THE ILEAL NEOBLADDER — AN IDEAL BLADDER SUBSTITUTE?

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ABSTRACT

The ileal neobladder was evaluated on 5 patients following radical cystoprostatectomy. All the patients made good post-operative recovery. Complete day and night continence was achieved in all by the third month. Bladder capacities ranged between 475 mL and 690 mL and the residual volumes between 23 mL and 65 mL at 3 months. The neobladder pressures were below 35 mm of water. Ultrasound scanning and intravenous urography showed no signs of obstruction or reflux in the upper tracts.

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KEY WORDS : Neobladder; Ileum; Surgical technique.

Introduction

Camery was the first to use intestinal segments in a large number of patients to provide a functional bladder substitute [1] following radical cystectomy. Since then a large number of modifications have been made. A substitute should ideally provide i) low pressure storage, ii) voiding at will with a good stream, iii) continence at all times, and iv) avoidance of external collecting appliances. The neobladder created from detubularized ileum is appealing as it incorporates all the above features. The technique as originally described in 1988 by Hautmann and associates [2] has only recently caught the imagination of urologists in India. Infrequently done because of the demanding nature of the surgery, experience is limited to major Indian urology centers. An evaluation of the functional and urodynamic performance of the ileal neobladder is presented.

Material and Methods

Between 1993 and 1995 five patients (two at the All India Institute of Medical Sciences, New Delhi and three at Command Hospital (CC) Lucknow) who underwent radical pelvic lymphadenectomy and cystoprostatectomy for carcinoma bladder received bladder replacement with

the ileal neobladder. The technique adopted was as described by Hautmann and associates in 1988 [2]. An ileal segment, 70 cm long, was isolated about 20 cm away from the ileocecal junction. Bowel continuity was re-established and appendicectomy done. The isolated segment was formed into a 'W' configuration with appropriate stay sutures (Fig 1) and its anti-mesenteric border spatulated. The back walls of the intestinal segment were

Fig. 1 : The ileum configured as a 'W'

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Fig. 2: Intervening limbs sutured

Fig. 3: Anastomosis of ureter and urethra

sutured together using continuous 2-0 vicryl suture (Fig 2). A small opening was created at the lower end of the right limb of the 'W' for anastomosis with the urethra (Fig 3). This urethro-neobladder anastomosis was carried out with six 3-0 vicryl sutures over a 22 F Foley's catheter. The ureters were anastomosed to the ileal segment by incising the serosa of the ileum and laying them in a mucosal trough as proposed by LeDuc [3]. Finally the neobladder was closed in a manner similar to the 'cup patch' technique (Fig. 4).

Fig. 4: Completed neobladder

In all the patients 5 F instant feeding tubes were passed up each ureter and brought out through a anterior incision in the neobladder. A 22 F Malecot catheter was used as a supra-pubic tube into the dome of the neobladder. Tube drains were placed in both pelvic gutters. A gastrostomy replaced the Ryle's tube to facilitate chest physiotherapy in the post-operative period. Daily irrigation of the neobladder with sodabcarb was carried out to prevent mucous collection. The ureteral stents were left in place for 2 weeks. After 4 weeks a cystogram was performed to exclude leaks from the neobladder and only then the urethral catheters were removed. The patients were taught to void by relaxing the perineal muscles along with abdominal straining as in the Valsalva's manoeuvre.

Post-operative follow-up ranged from 6 months to 27 months. It included serum electrolyte monitoring and oral sodabcarbonate therapy for a period of 3 months following removal of the urethral catheter. Intravenous urogram (IVU) were performed at 6 weeks and 6 months after the operation. Urodynamic investigations were carried out at 3 months. The surveillance protocol included 3 monthly urethro-panendoscopies as is the standard follow-up for carcinoma bladder.

Results

Five male patients, 57 years to 65 years of age,

underwent the operation. Operative time ranged from 7 to 9½ hours. Three patients required 2 units of blood transfusion each and the other two required 3 units. Four patients had Stage C disease, while one was found to have Stage D1 disease following detailed sectioning of the pelvic lymphadenectomy specimen. The latter patient received 6 cycles of adjuvant chemotherapy (Methotrexate +DDP).

Early complications were by way of hypotension in one patient which developed 3 hours after surgery and was accompanied by pyrexia (103°F). It was thought to be a reaction to intravenous fluid and responded to Inj Novalgin and a dopamine drip. Another patient developed high grade fever with chills from the 15th post-operative day. Ultrasonography did not reveal any pelvic collection

and there was no improvement after antibiotic administration. Repeated blood testing revealed BT malaria and the pyrexia responded to antimalarial therapy. IVU after 6 weeks revealed upper tract fullness in one patient (Fig. 5) but this had cleared up in the follow-up IVU at 6 months (Fig. 6).

All patients were totally continent both during the day and night by the third month. Urodynamic evaluation (Table 1) at 3 months showed that the maximum bladder capacity was 690 mL. The maximum and half-capacity bladder pressures were below 35 mm of water. The residual urine did not exceed 65 mL in any patient and this was less than 10% of the neobladder volume.

Discussion

Our experience with the Hautmann ileal neobladder technique in 5 patients has been

Fig. 5 : Early hydronephrosis.

Fig. 6 : Resolution of hydronephrosis at 6 months.

TABLE 1

The urodynamic data at 3 months

	Case 1	2	3	4	5
Bladder capacity	475 mL	500 mL	690 mL	560 mL	650 mL
Residual volume	23 mL	45 mL	65 mL	30 mL	50 mL
Intra-vesical pressures: 1/2 full	< 10	< 15	< 15	< 20	< 15
(in cm of water) full	< 25	< 35	< 30	< 35	< 35

extremely satisfying. While any neobladder would mimic the storage function of the bladder, low pressure storage is provided by detubularization and reconfiguration, a concept demonstrated by Kock [4] with the intra-abdominal reservoirs.

All our patients achieved total day and night continence by the third month. Kock [5] found 30 of 34 patients completely continent with a urethral Kock pouch and Riedmiller et al [6] found 24 of 27 patients continent with a urethral Mainz pouch. Continence is affected by operative factors as also patient factors. While a detubularized reservoir of adequate capacity is essential, careful dissection at the apex of the prostate while tackling the dorsal venous complex is important to prevent damage to the external sphincter. A disciplined and well-motivated patient who coordinates his fluid intake with the frequency of voiding is equally critical. The Armed Forces background of our patients may have been a positive feature. During the day the patients were asked to void every 3 to 4 hours. Nocturnal continence was helped by restricting fluids after 7 p.m. and by voiding at least once at night. Complete continence was achieved in all the patients by the third month.

Mucous production was not a problem due to the daily sodabarbonate washes. No oral alkalinizing agents were used after 3 months and all patients were doing well with no overt symptoms and signs of acidosis. Intravenous urograms and ultrasound examination at 3 months and one year in all the cases showed normal upper tracts with no

evidence of obstruction or reflux. Ensuring proper handling and dissection of the ureters is vital in preventing ischaemic injury and later obstruction at the uretero-neobladder anastomosis. The LeDuc's technique of ureteral implantation along with a detubularized neobladder of adequate capacity appears sufficient to prevent reflux.

Patients acceptance of radical cystectomy is high with the ileal neobladder substitution instead of a conduit or a continent catheterizable pouch. The technique, though technically demanding, is not difficult for surgeons adept at performing radical cystoprostatectomies. The ileal neobladders created by us have functioned well and appear to approximate most closely the optimal substitute.

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