RECONSTRUCTIVE UROLOGY

An artificial somatic-autonomic reflex pathway procedure for bladder control in children with spina bifida

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Purpose: Neurogenic bladder is a major problem for children with spina bifida. Despite rigorous pharmacological and surgical treatment, incontinence, urinary tract infections and upper tract deterioration remain problematic. We have previously demonstrated the ability to establish surgically a skin-central nervous system-bladder reflex pathway in patients with spinal cord injury with restoration of bladder storage and emptying. We report our experience with this procedure in 20 children with spina bifida.

Materials and Methods: All children with spina bifida and neurogenic bladder underwent limited laminectomy and a lumbar ventral root (VR) to S3 VR microanastomosis. The L5 dorsal root was left intact as the afferent branch of the somatic-autonomic reflex pathway after axonal regeneration. All patients underwent urodynamic evaluation before and after surgery.

Results: Preoperative urodynamic studies revealed 2 types of bladder dysfunction- areflexic bladder (14 patients) and hyperreflexic bladder with detrusor external sphincter dyssynergia (6). All children were incontinent. Of the 20 patients 17 gained satisfactory bladder control and continence within 8 to 12 months after VR microanastomosis. Of the 14 patients with areflexic bladder 12 (86%) showed improvement. In these cases bladder capacity increased from 117.28 to 208.71 ml, and mean maximum detrusor pressure increased from 18.35 to 32.57 cm H2O. Five of the 6 patients with hyperreflexic bladder demonstrated improvement, with resolution of incontinence. Urodynamic studies in these cases revealed a change from detrusor hyperreflexia with detrusor external sphincter dyssynergia and high detrusor pressure to nearly normal storage and synergic voiding. In these cases mean bladder capacity increased from 94.33 to 177.83 ml, and post-void residual urine decreased from 70.17 to 23.67 ml. Overall, 3 patients failed to exhibit any improvement.

Conclusions: The artificial somatic-autonomic reflex arc procedure is an effective and safe treatment to restore bladder continence and reverse bladder dysfunction for patients with spina bifida.

Editorial Comment

A successful but not rewarding patient treatment of malfunctioning bladders with spina bifida became possible with both the introduction of sphincterotomy of the external urethral sphincter and intermittent clean self-catherisation in order to protect and preserve the upper urinary tract.

In the last two decades there was no real breakthrough in the treatment options for pediatric spina bifida patients. The most commonly used drugs in adults were not approved for children. This includes the direct injection of Botulinum toxin into the detrusor or the external sphincter (1-3).

Through the extraordinary work of Shapiro et al., it was recognized that in patients with spinal cord changes apart from lower urinary tract malfunction, fetal muscle and innervation changes could be seen (4). The “defect in the development” of the lower urinary tract is complete by the 20th week of pregnancy, but that there is no correlation between the smooth muscle cell mal-development and the severity of the spinal cord defect.

It is stunning to see in the present paper that surgery on the spinal roots might be a treatment solution for the malfunction of the lower urinary tract (5). Xiao et al. presented initially their work by creating an artificial somatic-autonomic reflex pathway to treat neurogenic bladder in spinal cord injured patients (6).

They have now apparently found a way for a successful treatment using the same technique in spina bifida patients (7).

In the present study they enrolled 20 children with spinal bifida and performed intradural anastomoses of the ventral root of the L5 with the ventral root of S3. Twelve of 14 patients with a former areflexic bladder improved their bladder pressure from 18.35 to 32.57 cm H_2O. Five of the 6 patients with a detrusor-sphincter dyssynergia increased their bladder capacity from 94.33 to 177.83 mL and postoperatively decreased the post voiding residual from 70.17 to 23.67 mL within 8 to 12 months.

Most of these children (12 male, 8 female; 5 - 14 years) had successful results and were able to void voluntarily (n = 16), whereas one had to scratch the skin dermatome of L5 to initiate the micturation (n = 1). In 17 (85%) patients, they noted improved bladder function (the young patients had an increased bladder storage and bladder sensory in the emptying function and maintained the ability to sense for a full bladder and felt the desire to void). However, some possible side effects might be the partial loss of the L5 motor function.

The surgical option to improve the neurogenic bladder of young patients with spina bifida will increase possibilities in their future life. Because of the success rate, specialized groups should confirm these results with an equivalent follow-up. It seems to be possible that this surgical approach will teach us that the pathology described by Shapiro et al. might be reversible, partial or complete, up to a certain age (4).

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Combined buccal mucosa graft and local flap for urethral reconstruction in various forms of hypospadias

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Purpose: Hypospadias is one of the most common congenital deformities in the male urogenital system. Although there are more than 250 techniques for treating hypospadias, it is often difficult to repair severe hypospadias using conventional methods.

Materials and Methods: We combined a buccal mucosa graft with a local onlay flap for urethral reconstruction in cases of severe hypospadias or a failed previous operation. A total of 162 patients with hypospadias (glandular 11, penile 40, penoscrotal 49, scrotal 34 and perineal 28) were treated between July 2000 and November 2003. For patients whose urethral meatus was perineal 2 treatment steps were taken. First, we used the aforementioned method to construct the penile urethra, and then we constructed the scrotal and perineal urethra with a local flap.

Results: Of the 134 nonperineal cases 127 were managed successfully in 1 stage, and 26 of 28 perineal cases were managed successfully in 2 stages. Most patients had a satisfactory penile appearance. A urethral fistula resulted in 8 cases, of which 4 closed spontaneously within 1 month postoperatively. Meatal stenosis occurred in 1 case.

Conclusions: This technique is simple, safe and reliable, especially in cases of failed previous operation or for salvage hypospadias repair with deficient local tissue.

Editorial Comment

The reconstruction of the pediatric urethra requires knowledge of the anatomical system, specifically of blood supply of both the native urethra and a pedicled flap as well as other peculiarities of certain flaps e.g. hair growth after puberty, thickness of the basement membrane etc. Whereas buccal mucosa has become a frequent way of urethral reconstruction in circumcised adult patients, its use in pediatric patients is rare for various reasons. The data presented in this paper of more than 160 patients deals with the use of a combination of buccal mucosa with a pedicled flap to resolve different forms of severe or previously unsuccessfully operated hypospadias.

Various techniques exist both for the simple as well as the complicated cases of urethral malformations. It has been shown like in many other fields of reconstructive surgery that the best results may be obtained with the simplest possible technique and the use of a pedicled instead of a free flap.

In our experience, the distal hypospadias reconstruction can be performed with an excellent outcome by the MEMO technique (meatus-mobilization technique) (1) with an acceptable surgery time (mean 85 minutes in this series), and no need for a tissue transfer. If necessary a lengthening of the penile shaft is possible in some cases by reconstruction of the penile skin.

Why do we want to mention this paper then? Not always do we have enough pedicled epithelial tissue for a single stage reconstruction, especially in the previously operated penoscrotal or scrotal hypospadias cases. Although we are not totally convinced that pedicled tissue flaps combined with buccal mucosa may be best solution despite the good results presented here, the recent progress with urothelial cell cultivation (2) may be the future in desperate cases. Instead of harvesting buccal mucosa and transposing it to the urethra, expanded urothelium applied to well vascularized flaps may cause less foreign reaction and less morbidity.

This paper is a good preparation for applying tissue engineering in combination with pedicled flaps for complicated urethral reconstruction. Such a combination for the time being is probably the best way to successfully introduce tissue engineering into urologic surgery.

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UROLOGICAL ONCOLOGY

External beam radiation therapy after radical prostatectomy: efficacy and impact on urinary continence

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Introduction and Objectives: The efficacy of adjuvant and salvage external beam radiation (AXRT+SXRT) for prostate cancer after radical prostatectomy (RP) has been debated because of the inability to rule out systemic occult metastasis, uncertainty that radiation eradicates residual local disease and the potential of exacerbating impotency and incontinence. To characterize the effectiveness and treatment morbidity a retrospective review was performed.

Methods: In all, 38 patients received AXRT and 91 received SXRT. The SXRT group was stratified by PSA level, age, race, pathologic stage, margin status, worst Gleason sum, radiation dose and pelvic field. Complications evaluated were impotence and incontinence. Median follow-up was 60.2 months.

Results: The 5-y disease-free survival (DFS) rate was 61.3% for AXRT and 36.3% for SXRT. Multivariate analysis of the SXRT cohort showed Gleason score, pathologic stage and pre-XRT PSA to be predictors of disease recurrence. After XRT 26% had worsened continence.

Conclusions: Patients who recur after RP whose pathologic stage is pT2 or pT3c, Gleason score of 8 or higher or pre-XRT PSA is > 2.0 ng/dL may have microscopic metastatic disease and a decreased chance of cure with SXRT alone. Continence was further impaired after XRT.

Editorial Comment

A current treatment option for positive margins after radical prostatectomy (RP) (required by up to 35% within 5 years after RP) is adjuvant external beam radiation (AXRT), if PSA progression already has occurred salvage external beam radiation (SXRT) often is performed. Outcomes and side effects of these approaches have been documented in the current paper from two large institutions.

The AXRT group had a 5-year disease-free survival (DFS) rate of 61.3%; the SXRT group DFS was 36.3%. Post-RP PSA below 2 ng/mL was a significant determinant of success.

Most interesting are data on side effects of this approach. In all groups a significant deterioration of continence occurred. After XRT 10% of previously continent patients became incontinent and 14% became partially incontinent. These data are even worse in partially continent patients after RP.