

Preliminary experience with Mainz type II pouch in gynecologic oncology patients

I. K. El-Lamie, M.D.

Gynecologic Oncology Unit, Department of Obstetrics & Gynecology, Ain Shams University, Cairo (Egypt)

Summary

Objective: To evaluate the Mainz low-pressure modification of ureterosigmoidostomy with extramural serous-lined ureterointestinal anastomosis as a method of urinary diversion in gynecologic patients undergoing anterior pelvic exenteration.

Materials & Methods: Between December 1995 and September 1998, Mainz type II pouch was performed in 11 patients aged between 27-70 years (mean 58.5). Four were diagnosed with cervical cancer (2 stage IV A and 2 central recurrences following radical hysterectomy done elsewhere), two with stage III bilharzial bladder cancer, two with urethral cancer (one stage III and one recurrent following surgery done elsewhere), one with stage IV A endometrial cancer, one with stage IV A vaginal cancer complicating long standing incarcerated total procidentia and lastly one patient with refractory obstetric vesicovaginal fistula with almost total loss of the upper urethra, bladder neck and base. All patients were followed closely and particular complications related to the diversion were recorded as acid-base imbalance, renal impairment and incontinence.

Results: The pouch construction with anterior exenteration took an average of 242 min (150-330). There were two postoperative deaths due to pulmonary embolism and pneumonia both being related to the precarious condition of the patients and not to the diversionary procedure. The follow-up ranged between 25-60 months, with a mean of 43.5 months for the surviving patients. During that time period, four deaths occurred due to cancer recurrence. Otherwise, all patients remained continent during the day with one patient being incontinent at night. Two patients developed one attack of pyelonephritis and were treated successfully with antibiotics. No hyperchloremic acidosis and no hydronephrotic changes were seen in any patient and renal function remained normal.

Conclusion: Mainz type II pouch with extramural serous-lined ureterointestinal anastomosis is a safe promising quick and easy method of urinary diversion for patients undergoing anterior pelvic exenteration and having an intact anal sphincter. Longer follow-up and a greater number of patients will be needed to compare it with other forms of urinary diversion.

Key words: Anterior exenteration; Urinary diversion; Mainz type II pouch.

Introduction

More than half a century has elapsed since Brunschwig's first report on total pelvic exenteration [1]. This operation has become established as part of the surgical salvage for patients with central pelvic malignancies of different types with anterior exenteration being performed in a selected group of patients with excellent survival and acceptable morbidity and mortality [2-6].

Originally, ureterosigmoidostomy was the standard method of urinary diversion. However, with increasing recognition of its long-term sequelae, mainly incontinence particularly at night, and recurrent pyelonephritis with consequent renal failure, the technique fell into disrepute and was replaced by the standard Bricker's ileal conduit [7-9]. However, with the introduction of continent cutaneous and orthotopic diversion, the latter suffered a similar fate [8, 9].

Despite such innovations, the affinity of urologists to a rectal urinary diversion has never vanished. The recent introduction of the Mainz type II pouch, a low pressure modification of the classical ureterosigmoidostomy is considered a major breakthrough avoiding urinary collecting devices and intermittent catheterization, particularly in developing countries where the presence of stoma is socially unacceptable and its care could be cumbersome and expensive [10-12].

This technique was still better modified by a group of urologists at Mansoura University in Egypt by double folding the rectosigmoid segment to improve continence and decrease reflux which was further diminished by reimplanting the ureters using an extramural serous lined technique [13].

In this paper, the Unit's preliminary experience with this form of urinary diversion in patients undergoing anterior pelvic exenteration is reported without discussing in detail the indication and technique of the exenterative procedure which has been extensively described and reviewed elsewhere [2-6].

Materials and Methods

Between December 1995 and September 1998, Mainz type II pouch was performed in 11 patients aged between 27 and 70 years (mean 58.5). Four were diagnosed with cervical cancer (2 stage IV A and 2 central recurrences following radical hysterectomy done elsewhere), two with stage III bilharzial bladder cancer, two with urethral cancer (one stage III and one recurrent following limited surgery done elsewhere), one with stage IV A endometrial cancer, one with stage IV A vaginal cancer complicating long standing incarcerated total procidentia and lastly one patient with refractory giant obstetric vesicovaginal fistula with almost total loss of the upper urethra, bladder neck and base.

Patients were considered to be eligible for the procedure if they were 70 years or younger, with normal renal function

Revised manuscript accepted for publication November 20, 2000

(creatinine <1.5 mg/dl), a normal IVP, gastrografen enema and no past colonic disease, e.g. diverticulosis or pelvic radiotherapy that could preclude the performance of such surgery. Anal sphincter competence was assessed by showing the ability to hold a water enema of 350-400 ml for at least four hours without effort while executing normal activities and during the whole night [10-13].

Informed consent was obtained and standard preoperative preparation including bowel preparation, prophylactic antibiotics and proper anticoagulation until fully ambulatory was instituted.

The diversionary surgical technique used will be described briefly and the reader is referred to standard texts for a detailed description of the exenterative procedure as well as the performance of the Mainz type II procedure [2-6, 8-13]. The abdomen is opened through an extended Maylard's incision and after completion of a supralelevator or infralevator anterior exenteration, the rectosigmoid is folded into an S-shaped configuration following its mobilization and the two adjacent loops of the sigmoid are joined together with a continuous 3-0 polyglactin seromuscular suture to form two serous-lined tunnels. The antimésenteric bowel border is incised for 20-25 cm and both ureters are passed through buttonholes in the mesocolon and laid down into each corresponding tunnel. Both ureteric ends are spatulated and a stented mucosa-to-mucosa anastomosis is completed using interrupted 4-0 polyglactin. The ureters are thereafter covered by approximating the bowel mucosal edge using a continuous 3-0 polyglactin and the anterior wall of the pouch is closed using the same continuous suture after threading the ureteric stents through a previously inserted wide rectal tube. The pouch is fixed to the sacral promontory using interrupted 3-0 polypropylene sutures to avoid axial rotation of the pouch and ureteral kinking. After completion of the procedure the pelvic cavity is drained and the abdomen is closed followed by gradual manual anal dilatation up to 3 fingers. Figure 1 depicts the whole procedure. Oral feeding is resumed when normal bowel function returns. The ureteral stents and the rectal tube are removed after

ten days. All patients were maintained on adequate prophylactic alkalinization therapy thereafter for life.

Patient follow-up included assessment for daytime continence and nocturnal enuresis. IVP and ascending proctograms with a voiding study were done six months postoperatively. Complete renal function and acid-base balance profile including determination of creatinine, urea, arterial blood gases, bicarbonate, Na^+ , K^+ and Cl^- were performed every three months for the first two years and at regular follow-up thereafter. For the early detection of anastomotic neoplasms, sigmoidoscopy is performed yearly starting five years after surgery [14].

Results

All procedures were executed satisfactorily and the whole surgery took a mean of 242 min (150-330). Blood transfusion was needed in eight patients; two with one unit, five with two units and one with three units. Two postoperative deaths occurred following infralevator anterior exenteration and were not related directly to the surgery. One 65-year-old patient with recurrent urethral cancer died of pneumonia ten days postoperatively and a 70-year-old patient with stage IV A vaginal cancer died of massive pulmonary embolism one week postoperatively. Both patients were in a precarious general condition and despite full supportive measures could not withstand their ordeal.

The follow-up ranged between 25-60 months with a mean of 43.5 months for the surviving patients. During this period, four deaths occurred due to cancer recurrence locally and/or distantly more than one year postoperatively. Recurrence was distant in the endometrial and urethral cancer patients and was both distant and local at

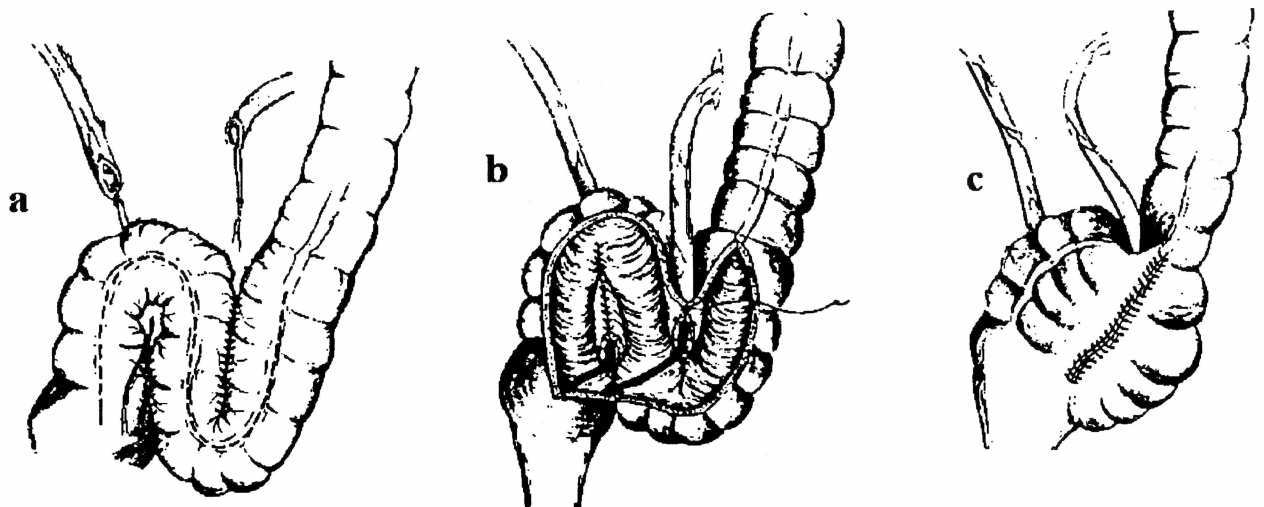


Figure 1. — Formation of Mainz type II pouch modified from reference [13].

a) S-shaped configuration and adjacent bowel limbs joined to form two serous-lined tunnels.

b) Ureters are passed through the mesocolon, placed into tunnels and anastomosed to the colon with closure of the mucosal edges over the anastomosis.

c) Final configuration of the pouch after closure of the anterior wall.

the pelvic wall in two cervical cancer patients, one originally stage IV A and the other with a central recurrence following radical hysterectomy done elsewhere.

After removal of indwelling stents and rectal tube, the initial voiding interval was 2-3 hours but increased gradually over the following week. All living patients were satisfied with their diversion being continent by daytime and with an emptying frequency between 3-6 hours with a mean of 4. Currently, all living patients are dry by night voiding occasionally once, except for one patient having mild nocturnal enuresis for which she is using pads. A longer follow-up will demonstrate whether such a high rate of continence can be maintained with advancing age. Only two patients developed pyelonephritis and were treated conservatively by antibiotics. No electrolyte abnormalities, acid base imbalance or deterioration of renal function occurred during the study period. IVP, voiding studies, and ascending proctograms revealed no hydronephrotic changes due to anastomotic stenosis or ureteral reflux, but only mild regurgitation of the rectal contents to the proximal colon during voiding (Figures 2 and 3).

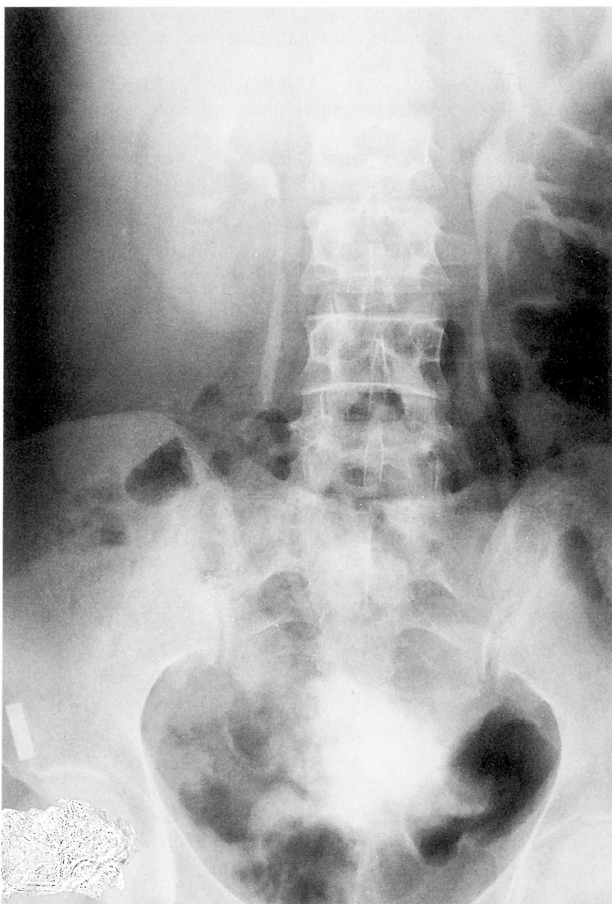


Figure 2. — IVP two years postoperatively showing normal upper urinary tract.

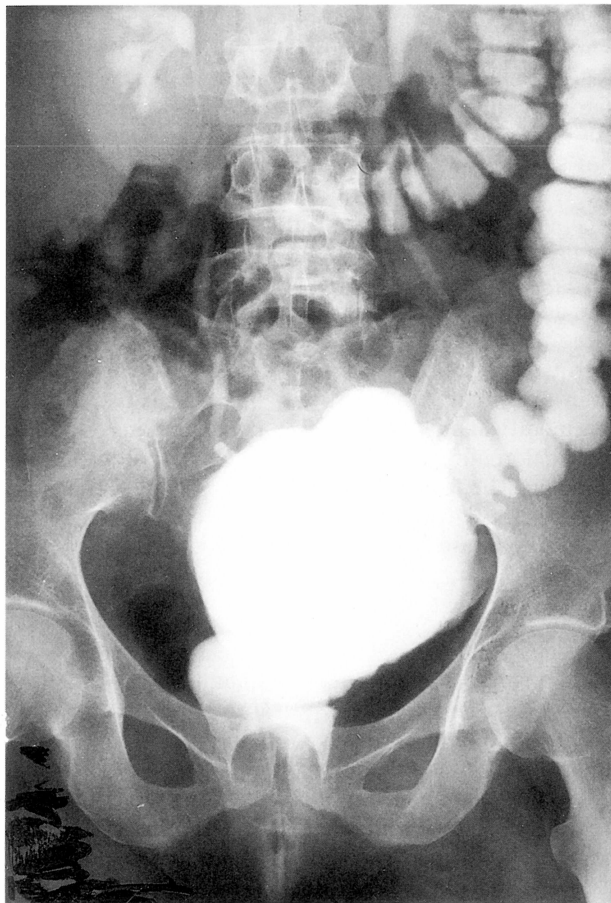


Figure 3. — Proctogram following IVP study showing large capacity rectosigmoid pouch.

Discussion

Until recently, the unresolved problems of ureterosigmoidostomy were recurrent pyelonephritis and a high rate of nocturnal incontinence. It seems reasonable to attribute both of these mostly to the high rectal pressure [9, 15]. The introduction of the detubularization procedure aimed at reducing the storage pressure by decreasing the frequency and amplitude of bowel contractions [16]. The principle is to form a low-pressure reservoir, just as with other forms of continent diversion. It is believed as proposed by others that by double folding the rectosigmoid, increasing its storage capacity at low pressure, and by reimplanting the ureters, using an extramural subserous tunnel to prevent reflux and pyelonephritis, will add to the advantage of Mainz modification of ureterosigmoidostomy [13]. The latter technique avoids the tendency of ureterointestinal anastomosis stenotic complications which are inherent in approximately up to a third of cases [15].

To my knowledge this is the first report of preliminary experience in a select group of gynecologic patients undergoing anterior exenteration and Mainz type II pouch as a form of permanent urinary diversion. Although, many would criticize the occurrence of two

postoperative mortalities, both were in elderly patients who had precarious conditions with advanced malignancy and both died of cardiopulmonary causes unrelated to the diversionary procedure itself but to the demanding exenterative surgery with its associated risks. However, regarding the modified ureterosigmoidostomy, the remaining patients had minimal morbidity with acceptable continence and urinary tract infection rates similar to those reported in the urological literature [10-13, 17-21].

In addition, the technique is simple, feasible and applicable to normal as well as dilated ureters, which is a distinct advantage over submucosal tunneling. It is noteworthy that the Mainz group in Germany has adopted this modification [12]. However, complications related to hyperchloremic acidosis and carcinogenesis remain problematic. The former is remedied by prophylactic alkalinization while the latter may be prevented by the use of cyclo-oxygenase type 2 inhibitors [13].

Conclusion

Mainz type II pouch with extramural serous-lined ureterointestinal anastomosis is a safe promising quick and easy method of urinary diversion for patients undergoing anterior pelvic exenteration and having an intact anal sphincter. Longer follow-up and a greater number of patients will be needed to establish the exact role of this new modification among other urinary diversionary techniques in the near future.

References

- [1] Brunschwig A.: "Complete excision of pelvic viscera for advanced carcinoma: A one stage abdominoperineal operation with end colostomy and bilateral ureteral implantation into the colon above the colostomy". *Cancer*, 1948, 1, 177.
- [2] Marshall F. F., Treiger B. F. G.: "Radical cystectomy (anterior exenteration) in the female patient". *Urol. Clin. North. Am.*, 1991, 18, 765.
- [3] Curtin J. P., Hoskins W. J.: "Pelvic exenteration for gynecologic cancers". *Surg. Oncol. Clin. North. Am.*, 1994, 3, 267.
- [4] Morrow C. P., Curtin J. P.: "Exenterative procedures". In: "Gynecologic Cancer Surgery". Morrow C. P., Curtin J. P. (eds.) Churchill Livingstone, New York, 1996, 530.
- [5] Morley G. W.: "Pelvic exenteration". In: "Gynecologic Surgery", 3rd edition. Hirsh H. A., Käser O., Iklé F. A. (eds.) Thieme, Stuttgart, 1997, 393.
- [6] Soper J. T.: "Pelvic exenteration and pelvic reconstruction". In: "Gynecologic, Obstetric and Related Surgery", 2nd edition, Nichols D. H., Clarke-Pearson D. L. (eds.) Mosby, St. Louis, 2000, 723.
- [7] Bricker E. M.: "Bladder substitution after pelvic exenteration". *Surg. Clin. North. Am.*, 1950, 30, 1511.
- [8] Seigne J. D., McDougal W. S.: "Urinary diversion". *Surg. Oncol. Clin. North. Am.*, 1994, 3, 307.
- [9] Müller S. C.: "Options for urinary diversion". In: "Practical Procedures for the Gynecologic Oncologist". Heintz A. P. M., Allen D. G. (eds.) El Sevier, Amsterdam, 1998, 135.
- [10] Fisch M., Wammack R., Steinbach F., Müller S. C., Hohenfellner R.: "Sigma-rectum pouch (Mainz pouch II)". *Urol. Clin. North. Am.*, 1993, 20, 561.
- [11] Fisch M., Wammack R., Hohenfellner R.: "The sigma-rectum pouch (Mainz pouch II)". *World J. Urol.*, 1996, 14, 68.
- [12] Fisch M., Hohenfellner R.: "Ureterosigmoidostomy and Mainz pouch II". In: "Glenn's Urologic Surgery", 5th edition. Graham Jr. S. D., Glenn J. F. (eds.), Lippincott-Raven Publishers, Philadelphia 1998, 615.
- [13] El-Mekresh M. M., Hafez A. T., Abol-Enein H., Ghoneim M. A.: "Double folded rectosigmoid bladder with a new ureterocolic anti-reflux technique". *J. Urol.*, 1997, 157, 2085.
- [14] Husmann D. A., Spence H. M.: "Current status of tumor of the bowel following ureterosigmoidostomy". *J. Urol.*, 1990, 144, 607.
- [15] McConnell J. B., Stewart W. K.: "The long-term management and social consequences of ureterosigmoid anastomosis". *Br. J. Urol.*, 1975, 47, 607.
- [16] Hinmann Jr F.: "Selection of intestinal segments for bladder substitution: Physical and physiological characteristics". *J. Urol.*, 1988, 139, 519.
- [17] Gilja I., Kovacic M., Radej M., Kosuta D., Bakula B., Goles L.: "The sigmoidorectal pouch (Mainz pouch II)". *Eur. Urol.*, 1996, 29, 210.
- [18] Ata M.: "Detubularized isolated ureterosigmoidostomy: Description of a new technique and preliminary results". *J. Urol.*, 1998, 81, 147.
- [19] El-Damanhoury H., Miligi A., El-Helali A., Khalaf I.: "Mainz pouch II for continent urinary diversion after cystectomy". *J. Urol.*, 1996, 155, 520A.
- [20] Woodhouse C. R. J., Christofides M.: "Modified ureterosigmoidostomy (Mainz II) - Technique and results". *Br. J. Urol.*, 1998, 81, 247.
- [21] Gerharz E. W., Köhl V. N., Weingärtner K., Kleinhans B. J., Melekos M. D., Riedmiller H.: "Experience with the Mainz modification of the ureterosigmoidostomy". *Br. J. Surg.*, 1998, 85, 1512.

Address reprint requests to:
 ISMAIL K. EL-LAMIE
 3 El-Beyrouni st,
 Heliopolis 11341
 Cairo (Egypt)