

# THE PARALYZED BLADDER: CURRENT TREATMENTS

Inder Perakash\*

**Problems of the urinary tract are no longer the number one cause of illness and death in people with spinal cord injuries, as a result of research.**

The spinal cord carries messages to and from the brain and to all parts of the body. Injury to the spinal cord leads to paralysis below the level of injury and to loss of bladder and bowel function.

Bladder dysfunction in people with SCI occurs because the external urethral sphincter muscle cannot relax adequately when the bladder muscle contracts to pass urine; therefore, urine is held. Medically this is referred to as "detrusor-sphincter dyssynergia." Individuals with SCI also do not have bladder control to hold urine, so urine may leak from time to time (in continence). To determine the degree of neurologic damage to the bladder and outflow obstruction, urodynamic studies are carried out.

Nonrelaxation of the external sphincter muscle during attempted voiding produces high bladder pressure, which in turn can let the urine go back into the kidney. This is medically referred to as "vesicoureteral reflux." Since people with SCI hold large amounts of urine, the bladder can get infected easily. In addition, if vesicoureteral reflux is present, infected urine can backtrack into the kidneys, which also get infected.

Kidney infection usually manifests with chills and fever, which in medical jargon is "pyelonephritis." Repeated kidney infections lead to precipitation of calcium salts, resulting in the formation of stones in the kidney.

## BLADDER DRAINAGE

Since SCI individuals are unable to expel urine at will, alternate methods have to be used to provide bladder drainage. Earlier in this century, bladder drainage was essentially provided with an indwelling Foley catheter or a suprapubic tube, where a tube is left in the bladder through the lower part of the abdomen. However, any tubes permanently left in the bladder lead to chronic irritation and infection. Long term use of catheters in the bladder have been shown to produce bladder stones, reflux, kidney stones, and permanent kidney damage.

Instead of leaving indwelling catheters for continuous bladder drainage, intermittent catheterization is now preferred. In this method, a catheter introduced every four to six hours to empty the bladder has reduced some of the ill effects of catheters left permanently in the urethra.

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\* Professor of Urology, Professor of Functional Restoration (PM&R), and PVA Professor of Spinal Cord Injury, Stanford University. Chief, Spinal Cord Injury Center, VAMC, Palo Alto, CA  
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system (sympathetic and parasympathetic), drugs have been used to counteract the action of sympathetic nerves to relax the bladder neck so that patients can pass urine on their own by bearing down. Examples of these antisympathetic drugs are prazosin (Minipress), phenoxybenzamine (Dibenzyline), and terazosin (Hytrin). For maximum benefit, optimal drug dosage and a check on voiding through voiding studies is necessary. Not all patients respond equally well to these drugs.

These drugs have also been found useful to control autonomic dysreflexia. This condition is found most often in patients with a spinal cord lesion above the T5-6 level and manifests with headache, rise in blood pressure, and slowing of the heart rate.

During intermittent catheterization, other autonomic drugs (anticholinergics) are used to reduce bladder-voiding pressures. By reducing voiding pressures to below 30-40 cm, patients do not leak urine. Therefore, they can also eliminate the need for leg bags. Intermittent catheterization in selected patients (usually lower paraplegics) can accomplish some degree of continence, and elimination of leg bags can reduce bladder infections. Some of our studies have shown that leg bags are great culprits for producing bladder infection. They need to be cleaned every day (preferably with a tablespoon of bleach in 200 cc of water) and then flushed in running water to remove the bleach.

High paraplegics and tetraplegics are prone to autonomic dysreflexia. This condition, usually related to a bladder full with urine, requires the need to do urgent evacuation. At times, this may not be easy. Drugs such as calcium channel-blockers (e.g., Nifedipine) can help lower blood pressure temporarily.

## SURGICAL SOLUTIONS

The permanent solution to bladder drainage may require surgery. Transurethral sphincterotomy, where cuts are made in the urethral sphincter through instrumentation (resecto-scope), can provide easy drainage all the time. However, then a leg bag and external catheter must be worn. Gentle tapping over the lower part of the abdomen can accomplish easy emptying of the bladder without catheterization. Long-term results of sphincterotomy are satisfying, since bladder infection and stone disease are infrequently noticed in the person with satisfactory bladder drainage.

Other surgical procedures, such as ileal loop to provide easy drainage of urine, have not withstood the test of time. There is a higher incidence of stone disease following diversion of urine in the ileal loop. However, surgical procedures where bladder capacity is enlarged (augmentation procedures) can benefit some selected patients with a small-capacity bladder. In particular, a spinal injured female who is leaking all the time may benefit from these procedures.

## ELECTRICAL STIMULATION

An electrical bladder controller with implantable electrodes on nerve roots (usually sacral 2,3 and 4) supplying the bladder has been developed to improve bladder emptying. Long-term results following implants are still awaited. However, its use in female spinal injury patients seems exciting since it provides control on voiding by electrically stimulating the bladder.

Satisfactory results following electrical stimulation have also been reported in male paraplegics who developed control of voiding. Success of this operation depends on cutting of the sensory nerve roots when electrodes are placed on motor-nerve roots. However, this does lead to loss

of erection in males and is of concern to many patients.

## CONCLUSION

Problems of the urinary tract are no longer the number-one cause of illness and death in people with spinal cord injuries. Bladder studies through urodynamics have improved our understanding, enabling scientific treatment of

bladder dysfunctions. The availability of newer antibiotics has helped us to control infections more easily. As a result, mortality and morbidity due to kidney damage have been reduced significantly. Electrical stimulation with suitable electrodes and improved technology gives control of voiding to some SCI individuals, with elimination of bladder collection devices.