ORTHOTOPIC BLADDER SUBSTITUTION IN WOMEN WITH AN ILEOCOLONIC POUCH: FUNCTIONAL AND ONCOLOGICAL OUTCOME.

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Summary.- OBJETIVES: In select female patients, bladder reconstruction following cystectomy will provide a better quality of life and self-image. We reviewed our results with ileocolonic orthotopic neobladders in female patients undergoing cystectomy for bladder cancer. Impact of pathologic stage on disease outcome, urinary continence results and surgical technique are described. Because of the relative paucity in the number of female neobladders performed, reporting of our results appear warranted.

METHODS: Radical cystectomy with ileocolonic neobladder was performed in 22 consecutive women with bladder cancer over a five year period. Our technique spares the urethral support mechanism and innervation of the rhabdosphincter. Patients were selected based on renal function, ability to perform self-catheterization, organ confined disease and evidence of a disease free urethra, trigone and bladder neck. A retrospective review of the functional and cancer outcome was conducted.

RESULTS: Postoperatively total diurnal urinary continence was achieved by 86% of the patients. Seventy-three percent of the patients had diurnal and nocturnal continence. Hypercontinence developed in 13.6% of patients. Only three patients developed advanced metastatic disease. None of the patients had evidence of local pelvic recurrence. The pathologic stage in the three patients that progressed were pT3a, pT3b, and pT2.

CONCLUSIONS: Orthotopic neobladder substitution in female patients with bladder cancer is an alternative to a non-continent diversion. We report oncolgic outcomes similar to the traditional anterior pelvic exenteration and non-continent urinary diversion. Surgical outcomes and complications are comparable with a significant improvement in the quality of life.

Keywords: Orthotopic bladder substitution. Ileocolonic orthotopic neobladders. Women.

Resumen.- OBJETIVO: La reconstrucción vesical después de la cistectomía en mujeres seleccionadas ofrece mejor calidad de vida e imagen corporal. Comunicamos nuestros resultados con neovejigas ileocolónicas ortotópicas en mujeres con cáncer de vejiga sometidas a cistectomía. Se describen el impacto del estadío patológico sobre la evolución de la enfermedad, los resultados de continencia y la técnica quirúrgica.
INTRODUCTION:

In women undergoing anterior pelvic exenteration, non-continent urinary diversion has been the standard of care. Better understanding of the female pelvic anatomy and improved knowledge of bladder cancer behavior has resulted in more women becoming candidates for bladder substitution. (1-5) If feasible, creation of a neobladder offers patients an improved self image and quality of life. The purpose of this work is to report on our experience with female neobladders and to put into perspective the changing concepts of radical cystectomy in female patients.

MATERIALS AND METHODS:

From July 1994 to December 1999, 22 consecutive women with bladder cancer underwent radical cystectomy and urinary diversion via a neobladder. The age of the patients ranged between 34 and 63 years (mean 58). Of the patients, 21 had transitional cell carcinoma and in one the histologic type was a primary adenocarcinoma of the bladder. Candidate selection was based on general health, tumor location, and renal function. We further required the motivation and ability to perform self-catheterization if necessary. Tumors had to be clinically organ confined with no evidence of involvement of the trigone or bladder neck. Additionally, adequate renal function was a requirement, and continent diversion was avoided in patients with serum creatinine greater than 2.5 mg/ml.

Preservation of the urethra and the continence mechanism during radical cystectomy is imperative in female patients who are candidates for orthotopic continent diversion. Our technique aims at preserving...
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The external urethral support mechanism and innervation of the rhabdosphincter while maintaining sound principles of oncologic surgery. After performing a bilateral pelvic node dissection, and exposing the anterior pelvic structures, the posterior aspect of the bladder is dissected sharply from the anterior vaginal wall. The initial posterior dissection is only carried to the level of the bladder neck. Further dissection is performed in a retrograde fashion. The endopelvic fascia and the pubourethral suspensory ligaments are left intact, the vesical neck is transected at the junction of the urethra (Figure 1). The plane between the bladder and anterior vaginal wall is developed. Minimal lateral dissection is done in order to preserve the nerve supply to the rhabdosphincter (Figure 2). The vascular pedicles are sequentially clipped and divided and the specimen removed. We routinely submit tissue from the bladder neck for frozen section analysis to ensure that a negative surgical margin is present.

The neobladder was constructed from an ileocolonic segment in all patients. Approximately 20-25 cm of right colon and 25 cm of distal ileum was used. The bowel is detubularized except for 12 to 15 cm of the proximal ileum) segment. This segment is left intact and used as a chimney to anastomose the ureters (Figure 3). The detubularized bowel is then reconfigured and the pouch created (Figure 4). A small opening is made for the urethral anastomosis at the most dependent portion of the neobladder. The anastomosis is made with interrupted 3-0 polyglycolic acid non braided suture over a 22 French catheter. A total of six to eight anastomotic sutures are routinely employed (Figure 5).

Postoperatively, the ureteral stents are removed in seven to ten days and the urethral catheter is discontinued at day 21 if no evidence of urinary extravasation is noted on contrast cystography. At six months either a renal ultrasound or intravenous urogram is obtained to monitor the upper tracts and repeated at 12 month intervals. Serum electrolytes and complete blood count are conducted every three months during the first year and biyearly thereafter. Two years postoperatively we recommend checking a vitamin B12 level and then monitoring it at least once a year thereafter. Chest radiography and computed tomography of the abdomen and pelvis are obtained yearly or earlier if the clinical condition mandates.

**FIGURE 2.** Following division of the urethra, the plane between the bladder and vagina is developed by a combination of blunt and sharp dissection. Avoiding lateral dissection as much as possible helps maintain integrity of the neurovascular plexus.

**FIGURE 3.** Ileocolonic bowel segment used for creation of the neobladder. Solid line demarcates site of transection, dotted line illustrates path for detubulation of the bowel.
RESULTS:

Median follow-up was 32 months with a range of six to 52 months. Histologically 21 patients had transitional cell carcinoma and one primary adenocarcinoma. Pathologic stage was pT1 G3 in four, pT2 in 15, pT3a in two, and the patient with adenocarcinoma was staged as pT3b. To date, only three patients (13.6%) have demonstrated disease progression. One with stage pT3a presented with weight loss and retroperitoneal lymphadenopathy, and another with stage pT2 developed liver metastases at 12 months and lymph node metastases at 32 months. The former remains alive following systemic chemotherapy and the latter despite systemic therapy died 33 months following the initial surgery. The patient with adenocarcinoma developed lung metastases and died 18 months after surgery. None of these patients had evidence of local pelvic recurrence.

Urinary continence was defined as total if no pads were needed for protection. Total diurnal urinary continence was achieved by 19 (86%) of the patients. Both diurnal and nocturnal continence was attained by 16 (72.7%). Urinary continence was gained at three months after catheter removal by 11 of the 19 women attaining total urinary control (57%), and the remaining eight achieved continence by six months. Three patients did not attain urinary continence, one uses up to four pads per day due to severe type III incontinence, and the other two experience primarily stress incontinence and are well managed with protective garments. In two of these women there was a previous history of stress incontinence and bladder neck suspension. Hypercontinence developed in three of the patients, requiring self-catheterization. This phenomenon was noted at six, 32, and 32 months postoperatively, respectively. In these three patients, volitional voiding is possible, however, elevated post-void residual volumes of 150 to 350 cc make it necessary for self-catheterization two to three times per day.

Urodynamics were obtained in nine of the patients at approximately 12 months, which demonstrated a bladder capacity ranging between 470 to 1200 cc.

**FIGURE 4.** Following detubularization, the posterior wall of the neobladder is constructed by suturing the ileum and colonic bowel walls with a continuous suture line of 3-0 polyglycolic suture material. The ileum is folded over to create the anterior wall of the pouch.

**FIGURE 5.** Completed neobladder with anastomosis to the urethra and ureters implanted to the afferent limb.
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The patients had adequate compliance with filling pressures averaging below 30 cm of water. Residual urines ranged between 20 to 350 cc and the urethral pressure profile ranged between 35 to 80 cm of water.

Early complications, defined as occurring within 30 days of surgery occurred in two patients (9%). Both developed prolonged paralytic ileus, which resolved with conservative management. Late complications were seen in two patients (9%). One developed an incisional hernia approximately six months after surgery requiring repair and another patient has experienced troublesome mucous overproduction which requires periodic catheter irrigation.

DISCUSSION:

Traditionally, women with invasive bladder cancer have been treated with an anterior pelvic exenteration and a non-continent method of urinary diversion. Current evidence indicates that for selected female patients, preservation of the anterior vaginal wall, urethra and other structures necessary for urinary continence is possible without compromising cancer outcomes. (6-8) Stenzel and collaborators have reported on the risk of urethral involvement in women with bladder cancer. In their study, the overall incidence of synchronous urethral involvement was only two percent, furthermore all patients with urethral extension also had either tumors involving the trigone and/or the bladder neck. (6) Stein et al have made similar observations. (7) In their series of female patients, 13% of the patients undergoing cystectomy were found to have urethral involvement, however, all of these women also had concomitant bladder neck or trigonal disease. This data demonstrates the feasibility of urethral sparing in female bladder cancer patients without evidence of bladder neck or trigone involvement by the primary tumor. Thus the possibility of orthotopic bladder reconstruction in females is very much a reality. In the present study, we firmly adhered to these principles of patient selection, and frozen section biopsy-confirmed negative urethral involvement at the time of cystectomy. On follow-up, no evidence of local recurrence has been encountered to date on any of the patients.

Paramount to obtaining a satisfactory functional outcome is the preservation of the urethra, rhabdosphincter, and support structures for the urethra. (9-10) Preservation of the autonomic nervous plexus remains somewhat controversial. Stein et al make no attempt at preserving the neurovascular structures, (2) however we, like Marshall, make an attempt at preserving autonomic innervation. (11) Indeed, by conducting the dissection along the path of the nervous plexus, it allows a virtually bloodless extravaginal plane to be developed to the level of the urethra, which allows for a direct approach to the vascular pedicles and excellent visualization of the pertinent anatomic landmarks. Our continence rate of 86% compares favorably to that reported by others. (1-5,12,13) This further substantiates the value of orthotopic bladder reconstruction in female patients with bladder cancer. Although not firmly established, we believe women with a previous history of urinary incontinence, particularly those with previous anti-incontinence surgery, must be approached cautiously since previous disruption of the urethral support mechanism may lead to unsatisfactory continence results in orthotopic neobladder function. We have encountered such an association in two of the three patients with postoperative urinary incontinence in our series.

The phenomenon of hypercontinence is puzzling. Three of our patients have required intermittent catheterization, however, on average it is required no more often than twice per day and patients are able to void spontaneously a significant volume. We did not preserve the bladder neck in our patients, a possible mechanism proposed as the cause for this problem. (4) Ghoneim et al suggests that the cause for the hypercontinence may be mechanical, created by the falling back of the neobladder into the relatively empty pelvic cavity, resulting in angulation of the pouch-urethral junction at the time of voiding. (13) These authors recommend various steps to prevent this problem from occurring, they include: omental packing posterior to the pouch, suspension of the vaginal stump wherever possible in later cases.

Overall the majority of our patients are satisfied. Although, we have not conducted a formal quality of life assessment, most of the women in this series agree that voiding per urethra represents a significant improvement in their self image and has helped them return to a more normal life style.
CONCLUSIONS:

Radical cystectomy in select female patients can be safely performed with preservation of the urethra without an increased risk for cancer recurrence. Construction of a neobladder in females significantly improves their self image and quality of life.

BIBLIOGRAFIA y LECTURAS RECOMENDADAS (*lectura de interés y **lectura fundamental)