

## TWO TYPES OF MICTURITIONS OF ILEAL NEOBLADDER

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Eight patients were evaluated clinically, radiologically, and urodynamically to determine the outcome of continent urinary diversion with ileal neobladder performed to treat the recurrent superficial bladder cancer after cystectomy with subcapsular prostatectomy. The mean age of the patients was 55.3 years. After descending dissection of the urinary bladder without ligation or dissection of Santorini's plexus, the prostate was cut to the bladder neck distally for 2 cm under the subcapsular prostatectomy. One patient who had a short 3 cm intestinal segment between the pouch and the urethra, had severely prolonged micturition with peristalsis in this short segment, and required a re-operation. Micturition was good in the other seven patients, all with detubularized neobladder directly to the prostate capsule in anastomosis. Pressure flow studies performed on these seven patients revealed two types of micturition; "fast bladder" and "intermittent flow", the latter resembling detrusor sphincter dyssynergia.

(Acta Urol. Jpn. 43 : 713–718, 1997)

**Key words :** Ileal neobladder, Continent urinary diversion, Bladder cancer, Pressure flow study

### INTRODUCTION

We evaluated the behavior of micturition of neobladder. Urinary diversion is an integral part of total cystectomy production for bladder cancer. Ileal conduit has been the most commonly used method of urinary diversion. However, to improve the quality of life after cystectomy, continent urinary diversion has been widely performed. In particular, since the construction of continent low pressure bowel reservoir was proposed by Kock<sup>1)</sup> and an anastomosis ileum to the urethra by Camey and Le Duc<sup>2)</sup>, the direct anastomosis of the reservoir to the remaining urethra has been widely applied.

We performed continent urinary diversion which included anastomosis directly to the urethra, and also examined the micturition after the operation.

### PATIENTS AND METHODS

Between November 1990 and November 1993, eight patients underwent ileal neobladder following cystectomy due to recurrent bladder cancers. The patients were between 45 and 69 years of age with mean age of 55.3 years.

Pathological studies were done according to the general rules for clinical and pathological studies on bladder cancer, established by the Japanese Urological Association and the Japanese Society of Pathology<sup>3)</sup>. Grade and final pathological evaluation revealed Grade 1 in one patient, Grade 2 in three patients and Grade 3 in four patients, the stage of cancer was stage pTis in five patients, pTa in one patient and pT1 in two patients. All patients had superficial bladder cancers and the prostatic urethra

Table 1. Patient characteristics

No.	Age	Grade	pTNM	Follow up (mos.)
1	55	G3	T1 N0M0	76
2	45	G1	Ta N0M0	66
3	55	G3	TisN0M0	64
4	69	G3	TisN0M0	58
5	58	G3	TisN0M0	58
6	49	G2	TisN0M0	58
7	62	G2	TisN0M0	55
8	51	G2	T1 N0M0	39

was determined to be free of carcinoma by a preoperative loop biopsy and examination of a frozen section at the time of cystectomy. The follow-up period was between 39 and 76 months with a mean of 59.3 months (Table 1). Patients were evaluated clinically, radiologically, and urodynamically. A pressure flow study was performed using a UD-2000 (Dijkman Co., LTD). At the completion of filling, the 8 Nelaton catheter was withdrawn from the bladder while the 4F pig tail catheter was placed in the bladder to monitor the total intravesical pressure and a 16F rectals manometer was kept in situ for the electromyography (EMG) of the extraurethral sphincter muscle monitored with a superficial electrode during micturition. Patients were then asked to sit and void to completion during micturition. The surgical procedure involved cutting the prostate to the bladder neck distally for 2 cm under the subcapsular prostatectomy after performing a descending dissection of the urinary bladder without ligation or dissection of Santorini's plexus. This allowed us to leave the prostate capsule intact and

excise the prostatic urethra by enucleating the adenoma (Fig. 1). During the construction of a neobladder, a 45–55 cm length of ileum was detubularized and provided with an orifice for the

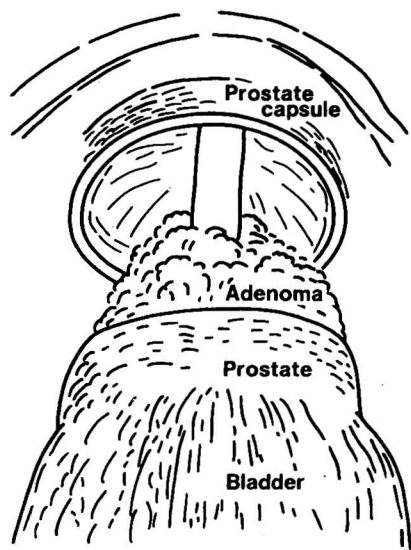


Fig. 1. The prostate was cut to the bladder neck distally for 2 cm under the subcapsular prostatectomy which left the prostate capsule intact and enucleated the adenoma.

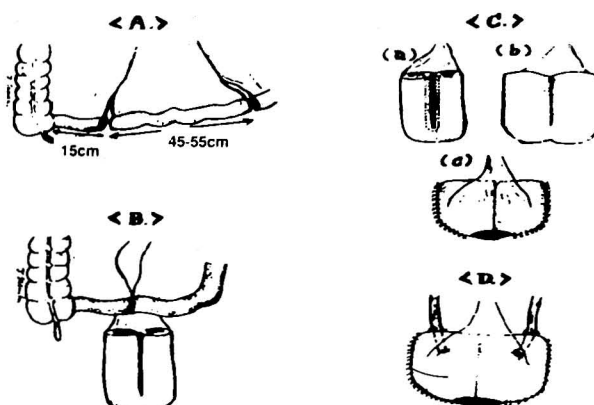


Fig. 2. The schema of our procedure of Ileal neobladder; Approximately 15 cm proximal to the ileocecal junction, a 45–55 cm length of ileum was detubularized. Implantation of the ureter into the neobladder was performed according to the technique reported by Le Duc and Cazey.

outlet of urine at the caudal portion, approximately 15 cm proximal to the ileocecal junction. The ureter was implanted into the neobladder according to the technique reported by Le Duc and Camey<sup>2)</sup> (Fig. 2).



Fig. 3. Patient with a short intestinal segment between the pouch and the urethra in which an intermittent peristaltic wave, a stretch and a twist were found (rt side: voiding cystourethrography).

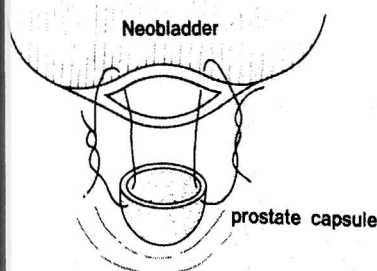
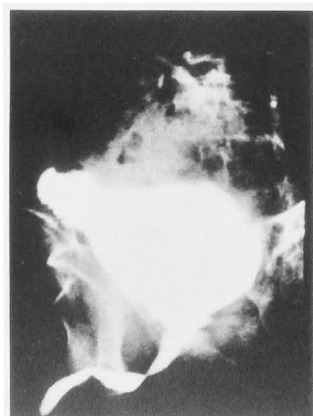
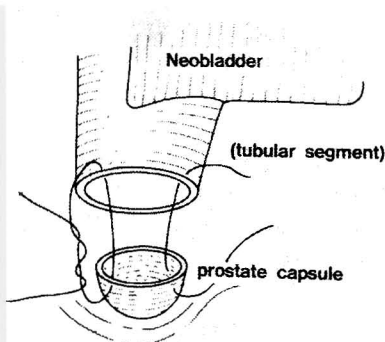


Fig. 4. Patients with urethra anastomosed with neobladder detubularized directly to the prostate capsule. There was no urethral obstruction.

Table 2. Results of IVP, VUR, Ves. P., uroflowmetry, residual urine, incontinence and nocturia

No.	IVP	VUR	Ves.P. (cmH <sub>2</sub> O)	V.V. (ml)	MFR (ml/s.)	AFR (ml/s.)	RU (ml)	Incon.	Nocturia
1	±	±	28.6	380	36.5	27.5	8	none	2
2	—	—	39.0	420	35.0	15.6	4	none	2
3	#	±	31.2	450	13.0	5.0	30	none	1
4	—	—	—	400	16.8	4.0	4	mild	1
5	—	—	—	470	33.0	21.0	10	mild	2
6	—	—	36.4	380	34.5	13.5	18	none	2
7	—	—	46.8	375	9.4	4.2	4	none	1
8	—	—	35.0	350	16.0	5.0	20	none	1

IVP; — none, ± mild hydronephrosis, # moderate. VUR; — none, ± Grade I. Ves. P.; Intravesical pressure. V.V.; Voided volume. RU; Residual urine. Incon; Incontinence.

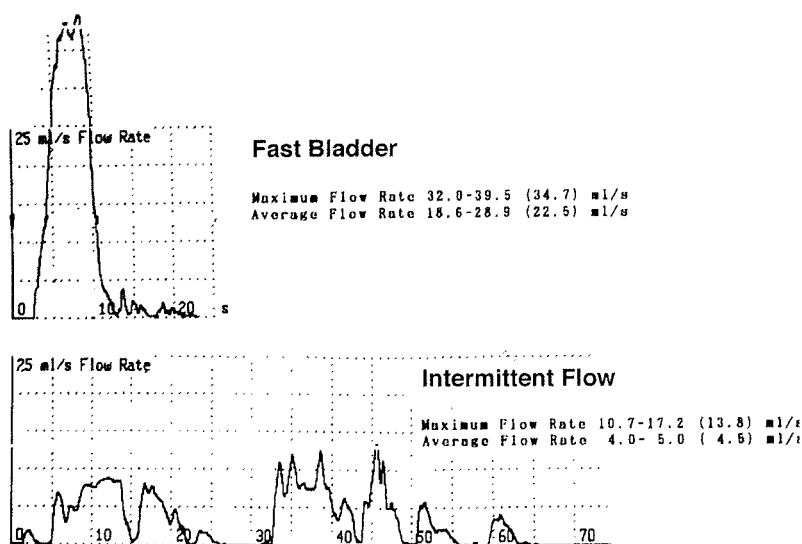


Fig. 5. The uroflowmetry revealed two patterns, "fast bladder" (upper) and "intermittent flow" (lower).

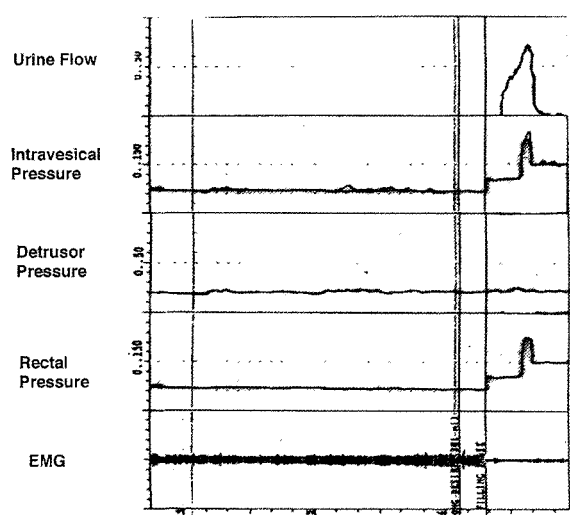


Fig. 6. Pressure flow study in fast bladder revealed a disappearance of the electron potential on the EMG of the extraurethral sphincter muscle accompanied by intravesical pressure increase. The base lines of intravesical and rectal pressure were shifted upward at sitting.

## RESULTS

In the patient who had a small tubular segment with a length of 3 cm between the pouch and prostatic capsule, and in which there was an intermittent peristaltic wave, a stretch and twist was found to be the cause of urinary obstruction and required a reoperation (Fig. 3). In the seven other patients, the urethral was anastomosed with neobladder detubularized directly to the prostate capsule. Urethral obstruction was not detected (Fig. 4).

Intravenous pyelography (IVP), revealed mild and moderate hydronephrosis in one patient each and Grade I vesicoureteral reflux (VUR) in two patients. The intravesical pressure was between 28.6 and 46.8 cmH<sub>2</sub>O with a mean of 36.2 cmH<sub>2</sub>O. The voided volume was between 350 and 470 ml with a mean of 403.1 ml. The maximum flow rate was between 9.4 and 36.5 ml/s with a mean of 24.3 ml/s. The residual urine was between 4 and 30 ml with a mean of 13.4 ml. Two patients experienced mild and only nighttime incontinence. Nocturia occurred once in four pa-

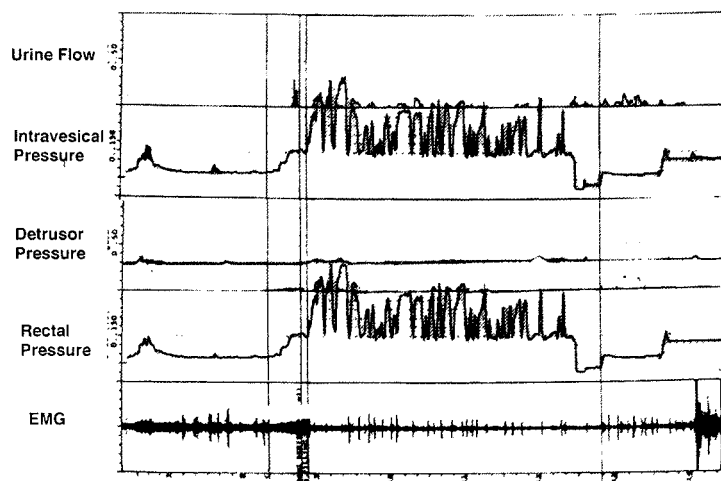


Fig. 7. Pressure flow study in intermittent flow showed an intermittent EMG pattern for the extrasphincter muscle during intraveical pressure increase.

tients and twice in four patients (Table 2). The voided volume reached the maximum after five months when the indwelling catheters were removed. The residual volume reached a minimum after six months. The uroflowmetry revealed two patterns, "fast bladder" in four patients, and "intermittent flow" in three patients (Fig. 5). A pressure flow study in "fast bladder" revealed the disappearance of electron potential on the EMG of the extraurethral sphincter muscle accompanied by intravesical pressure increase (Fig. 6). The pressure flow study in "intermittent flow" showed an intermittent EMG pattern for the extraurethral sphincter muscle during intravesical pressure increase (Fig. 7).

### DISCUSSION

We performed continent urinary diversion after cystectomy with subcapsular prostatectomy. The procedure described here is superior to the traditional replacement of the ileal neobladder in several ways: [1] It is a simpler procedure without ligation or dissection of Santorini's plexus and loss of blood can be kept minimal. [2] The anastomosis operation is simplified by retaining the partial prostatic capsula (subcapsular prostatectomy). [3] Less damage to the sphincter results by retaining the apex of the prostate. Zinman and Libertino first reported the concept of preservation of the prostatic apex<sup>4)</sup>, which was supported by Kamat MR, et al.<sup>5)</sup> However, Winfield et al. suggested the possible development of malignancy in the retained prostatic cuff<sup>6)</sup>. In our studies, all patients had superficial bladder cancers and the prostatic urethra was free of carcinoma, confirmed by a preoperative loop biopsy and a frozen section at the time of cystectomy. The absence of prostatic capsular involvement of cancer cells was later confirmed histopathologically. However, the patients were followed up to check the possible development of malignancy in the retained prostatic

cuff.

In one patient who had a small tubular segment with a length of 3 cm between the pouch and prostatic capsule and in which there was an intermittent peristaltic wave, a stretch and twist was found to be the cause of urinary obstruction. Required a re-operation as reported by Studer, et al.<sup>7)</sup>

Because the incision line is made avoiding the urethral sphincter muscle<sup>8)</sup>, the damage to the sphincter is kept minimal and the extraurethral sphincter muscle is left undamaged. In our studies, none of the patients reported incontinence during the daytime. Two patients had mild and only nighttime incontinence.

In "intermittent flow", EMG of the extraurethral sphincter muscle appeared intermittently during intravesical pressure increase and in "fast bladder", EMG of the extraurethral sphincter muscle disappeared accompanied by an intravesical pressure increase. "Intermittent flow" may be produced by the so-called detrusor-sphincter dyssynergia. Porru D. reported that incoordination between the reservoir and the pelvic musculature prevented complete urine evacuation. Micturition physiology in patients after radical cystoprostatectomy and bladder replacement, which require coordination between abdominal contraction and pelvic relaxation requires further study<sup>9)</sup>

### CONCLUSION

Patients were evaluated clinically, radiologically and urodynamically to determine the outcome of continent urinary diversion after cystectomy. Two types of micturition of neobladder were noted: "fast bladder" and "intermittent flow". The intermittent flow type resembled detrusor sphincter dyssynergia.

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- (Received on January 27, 1997)  
(Accepted on July 21, 1997)  
(迅速掲載)

## 回腸新膀胱の2つのタイプの排尿

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尿路変向は多くの方法が用いられているが，未だに回腸導管が最も多い．しかし膀胱摘出後の Quality of Life の向上のため，禁制型尿路変向術が広く施行されている．そこで，われわれは回腸新膀胱による禁制型尿路変向術を再発性表在性膀胱腫瘍8例に被膜下前立腺摘出下膀胱摘出後に施行し，術後の排尿状態を検討した．術後の結果を臨床的，X線検査および尿流動態学的に検査した．8患者は男性で平均55.3歳，サントリニー静脈叢を結紮切除せずに順行性に膀胱を切除後，前立腺は膀胱頸部より2 cm 末梢側で切除し被膜下前立腺摘出した．1例で代用膀胱と尿道の間に3

cm の腸管部分を残し，その蠕動運動のため排尿が著明にぜん延したため，再手術を要した．他の7名はすべて脱管腔化した新膀胱を直接前立腺被膜に縫合し，排尿は良好であった．内圧—尿流検査を7名の患者で施行し，fast bladder と intermittent flow の2つのタイプの排尿が見られ，後者は排尿筋 括約筋協調不全様所見がみられた．新膀胱に2つのタイプの排尿が見られた．尿流動態検査による経過観察が必要と思われる．

(泌尿紀要 43 : 713-718, 1997)