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Clinical Case of the Month

Detrusor-sphincter dyssynergia and vesico urethral reflux: management

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Case presentation

A 43 year old man developed tetraplegia following a motor vehicle accident in November 1984. His initial bladder drainage in the previous hospital was with intermittent catheterization and unsuccessful trials of voiding using Bethanechol and Phenoxybenzamine. He had two unsuccessful transurethral sphincterotomies (TURS). He was not on any medication whilst continuing intermittent catheterization until he developed a false passage in the urethra. Following this he had an indwelling Foley catheter inserted every month using a guide wire for its placement. Records from previous hospitalization showed some loss of cortical margin in the left kidney. He also gave a history of deep venous thrombosis in 1985 after injury and was on Coumadin. He was PPD-positive and status post INH therapy. He smoked a pack of cigarettes daily.

He was first time admitted to our facility in 1987 for difficult catheterization and also with a history of frequent autonomic dysreflexia. He had an indwelling urethral catheter for bladder drainage, and wanted to have the catheter removed. There were also repeated urinary tract infections. Neurologically, there was a Frankel A C7 tetraplegia. A renal scan showed a small left kidney, with photopenic areas. Ultrasound of the kidneys revealed bilateral pelviectasis, scarring and multiple cysts in the right kidney. Complex urodynamic studies showed a hyperreflexic bladder with a bladder capacity of 150 ml, associated with detrusor sphincter dyssynergia. On 27 August 1987, a cystoscopic examination showed three plus trabeculations and a gaping left ureteric orifice. The patient was concerned that repeat TURS should be limited and also there should not be any cut of the bladder neck. Therefore a limited TURS was accomplished. His expected renal plasma (ERPF) flow on renal scanning using 1–131 Hippuran was 463. He also had severe spasticity in the lower extremities for which he was given Baclofen and he was placed on a daily standing program on a standing frame, and the spasticity decreased significantly. Following TURS he was able to empty his bladder well with a post void of 100 ml.

He was readmitted 2 years later (1/89) for tendon transfers to improve the function in the right hand. This helped him to be independent for most things, including self feeding. He had persistent difficulty in maintaining an external condom drainage. Prior to placing a semirigid penile implant (March, 1989) to retain an external condom easily for urine drainage, a cystoscopic examination was done. This revealed a false passage in the urethra which was unroofed. The patient was discharged well on Prazosin 1 mgm p.o. at bedtime and Baclofen 10 mgm once a day. He was readmitted in March 1990 for urological and hand evaluation and was doing very well. His subsequent admissions in March 1991 and October 1991 were for back pain. A voiding cystourethrogram revealed vesico-ureteral reflex on the left side. Urodynamic studies showed a low pressure (almost areflexic) bladder with a bladder capacity of 250 ml and a post void of 60 ml. Cystoscopic examination showed tightness in the distal external sphincter near the membranous urethra. A repeat TURs incision at 12 o'clock was made using contact laser in October 1991. Following surgery, a voiding cystourethrogram showed a wide open bladder neck and posterior urethra with good bladder capacity and a still persisting vesico-ureteral reflux (Figure 1).

His subsequent admissions for follow-up studies in 1992, 1993, 1994 were uneventful. A voiding cystourethrogram showed a wide open bladder neck and

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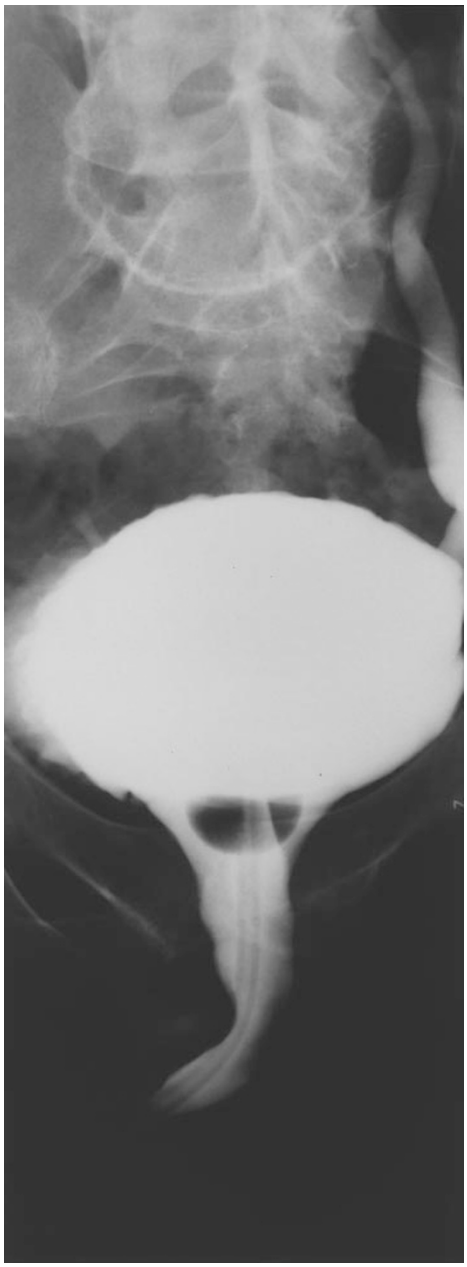

Figure 1 11/91. Voiding cystourethrogram showing wide open bladder neck and posterior urethra. There is vesico-urethral reflux on the left side

posterior urethra with a refluxing left ureter (Figure 2). At his last follow-up admission in August 1996, the laboratory findings were: BUN 10, creatinine 0.9 and hematoerit 41.2. A radionuclide renal scan was stable with an ERPF of 326 (it was 366 in 1988). Sonographic studies of the kidneys did not show any significant change in them. He is currently taking Terazosin 2 mgm twice daily along with Ditropan 2.5 mg twice daily. To control his spasticity he takes Baclofen 30 mg daily.

Please critique the management of this patient

First opinion

TA Linsenmeyer, MD

It is noted that during the patient's initial hospitalization, after failing trials of voiding using bethanechol and phenoxybenzamine, he underwent two unsuccessful sphincterotomies. One of the causes of failure to void post sphincterotomy is the lack of uninhibited contractions (detrusor areflexia) prior to the sphincterotomy. A urodynamic evaluation is therefore essential prior to deciding to manage a person's bladder with a sphincterotomy. It is possible that in this case his bladder was still in 'spinal shock'. A person's bladder usually comes out of spinal shock and begins having uninhibited contractions 3–6 month post injury; however there have been reported cases of this occurring as long as 2 years post injury.

This patient developed a false passage post sphincterotomy when he was restarted on intermittent catheterization. The false passage may have been caused from a ledge at the bladder neck. Forceful attempts at trying to pass a catheter past a bladder neck ledge can in fact undermine the bladder neck and create a false passage. One reason for this ledge is that in addition to performing a sphincterotomy, a transurethral resection of the prostate is sometimes needed if there is a concern of prostate obstruction. Some urologists routinely remove a significant amount of prostate tissue at the 6 o'clock position, which can create a ledge at the bladder neck. Another reason for this ledge, is failure to recognize and treat a pre-existing ledge at the bladder neck. This ledge has been found to occur secondary to hypertrophy of the smooth muscles around the bladder neck.[1] While a bladder neck ledge is not a problem in an able-bodied person who is not going to be performing intermittent catheterization this can be a problem for a person who needs to perform intermittent catheterization since it can make it difficult for a catheter to pass into the bladder and be a set up for the creation of a false passage. Therefore in a person with a neuropathic bladder, in which there is the possibility of future catheterization, extreme care has to be taken not to resect an excess of tissue and create a ledge at the 6 o'clock position. Additionally, if a person has a ledge due to hypertrophy of the bladder neck muscles, this should be treated at the time of sphincterotomy with bladder neck incisions.

It is important to note that after the discovery of vesico-ureteral reflux the patient underwent a repeat laser transurethral sphincterotomy rather than a ureteral reimplant. Ureteral reimplants are extremely difficult to perform in a thickened trabeculated bladder and there is a higher possibility of post operative obstruction. Therefore, in a SCI person who reflexly voids and has reflux, the key is to maintain low voiding pressures by urodynamic monitoring and treatment of detrusor sphincter dyssynergia.

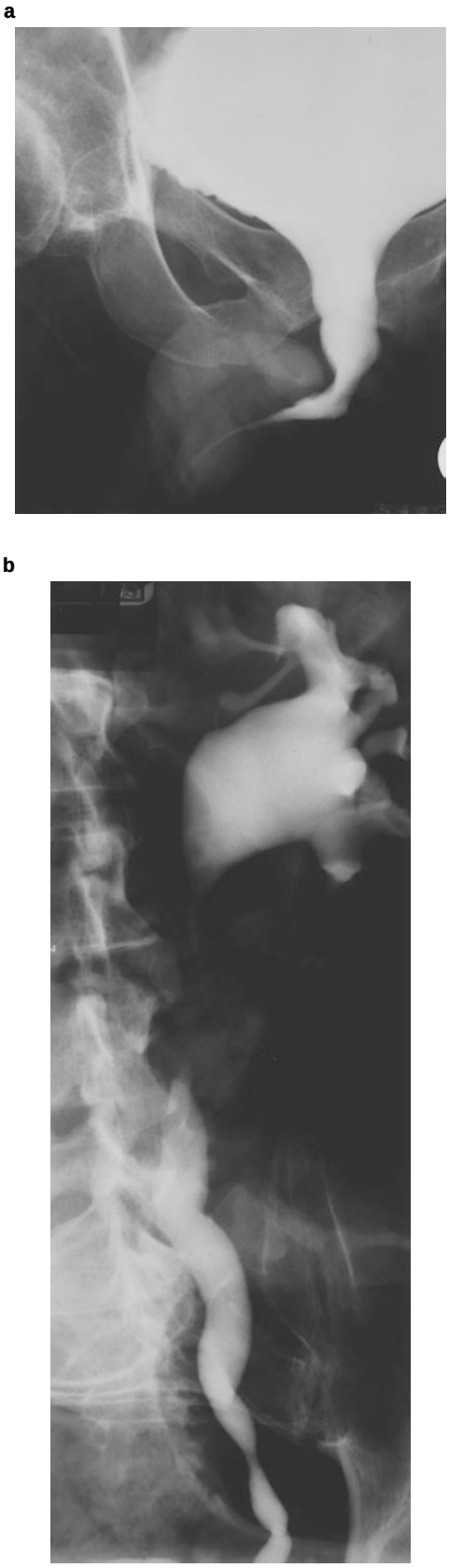

Figure 2 (**a**) (**b**) 12/93. (**a**) Voiding cystourethrogram showing wide open posterior urethra, and (**b**) Vesico-ureteral reflux left side

This person is presently being treated with an alpha blocker (terazosin) and a low dose anticholinergic (oxybutynin). In general, care should be taken when considering the use of anticholinergic medications in a person who reflexly voids. Anticholinergic medications can suppress the uninhibited contractions and lead to bladder distention and autonomic dysreflexia. This does not seem to be a problem with the person presented in this case, since he has had several sphincterotomies, is also on an alpha blocker to relax the sphincter, and is being monitored by an experienced team.

References

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Second opinion

DR Bodner, MD

This is a classic case of complications secondary to a neuropathic bladder with detrusor-sphincter dyssynergia. The high pressure bladder contracting against a spastic urethral sphincter results in inefficient bladder emptying and can lead to vesico-ureteral reflux, hydronephrosis, and upper tract deterioration. Warning signs include recurrent urinary tract infectons and autonomic dysreflexia, although upper tract changes can be silent and all patients with a neuropathic bladder require routine life-long urological follow-up.

Bethanechol, a cholinergic agent, whilst being poorly absorbed orally, has been shown to increase bladder pressure and, along with sphincter dyssynergia, may cause very high bladder pressures, leading to reflux. This drug, therefore, is contraindicated in this clinical setting.

Intermittent catheterization in tetraplegic patients frequently requires external assistance from a family member or care-giver because of inadequate hand function. False passages in the urethra may occur secondary to traumatic catheter insertion against a spastic urethral sphincter.

Appropriate management of vesicoureteral reflux in the presence of detrusor-sphincter dyssynergia includes treating the bladder outlet obstruction. Transurethral sphincterotomay is a preferred treatment in tetraplegic patients with inadequate hand function to perform self-intermittent catheterization. Transurethral sphincterotomy may be inadequate or result in urethral stricture, requiring repeat procedures. In more experienced hands and with the use of contact laser,[1,2] failure rates have been quite low. Adjunctive pharmacological management with alpha-blockers to relax the smooth muscle at the bladder neck, and anticholingergic medications to lower bladder pressure when needed after outflow obstruction has been relieved are often helpful. In rare cases, this may be inadequate and surgical bladder

augmentation with ureteral reimplantation may be required.

References

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Third opinion

RU Anderson, MD

This case represents one of the failures of early urological management of a patient with a spinal cord injury. Prevention of bladder deterioration and eventual problems of vesico-ureteral reflux, hydroureteronephrosis, or renal insufficiency should be the standard of care. Deterioration in this case undoubtedly occurred during the first year following injury, and it is during this time that careful urodynamic measurements, X-ray and ultrasound imaging, as well as monitoring of renal function using nuclear isotope studies should have been done. Depending upon the evaluation further management by anticholinergics, sphincter spasmolytics, transurethral sphincterotomy, rhizotomy and neurostimulation could be entertained.

We do not have any information concerning his original detrusor pressure, sphincter dyssynergia or uroflowmetry. A sphincterotomy may be unsuccessful in obliterating pelvic floor spasticity and follow-up urodynamic voiding studies are helpful in determining voiding pressures in these patients. The patient has now had three sphincterotomies and the current bladder capacity is 250 mls, voiding down to 60 mls with a grade I left vesicoureteric reflux. He probably does not need surgical repair of the reflux if infections are under control. He clearly has had renal compromise with a ERPF diminishing from a known 463 to 326 presently. An accurate creatinine clearance may be more revealing of his current renal function. The objective now is to preserve what function he currently has. Monitoring of gradual hypocontractility and/or contraction of the bladder needs to be undertaken along with prevention of bacteriuria.