Cutaneous vesicostomy is indicated as initial treatment in upper urinary tract dilatation secondary to posterior urethral valves, high-grade vesicoureteric reflux and neurogenic bladder dysfunction, when immediate definitive therapy cannot be undertaken or fails. Vesicostomy prevents urinary tract infection, improves or stabilizes renal function and allows the urinary tract dilatation to resolve. Catch-up growth in the low-weight infant is improved. Cutaneous vesicostomy is a simple procedure, having minimal complications if operative detail is followed.

INTRODUCTION

Vesicostomy achieves urinary diversion at bladder level through the lower abdominal wall by means of direct drainage. Cutaneous vesicostomy is an elective temporary procedure performed for patients with upper urinary tract dilatation, secondary to vesical or infravesical disease. The operation is effective in preventing urinary infections, improving or resolving ureterohydronephrosis and stabilizing or improving renal function: that is, functional and morphologic recovery of the urinary tract.1–3 For some children and adults with myelomeningocele, a permanent cutaneous vesicostomy may be indicated.4,5 When carried out for low-weight infants, vesicostomy helps neonates catch up the growth deficit in the first 2 years of life.6

Generally the urethra can be catheterized and the bladder may be drained for a short while until the definitive treatment is effected. Long-term indwelling catheters are inappropriate in most cases, particularly for young children, being associated with recurrent infection, urethral strictures and bladder stones.7,8

INDICATIONS

Vesicostomy may be used as an initial treatment for infants with posterior urethral valves, high-grade vesicoureteric reflux, and “prune-belly” syndrome. The procedure may play a limited role in the treatment of both children and adults with neurogenic bladder dysfunction, and of individuals with obstructing intravesical tumors of urologic or gynecologic origin.

Posterior urethral valves

Posterior urethral valves occur in males and are congenital membranous folds of mucosa that arise just distal to the verumontanum. They cause partial or total obstruction of the posterior urethra (Figure 1). This leads to bladder outflow obstruction, back pressure and consequent renal damage.

Primary valve ablation is the gold-standard treatment of posterior urethral valves, vesicostomy being reserved for selected cases.9 Primary valve ablation is associated with better bladder function outcome than vesicostomy with delayed valve ablation.10,11 However, vesicostomy is appropriate where equipment and expertise for valve ablation are not available and patients have to be referred some distance. Sometimes the very fine resectoscope needed for infant valve ablation may not be available, and the child may have to retain a vesicostomy until a larger instrument can be passed.

Vesicoureteric reflux

Under normal conditions urine does not flow back from the bladder into the ureter. When vesicoureteric reflux occurs, bladder urine passes retrogradely into the ureter, renal pelvis and calyces. The reflux may be primary, due to abnormalities of the ureteroovesical junction, or may be...
secondary to conditions such as posterior urethral valves, neurogenic bladder dysfunction and “prune-belly” syndrome.

Vesicostomy is an alternative to conservative or definitive surgical treatment for selected febrile infants with high-grade vesicoureteric reflux and risk of renal function impairment. The procedure allows easy management of urinary tract infection until anatomic conditions suitable for reconstructive surgery are attained. The bladder of young infants with primary vesicoureteric reflux treated with temporary vesicostomy regains normal function after reconstructive surgery.

Neurogenic bladder
This describes the result of conditions in which normal neurological bladder control is disturbed; it is associated with spina bifida, sacral agenesis, hydrocephalus, spinal cord injury, spinal tumors and complications of diabetes mellitus, or it may be idiopathic.

The management of infants with spina bifida and neurogenic bladder dysfunction involves a combination of clean intermittent catheterization and anticholinergic medication. In some cases this may fail, resulting in high detrusor pressures, hydronephrosis and febrile urinary tract infections. Vesicostomy rapidly stabilizes the upper urinary tract. In some children with spina bifida and myelomeningocele it is not always possible to achieve urinary continence. A permanent cutaneous vesicostomy is an acceptable alternative that the reconstructive surgeon should consider to avoid the complications of urinary diversion using segments of bowel.

Adults with myelomeningocele may not always find self-catheterization possible or acceptable. In such cases, urinary diversion is frequently hampered by anatomic abnormalities, preventing the use of bowel, and vesicostomy may be preferred for selected patients.

“Prune-belly” syndrome
This is a congenital condition in which there is lack of abdominal wall musculature, bilateral undescended testes, and dilatation of the upper urinary tracts and bladder. Although vesicostomy offers incomplete drainage because of poor bladder tone, the overall result is satisfactory.

Cutaneus vesicostomy is appropriate for upper urinary tract dilatation due to vesical or infravesical disease

**OPERATIVE TECHNIQUE**
The Blocksom technique is the most effective. In the child, this is carried out under general anesthesia. In the adult with myelomeningocele, the operation can be performed under local anesthesia, particularly if there is impairment or lack of sensation.

A subumbilical vesicostomy is usually preferred. The infantile bladder has a more abdominal location than its adult counterpart, and is highly mobile, allowing the bladder opening to be readily placed at the dome, thus reducing the risk of bladder prolapse. Since the infant can use diapers or napkins for several years, vesicostomy provides an ideal form of diversion for this age group.

The essential steps of the operation are outlined in Figure 2.

- The patient is placed in a supine position.
- Before surgery, the bladder is distended with sterile normal saline via a small feeding tube or catheter passed through the urethra. The dome of the bladder, which can be palpated, is used as a guide for the skin incision.
- A 3-cm transverse incision is made below the umbilicus.
- The fascia is incised transversely, and vertical nicks are made in the centre.
- The rectus abdominis muscles are
separated and the peritoneum reflected cephalad; the dome of the bladder is freed to the level of the urachus, which is divided.

- The bladder wall is sutured to the fascial defect.
- A transverse incision is made through the bladder wall behind the urachus. If the detrusor is very thick, part of the dome is excised.
- The bladder urothelium is matured to the skin and the procedure completed (Figure 3). Drains and dressings are unnecessary.

**COMPLICATIONS**

**Bladder prolapse**

Bladder prolapse is the most significant complication of vesicostomy, and occurs if the diversion is created through the anterior bladder rather than the dome. This allows the mobile posterior wall to evert through the defect in the abdominal wall, and revision using the appropriate technique becomes necessary.

**Stomal stenosis**

Stomal stenosis may result from bladder mucosal proliferative reaction caused by lack of irrigation with urine. Periodic dilatation is required. If urinary drainage is impaired, simple revision may become necessary. This involves advancement of a small triangular flap of healthy tissue into the defect in the cicatrix. Long-term catheterization of a stenosed stoma is inadvisable, in view of the potential complications.

**Bladder calculi**

Bladder calculi, if they occur, can be removed cystoscopically.

**Diaper dermatitis**

Diaper dermatitis can be minimized by frequent change of napkins or diapers. If the reaction is severe, 1% hydrocortisone ointment is applied.

**Rare complications**

Transitional and squamous cell carcinomas as long-term complications associated with vesicostomy have been reported, and also one case of adenocarcinoma. Intestinal obstruction due to incarceration of bowel into prolapsed bladder via the stoma of the vesicostomy has also been reported.

**REVERSAL OF THE STOMA**

After the primary condition requiring vesicostomy has been treated, the stoma is closed. A separating incision is made between the skin and bladder, and the bladder is closed separately from the skin. Bladder attachments to the fascia and linea alba are left intact.

**SAMPLE CLINICAL RESULTS**

From 2000 to 2005, seven male patients and one female patient underwent cutaneous vesicostomy at the Coast Province General Hospital, Mombasa, Kenya (Table 1).

One infant with posterior urethral valves was severely ill, emaciated, with purulent urine. He made a dramatic recovery after vesicostomy, and underwent ablation of the valves a year later. All cases of posterior urethral valves were treated with valve ablation.

The patient with sacrococcygeal teratoma had urinary retention with upper urinary tract dilatation and tendered bladder at presentation. After vesicostomy, she was referred a distance of 500 km to Kenyatta National Hospital, Nairobi, where the teratoma was excised and the vesicostomy closed.

The child with neurogenic bladder dysfunction had gross hydrocephalus, that had been shunted, and chronic urinary retention. He was lost to follow-up, and it was presumed that he had died.

There were no significant vesicostomy complications such as prolapse or stenosis.

Before 2003, all patients with posterior urethral valves were sent to the referral hospital for endoscopic ablation of the valves by a pediatric surgeon. Since then, the surgeon has visited our institution about every 2 months.

**CONCLUSIONS**

Cutaneous vesicostomy should be promptly performed for children with upper urinary tract dilatation due to posterior urethral valves, high-grade vesicoureteric reflux, and neurogenic bladder dysfunction, if primary treatment for these conditions is not appropriate, not possible, not available or fails. The procedure protects against urinary tract infections and allows functional and morphologic recovery of the urinary tract. Cutaneous vesicostomy is easy to perform and, if the appropriate operative detail is followed, has a low rate of surgical complications.

**ACKNOWLEDGEMENTS**

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REFERENCES

PRACTICAL POINTS
- Vesicostomy provides for functional and morphologic recovery of the urinary tract.
- Vesicostomy helps low-weight infants to catch up in growth.
- Long-term indwelling urethral catheters are associated with recurrent infections, urethral strictures and bladder stones.

AUTHOR QUERY
1. Possibly a fuller list of Practical Points would be helpful. Please expand if possible.