Mitrofanoff Procedure Incombination with Enterocystoplasty for Detrusor Hyperreflexia with External Sphincter Dyssynergia: One-Year Experience of 12 Cases

WACHIRA KOCHAKARN, M.D.*,
VERASING MUANGMAN, M.D.*

Abstract

Twelve patients with the mean age of 35 years who had undergone Mitrofanoff procedure incombination with enterocystoplasty between 1998-1999 were interviewed. All of the patients had suprasacral spinal cord injuries for the mean of 3.5 years from the accident to the operation and failure of medical treatment to suppress hyperreflexic bladder. The vermiform appendix was used to implant as continent stoma in 10 cases and ileal segment was used in 2 cases due to prior appendectomy. The bladder capacity was increased from the mean of 180 ml before the operation to 300 ml intraoperation and 800 ml at 1 year post-operation. Up to 1 year, no immediate and late complication was detected except one case who had orchitis at eleven months post-operation. All of them still have continence and self-intermittent catheterization can easily be performed *via* continent stoma at the abdominal wall.

Key word : Mitrofanoff, Catheterization, Continence

KOCHAKARN W & MUANGMAN V
J Med Assoc Thai 2001; 84: 1046-1050

Detrusor hyperreflexia with external sphincter dyssynergia is frequently observed in chronic suprasacral spinal-injured patients(1). The patients have high risk of vesicoureteral reflux due to high intravesical pressure resulting in kidney deterioration(2). Parasympatholytic drugs in combination with clean intermittent catheterization are the primary treatment generally accepted. However, medical treatment often fails to suppress this hyperactivity(3). Several alternative choices have been introduced to treat this group of patients such as neuromodalities, enterocystoplasty and urinary diver-

* Division of Urology, Department of Surgery, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok 10400, Thailand.

sions[4,5]. Of these modalities, enterocystoplasty seems to be superior due to its higher bladder capacity, lower intravesical pressure and better quality of life[5].

Most of the paraplegic patients need assistance for catheterization. Therefore, we decided to use Mitrofanoff procedure in creating a continent stoma at the abdominal wall in order to make accessibility of the patient to catheterize himself. The aim of this study was to access the technique, complications and quality of life of the patients after the operation.

MATERIAL AND METHOD

From January 1998 to April 1999, 12 male patients with detrusor hyperreflexia and external sphincter dyssynergia were enrolled in this study after failure of medical treatment. The mean patient age was 35 years old (range 18-45) and the level of spinal cord injuries was between T4-T12 with complete paraplegia. The causes of spinal cord injuries were traffic accident in 6, gun shot in 2 cases, fall from a height in 3 cases and occupational accident in one case. The mean duration after injuries to the operation was 3.5 years (range 3-5 years). None of the patients responded to anticholinergic drugs for control of bladder hyperactivity after a full dose of treatment for at least 3 months. The pre-operative evaluation included urodynamic studies with electromyography, serum BUN, creatinine, electrolytes (Na, K, CO_2 and Cl), urine examination, urine culture, IVP, and voiding cystourethrogaphy. Patients who had azothemia were excluded from this study. All cases who had urinary tract infection were treated with antibiotics until negative urine culture was gained. Mean bladder capacity was 180 ml (range 80-220) and all of the patients had early vesicoureteral reflux.

The patients were admitted 3 days prior to the operation for bowel preparation. After laparotomy, good bowel segment was chosen for augmentation cystoplasty. Vermiform appendix was evaluated for size, length and blood supply. It was harvested to keep the blood supply intact for implantation. (Fig. 2) If the vermiform appendix was not available, the ileal segment was replaced as shown in Fig. 3. The bladder was opened, the appendix or ileal segment was implanted at the bladder wall with a submucosal tunnel. Bowel segment was detubularized and anastomosed to the bladder. Continent stoma was created at the abdominal wall at the right lower quadrant. Post-operative urinary drainage was cystostomy and urethral catheter. Clean intermittent catheterization was started at the second week post operation *via* continent stoma. The follow-up parameters were serum BUN, creatinine,

Fig. 1. Shows pre-operative IVP. A metallic density at right upper quadrant is the bullet, small bladder and dilatation of upper tract is also noted.

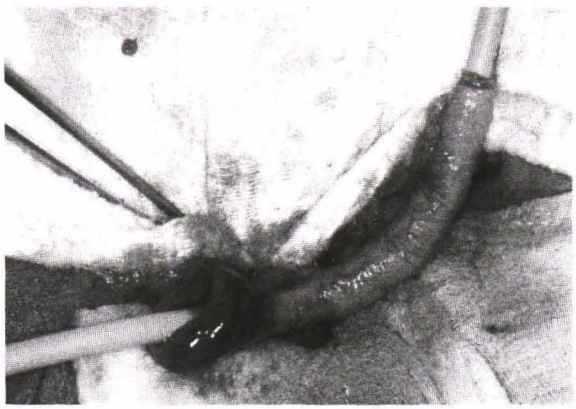

Fig. 2. Vermiform appendix is ready for implantation. Red catheter 16 F can be passed *via* the lumen is noted.

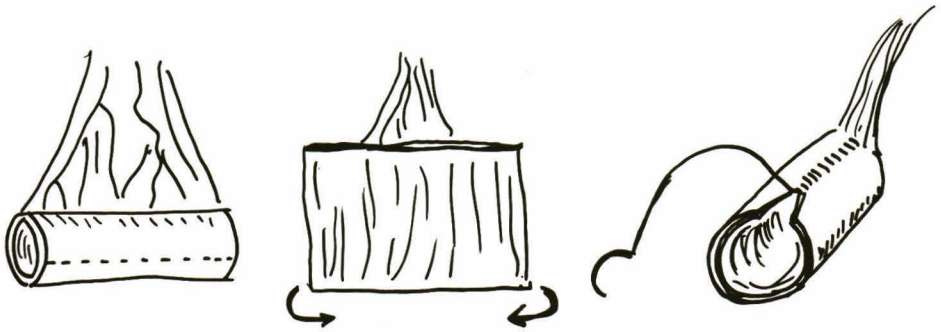

Fig. 3. The technique for usage of ileum to create a continent stoma.

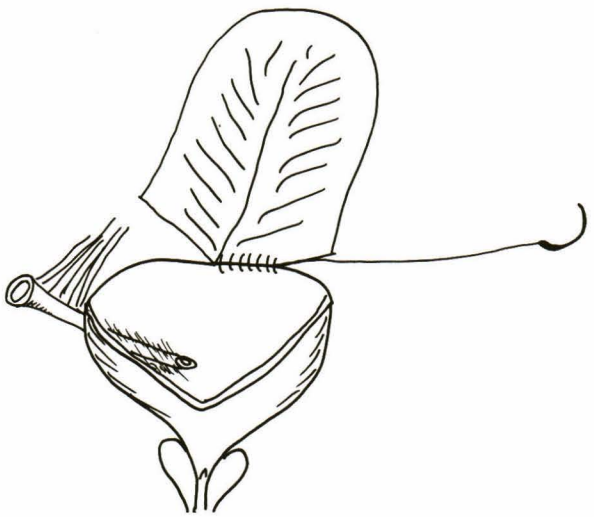

Fig. 4. Shows operative technique.

Fig. 5. Shows cystogram at one year post-operation, no reflux *via* continent appendicovesicostomy is also noted.

electrolytes, cystography, IVP and catheterized technique at 3, 6 and 12 months.

RESULTS

Of 12 cases followed, no intraoperative and immediate post-operative complication were detected. Ileal segments were used for augmentation in all of the cases with the mean of 35 cm long (range 20-40 cm). Vermiform appendix was used as continent diversion in 10 cases and ileal segments were used for continent diversion in 2 cases due to prior appendectomy. The mean intraoperative bladder capacity was 300 ml (range 250-400 ml). The mean hospital stay was 25 days (range 20-28 days). In the follow-up period, no significant change of BUN, creatinine, electrolytes and no metabolic complication was detected. Up to 1 year, the mean bladder capacity was 800 ml (range 700-1,000 ml). All of the patients are still continent and clean intermittent catheterization is done every 8 hours *via* continent stoma with ease. No upper urinary tract infection, diarrhea or steatorrhea were detected except one patient who developed orchitis at eleven months after the operation and was cured after 2 weeks of antibiotics.

DISCUSSION

Detrusor hyperreflexia with external sphincter dyssynergia is a common consequence after suprasacral spinal cord injury[1]. High intra-

vesical pressure and incomplete urinary drainage are the problems concerned among urologists which can cause severe complications including urinary tract infection and renal function deterioration[2]. The aims of the treatment are to reduce intravesical pressure, increase bladder capacity and complete urinary drainage[6,7]. Parasympatholytic drugs are the treatment of choice for suppressing detrusor contraction[3]. Due to the incomplete emptying of the bladder, Guttman recommended sterile intermittent catheterization but it was difficult to perform in the long term[8,9]. Lapides was credited as the pioneer in promotion for clean intermittent catheterization based on his theory that host resistant factors supersede the introduction of bacteria for preventing urinary tract infection[10]. Early and long term clinical experience with clean intermittent catheterization showed a low risk of urinary tract complications[11]. However, due to paraplegia many patients can not insert the catheter by themselves therefore suprapubic cystostomy, vesicostomy or chronic urethral catheterization were chosen for them[12-15].

Frequently, a hyperreflexic bladder can not be suppressed by parasympatholytic drugs and urinary incontinence continues with or without vesicoureteral reflux[3]. Many modalities were introduced to treat this group of patients such as sacral rhizotomy, phenol injection to trigone, electrical stimulation and enterocystoplasty[3-5]. Enterocystoplasty gives a higher successful rate to reduce intravesical pressure and keep continence[5]. Clean intermittent catheterization is still needed for urinary drainage after operation[5]. In the long term follow-up, no metabolic complication or absorptive complication including diarrhea and steatorrhea were reported after enterocystoplasty[16].

Mitrofanoff procedure, using a tubal structure implant to urinary reservoir, was introduced for continence urinary diversion due to the simplicity and reliable outcome[17]. Because of the flap valve mechanism and less invasiveness, this technique is becoming the continent mechanism of choice for patients who need urinary diversion. Creating a continent stoma at the abdominal wall is advantageous to the patient because of simplicity in inserting a catheter *via* this stoma[18,19].

In this study, we used the Mitrofanoff procedure in combination with enterocystoplasty and showed low complication and low morbidity. All of the patients could insert the catheter by themselves easily.

SUMMARY

Mitrofanoff procedure in combination with enterocystoplasty is a safe procedure that can be introduced to manage detrusor hyperreflexia with external sphincter dyssynergia. It also showed good results including quality of life in paraplegic patients.

(Received for publication on May 29, 2000)

REFERENCES

1. Watanabe T, Rivas DA, Chancellor MB. Urodynamics of spinal cord injury. Urol Clin North Am 1996; 23: 459-74.
2. Pearman JW. Urologic follow-up of 99 spinal cord injuries patients initially managed by intermittent catheterization. Br J Urol 1976; 48: 297-310.
3. Chartier-Kastler E, Azouvi P, Yakovleff A, et al. Intrathecal catheter with subcutaneous port for clonidine test bolus injection. Eur Urol 2000; 37: 14-7.
4. Weil EHJ, Carda-Ruiz JL, Eerdmans PHA. Sacral Root Neuromodulation in the treatment of refractory urinary urge incontinence: A prospective randomized clinical trial. Eur Urol 2000; 37: 161-71.
5. Webster GD, Mark SD. Augmentation cystoplasty In: Krane RJ, Siroky MB, Fitzpatrick JM. eds. Clinical Urology, Philadelphia: JB Lippincott company, 1994: 735-48.
6. Weld KJ, Dmochowski RR. Effect of bladder management on urological complications in spinal cord injured patients. J Urol 2000; 163: 768-72.
7. Zermann DH, Wunderlich H, Derry F, et al. Audit of early bladder management complications after spinal cord injury in first-treating hospitals. Eur Urol 2000; 37: 156-60.
8. Guttman L, Frankel H. The value of intermittent catheterization in the early management of traumatic paraplegia and tetraplegia. Paraplegia 1966;

4: 63-7.
9. Guttman L. Intermittent catheterization for blabber emptying in paraplegia. Roy Soc Med 1947; 40: 219-25
10. Lapides J, Diakno AC, Gould FR, et al. Follow-up on unsterile intermittent self-catheterization. J Urol 1974; 111: 184.
11. Lapides J, Diakno AC, Gould FR, et al. Further Observations on self-catherization. J Urol 1976; 115: 169.
12. Dewire DM, Owens RS, Anderson GA, et al. A comparison of the urological complications associated with long-term management of quadriplegics with and without chronic indwelling urinary catheters. J Urol 1992; 147: 1069-72.
13. MacDiarmia SA, Arnold EP, Palmer NB, et al. Management of spinal cord injured patients by indwelling suprapubic catheterization. J Urol 1995; 154: 492-4.
14. Namiki T, Ito H, Yasuda K. Management of the urinary tract by suprapubic cystostomy kept under a closed and aseptic state in the acute stage of the patient with spinal cord lesion. J Urol 1978; 119: 359-62.
15. Cook JB, Smith PH. Percutaneus suprapubic cystostomy after spinal cord injury. Br J Urol 1976; 48: 119-21.
16. Fujisawa M, Nakamura I, Yamanaka N, et al. Changes in calaium meabolism and bone demineralization after orthotopic intestinal neobladder creation. J Urol 2000; 163: 1108-11.
17. Mitrofanoff P. Trans-appendicular continent cystostomy in the management of neurogenic bladder. Chir Pediatr 1980; 21: 297-305.
18. Fishwick JE, Gough DCS, O'Flynn KJ. The Mitrofanoff procedure: does it last? BJU Int 2000; 85: 496-7.
19. Sumfest JM, Burns MW, Mitchell ME. The Mitrofanoff principle in urinary reconstruction. J Urol 1993; 150: 1875-7.

การผ่าตัดแบบไมโตรฟานอฟร่วมกับการเพิ่มความจุของกระเพาะปัสสาวะเพื่อการรักษาผู้ป่วยที่มีกระเพาะปัสสาวะบีบตัวผิดปกติและหูรูดทำงานไม่ประสานกัน : ประสบการณ์ 1 ปี ในผู้ป่วย 12 ราย

วชิร คชการ, พ.บ., วีระสิงห์ เมืองมั่น, พ.บ.**

ได้ทำการรักษาผู้ป่วยชายที่มีอุบัติเหตุของกระดูกสันหลังและอัมพาตครึ่งท่อนจำนวน 12 ราย อายุเฉลี่ย 35 ปี ผู้ป่วยทุกรายมีปัญหากระเพาะปัสสาวะพิการชนิดกระเพาะปัสสาวะบีบตัวมากกว่าปกติและหูรูดทำงานไม่ประสานกันซึ่งรักษาด้วยยาไม่ได้ผล โดยผ่าตัดเพิ่มความจุของกระเพาะปัสสาวะด้วยลำไส้ไอเลี่ยมและเสริมด้วยการผ่าตัดไมโตรฟานอฟ เพื่อเป็นช่องทางให้ผู้ป่วยสวนปัสสาวะเองทางหน้าท้องโดยใช้ไส้ติ่งมาทำเป็นทางสวนปัสสาวะ 10 รายและอีก 2 ราย ต้องใช้ลำไส้ไอเลี่ยมเพราะไส้ติ่งถูกตัดมาก่อนแล้ว กระเพาะปัสสาวะก่อนการผ่าตัดมีความจุเฉลี่ย 180 มล. ขณะผ่าตัดเพิ่มเป็น 300 มล. และเมื่อติดตามมา 1 ปีเพิ่มเป็น 800 มล. ไม่พบอาการแทรกซ้อนระหว่างการผ่าตัดตลอดจนหลังผ่าตัดที่ติดตามมา 1 ปี ทุกรายสามารถกลั้นปัสสาวะได้ไม่มีปัสสาวะเรี่ยราดและสามารถสวนปัสสาวะได้เองทางรูเปิดบริเวณหน้าท้อง

คำสำคัญ : การสวนปัสสาวะ, ไมโตรฟานอฟ, กระเพาะปัสสาวะพิการ

วชิร คชการ, วีระสิงห์ เมืองมั่น
จดหมายเหตุทางแพทย์ ฯ 2544; 84: 1046–1050

* หน่วยศัลยศาสตร์ระบบปัสสาวะ, ภาควิชาศัลยศาสตร์, คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี, มหาวิทยาลัยมหิดล, กรุงเทพ ฯ 10400