Vesicostomy, Appendicovesicostomy and Other Variants

What is it?
A Vesicostomy is an opening in the abdomen that allows urine to drain continuously from the bladder. The opening is made by making a small incision through the skin and into the bladder. A small part of the wall of the bladder is turned inside out and sewn to the abdomen. There is not a gaping hole in the abdominal wall. The opening instead looks like a small slit surrounded by some pink tissue.

Most often patients who need this procedure are very young -- usually infants and toddlers. Children may have been born with an obstruction somewhere in the urinary tract. This may occur in children who have been diagnosed with posterior urethral valves, cloacal anomalies, vesicoureteral reflux or spina bifida. This procedure is a necessary step for some patients to help prevent urinary tract infections and/or kidney damage. Although most children who need a vesicostomy are young (under 5 years old), sometimes this procedure also helps older children or teenagers temporarily.

An appendicovesicostomy is a variant of the simple vesicostomy, using the appendix as a conduit reservoir for urine. The appendicovesicostomy is created by fashioning a skin flap for the stoma and bringing the reversed cecal end of the appendix through a generous fascial opening without kinking the appendiceal mesentery. The reservoir end of the appendix is created in an antirefluxing fashion by bringing the amputated end of the appendix through the reservoir wall into a submucosal tunnel or a mucosal trough. A catheterizable efferent conduit that is straight, easily accessed with a catheter, and has a tension-free anastomosis is the ultimate goal. Catheterization of the stoma 4 times a day may be required to minimize the risk of stomal stenosis.

An alternative technique, appendicocolostomy, is performed by tunneling the appendix under the taenia of either a patch of detubularized cecum or sigmoid which becomes part of a continent neobladder. Moreover, cecoappendicovesicostomy using cecal tubularization has been reported to be a safe and useful means of conduit lengthening for patients who are undergoing continent cutaneous appendicovesicostomy. If the appendix is short, the cecum can be tubularized or the distal portion of the cecum can be stapled to increase the appendiceal length.
Mitrofanoff Variants
There are numerous options for continent urinary reconstruction using the Mitrofanoff principle:

Ureter
In the original report by Mitrofanoff, the ureter was used as a catheterizable ureterostomy associated with a high transureteroureterostomy (both renal units were present). Other investigators have confirmed the applicability of the ureter to the Mitrofanoff principle. In the report of Duckett and Lotfi, 13 of 41 patients with neurogenic bladders received a flap valve continence channel using the ureter as the conduit into the urinary reservoir. Other studies indicate that ureteral Mitrofanoff channels seem somewhat less satisfactory than those of appendicovesicostomy. Stomal stenosis tends to occur more frequently with ureteral conduits than with appendiceal conduits.

Detrusor Tube
When the appendix and the ureter are not available, a segment of tubularized bladder may be used as a catheterizable stoma. Patients must have a large-capacity bladder to be considered candidates for this procedure. This variant raises a 7 3 3-cm rectangular flap of full-thickness detrusor muscle wall whose mucosal blood is supplied through the superior vesicle pedicle. The flap is tubularized over a 12F catheter, and the proximal end of the detrusor tube is buried underneath detrusor flaps. Stomal stenosis seems to be the only complicating factor.

Gastric Tube
Segments of the GI tract other than the appendix can be used to create a continent efferent limb. In patients undergoing GI augmentation, a gastric segment with blood supply from the right gastroepiploic artery can be harvested from the greater curvature of the stomach and tubularized as a narrow-lumen conduit. This variant may create skin breakdown from secreted gastric acid and can be serious.

Tapered Ileum/Sigmoid
In the case of the small bowel, a segment of terminal ileum (6 to 10 cm) can be isolated and tapered longitudinally over a 12F catheter; then the proximal end is tunneled into the reservoir in a nonrefluxing manner. Urinary continence rate is much less with reports of approximately 60%.

The technique of transverse retubularization of the ileum to create a continent catheterizable conduit for an ileal reservoir has become the second preferred option for creating a Mitrofanoff conduit, especially if the ileum is used for bladder augmentation simultaneously.
The appendix remains the tissue of choice to create the conduit.

**Other Mitrofanoff Variants**

In patients with an unsuitable appendix and limited bowel or ureter, the accessory internal sex structures, the vas along with preputial skin, can serve as an alternative to create a Mitrofanoff flap valve conduit.

**Bowel Continence**

Patients with neurogenic voiding dysfunction usually have coexisting neurogenic bowel problems. Impaired bowel evacuation can lead to both severe fecal impaction and fecal incontinence. Traditional management includes stool softeners, bulking agents, digital rectal stimulation, suppositories, and enemas. In 1990, surgeons began combining the principles of antegrade colonic washout thru a MACE stoma and the Mitrofanoff nonrefluxing catheterizable channel to produce a continent catheterizable colonic stoma. The intention was that antegrade washouts delivered by this route would produce complete colonic emptying and thereby prevent soiling.

Surgeons have also reported splitting the appendix to provide both the Mitrofanoff and MACE stomas. The technique involves dividing the appendix such that the distal portion used for the Mitrofanoff urinary stoma is supplied by the appendiceal artery, while the proximal stump is fed by the ileocecal artery. This has resulted in successful outcomes for patients with urinary and bowel incontinence. This procedure is well accepted by most patients; however, detailed preoperative preparation and patient selection as well as postoperative follow-up and catheter training are still vital for the prevention of psychological disorders, such as postoperative depression, despite an apparent good functional result.

**Complications**

The most common problem encountered with the catheterizable stoma following creation of a continent urinary diversion is difficulty with catheterization. It has been reported that the site of the stoma may be significant to the incidence of stomal stenosis. Stenosis was 13% with the stoma at the umbilicus and 4% with the stoma in the lower abdominal quadrant.

Stomal incontinence tends to result from an inadequate flap valve mechanism, inadequate urinary reservoir capacity, or both. A urodynamic evaluation of the reservoir is essential to detect a correctable cause.
Stone formation may also occur in the continent urinary conduit due to inadequate evacuation of the reservoir with catheterization. Mucus retained because of insufficient irrigation of the reservoir coupled with bacterial colonization may also contribute to stone formation.

**Caring for a Vescostomy at Home**

The opening of the vescostomy will naturally shrink down if it is not stretched at regular intervals. It may be necessary to dilate the opening with a catheter once or more times a day. It is best to do this in the morning and again in the evening before bedtime. Urine should continuously drain through the vescostomy opening, called a stoma. It is normal for a slight amount of bleeding to occur from the stoma during dilation.

All patients who have a vescostomy need to wear a diaper or incontinence brief. Urine draining into a diaper or incontinence brief generally does not cause skin problems. Occasionally, however, skin may become red, irritated and sore. If this happens, the skin may need to be treated with ointments or other medicine.

The physician needs to be notified if:

- If urine doesn't drain from the vescostomy for 2 hours
- If the skin around the stoma site looks red, crusty, irritated or infected
- If you are unable to pass the catheter through the stoma to dilate it
- If a portion of tissue protrudes from the stoma
- If it is painful for the catheter to be passed through the vescostomy
- If urine develops a bad odor
- If there is blood in the urine (more than the usual amount that occurs with the dilation)
- If a fever greater than 101.5°F (38.6°C) develops

**References:**
