Urinary Diversions: Perspectives on Nursing Care

By Mikel Gray, PhD, CUNP, CCCN, FAAN; Dorothy Cluff, RN, MSN, FNP-C; Vicki Y. Johnson, PhD, CURN; Lois Dixon, MSN, RN; Dianne Wasson MSN, RN

The indications for urinary diversion include bladder cancer, hostile neurogenic bladder, refractory interstitial or radiation cystitis, and congenital anomalies of the lower urinary tract. Bladder cancer is the most common indication for continent urinary diversion. These malignancies account for about 3% of all cancer deaths. Superficial bladder tumors are managed by transurethral resection or laser ablation with or without intravesical chemotherapy, but more invasive tumors require radical cystectomy and urinary diversion.

Neurogenic bladder dysfunction occurs when trauma, infection, or disease alters neurological control of the lower urinary tract. The neurogenic bladder creates two primary problems from the urological perspective: voiding dysfunction (urinary incontinence or retention) and upper urinary tract distress, which is characterized by reflux, febrile urinary tract infections, and renal insufficiency or failure.

A hostile neurogenic bladder threatens the health of the kidneys that it serves. Several urodynamic conditions, including low bladder compliance, obstruction, and detrusor sphincter dyssynergia, are associated with this type of bladder dysfunction. When a patient has a hostile neurogenic bladder, bladder augmentation or urinary diversion are performed to reduce bladder filling and urine storage pressures and to alleviate subsequent upper urinary tract distress.

Radiation cystitis is a chronic inflammation of the bladder, which is caused by exposure to external-beam or interstitial radiation therapy for pelvic cancer. In mild cases, radiation cystitis causes irritative voiding symptoms. They may be successfully managed by fluid and dietary changes, including the avoidance of bladder irritants, often combined with urinary analgesics, or antispasmodics. In more severe cases, hemorrhagic radiation cystitis may be improved, at least over a short-term period, by hyperbaric oxygen treatment. Nevertheless, in some cases of radiation cystitis associated with low bladder-wall compliance and hemorrhagic cystitis, urinary diversion is done when more conservative therapies ineffectively control the bleeding, pain, and voiding dysfunction caused by significant radiation exposure.

Continent urinary diversion is also indicated as one portion of the extensive reconstructive surgery in children with classic exstrophy, epispidias, or cloacal exstrophy congenital defects. Classic exstrophy in males is characterized by externalization of the bladder, pelvic diastasis, separation of the hemi-scrotum or labia, penile
or clitoral defects, and significant urinary incontinence. Cloacal exstrophy occurs in females when the cloacal membrane fails to separate the vaginal, urethral, and anal orifices. While bladder neck reconstruction and bladder closure are adequate for most children who have these significant birth defects, continent urinary diversion is indicated in a minority who are not adequately managed by primary reconstruction.

Continent urinary reservoirs

A continent urinary diversion contains two essential elements: a urinary reservoir anastomosed to the ureters and a continent, catheterizable stoma attached to the abdominal wall. They are typically constructed from isolated segments of the bowel, although the fundus of the stomach has also been incorporated into the urinary reservoir.

Kock pouch

Continent urinary diversion requires construction of a urine reservoir that is attached to the ureters and some form of continence mechanism, which is incorporated into a stoma that is attached to the abdominal wall. The Kock pouch: The first contemporary report of a continent urinary diversion incorporating these essential elements was published by Kock, who described a pouch that used detubularized small bowel. The Kock pouch comprises three main segments: a proximal nipple mechanism made from approximately 17 cm of bowel; a reservoir that uses 78 cm of ileum; and a distal nipple, requiring another 17 cm, which is attached to the abdominal wall via a stoma. Continence is achieved by intussuscepting 17 cm of small bowel to form a segment that is at least 5 cm long as well as two other segments; one is used for budded stoma construction; and the other is for anastomosis to the reservoir. Intussusception is maintained by extensive stapling, sutures, and a mesh of artificial material. A similar mechanism is constructed by converting a second 17-cm segment of small bowel into a non-refluxing mechanism for ureteral implantation.

The reservoir for the Kock pouch is constructed by detubularization of an isolated bowel segment. This technique alters the geometry of the incorporated bowel and markedly diminishes its efficiency in propagating a peristaltic contraction. Were the bowel not detubularized, the increasing bolus of urine in the reservoir would stretch the multi-unit smooth muscle of the bowel wall, causing a powerful peristaltic contraction independent of nervous stimulation. We have observed such contractions during provocative urodynamic testing and found that they cause urine leakage from the stoma and an uncomfortable, cramping sensation within the abdomen.

When constructing a reservoir for the Kock pouch, the 78 cm of bowel is placed in a U-shape on a sterile towel and isolated from the rest of the surgical field. The surgeon opens both halves of the bowel along the antimesenteric edge. The exposed mucosal edges are then anastomosed with running sutures to create a large, U-shaped reservoir as opposed to the characteristic tubular shape.

In experienced hands, the Kock pouch has been reported to achieve a daytime continence rate of 94% and a nocturnal continence rate of 84%. However, this procedure has several disadvantages when compared to pouches that incorporate primarily large-bowel segments, and it has not gained widespread use by urological surgeons.

Metabolic complications associated with the Kock pouch include hypokalemia, hypomagnesia, and hyperammonemia leading to metabolic acidosis in 10% to 50% of patients. Blood urea nitrogen and creatinine levels also rise, and some patients develop constitutional symptoms of renal insufficiency, including fatigue, anorexia, weight loss, and polydipsia. Chronic metabolic acidosis poses particularly problematic responses in children, leading to vitamin D resistance, hypocalcemia, hypercalciumia and bone demineralization. In addition to vitamin D resistance, many adults and children experience vitamin B12 deficiencies after the creation of a Kock pouch. Because the liver is able to store significant supplies of this vitamin, a deficiency may not be apparent until two to five years after the procedure. Monthly intramuscular replacement may be required.

Non-metabolic complications include urinary calculus formation within the ileal reservoir, uretero-ileal anastomotic stricture, and vesicoureteral reflux. Because of the need for relatively extensive reconstruction and intussusception, problems with the proximal (antireflux) and distal (anti-incontinence) nipple valves are relatively common; 17% to 23% have been reported to require at least one surgical revision. Based on metabolic and mechanical complications, particularly those observed more than five years after pouch creation, as well as the complexity of this surgical procedure, most urologists prefer to create a continent diversion with the large bowel, which is usually isolated from its right segment.

Other pouch techniques

Pouches incorporating the large bowel: Several procedures, including the Indiana, Florida, Miami, and Mainz pouches, incorporate segments of the right colon into the urinary reservoir, usually in combination with a segment of distal ileum.

The Indiana pouch uses an isolated bowel segment, usually the ileum and ascending colon, which is made into a reservoir by detubularization. In this case, detubularization is achieved by transecting the bowel and folding it into an inverted U-shape. The ureters are then implanted into the side of the reservoir and a special nipple and valve is constructed to attach the reservoir to the skin. The ureters may be implanted in a refluxing or non-refluxing manner, since vesicoureteral reflux has not been proven deleterious to these high-volume, low-pressure reservoirs.

The anti-incontinence mechanism for the right colonic pouch was pioneered by a urologist at the University of Indiana. It incorporates the ileocecal valve, which is reinforced by infolding the bowel wall, which extends to a budded stoma placed within the abdominal wall.

The candidate for continent urinary diversion with the right colon must be physically able to undergo a lengthy surgery. The patient’s life expectancy in relation to quality of life also must be considered; persons with a life expectancy of less than one year are usually considered inappropriate for continent urinary diversion because of the prolonged time required to adjust to the surgery. The person must have adequate renal function, because the reservoirs have the potential to absorb fluids and urinary waste products. Generally, a serum creatinine level of 2.5 mg/dl or less is preferred. In most cases, the patient should have adequate gross and fine motor coordination to perform intermittent self-catheterization. The person also must be able to follow directions and be willing to participate in the self-care skills demanded by the continent diversion.

Contraindications for continent diversions that use the right colon include previous surgery with significant bowel resection resulting in malabsorption or chronic diarrhea, patients with irritable bowel syndrome, ulcerative colitis, extensive diverticular disease, or bowel cancer. The presence of progressive neurological disorders involving the upper extremities is a possible contraindication, because the patient may be unable to self-catheterize. Other possible contraindications include morbid obesity and pelvic irradiation, because of the increased risk of anastomotic leaks or poor wound healing.

Clearly, the major advantage of continent urinary diversion is the preservation of continence. Continence is initially attained during the first five years after pouch creation, as well as the complex of this surgical procedure, most urologists prefer to create a continent diversion with the large bowel, which is usually isolated from its right segment.

Table 1. Reported continence after continent urinary diversion

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<tr>
<th>Type</th>
<th>Overall Continenle Rate</th>
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<tr>
<td>Florida Pouch</td>
<td>97%</td>
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<td>Indiana Pouch</td>
<td>68% - 100%</td>
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<td>Mainz Pouch</td>
<td>91% - 97%</td>
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<tr>
<td>Miami Pouch</td>
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Reference: 55

Table 1. Reported continence after continent urinary diversion
pliant with self-catheterization. Because of long-term problems associated with maintaining continence with surgically reconstructed bowel, M i trof anoff described an alternative continent mechanism that incorporates the appendix.25 This surgical technique uses three maneuvers to achieve continence: a small-caliber conduit (appendix or a segment ureter in selected cases) is mobilized that has sufficient length to extend to the abdominal wall to form a small stoma; an antirefluxing connection is established with the urinary reservoir, and a submucosal tunnel using a flap-valve mechanism is completed. As an alternative, the stoma can be placed at the umbilicus, providing a more cosmetic effect with the abdominal wall. When compared to a continent stoma formed with reconstructed bowel, the M i trof anoff technique offers several distinct advantages.26 It provides excellent diurnal and nocturnal continence (98%) and a straighter lumen between stoma and reservoir, facilitating self-catheterization. It also tends to produce less mucus than the stoma constructed from bowel and is less likely to require re-operation.

Orthotopic neobladder

In certain patients with a cancer-free trigone and urethra, and a competent, unobstructed sphincter, an orthotopic neobladder may be created as an alternative to urinary diversion. The neobladder is often preferred over even a continent urinary diversion, because it preserves micturition and avoids the need for an abdominal stoma.24

Cystectomy or cystoprostatectomy is completed prior to creation of the neobladder. Local lymph nodes may be scrutinized or removed for pathological analysis. Construction of the reservoir for an orthotopic neobladder is similar to construction of a reservoir for continent urinary diversion. It may be made from a 60- to 80-cm segment of small bowel, incorporating the ileocecal valve, which is detubularized to form a W-shaped reservoir; a 30-cm segment of terminal ileum and 25 to 30 cm of cecum and right colon; or a portion of the stomach.22,23 The colon is cut along the antimesenteric border and folded to create an S-shaped reservoir. An appendectomy is also performed.22 The colon is then attached to the trigone and proximal urethra, following incision and eversion of a small segment of bowel. The reservoir may also be attached to the posterior periosteum of the symphysis using a technique similar to Marshall-Marchetti-Krantz urethral suspension. Contraindications for an orthotopic neobladder include bladder tumors that involve or extend into the trigone or proximal urethra, multifocal carcinoma in situ, positive prostatic biopsy, a locally advanced tumor, or lymph node involvement.20 Other contraindications include previous radiation therapy that is likely to interfere with wound healing or postoperative bowel function, pre-existing bowel disease, or renal insufficiency.24

Because the reservoir is attached to the urethra, patients maintain the ability to void by combining abdominal straining and pelvic floor muscle relaxation. Reported diurnal continence rates vary from 83% to 96% and nocturnal continence rates range from 34% to 71%.26-32 Metabolic complications may occur when ileum is used to create the urinary reservoir, including metabolic acidosis requiring alkalinization in approximately 50% of patients. Long-term complications include vitamin B12 deficiency.27 Although ileal and ileocecal reservoirs are prone to pouch rupture if bladder evacuation is not improved or intermittent catheterization begun. Other complications include stenosis of the cal-cal-urethral or ileo-urethral anastomosis, gastrointestinal fistula, ureteral fistula, and urinary calculi.33

Preoperative considerations

Preoperative educational needs depend on the type and extent of the planned surgical procedure. For the patient with cancer, preoperative educational counseling must reinforce flexibility, since the ability to complete a continent urinary diversion or neobladder may depend on intraoperative findings. In contrast, preoperative teaching can be more focused for the patient who has continent urinary diversion or neobladder construction because of a hostile neurogenic bladder or severe cystitis. The nurse teaches the patient about the anticipated type of urinary diversion, self-care practices, number and type of postoperative drains, methods of pouching, control of urinary drainage, and minimization of odor.34

Intermittent catheterization education is begun for the patient who is scheduled for continent urinary diversion. The patient who will have a neobladder is advised that, while urethral voiding is expected to be preserved, strain voiding, i.e., increasing abdominal pressure while relaxing the pelvic floor muscles, will be necessary for micturition. An abdominal binder, with a Velcro® closure that can be secured at any point, may be applied to increase abdominal pressure.

Bowel preparation

Bowel preparation is completed preoperatively to prevent fecal contamination of the perineal cavity and to decompress the bowel.35 Typical bowel preparation includes a low residue diet for 1 to 3 days prior to surgery, mechanical bowel cleansing using GoLYTELY® and marked reduction of bacterial flora via an anti-biotic bowel preparation with neomycin or erythromycin.1,10,3,23 Intravenous hydration may be required during the late stages of preparation owing to fluid and electrolyte losses from extensive bowel preparation. Parenteral tobramycin and vancomycin may be administered preoperatively to reduce the risk of postoperative wound infection involving anaerobic pathogens, such as the bacteroides.36

Physical and functional assessment

The preoperative nursing assessment is based on information from the patient’s history and surgical plan. A general preoperative assessment is based on knowledge that the surgery will involve bladder reconstruction, the significant alteration of urinary function, and the removal of a segment of the large or small bowel from the gastrointestinal stream. The nurse particularly focuses on preoperative bowel elimination patterns, since bowel resection will produce a transient paralysis of peristalsis, which must be corrected during the early postoperative course. The urinary system is assessed for signs of infection, including gentle palpation of the costovertebral angle for evidence of pyelonephritis.

The patient’s fluid status must be evaluated and closely followed, particularly if the person is elderly or has experienced nausea and vomiting during bowel preparation. A cardiovascular assessment includes blood-pressure measurement and auscultation for apparent abnormalities. The
respiratory assessment includes auscultation for the quality of respirations and evidence of pneumonia, chronic obstructive pulmonary disorder (COPD), or other respiratory disorders likely to impact postoperative respiratory function.

A functional evaluation should be completed, because it will have a direct impact on postoperative education about self-management of the continent urinary diversion. For the patient with a paralyzing spinal disorder and limited upper-extremity dexterity, preoperative preparation may include consultation with an occupational therapist for detailed instructions on intermittent catheterization and fitting with assistive devices, such as a tenodesis brace or other prosthetic. The skin should be assessed for integrity and a pressure ulcer risk analysis should be completed.

For the patient who will have an orthotopic neobladder, neurological and musculoskeletal assessment should include the evaluation of pelvic floor muscle strength and function using a gloved finger placed in the vagina or anal canal. This assessment is significant, because it influences postoperative education about strain-voiding techniques.

**Stoma site selection**

The Wound Ostomy Continence (WOC) or Enterostomal Therapy (ET) nurse should be consulted to answer questions about surgery and postoperative care that are specific to urinary diversion and for stoma site selection. For the patient who will have a diversion with a catheterizable, continent stoma, the WOC nurse helps to select a site that is accessible for catheter insertion and visual inspection. This site should not become lost in a skin crease or fold when the person assumes an upright position. It should allow for placement of a small dressing to protect the clothing from mucus discharge when the person assumes an upright position. It should not become lost in a skin crease or fold when the person assumes an upright position.

**Postoperative considerations**

**Routine postoperative care**

The patient is closely monitored by critical care nurses for two to five days postoperatively for cardiovascular and respiratory function, hemostasis, and fluid and electrolyte balance. A nasogastric (NG) tube is placed to decompress the stomach and bowel, to prevent vomiting, to protect the incision, and to administer medications to prevent stress ulcers. NG tube holders with a Velcro® type locking device are indicated because they reduce the irritation associated with tube manipulation or inadvertent dislodgement. Incentive spirometer, coughing, and deep-breathing exercises minimize postoperative respiratory complications. An abdominal binder may be worn to promote deep breathing. Sequential compression stockings are used to prevent venous stasis and thromboembolism.

Ambulation should occur by postoperative day three or four. Early ambulation is strongly encouraged because of its preventive role in cardiovascular and respiratory complications and because of its facilitatory role in encouraging the return of bowel function.

The patient is assessed daily for evidence of peristalsis by auscultation. In addition, the patient is regularly assessed for the passage of flatus or a bowel movement (which is confined to passage of mucus material, often streaked with a small volume of blood).

**Managing metabolic balance**

Metabolic complications occur because urine is stored in a reservoir constructed from the gastrointestinal system. While the normal urinary bladder mucosa forms an effective barrier against the reabsorption of fluid or salts from stored urine, reservoirs constructed from ileum, colon or stomach both secrete and reabsorb a variety of ions and fluid, including sodium ions, which are exchanged for hydrogen ions, and bicarbonate, which is exchanged for chloride. In addition, an ileal or intestinal reservoir will reabsorb ammonium ions, causing an increase in serum urea and creatinine levels. These problems may occur at any time after surgical intervention, and many patients who have continent urinary diversion or neobladder construction will require systemic alkalization to prevent or alleviate bone demineralization caused by metabolic acidosis.

Systemic alkalization is accomplished by diuretic restriction of chloride intake. Sodium bicarbonate or Polycitra-K® (Baker Cummins) may be administered to supplement the body's store of these buffering substances. Chlorpromazine (Thorazine) administered as 5 mg/kg/day or nico-tinic acid 50 mg/kg/day may be administered to inhibit production of cyclic AMP-dependent acids from the urinary reservoir.

In addition to a predisposition toward metabolic acidosis, loss of the ileocecal valve and ileal segments lessens the resorptive potential of the small bowel and reduces intestinal transit time. These changes predispose the person to diarrhea and malabsorption problems. Resection of significant amounts of ileum can lead to malabsorption of bile salts and vitamin B12, while resection of larger amounts of ileum (> 80 cm) is associated with malabsorption of fat and fat-soluble vitamins A, D, E, K. The malabsorption of bile acid salts increases the synthesis of bile acids, which predisposes the patient to gallstones, kidney stones, and steatorrhea.

**Diversion-specific management**

Continent diversion-specific management requires ongoing assessment of the stoma. Ureteral stents are used with continent urinary diversions to maintain ureteral patency. These stents may terminate into the urinary reservoir, a separate stab wound within the abdominal wall, or via the cutaneous stoma. The stents are essential to upper urinary tract drainage since urine flow never ceases following surgery. They are connected to a drainage bag immediately. Care is taken to see that they remain patent.

A suprapubic catheter may be placed into the urinary reservoir via a small stab wound in the abdomen. A second catheter is inserted through the stoma to facilitate drainage of urine not flushed by the stents. Use of Velcro®-type Foley catheter holders will help to stabilize drainage tubes and prevent accidental dislodgment. A Jackson-Pratt drain in the lower pelvic cavity and an indwelling catheter inserted through the urethra facilitates drainage of pelvic fluid accumulation. A Velcro® type drainage bulb holder also may be applied to reduce the likelihood of tube dislodgment.

**Urinary extravasation**

During the early postoperative period, the patient is at risk for urinary extravasation as the suture lines heal. Early signs of urinary or fecal leakage from anastomosis include an increased abdominal girth, fever, and drainage through the incision and around tubes or drains. The surgeon may choose to control the leakage by diverting the urine via nephrostomy tubes in order to allow the suture lines to heal. Leakage of urine at the anastomotic site or ureteral separation from the conduit may occur, causing the urine to seep into the peritoneal cavity. Fecal anastomotic leaks occur uncommonly, but they cause peritonitis and usually require emergent surgical repair. The symptoms associated with a fecal anastomotic leak are typically caused by peritonitis. They include fever, abdominal pain and rigidity, and absence of bowel sounds.

**Stoma viability**

Stoma management during the postoperative hospital course is achieved by the combined efforts of WOC and unit-based nurses. The stoma is inspected every hour for the first postoperative day for viability and to provide a baseline for assessment of subsequent deviations. If no problems occur during the early postoperative period, the interval between inspections is extended to every 4 hours, then every 8 hours prior to discharge from hospital.

The size, shape, and color are noted with each assessment. It should be red, moist, and edematous during the initial postoperative period. Peristomal sures that adhere to the skin and mucosal bowel edge are observed; slight bleeding when the site is cleansed is normal. However, other changes may indicate complications, warranting prompt consultation with the WOC nurse or physician. Any sign of darkness or dusking raises a suspicion of an ischemic vascular supply. An ischemic stoma usually appears pale, gray, and blanches when touched. Fortunately, necrosis is limited to the mucosal stoma on the skin surface. It does not constitute a surgical emergency, as the upper portion will slough off, leaving a retracted or flush stoma. However, extensive necrosis occasionally occurs, demanding prompt surgical intervention. Stomal...
necrosis may result from poor surgical technique or an incorrectly sized or fitted appliance faceplate or related pouching appliance. Other complications include stomal herniation or retraction. Stenosis and retraction of the ostomy may result from scarring during maturi-
nasogastric tube, which patients usually find uncomfortable.

**Patient education during hospitalization**

Patient education about bladder management after urinary diversion or orthotopic neobladder construction begins before surgery and is re-started as soon as possible after surgery. While education focuses on the patient, family members and other care providers are included, whenever feasible.

The patient is taught multiple measures for mucus management, including irrigation, which transiently removes mucus from the pouch. They also learn strategies that reduce the volume of mucus production and mucus viscosity. Patients should be taught to drink an adequate volume of fluids to dilute the mucus. This intake is based on the Recommended Daily Allowance (RDA) for fluids (30 ml/kg or 5 ounce/lb). Patients are also encouraged to drink 4 to 8 ounces of cranberry juice, which contains several substances, including benzoic and quinic acids, that are converted into hippuric acid, which thins the mucus within the pouch and makes catheterization easier.

The patient with an orthotopic neobladder is taught that the reconstructed bladder will function differently than the native bladder. Following construction of a neobladder, micturition requires increasing pressure within the neobladder by abdominal straining, combined with striated sphincter (pelvic floor muscle) relaxation. In addition, voiding may be assisted by smooth muscle contraction within the reservoir wall. Using this combination of techniques, residual volumes vary from 0 to 300 ml. Only 3% to 6% will require ongoing intermittent catheterization. However, the risk of markedly elevated residuals with inefficient voiding is significant, as illustrated by one case study of a patient with an abdominal abscess after neobladder construction who was non-compliant with voiding instructions.

Because of the risk of inefficient voiding and elevated residual volumes, patients are taught to void when the bladder feels full or to urinate by the clock (every 3 to 5 hours). They are also taught to identify, contract, and relax the pelvic floor according to the clock (every 3 to 5 hours). They are also taught to gently rotate the catheter to identify the location of the central lumen. We have observed that most patients rapidly learn to identify the best angle for catheterization, and the nurse frequently benefits from asking the patient with a long-standing continent diversion to identify this angle before attempting catheter insertion.

In contrast, the patient with a Mitrofanoff procedure is typically taught to catheterize with a smaller-sized tube (10 to 14 Fr). Patients with a Mitrofanoff procedure typically find self-catheterization easier to do than those with a continent abdominal stoma constructed from intussuscepted bowel.

In addition to teaching the patient to self-catheterize, we have found it necessary to teach at least one family member or significant other to perform catheterization. This preventive education is invaluable should the patient be temporarily unable to complete this procedure. Teaching care providers or family members is also essential for handicapped patients who have continent urinary diversion, particularly when upper extremity function is impaired.

A stoma that is incorporated into a continent urinary diversion is not expected to leak urine, but it may produce mucus. Therefore, it may be covered with a gauze dressing between catheterizations to contain mucus discharge. The peristomal skin should be regularly observed for rashes and for integrity, but patients can be reassured that skin problems are rare. The use of a secondary wound dressing and holder is recommended when skin problems are present.

**Follow-up and home care**

**C. Continent urinary diversion**

Follow-up and home care of the patient with a continent urinary diversion differs from that recommended for the patient with an incontinent diversion. About 3 to 4 weeks postoperatively, a cystogram is obtained to ensure anatomic integrity of the reservoir and any remaining indwelling catheters are typically removed. This cystogram may be done under low and high pressures, but significant discomfort is not typically associated with this procedure.

Once anatomic integrity is ensured, the patient with a continent urinary reservoir is taught self-catheterization. Catheterization proceeds on a progressive schedule designed to promote expansion of the urinary reservoir. Ultimately, most reservoirs hold 500 to 1000 ml. With an intussuscepted continent stoma, the patient uses a relatively large catheter (16-18 Fr). He or she is taught to apply gentle pressure if resistance is met with catheterization and to gently rotate the catheter to identify the location of the central lumen. We have observed that most patients rapidly learn to identify the best angle for catheterization, and the nurse frequently benefits from asking the patient with a long-standing continent diversion to identify this angle before attempting catheter insertion.

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**Long-term complications**

All patients who have a urinary diversion or orthotopic neobladder are taught signs and symptoms of urinary tract infection (UTI). Patients with a continent urinary diversion or orthotopic neobladder may experience a febrile UTI, which may indicate pyelonephritis but more likely indicates pouchitis. This infection is characterized by abdominal discomfort that may or may not be localized to the urinary reservoir. Mucous production is likely to increase and blood-tinged urine may be present. Treatment of pouchitis or febrile UTI is based on sensitivity-guided culture results.

Patients are taught the importance of routine follow-up management, including regular monitoring of renal function and residual urine volumes. The routine monitoring of residual volumes and voiding efficiency is particularly significant for the patient with an orthotopic neobladder, since elevated residual volumes predispose the patient to complications, such as stones, infection, and compromised renal function.

**References**


55. Santucci et al. 1999; Penalter et al. 1999; Bloch et al. 1992; Lockhart et al. 1991. Additional references are available on request.
1. The first continent urinary diversion, the ureterosigmoidostomy, was eventually abandoned because of:
   a. frequency of liquid stools.
   b. anastomotic strictures.
   c. long-term complications such as pyelonephritis and colon cancer.
   d. patient dissatisfaction.

2. A cystectomy and urinary diversion is necessary when bladder cancer:
   a. is recurrent.
   b. presents in multiple superficial sites.
   c. responds only to fulguration.
   d. is advanced stage.

3. Urinary diversion for interstitial cystitis is less than optimal alternative treatment because:
   a. of complicating psychosocial factors.
   b. it enhances bladder cancer without relieving pain.
   c. it necessitates self-intermittent catheterization.
   d. of the risk for subsequent bladder cancer.

4. While continent diversion is often preferred by patients and their surgeons, the ileal conduit is the procedure of choice for patients with guarded prognosis because:
   a. it has withstood the test of time.
   b. there is minimal reabsorption of electrolytes.
   c. the ease of construction and low incidence of severe complications.
   d. the patient does not need to worry about remembering to catheterize a continent reservoir.

5. Which surgical technique, first incorporated into the Kock pouch, is used to abolish peristaltic contractions within a urinary reservoir created from bowel:
   a. application.
   b. intussusception.
   c. marsupialization.
   d. detubularization.

6. What is an advantage of incorporating the Mitrofanoff technique into the continent urinary diversion?
   a. avoids need for construction of nipple for continence.
   b. reduced risk of long-term metabolic complications.
   c. larger capacity of urinary reservoir.
   d. less prone to spontaneous rupture.

7. Typical bowel preparation includes a low residue diet and mechanical cleansing using:
   a. erythromycin.
   b. GoLYTELY.
   c. mineral oil.
   d. Dulcolax.

8. What is the primary complication associated with bowel preparation before continent urinary diversion?
   a. perforation.
   b. persistent diarrhea.
   c. metabolic alkalosis.
   d. electrolyte imbalance.

9. Early ambulation is strongly encouraged because it:
   a. reduces postoperative discomfort.
   b. promotes healing of the surgical wound.
   c. enhances recovery of peristaltic function.
   d. shortens the time spent in a critical care unit.

10. Which is the best strategy to manage metabolic acidosis following creation of an orthotopic neobladder?
    a. alkalinization using Polycitra.
    b. conversion to an ileal conduit.
    c. supplementation with vitamin B12.
    d. neutralization by increased dietary intake of sodium chloride.

11. A patient returns from cystectomy with construction of a continent reservoir and an orthotopic neobladder. The suprapubic catheter does not drain urine over the first 2 hours and the patient complains of increasing discomfort localized to the suprapubic area. What is the best explanation for these findings?
    a. urinaryflow typically stops for 2-4 hours following surgery.
    b. the patient is experiencing acute pre-renal failure.
    c. the catheter is blocked by mucus or blood.
    d. the neobladder is not yet functioning.

12. Which of the following strategies is used to reduce mucous production in the reservoir of a continent urinary diversion?
    a. glucophage bid.
    b. reduced fluid intake.
    c. 8 ounces of cranberry juice qd.
    d. 12 ounces of milk with meals.

13. Patients often prefer the orthotopic neobladder to the continent urinary diversion because:
    a. preserves urethral voiding.
    b. requires less surgical time.
    c. reduces the risk of recurrent cancer.
    d. avoids the risk of metabolic complications.

14. On the day of hospital discharge, a patient with a Mainz pouch asks when the remaining catheters will be removed. Which is the best response to this question?
    a. The catheters will be removed today, prior to hospital discharge.
    b. The catheter will be removed in 5-7 days or as soon as the urine regains its normal color and character.
    c. The catheters will be removed in 10-12 weeks after all suture lines are completely healed and the diversion is able to withstand the stress of regular filling and emptying.
    d. The catheters will be removed in 3-4 weeks, after a cystogram is completed to ensure watertight healing of the urinary reservoir.

15. Patients with an orthotopic neobladder should be taught to urinate by:
    a. allowing the bladder to fill until spontaneous bowel contractions cause urination.
    b. performing a Valsalva maneuver while relaxing the pelvic floor muscles.
    c. self-intermittent catheterization every 4-6 hours.
    d. Crede maneuver.

Mark your answers with an X in the box next to the correct answer

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Participant’s Evaluation

1. What is the highest degree you have earned?
   1. Diploma
   2. Associate
   3. Bachelor’s
   4. Master’s
   5. Doctorate

Using 1 =Strongly agree to 6 = Strongly disagree rating scale, please circle the number that best reflects the extent of your agreement to each statement.

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2. Indicate to what degree you met the objectives for this program:
   ■ 1. Compare and contrast the nursing management for patients with a continent urinary reservoir and an orthotopic neobladder.
   1 2 3 4 5 6
   ■ 2. Describe the types of complications that may arise in the postoperative period and the nursing management for each complication.
   1 2 3 4 5 6
   ■ 3. Discuss the nurse’s role in preparing the patient with a urinary diversion for self-care management in the home setting.
   1 2 3 4 5 6

3. Have you used home study in the past? □ Yes □ No

4. How many home study courses do you typically use per year?

5. What is your preferred format? □ Video □ Audio-cassette □ Written □ Combination

6. What other areas would you like to cover through home study?

Mail to: Cross Country University, PO Box 5028 Boca Raton, FL 33431-0828 • or Fax: (561) 988-6301

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