

Early outcome of Mainz Pouch2 urinary diversion

Aboud M.M, MD MMed,

Senior Lecturer,

Muhimbiri College of Health Sciences (MUCHS),

P.O.Box 10105, Dar es Salaam, Tanzania.

Email: muhsinaboud@hotmail.com

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This was both a retrospective and prospective study of 19 patients who were managed at Kilimanjaro Christian Medical Centre (KCMC) with Mainz pouch 2 reconstruction after cystectomy for bladder cancer. Complications encountered included wound infection (4 patients), and wound dehiscence (2 patients). No case of urinary fistula was recorded. There was one death. Generally, the early results of Mainz pouch 2 were excellent; all the patients were continent and there were no cases of pyelonephritis or metabolic derangement. The upper tracts were preserved or improved in the 18 patients that survived. In conclusion, Mainz pouch, like ureterosigmoidostomy has been well accepted in our society. Our results compare favourably with those reported from elsewhere.

Introduction

The scientific basis of ureterosigmoidostomy was first described by Coffey. He also showed that the high rectal pressure caused incontinence and reflux of faecal material into the kidney¹. Improvement of operative technique, in particular in prevention of colo-ureteric reflux and stenosis and efficient management of metabolic disorders

eliminated many of the problems responsible for the ureterosigmoidostomy's earlier dispute^{2,3}. Fisch et al⁴ observed that incontinence is virtually abolished if the rectum is detubularized (sigma-rectum pouch). All these have led to a renaissance of this diversion. In 1992, an English urologist introduced at Kilimanjaro Christian Medical Centre (KCMC) for the first time, the Mainz pouch 2 technique of urinary diversion. Since then it has gained popularity and acceptance. This paper describes the operative technique used and the early results in patients treated with the method at KCMC.

Patients and methods

This was both a retrospective (9 cases) and prospective (10 cases) analysis of 19 patients who had Mainz pouch 2 urinary diversion following cystectomy for bladder tumours done at KCMC between June 1993 and June 1998. As part of the preliminary assessment of the patients, the anal sphincter was tested by filling the rectum with 300 ml of normal saline, which the patients had to hold for at least one hour. On the evening before the day of operation, total gut irrigation was done using 9 litres of normal saline that was run in within 2 hours. Preoperative gentamycin and metronidazole were given one hour before surgery.

The surgical technique as described by Fisch et al⁴ was used. At the end of the cystectomy, the lower colon lay at the bottom of the operating field with the cut ureters (Figure Ia). The antemesenteric 20 cm of the lower sigmoid and upper rectum were marked with stay sutures and opened longitudinally using cutting diathermy (Figure Ib). The posterior plate was formed by closing the posterior wall in an inverted “V” form with 2/0 vicryl sutures. We preferred using two rows, an outer interrupted seromuscular and inner continuous through and through layer.

The ureters were implanted on the posterior plate, lateral to the midline via a 3 cm long submucosal tunnel, and were then anchored with 5/0 vicryl sutures. Both ureters were stented with 10-F feeding tubes that were brought out through the anus via a 30-F flatus tube (Figure IIa) The flatus tube was sutured to the peri-anal skin. After closure of the anterior walls (Figure IIb), the pouch was fixed to the periosteum of the sacrum so as to prevent dragging or tension on the ureters (Figure IIc). Prophylactic antibiotics were continued for 3 days while the patients were kept on nil by mouth for 4 days. Both the flatus tube and stents were removed on the 7th post-operative day.

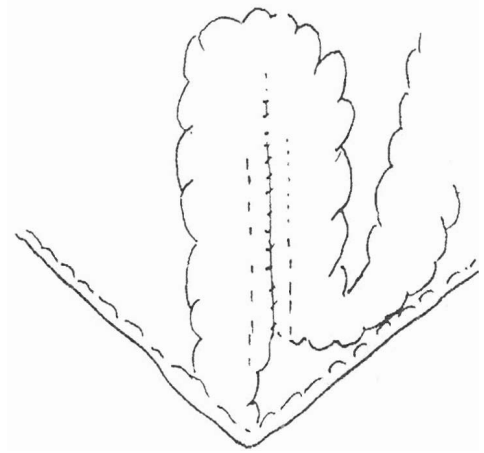
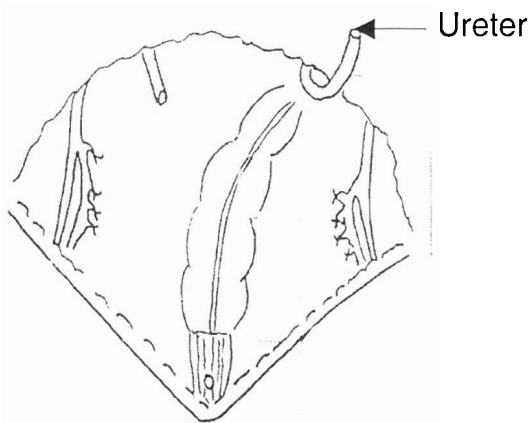


Figure Ib. Positioning for sigma Rectum Pouch formation.

Figure IIa

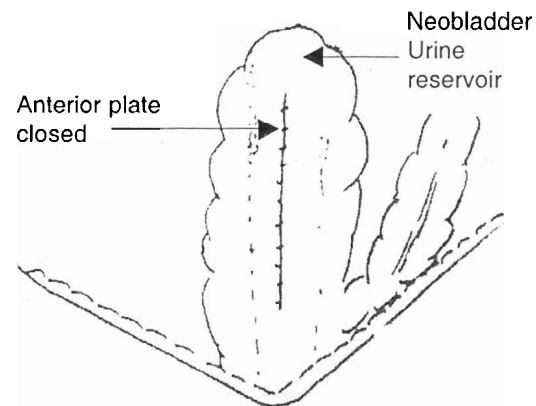
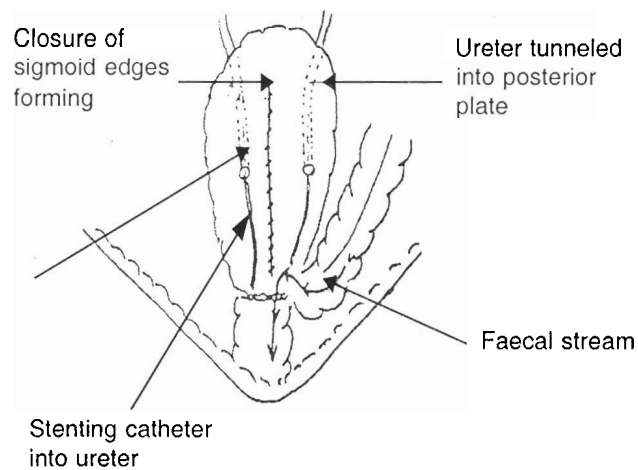


Figure Ia. Bladder and lymph nodes removed.

Figure IIb.

Sagittal section showing in promontory of sacrum.
(Figure IIc below)

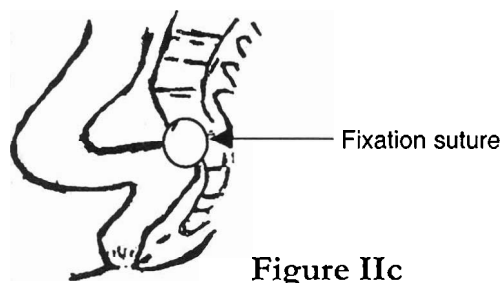


Figure IIc

Results

Between June 1993 and June 1998, 19 patients had cystectomy for bladder tumours followed by Mainz pouch 2 urinary diversion. Fourteen patients were males and five were females. Their ages ranged between 31 and 72 years with an

average age of 49.9 years (Table 1). The average postoperative hospital stay was 13.8 days. The reconstruction of Mainz pouch 2 took longer to perform than the classical ureterosigmoidostomy and on average each patient required 2.4 units of blood transfusion in addition to the autologous unit taken preoperatively. Four patients developed wound infection in the first postoperative week, which in two of them was so severe that it resulted in wound dehiscence (Table 2). One patient who had wound disruption developed septicaemia and deep jaundice. He died on the 15th postoperative day. One patient had to be re-operated because of generalized peritonitis but no leaking urinary fistula was found at surgery. On removal of the flatus tube and stents normally on the 7th day, all the patients were continent but one complained of occasional nocturnal soiling. Evaluation of the patients before discharge included

Table 1. Characteristics and outcome of 19 patients who had Mainz Pouch 2.

Parameter	Number
Age range in years (mean)	31-72 (mean=49.9)
Sex ratio Male / female	14 / 5 (2.8:1)
Average transfusion	2.4 units
Average hospital stay	13.8 days
Pre-operative renal unit dilated (ratio)	18 / 38
Post-operative renal unit dilated (ratio)	7 / 38
Worsening biochemistry	1
Bowel function at discharge:	
• Incontinence	Nil
• Night soiling	1
• Fully continent	18
Symptomatic renal infection	Nil

Table 2. Immediate / early post-operative complications among 19 Mainz Pouch 2 patients.

Complication	No. of cases	% Rate
Wound infection	4	21.1
Wound dehiscence	2	10.5
Peritonitis	1	5.3
Urinary fistula	-	0
Death	1	5.3

assessment of the renal function and the configuration of the upper urinary tracts using ultrasound.

One patient had deterioration of the renal function. None of the patients developed new upper tract dilatation or worsening of the previous dilatation. Eleven patients who had pre-operative renal unit dilated had the dilation improved.

Discussion.

The choice of procedure of urinary diversion may depend on the socio-economic and environmental factors. What is acceptable in the developed nations such as wet cutaneous stomas may be totally unacceptable or even rejected in the third world countries. This justified the attempts to develop a reliable, appliance-free urinary diversion, which is readily accepted by society.

Ureterosigmoidostomy had been the prime method of urinary diversion in Tanzania until 1992 when Mainz pouch 2 was introduced at KCMC by an English urologist³. The advantage of rectosigmoid diversion included absence of a stoma, none of the problems of an external collecting device and normal form of urinary control. Being a simpler technique and definitely shorter operating time seemed to be distinct advantages. The added advantage of Mainz pouch 2 is its low rectal pressure, which subsequently

prevents incontinence and reflux of faecal material into the kidney⁴.

There is a great variation from centre to centre in the surgical mortality and morbidity of urinary diversion for malignant diseases. Even in the best series, there are problems of recurrent infection, peritonitis, paralytic ileus, abdominal wound dehiscence, leak in the ureterocolic anastomosis, intestinal obstruction and even death.

Early complications, generally defined as occurring within 30 days of urinary diversion, were seen in 5 of the 19 patients. Only two complications were serious. One death occurred in a patient who had wound infection and wound dehiscence. The second serious complication was peritonitis whose cause was not established. The extremely low rate of peritonitis may be attributed to the use of ureteral stents, which completely prevented the occurrence of ureterocolic anastomotic leak, which is potentially one of the most serious early complications. Wound infection was the most common early complication in our series.

Infection is always a risk when the bowel, particularly the large one, is opened. It is now well known that the most important single factor in large bowel preparation is complete mechanical cleansing. Debilitated patients with malignancies are notoriously at risk of getting wound dehiscence. The value of parenteral nutrition, which unfortunately was not available in KCMC, should not be overlooked. We observed that there was no significant difference between the classical ureterosigmoidostomy and Mainz pouch 2 in terms of blood transfusion requirement and average hospital stay. Obviously, reconstruction of Mainz pouch 2 takes longer than ureterosigmoidostomy.

The two most troublesome complications reported in ureterosigmoidostomy are

incontinence and pyelonephritis⁶. Both of these complications are attributed to the high rectal pressures. The modification described in Mainz pouch 2 is specifically aimed at reducing the rectal pressures, the principle being to form a low-pressure reservoir. The results achieved in our series of day time continence rate of 100% and a single case of mild night soiling were much better when compared with those of ureterosigmoidostomy^{6,7}.

Hyperchloraemic acidosis has been reported in a few patients with urinary diversion, especially if they have impaired renal function. The problem is caused by absorption of chloride and ammonium ions and urea from the urine and by loss of potassium⁸. This was not a serious problem in our series. The mixture of faeces and urine in the bowel is associated with a high risk of neoplasia at 20-30 years of follow up⁹. The modification in Mainz 2 pouch does not reduce this risk, if anything it might increase it due to increased stasis. However in patients who undergo diversion due to cancer like in our cases, this risk is irrelevant.

The long-term complications of Mainz pouch 2 are not known. Biochemical screening should include creatinine, urea, full electrolyte and acid-base studies of blood. These tests should be done monthly for the first year after surgery, thereafter twice a year for 5 years. Ultrasound of the upper tract should be performed 6 monthly

and if the patient survives for 10 years, colonoscopy should be done yearly thereafter. The patient should be fully informed of his condition and the anticipated complications that may occur. Our early results of the Mainz Pouch 2 operation are very encouraging and compared favourably with those reported by others^{10,11}. The long-term complications of the operation are unknown and were not within the scope of our present study. They demand a study of their own.

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