutured together using absorbable suture. The bladder was opened vertically across the bladder dome, and the ureter was sutured as a patch onto the open bladder with a continuous absorbable suture. Bilateral reimplantation of the ureters in 2 patients and unilateral reimplantation in 1 was performed using the Paquin technique.⁽⁵⁾ Two double-J stents were inserted in each ureter. A Pezzet catheter was placed as a cystostomy. A Foley catheter was inserted transurethrally and the bladder was closed with continuous absorbable suture material.

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RESULTS

The age range of the patients was 18 to 22 years (Table). Preoperative serum levels of creatinine were 2.3 mg/dL to 2.7 mg/dL. Preoperative voiding cystourethrography showed trabeculated low-capacity bladder and bilateral severe vesicoureteral reflux (Figure). The operative time was 2.5 to 3 hours. The median intra-operative blood loss was 280 mL. The postoperative course was uneventful. The patients became ambulated 48 hours after the operation and liquid diet was started the morning after the operation. The median hospital stay was 6.7 days. All of the patients were dry by the day with clean intermittent catheterization. Serum creatinine levels were 1.2 mg/dL, 1.6 mg/dL, and 1.9 mg/dL, 1 month postoperatively. Bladder capacities of the patients reached 290 mL to 360 mL from the baseline values of 55 mL to 100 mL.

DISCUSSION

First, Eckstein and Martin described the extraperitoneal removal of a poorly functioning kidney in a 7-month-old infant.⁽⁶⁾ They transversely opened the bladder to facilitate incorporation of the longitudinally incised ureter and showed that the procedure could be performed after ureteral reimplantation. This surgical technique became popular when it was shown to be the most suitable for patients with a dilated ureter draining a poorly functioning kidney.^(7,8) Ureterocystoplasty is now suggested for a variety of conditions associated with low bladder capacity, poor compliance, and increased intravesical pressure.

A segment of the small or large bowel is conventionally used for augmentation of the bladder. Complications of this approach, though, are well known, including excessive

Characteristics of Patients Before and After Augmentation Ureterocystoplasty

Patient	Age, y	Operative Time, h	Preoperative			Postoperative		
			Serum Creatinine, mg/dL	Bladder Capacity, mL	Compliance, mL/cm H ₂ O	Serum Creatinine, mg/dL	Bladder Capacity, mL	Compliance, mL/cm H ₂ O
1	18	3.0	2.3	100	4.5	1.2	290	29.0
2	22	2.5	2.4	90	4.5	1.6	340	22.6
3	21	2.5	2.7	110	4.0	1.9	360	21.1



Left, Preoperative voiding cystourethrography. **Right**, Postoperative voiding cystourethrography.

mucus formation, calculus formation, dysplasia and malignancy, metabolic acidosis, and abnormalities of calcium metabolism. Using the stomach can also lead to hematuria, dysuria, metabolic alkalosis, and hypergastrinemia.^(9,10) Several other techniques have been suggested to produce a urothelial-lined reservoir; however, none of them has gained worldwide acceptance. Urothelial grafting onto denuded bowel muscle, auto-augmentation, diverticulocystoplasty, and demucosalized enterocystoplasty are either not attempted in human or not appropriate enough to be applied in all patients.⁽⁷⁾ In contrast, bladder augmentation with the ureter provides a urothelial-lined reservoir with the appropriate histological layers. It seems that ureterocystoplasty is an ideal option for patients with appropriately enlarged ureters. Completely extraperitoneal ureterocystoplasty is a recently introduced technique that has several additional benefits. The risk of ventriculoperitoneal shunt infection and adhesive bowel obstruction are reduced by this method, because the integrity of the peritoneal cavity can be maintained. Taking the patient-oriented viewpoint into consideration, extraperitoneal approach is accompanied by less postoperative pain and better cosmetic results.⁽⁷⁾

Previously, ureterocystoplasty had been used only at the time of concurrent nephrectomy, because it was thought that an adequate bladder volume can be achieved only by the use of both the renal pelvis and the megaureter.⁽¹¹⁾ However, recent studies have shown that the lower two-thirds of a dilated ureter can provide the desired bladder capacity, so that the ipsilateral kidney can be preserved by forming a transureteroureterostomy.⁽⁴⁾ Also, the lower two-thirds of the divided ureter can be used for bladder augmentation and the transected upper ureter replanted into the bladder, using the lower ureter for augmentation. Indeed, both ureters can be used simultaneously, with one to enlarge the bladder and the other to form a continent diversion stoma.⁽¹²⁾ We used the distal one-thirds of both ureters for augmentation and reimplanted both into the bladder, separately.

A midline incision and transperitoneal approach to the kidney has been advocated if preservation

of the kidney and transuretero-ureterostomy is planned.⁽⁷⁾ We used the plane between the peritoneum and the great vessels, enabling access to the both ureters. Therefore, we enjoyed the benefits of the extraperitoneal approach, too.

We believe that the early results of ureterocystoplasty are comparable with those of enterocystoplasty, while the risks of long-term metabolic and neoplastic complications are prevented. Division of the ureter and use of its distal part for augmentation is always possible. We can conclude that augmentation ureterocystoplasty performed this way can be done more frequently.

CONFLICT OF INTEREST

None declared.

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