



Your Health Matters

Continent Urinary Reservoirs and Bladder Substitutes

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Continent Cutaneous Urinary Reservoirs and Bladder Substitutes

Anatomy

The bladder is an organ in the pelvis that collects, stores and expels urine. Urine is produced by the kidneys and travels down two tube-like structures called the ureters. The ureters connect the kidneys to the bladder. Urine leaves the bladder through another tube-like structure called the urethra. (Figure 1)

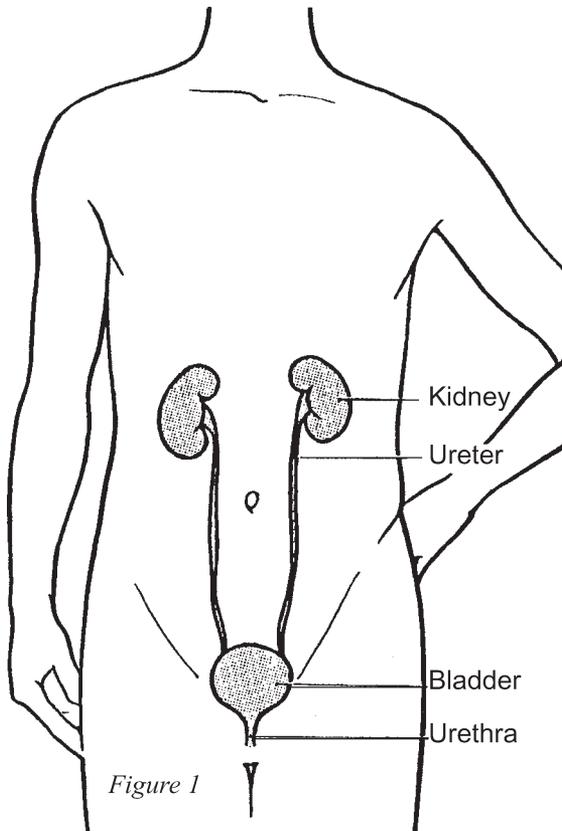


Figure 1

Removal of the bladder (cystectomy) may be necessary in some people with bladder cancer, congenital disorders of the urinary tract, and in some people who have suffered surgical, traumatic or neurologic damage to the bladder. In these situations, another method of collecting and excreting urine must be found.

The most common and easiest method for urinary diversion is to use a short piece of intestine as the connection between the ureters and the outside of the body (ileal or colon conduit). This type of diversion is easy for the patient to manage and has a low rate of complication. However, an ostomy bag must be worn at all times to collect urine. Newer surgical techniques are available which do not require the patient to wear an ostomy bag. These newer procedures involve creation of a continent urinary reservoir that collects and stores urine.

What is a Continent Urinary Reservoir and How is it Made?

A continent urinary reservoir is an internal “pouch” made from segments of the intestine. Urinary reservoirs can be made from small intestine alone, large intestine alone or from a combination of the above. (Figure 2) The bowel segments selected

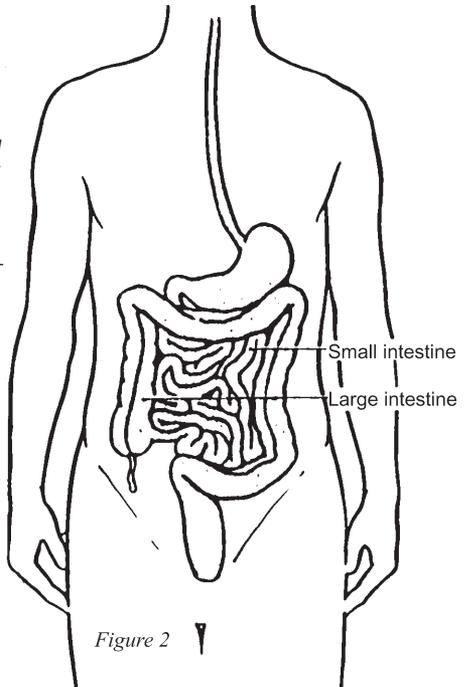


Figure 2

for use are disconnected from the remainder of the intestinal tract to avoid mixing the gastrointestinal contents (feces) with urine. These segments are then configured into a pouch or bladder substitute.

Continent Cutaneous Reservoir

Once completed, the new reservoir can be placed within the abdomen and connected to the skin (so-called continent cutaneous reservoir). (Figure 3a) In this situation, a nipple stoma is made from a portion of the intestine and brought to the skin. The stoma is fashioned so that the reservoir remains “continent” and urine does not spill onto the abdomen. The urine in the reservoir is removed by inserting a soft catheter through the nipple stoma (“catherization”) several times a day. An outside ostomy bag is not necessary.

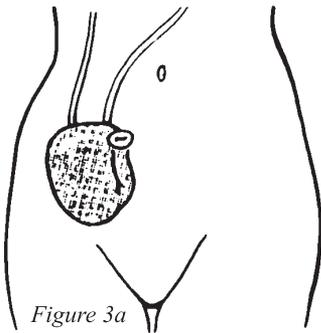


Figure 3a

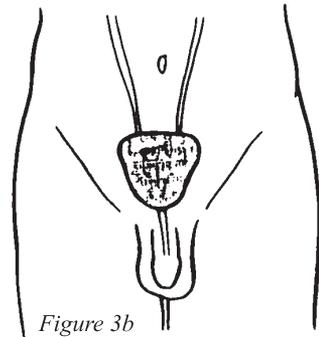


Figure 3b

Continent cutaneous reservoirs require irrigation with water. This is done to prevent the reservoir from filling with mucous that is normally produced by the intestine. After the initial post-operative period, patients usually catheterize the reservoir to empty urine every two hours during the day and

every three to four hours at night. Each week, the time interval is increased until patients catheterize every four to six hours during the day and once at night. Patients should also catheterize whenever they feel discomfort or pain.

This type of urinary diversion was quite popular after its initial introduction. However, with longer follow-up, it was discovered that this type of urinary diversion may be prone to complications such as recurrent infection, stone formation or urinary incontinence requiring repeat operation. With the advent of the bladder substitute, this type of urinary diversion has become less common.

Bladder Replacement

Beginning in the mid-1980's, bladder substitution (also known as orthotopic bladder replacement) became a popular form of urinary tract reconstruction for men undergoing radical cystectomy. Urinary diversion was no longer simply a means to divert urine, but was now a way to provide male patients with a more normal lifestyle and a more positive self-image following removal of the bladder. By allowing for voiding through the urethra, bladder replacement may lead to improvements in body image, sexuality, sociability and an overall better sense of well being when compared to other forms of urinary diversion. Beginning in 1990, bladder replacement became an accepted option for women undergoing cystectomy. Currently, bladder substitution is the preferred form of urinary diversion for most patients undergoing cystectomy.

Bladder substitutes are created in a similar fashion to continent cutaneous reservoirs, except that the reservoir is placed in the pelvis and connected to the urethra. (Figure 3b) The urine is then expelled from the urethra as before the procedure, with two important exceptions. First the orthotopic bladder replacement may not give the patient the same sensation of fullness as the patient's normal bladder. Therefore, patients must empty the bladder replacement regularly or by the clock. Patients are advised to urinate at least every two hours during the day and every three hours at night for the first week after catheter removal, every three hours during the day and every four hours at night for the second week after catheter removal and every four hours during the day and once a night for the third week after catheter removal and beyond. Patients should not hold urine in the reservoir for long periods of time, even if the sensation to void is not present. In such cases, the reservoir may become over-distended and very difficult to empty to completion.

The other difference between the new and old bladder is that the new bladder does not actively expel urine as the old bladder does. Therefore, the patient must use his/her abdominal muscles and strain to empty the new bladder. However, it is critical that patients relax the external sphincter muscles of the bladder before and during straining. Patients are encouraged to spend several minutes in the bathroom emptying the new bladder to ensure that all urine has been emptied. At first, men are asked to void while sitting to ensure that the bladder substitute is completely emptied. This is very important because once the bladder substitute has been over-

distended (stretched), it becomes very difficult to empty all the urine and patients may be prone to infection and/or kidney damage.

Initially, patients with new bladders may experience some urinary incontinence. Complete or near complete daytime continence is expected in 90-95% of men and women with bladder substitutes.

Continence improves with pelvic floor exercises known as “Kegel” exercises. Most people continue to need to wake up at night to urinate in order to avoid small amounts of nighttime incontinence.

Very few men and as many as 1 in 5 women may not be able to empty their bladder substitute to completion, even with straining. In such cases, catheterization (passing a soft catheter through the urethra) from once to several times per day may be necessary. It is for this reason that any patient receiving a bladder substitute must be willing and able to catheterize.

In most cases, irrigation is not necessary for patients with bladder substitutes after the initial post-operative period.

Who Can Have a Continent Cutaneous Reservoir or Bladder Substitute?

People who require removal of the bladder (cystectomy) and some people who may require diversion of urine because of severe bladder damage are candidates for a continent cutaneous reservoir or bladder substitute.

Patients must have adequate kidney function (serum creatinine < 2.0 mg/dl), be able to undergo a major surgical procedure and have the motivation and ability to perform regular catheterization, should the need arise. Patients with extensive bowel disease or previous bowel resection that may lead to intestinal malabsorption or diarrhea may be better candidates for an ileal conduit, since a shorter intestinal segment is needed for urinary diversion. Patients with pre-existing urinary incontinence may not be appropriate candidates for bladder substitution due to a high likelihood of persistent incontinence following surgery. Patients undergoing cystectomy for cancer who are found to have tumor in the urethra are not candidates for bladder substitution because the urethra would need to be removed to perform an adequate cancer operation. Neither advanced age, the presence of carcinoma-in-situ nor previous pelvic radiation represent absolute contraindications to the procedure. Overall, contraindications occur in few patients undergoing cystectomy and most patients remain appropriate candidates for bladder substitution or a continent cutaneous reservoir.

Construction of a continent cutaneous reservoir or bladder substitute may require more time than simpler forms of urinary diversion such as an ileal conduit. However, continued experience with this technique in both men and women has confirmed it to be a safe and reliable method of urinary diversion in appropriately selected patients. Indeed, even though continent diversion is perceived by some as a more complex procedure, prior studies have demonstrated complication and re-operation rates similar to those of ileal conduit urinary diversion.

Hospital Course

Preoperative: You will be on a bowel preparatory program the day before surgery, consisting of a clear liquid diet, laxatives and antibiotics. This program clears the stool and bacteria from the intestine thereby decreasing the risk of infection. You will receive instructions/prescriptions from your doctor's office. In addition, you can anticipate no food or liquids by mouth starting at midnight before the procedure.

Postoperative: Surgery usually lasts 6 hours. After surgery and a short stay in the recovery room (1-2 hours), you will return to your room with several drainage tubes. There will be a catheter in the stoma or urethra, depending on the type of diversion. Two small tubes that drain urine directly from the kidneys (stents) may exit the stoma or lower abdomen in patients with a continent cutaneous reservoir, while in patients with a bladder replacement, these stents are usually attached to the catheter and located within the intestinal pouch. There will be an additional drain, usually on one side of the abdomen that drains any fluid that accumulates in the abdomen after surgery. Some patients may also have an epidural catheter for pain control that is placed by the anesthesiologist. Patients may also have a small tube exiting from the nose that travels into the stomach (a nasogastric tube) to drain the stomach contents and prevent nausea and vomiting for 2-3 days after surgery.

The reservoir is made from intestine that normally produces mucous. To remove mucous, the reservoir will be irrigated through the catheter with water. At first, this will be done by the physician or nurse.

However, you will be taught to irrigate the reservoir yourself because you will need to do this at home every 4-6 hours for the first 3 weeks following surgery.

You will be able to start eating or drinking 2-5 days after surgery. This usually occurs when there is evidence that you intestines are functioning properly, such as flatus or bowel movements. At first, you will only have a liquid diet to ensure that your intestinal tract is ready to digest food. When you can tolerate liquids without nausea or vomiting, you will be given a regular diet.

Some patients develop diarrhea after urinary diversion. This may result from removal of a portion of the intestine that absorbs water or other compounds necessary for complete digestion. Diarrhea is usually temporary and mild. Until it subsides, adding more fiber to the diet or taking a prescribed medicine may be helpful. If diarrhea continues for more than 2 weeks or is severe, please notify your doctor.

After Discharge: Approximately 2-3 weeks after surgery you will return to the hospital for an x-ray of your reservoir/bladder substitute. This is done on an outpatient basis. Fluid that shows up on x-ray films will be placed into your reservoir/bladder substitute through the previously placed catheter to ensure that there is no leakage from the intestinal pouch. If there are no problems with the reservoir/bladder substitute, any remaining tubes will be removed and you will receive instruction regarding catheterization/ voiding. X-rays of the kidneys (CT scan, ultrasound or intravenous pyelogram) and blood tests will be performed at regular intervals (usually every 3-6 months for the first few years after surgery) to ensure that there is no kidney damage from the new

urinary diversion. For patients undergoing cancer surgery, these studies may also monitor the progress of the cancer.

Is There Anything Else I Should Know?

Since continent cutaneous urinary reservoirs and bladder replacements are usually performed at selected Medical Centers, many hospitals and physicians may not be familiar with them. To alert physicians and nurses in the event of an emergency, a "medic-alert" bracelet should be worn at all times. You may obtain such a bracelet from Medic Alert Foundation, PO Box 1009, Turlock, CA 95381-1009. Patients with a continent cutaneous reservoir should have the following printed: "I have a continent urinary reservoir. My stoma should be catheterized every 4 hours." Patients with a bladder substitute should have the following wording: "I have a continent urinary reservoir that may require urethral catheterization every 4 hours." If any questions arise, emergency room physicians and nurses should be encouraged to contact your surgeon directly. This is especially important during the immediate post-operative period (the first 3 weeks following surgery) since early removal of the stomal or urethral catheter may have significant consequences.

Discharge Instructions

Supplies:

- One irrigation kit
- One overnight drainage bag
- Two leg bags
- One bottle sterile water
- Blue clamp
- Alcohol pads
- Two large Ziploc style plastic bags
(can be purchased at grocery store)
- 3 14-16 French catheters
- 10 small packages of lubricant (K-Y Jelly)
- Tape
- 2x2 gauze sponges
- Band-aids

Recipe for sterile water

You can make the water used in irrigation at home. Make a weeks worth at a time (2-3 quarts) and store the unused portion in the refrigerator. Boil tap water for twenty minutes, cool and pour into covered containers. The bottles from the hospital work well. The water can be warmed to room temperature before use if you find it too cold.

How to Irrigate the Reservoir

Irrigation should be done through the catheter inserted into the abdominal stoma or the urethra (depending on the placement of the reservoir).

- ❑ Wash your hands.
- ❑ Attach the syringe to the catheter and gently draw back to ensure the reservoir is empty.
- ❑ Draw up 60cc of sterile water into the syringe and insert the syringe into the catheter.
- ❑ Push water into the catheter. Repeat with an additional 40cc of water so that the total volume of water in the reservoir is 100cc.
- ❑ Gently pull back with the syringe to begin, although you may allow salient and mucus to drain into the irrigation tray, basin, or toilet once most of the mucus has been removed. You may continue to irrigate the reservoir until the urine is clear with additional water if the urine has a lot of mucus or clots.
- ❑ After the contents have drained, wipe the catheter end and the bag end with alcohol and reconnect them. Tape the connection securely with plastic tape.
- ❑ The irrigation bottle and the syringe can be washed in the upper rack of a dishwasher or with hot, soapy water. The tray can be washed in hot, soapy water once the contents are emptied into the toilet.

*If the reservoir gets too full, urine backing up into the kidneys causes pain in the back. If you have severe or moderate back pain, you may need to irrigate the catheter to clean out the mucous to allow the reservoir to empty.

The reservoir should also be irrigated if the catheter stops draining.

How to Catheterize the Reservoir

Patients with the reservoir connected directly to the urethra usually do not require catheterization (except to irrigate the reservoir of mucus as described above). The catheter can be inserted directly through the urethra, the opening of the urinary tract at the tip of the penis in men or near the vagina in women.

Patients with an abdominal reservoir will need to catheterize the stoma to empty the reservoir. You can do this standing in front of or sitting on the toilet or into a container. If you choose to sit on the toilet, you will empty the urine between your legs.

- Wash your hands with soap and water.
- Remove the catheter from the Ziploc plastic bag it is stored in, lubricate the tip (if desired), and place it on a clean paper towel on the back of toilet (if standing). Hold the catheter if sitting.
- Insert the catheter into the stoma and drain the reservoir completely. If the catheter drains slowly or not at all, remove it and run hot water through it to remove mucus.

- ❑ Wipe the stoma with toilet tissue to remove any mucus or urine left on the surface.
- ❑ Cover the stoma with a gauze pad, a cut-up paper towel, a cut-up mini-pad and tape or a band-aid. Even if the stoma seldom leaks it is important to protect it from the friction of clothing.
- ❑ Place the catheter in another Ziploc plastic bag until it can be cleaned.

How to Take Care of the Catheters

To clean catheters:

- ❑ Soak used catheters in hot, soapy water. Use a syringe to push water through the catheter. Rinse thoroughly.
- ❑ Place the catheters on a paper towel to air dry. Make sure the inside dries, too.
- ❑ Store the catheters in a clean plastic Ziploc bag. Never place the unused catheters with used catheters and never place catheters on the back of a toilet or sink in a public bathroom.

After about a month, the catheters may develop small cracks and leak. They need to be thrown away. Replacements can be ordered at a medical supply store. You can find the one nearest you in the phone book yellow pages under “medical supply”.

Points to Remember

- ❑ Try to catheterize the reservoir on the scheduled time. If you get off schedule, re-schedule yourself to the appropriate time intervals instead of waiting for the next scheduled time. This is very important because urine may leak from the stoma or reflux to the kidneys. For example, if you miss the 10:00 am time, catheterize as soon as possible—do not wait until 2:00 pm.
- ❑ Wear your Medic-Alert bracelet at all times.
- ❑ Never use petroleum jelly as a lubricant. It does not rinse off easily and causes the catheter to wear out more quickly.
- ❑ Always be prepared to catheterize away from home. Keep a catheter in your car, pocket or purse. Plan to catheterize before leaving home if it will be difficult to catheterize while you are away.
- ❑ Keep a time schedule sheet to remind you to catheterize or empty the reservoir. It is better to catheterize early than late. During the first few months after surgery, it is often useful to keep a diary recording the times of catheterization and irrigation each day and to note any difficulty encountered.
- ❑ Never force the catheter. Remove the catheter and reinsert in a slightly different direction, gently rotating it as it is passed. If you are still unable to pass the catheter, contact your physician.

- ❑ Abdominal or pelvic pressure or discomfort may be felt when the reservoir is over-distended. Try to empty the reservoir before this occurs.
- ❑ Urinary tract infections occur when bacteria get into the urinary tract and begin to multiply. Usually the body flushes the bacteria out with the urine. However, sometimes the body is unable to rid itself of the bacteria and symptoms develop. Common symptoms include: flank or abdominal pain, fever or chills, dizziness, fainting or weakness.

If any of these symptoms develop, call your doctor's office for advice about what to do. To prevent infections, drink plenty of fluids, at least eight full glasses a day. Fruit juices, such as cranberry or grape, may help to acidify the urine and make it more difficult for bacteria to grow.

- ❑ A small amount of bleeding is common and usually occurs along the stoma due to irritation by the catheter, dressing or clothing. More significant or persistent bleeding should be reported to your physician.
- ❑ It may take several weeks to months for your bowel pattern to normalize. Let your doctor know if this continues to be a problem.
- ❑ Sexual activity can be resumed after 4-6 weeks. Some women may have problems with tightness in the vagina, and some men may have problems with getting an erection. If these problems occur, contact your doctor or nurse as these problems can be treated

Future Potential Complications

Infection

Signs and Symptoms of Infection

- Fever Low back pain (flank pain)
- Fatigue Cloudy urine
- Chills

*To avoid infection, drink plenty of fluids, catheterize or empty your new “bladder” regularly avoiding over distention

Urinary Retention/Obstruction

Signs and Symptoms of Urinary Retention/Obstruction

- Pain in lower back, flank, abdomen or pelvis
- Nausea
- Abdominal or pelvic distention

*To avoid this, ensure adequate drainage from the reservoir by irrigating as needed.

Vitamin Deficiency - B12

As the portion of the intestine which absorbs certain vitamins is used in the construction of your reservoir, monitoring of vitamin levels should be performed yearly. Replacement of these vitamins may be necessary.

Glossary

antibiotics — a prescription drug to combat infection

catheter — a small rubber tube into a body cavity to drain fluid

cecum — a small pouch at the junction of the small and large intestine

colon — the large intestine

congenital — abnormality existing at the time of birth

cystectomy — surgical removal of the bladder

hydronephrosis — blockage of the flow of urine from the kidney, causing kidney enlargement

ileum — a section of the small intestine

incontinence — involuntary passage of urine (passing urine without voluntary control)

irrigate — to wash out

kidney — the organ that removes waste products from the body by producing urine

mucus — thick secretions produced by body linings

stoma — from the Greek for “mouth”; here a piece of intestine visible on the abdominal wall

ureter — duct that connects the kidney and bladder

ureteral reflux — backwards flow of urine from the bladder up the ureters to the kidneys

urethra — canal connected to the bladder through which urine is expelled

Important Telephone Numbers

Physician: _____

Nursing Station: _____

Emergency Room: _____