

AAHD

American Association on Health and Disability
110 N. Washington Street • Suite • 340-A Rockville, MD 20850

RESEARCH ON BOWEL AND/OR BLADDER DYSFUNCTION IN PEOPLE WITH DISABILITIES

CHILDREN WITH DISABILITIES

The effectiveness of different methods of toilet training for bowel and bladder control.

Klassen TP, Kiddoo D, Lang ME, Friesen C, Russell K, Spooner C, Vandermeer B. Evid Rep Technol Assess (Full Rep). 2006 Dec;(147):1-57.

OBJECTIVES: The objectives of this report are to determine the following: (1) the effectiveness of the toilet training methods, (2) which factors modify the effectiveness of toilet training, (3) if the toilet training methods are risk factor for adverse outcomes, and (4) the optimal toilet training method for achieving bowel and bladder control among patients with special needs.

DATA SOURCES: MEDLINE, Ovid MEDLINE In-Process & Other Non-Indexed Citations, Ovid OLDMEDLINE, Cochrane Central Register of Controlled Trials, EMBASE, CINAHL, PsycINFO, ERIC, EBM Reviews, HealthSTAR, AMED, Web of Science, Biological Abstracts, Sociological Abstracts, OCLC ProceedingsFirst, OCLC PapersFirst, Dissertation Abstracts, Index to Theses, National Research Register's Projects Database, and trials registers.

REVIEW METHODS: Two reviewers assessed the studies for inclusion. Studies were included if they met the following criteria: Study design: RCT, CCT, prospective or retrospective cohort, case-control, cross-sectional or case-series; Population: infants, toddlers, or children with or without co-morbidities, neuromuscular, cognitive, or behavioral handicaps disabilities; Intervention: at least one toilet training method; and Outcome: bladder and/or bowel control, successes, failures, adverse outcomes.

Methodological quality was assessed independently by two reviewers. Data were extracted by one reviewer and a second checked for accuracy and completeness. Due to substantial heterogeneity, meta-analysis was not possible. RESULTS: Twenty-six observational studies and eight controlled trials were included. Approximately half of the studies examined healthy children while the remaining studies assessed toilet training of mentally or physically handicapped children. For healthy children, the Azrin and Foxx method performed better than the Spock method, while child-oriented combined with negative term avoidance proved better than without. For mentally handicapped children, individual training was superior to group methods; relaxation techniques proved more efficacious than standard methods; operant conditioning was better than conventional treatment, and the Azrin and Foxx and a behavior modification method fared better than no training. The child-oriented approach was not assessed among mentally handicapped

children. For children with Hirschsprung's disease or anal atresia, a multi-disciplinary behavior treatment was more efficacious than no treatment.

CONCLUSIONS: Both the Azrin and Foxx method and the child-oriented approach resulted in quick, successful toilet training, but there was limited information about the sustainability of the training. The two methods were not directly compared, thus it is difficult to draw definitive conclusions regarding the superiority of one method over the other. In general, both programs may be used to teach toilet training to healthy children. The Azrin and Foxx method and operant conditioning methods were consistently effective for toilet training mentally handicapped children. Programs that were adapted to physically handicapped children also resulted in successful toilet training. A lack of data precluded conclusions regarding the development of adverse outcomes.

CHILDREN WITH MUSCULAR DYSTROPHY

Bladder dysfunction in Duchenne muscular dystrophy.

MacLeod M, Kelly R, Robb SA, Borzyskowski M.

Department of Paediatric Neurology, Guy's Hospital, London, UK. Arch Dis Child. 2003 Apr;88(4):347-9. Comment in: Arch Dis Child. 2004 Jan;89(1):92.

Although bladder function is thought to be unaffected in Duchenne muscular dystrophy, 46/88 boys interviewed had urinary problems. Nine underwent video urodynamics, showing in eight a small capacity, hyperreflexic bladder, and in the ninth (post spinal surgery) hyperreflexia and detrusor sphincter dyssynergia. Urinary dysfunction is a treatable feature of DMD.

CHILDREN WITH SPINA BIFIDA

Achieving fecal continence in patients with spina bifida: a descriptive cohort study.

Vande Velde S, Van Biervliet S, Van Renterghem K, Van Laecke E, Hoebeke P, Van Winckel M.

Department of Pediatric Gastroenterology and Surgery, University Hospital Ghent, Ghent, Belgium. Saskia.vandavelde@ugent.be J Urol. 2007 Dec;178(6):2640-4; discussion 2644. Epub 2007 Oct 22.

PURPOSE: Fecal incontinence is a major problem in patients with myelomeningocele. We evaluate the results of a stratified approach aimed at obtaining fecal pseudo-continence in patients with myelomeningocele.

MATERIALS AND METHODS: We conducted a cross-sectional descriptive study of last file data in 80 patients 5 to 18 years old with myelomeningocele followed at our center. Beginning at birth patients with myelomeningocele were seen at least annually by the pediatric gastroenterologist, a member of the multidisciplinary "spina team." Constipation was treated with diet and osmotic laxatives. Starting at age 5 years, treatment was targeted at achieving pseudo-continence. A toilet training scheme was started, associated with induced defecation by digital stimulation. Retrograde tap water enemas were used in patients with unsatisfactory results. If retrograde enemas were unsuccessful, an antegrade continence enema procedure was proposed. For children unable to sit on a toilet regular manual evacuation of stools was advised.

RESULTS: Eight of the 80 patients were fecal continent. Pseudo-continenence was achieved in 50 of the 72 incontinent patients (69%), including 5 of 5 following only a strict toilet scheme, 21 of 24 (87.5%) performing retrograde enemas, 16 of 20 (80%) performing orthograde enemas through an antegrade continence device and 8 of 10 performing regular manual evacuation of stools. In 4 of the 20 patients (20%) performing orthograde enemas complications led to closure of the antegrade continence device. Treatment failed and was stopped in 17 patients. Success of treatment was not related to level of spinal lesion or degree of mobility.

CONCLUSIONS: Fecal pseudo-continenence was achieved in 58 of 80 patients (72.5%) with myelomeningocele.

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

Xiao CG, Du MX, Li B, Liu Z, Chen M, Chen ZH, Cheng P, Xue XN, Shapiro E, Lepor H. Departments of Urology, Tongji Medical College, Xiehe Hospital, Huazhong University of Science and Technology, Wuhan, China. xiaocg@mails.tjmu.edu.cn J Urol. 2005 Jun;173(6):2112-6. Comment in: J Urol. 2005 Jun;173(6):1850-1.

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.

Augmentation cystoplasty rates at children's hospitals in the United States: a pediatric health information system database study.

Lendvay TS, Cowan CA, Mitchell MM, Joyner BD, Grady RW. Children's Hospital and Regional Medical Center, University of Washington School of Medicine, 4800 Sand Point Way NE, Seattle, WA 98105, USA. J Urol. 2006 Oct;176(4 Pt 2):1716-20.

PURPOSE: We identified augmentation cystoplasty rates in children with spina bifida at children's hospitals enrolled in the Pediatric Health Information System database.

MATERIALS AND METHODS: The Pediatric Health Information System database tabulates demographic and diagnostic patient data from 35 children's hospital centers in the United States. Between October 1999 and September 2004 we extracted data on 0 to 19-year-old patients with International Classification of Diseases-9 diagnosis codes for spina bifida. The International Classification of Diseases-9 procedure code for augmentation cystoplasty was cross-referenced with these patients to determine the total number of patients with augmentation, total population augmentation rates and individual institution rates of bladder augmentation.

RESULTS: Staff at enrolled pediatric medical centers submitted inpatient data accounting for 9,059 beds servicing an aggregate metropolitan population of 82 million individuals. In the 5-year period 12,925 unique spina bifida patient encounters were identified, including 665 patients who underwent augmentation cystoplasty. The mean 5-year institutional number of augmentations performed in children with spina bifida was 20 (range 1 to 121) and the mean annual number of augmentations performed per institution was 4. The overall augmentation rate at 33 hospitals contributing data for the full years 2000 to 2003 was 5.4% (range 0.5% to 16.3%, $p < 0.0001$). The male-to-female ratio of those who underwent augmentation was 1:1.2. Median length of stay in children with augmentation was 7 days (mean 9). The median age of children with augmentation was 10.4 years, that is 11.3 years in boys and 9.8 years in girls. The difference in mean age was statistically significant ($p < 0.003$). At institutions where 10 or more augmentations were performed in 5 years (mean 27) mean patient age at operation was 10.1 years. This was significantly younger than the mean patient age of 12.3 years at hospitals where fewer than 10 augmentations (mean 5) were done in 5 years ($p < 0.05$).

CONCLUSIONS: Clinical management for neurogenic bladder conditions has evolved to emphasize nonoperative management. Several studies suggest that aggressive early intervention improves bladder compliance and may protect renal function. However, results from the Pediatric Health Information System database demonstrate no change in augmentation rates during this time and they demonstrate significant interinstitutional variability. To our knowledge this represents the largest series of augmentation cystoplasty in children with spina bifida to date.

Current approaches to the urologic care of children with spina bifida.

Joseph DB. Section of Pediatric Urology, University of Alabama at Birmingham, Children's Hospital, 1600 7th Avenue, South, Birmingham, AL 35233, USA. dbjoseph@uab.edu Curr Urol Rep. 2008 Mar;9(2):151-7.

Most children born with spina bifida, the most common disabling congenital abnormality, have normal renal function. If left untreated, more than half of these children will have serious renal deterioration by age 5. This deterioration is secondary to hostile neurogenic changes of the bladder. Renal development should follow a normal course when close evaluation and intervention are undertaken during the newborn period and toddler years. As children age, attention is directed to quality-of-life issues, such as the establishment of urinary and bowel continence. Teenagers face the responsibility of

understanding their medical condition and should begin to assume responsibility for their own care with eventual transition to the adult health care system. This article describes the foundations of management, beginning at birth, for caring for children with spina bifida.

Evaluation of clinico-urodynamic outcome of bladder dysfunction after surgery in children with spinal dysraphism - a prospective study.

Kumar R, Singhal N, Gupta M, Kapoor R, Mahapatra AK. Department of Neurosurgery, Sanjay Gandhi Institute of Postgraduate Medical Sciences, Lucknow, India. rajikumar@sggpi.ac.in *Acta Neurochir* (Wien). 2008 Feb;150(2):129-37. Epub 2008 Jan 30.

BACKGROUND: The aim was to assess the clinical profile and urodynamic findings and the outcome of surgery in children with spinal dysraphism.

METHOD: Twenty five children with spinal dysraphism who were treated at our institute between January 2005 and June 2006 were studied prospectively. There were 10 with an open spina bifida and 15 closed. The clinical profile of bladder dysfunction was assessed and urodynamic evaluation done pre-operatively in each child. An ultrasound study of the kidneys was also done to assess for hydro-uretero-nephrosis. All underwent surgery for their primary and associated malformations. Post-operatively, re-evaluation of bladder dysfunction and urodynamic parameters was performed at 6-8 months.

RESULTS: Before operation there was a history indicating that the bladder was involved in 14 of the 25 children. Six of the 10 cases with an open spina bifida showed clinical involvement of the bladder as compared to 8 of 15 with a closed pattern. Urodynamic studies showed evidence of bladder dysfunction in 19 children. Of 10 with a meningomyelocele, there were abnormal urodynamics in 9 as compared to 10 of 15 with closed dysraphism. Follow up urodynamic studies showed improvement in 9 of 20 children 3 of 7 with a meningomyelocele and 6 of 13 with closed dysraphism.

CONCLUSION: Children with open spina bifida, as compared to closed dysraphism, tend to have more bladder dysfunction as exemplified on clinical history and urodynamic assessment. A pre-operative urodynamic study helps to identify severity of bladder dysfunction which is clinically overt cases and also identifies subtle bladder dysfunction in clinically silent cases. Evaluation after operation tends to show better outcome in children with closed dysraphism. The study also identifies deterioration in some patients with seemingly clinical improvement.

14 years of experience with the artificial urinary sphincter in children and adolescents without spina bifida.

Ruiz E, Puigdevall J, Moldes J, Lobos P, Boer M, Ithurralde J, Escalante J, de Badiola F. Section of Pediatric Surgery and Pediatric Urology, Department of Pediatrics, Hospital Italiano de Buenos Aires, Buenos Aires, Argentina. *J Urol*. 2006 Oct;176(4 Pt 2):1821-5.

PURPOSE: The efficacy of the artificial urinary sphincter to treat sphincteric incontinence in pediatric patients with spina bifida has been clearly reported. The possibility of maintaining spontaneous voiding has usually been the main reason for prosthetic device surgery. We reviewed our experience with the artificial urinary sphincter in patients without spina bifida who had had previous surgery of the bladder neck or proximal urethra.

MATERIALS AND METHODS: From 1990 to 2004, 112 children and adolescents underwent implantation of an AMS 800 artificial urinary sphincter. Of the patients 19

males and 4 females (20.5%) between ages 4 and 17 years (mean 8.1) had no spina bifida. Instead there were bladder exstrophy in 12 patients, anorectal malformation with a rectourethral or vesical fistula in 7 and epispadias in 4. A bladder neck cuff between 5.5 and 7.5 cm, and a 61-70 balloon were used in all patients.

RESULTS: Only 1 patient was lost to followup. In 22 patients (95.6%) mean followup was 80 months (range 4 to 155). Three sphincters in patients with exstrophy were removed because of erosion and/or infection 5, 49 and 60 months after initial surgery, respectively. A total of 19 sphincters remained in place (86.3% survival rate) with 5 revisions (26.3%) because of the pump (2), the cuff (2) or balloon fluid leakage. In this group 13 patients (68.4%) voided spontaneously and 6 (31.6%) performed clean intermittent catheterization, although 3 also voided spontaneously. Overall continence was good in 87% of patients because 2 were still incontinent at night.

CONCLUSIONS: The artificial urinary sphincter is a good long-term solution to urinary incontinence secondary to sphincter incompetence despite multiple previous surgeries of the bladder neck or proximal urethra. Patients with bladder exstrophy and many previous bladder procedures are more exposed to complications such as erosion compared with patients with epispadias or anorectal malformation. The high percent of patients maintaining spontaneous voiding and the good rate of continence are the most important benefits of this type of surgical option for sphincter incompetence.

Initial urologic management of myelomeningocele.

Snodgrass WT, Adams R. Pediatric Urology and Developmental Disabilities, Texas Scottish Rite Hospital for Children, 2222 Welborn Street, Dallas, TX 75219, USA. wsnodg@childmed.dallas.tx.us J Urol Clin North Am. 2004 Aug;31(3):427-34, viii.

Disordered innervation of the detrusor musculature and external sphincter in patients with myelomeningocele adversely affects bladder function and potentially threatens the upper urinary tracts. Children with this condition can be categorized into high and low-risk groups for secondary damage from a neurogenic bladder based on intravesical pressure. Those with elevated pressure are at risk for hydronephrosis or reflux, and evidence suggests that early management of high pressure protects the bladder from additional damage, reducing the need for augmentation. Management decisions made during infancy potentially impact long-term outcomes for preserving renal function and achieving urinary continence. This discussion focuses on the initial urologic care of infants with myelomeningocele, emphasizing the controversy regarding urodynamic versus radiologic-based management of the neurogenic bladder.

Is an anal plug useful in the treatment of fecal incontinence in children with spina bifida or anal atresia?

Van Winckel M, Van Biervliet S, Van Laecke E, Hoebeke P.

Department of Paediatrics, University Hospital Ghent, De Pintelaan 185, B-9000 Gent, Belgium. Myriam.vanwinckel@ugent.be J Urol. 2006 Jul;176(1):342-4.

PURPOSE: We evaluated the efficacy and tolerance of the Conveen anal plug in children with spina bifida or anal atresia with persistent fecal incontinence necessitating diapers despite bowel management.

MATERIALS AND METHODS: Seven 4 to 12-year-old patients with high congenital imperforate anus and 9 who were 6 to 13 years old with spina bifida, no mental retardation and no involuntary urine loss on clean intermittent catheterization were included in the study. During a prospective, 6-week crossover descriptive study after a

test period to find the most comfortable plug with a diameter of 37 or 45 mm patients and parents completed a diary with the number of soiling episodes, stool frequency, stool consistency and the number of diapers used during 3 weeks without and with the plug, respectively. They provided a final assessment of the device.

RESULTS: Two of the 7 patients with congenital imperforate anus discontinued use because of pain and discomfort, 1 had a decrease in soiling episodes and 4 achieved full continence and needed no diapers while using 2 plugs daily (range 1 to 4). All patients preferred the smaller plug. Two of the 9 patients with spina bifida always lost the plug within 1 hour after introduction, 5 had a decrease in soiling episodes but continued to need diapers and 2 achieved full continence using 2 plugs daily (range 1 to 4). All patients preferred the larger plug.

CONCLUSIONS: The Conveen anal plug is an adjuvant treatment option for fecal incontinence in children with congenital imperforate anus or spina bifida, enabling a minority to stop using diapers. The Conveen anal plug is not a universal solution for fecal incontinence problems in these patients.

Location of spina bifida occulta and ultrasonographic bladder abnormalities predict the outcome of treatment for primary nocturnal enuresis in children.

Miyazato M, Sugaya K, Nishijima S, Owan T, Ogawa Y. Division of Urology, Department of Organ-Oriented Medicine, Faculty of Medicine, University of the Ryukyus, Okinawa, Japan. f040812@med.u-ryukyu.ac.jp *Int J Urol.* 2007 Jan;14(1):33-8.

OBJECTIVE: We examined whether the existence of spina bifida occulta or ultrasonographic bladder abnormalities was related to the outcome of treatment for primary nocturnal enuresis in children.

METHODS: Between April 1996 and September 2005, a total of 77 subjects (53 boys and 24 girls, aged 5-18 years; mean age, 9.9 years) with primary nocturnal enuresis were studied. Plain X-ray films of the spine and ultrasonographic bladder measurements (bladder wall thickness, bladder neck descent and bladder neck opening) were obtained and the correlations with the outcome of treatment using imipramine hydrochloride were assessed.

RESULTS: On plain X-ray films of the spine, spina bifida occulta (lumbar vertebrae in three, lumbosacral vertebrae in 19 and sacral vertebrae in 31) was recognized in 53 children (69%). Ultrasonographic bladder abnormalities were recognized in 40 children (52%). Children with lumbar and lumbosacral spina bifida occulta showed a higher rate of concomitant ultrasonographic bladder abnormalities ($P = 0.006$) and had a poorer response to treatment ($P = 0.041$) compared with the children who had sacral spina bifida occulta. Children with ultrasonographic bladder abnormalities had a worse response to treatment ($P = 0.005$) compared to the children without bladder abnormalities.

CONCLUSIONS: The presence of lumbar spina bifida occulta and ultrasonographic bladder abnormalities was related to the outcome of treatment for primary nocturnal enuresis in children, suggesting that spinal radiography and vesical ultrasonography may be useful predictive tests.

Lower urinary tract reconstruction for spina bifida -- does it improve health related quality of life?

Macneily AE, Morrell J, Secord S. Division of Urology, University of British Columbia, Vancouver, BC, Canada. amacneily@cw.bc.ca J Urol. 2005 Oct;174(4 Pt 2):1637-43; discussion 1643.

PURPOSE: Reconstruction for incontinent myelomeningocele is assumed to improve health related quality of life (HRQOL) yet there are no published data to support this assumption.

MATERIALS AND METHODS: A retrospective cohort study was performed of 36 consecutive incontinent meningomyelocele cases undergoing surgery (augmentation, with or without Mitrofanoff, bladder neck reconstruction and cecostomy). Controls were matched 2:1 for age, lesion level, parental marital status, ambulatory status and shunt status. HRQOL was assessed with a previously validated disease specific discriminative instrument that stratifies for ages 12 years or less and 13 years or greater. An additional 5-point Likert questionnaire was used for self-scoring of bladder and bowel continence. **RESULTS:** Responses were 89% and 84% for cases and controls, respectively. The 2-sample t testing for subjects 12 years old or younger revealed no significant difference in mean HRQOL score between those who underwent reconstruction (12, mean 165 +/- 23) and those who did not (9, mean 162 +/- 27, $p=0.73$). Results in older subjects were similar for cases (20, mean 190 +/- 23) and controls (3, mean 192 +/- 26, $p=0.80$). This finding occurred despite the fact that 78% of reconstructed cases achieved urinary continence for 3 hours or more with equal or superior self-reported bladder and bowel continence compared to controls.

CONCLUSIONS: We were unable to demonstrate superior HRQOL in patients over controls. Several possible interpretations exist, such as surgery may have no impact on HRQOL, patients might have scored much lower without surgery, or perhaps only caregiver quality of life improves. The impact of urinary tract reconstruction upon quality of life in the myelomeningocele population warrants further study.

Robotic-assisted laparoscopic mitrofanoff appendicovesicostomy and antegrade continent enema colon tube creation in a pediatric spina bifida patient.

Lendvay TS, Shnorhavorian M, Grady RW. Division of Pediatric Urology, Children's Hospital and Regional Medical Center, Seattle, WA 98105, USA.

thomas.lendvay@seattlechildrens.org J Laparoendosc Adv Surg Tech A. 2008 Apr;18(2):310-2.

Robotic-assisted laparoscopic surgery has been applied to pediatric surgery, especially for technically challenging reconstructive procedures owing to the improved suturing capabilities over pure laparoscopic techniques when using fine suture material. In this paper, we report the techniques of creating both an appendicovesicostomy and an antegrade continent enema colon tube in a 9-year-old female with a neurogenic bladder and bowel secondary to myelomeningocele.

Surgical management of the neurogenic bladder and bowel.

Mingin GC, Baskin LS.

Pediatric Urology, Children's Hospital, University of California, San Francisco, California 94143-0738, USA. Int Braz J Urol. 2003 Jan-Feb;29(1):53-61.

Spina bifida and myelodysplasia are associated with neurogenic abnormalities of the bladder and bowel function. All children with myelodysplasia require an evaluation of their urinary tract with ultrasound and urodynamics to confirm normal bladder and kidney function. Patients with anatomical and functional abnormalities require treatment, the

mainstay being intermittent catheterization and anticholinergic medication. The treatment goals for patients with a neurogenic bladder are the preservation of the upper urinary tract, bladder and bowel continence, independence, autonomy, and facilitation of self-esteem. A minority of children will not respond to conservative therapy and will ultimately require surgical intervention. This review will discuss the surgical options for bladder augmentation, bladder neck reconstruction and closure, as well as the methods for the creation of continent catheterizable stomas. The timing, indications, and description for each procedure will be addressed. Finally, the antegrade continence enema procedure will be described for the management of refractory fecal incontinence.

Treatment of the neurogenic bladder in spina bifida.

de Jong TP, Chrzan R, Klijn AJ, Dik P. Pediatric Renal Center, Department of Pediatric Urology, University Children's Hospital, UMCU, P.O. Box 85090, 3508 AB, Utrecht, The Netherlands. Pediatr Nephrol. 2008 Mar 19. [Epub ahead of print]

Renal damage and renal failure are among the most severe complications of spina bifida. Over the past decades, a comprehensive treatment strategy has been applied that results in minimal renal scarring. In addition, the majority of patients can be dry for urine by the time they go to primary school. To obtain such results, it is mandatory to treat detrusor overactivity from birth onward, as upper urinary tract changes predominantly start in the first months of life. This means that new patients with spina bifida should be treated from birth by clean intermittent catheterization and pharmacological suppression of detrusor overactivity. Urinary tract infections, when present, need aggressive treatment, and in many patients, permanent prophylaxis is indicated. Later in life, therapy can be tailored to urodynamic findings. Children with paralyzed pelvic floor and hence urinary incontinence are routinely offered surgery around the age of 5 years to become dry. Rectus abdominis sling suspension of the bladder neck is the first-choice procedure, with good to excellent results in both male and female patients. In children with detrusor hyperactivity, detrusorectomy can be performed as an alternative for ileocystoplasty provided there is adequate bladder capacity. Wheelchair-bound patients can manage their bladder more easily with a continent catheterizable stoma on top of the bladder. This stoma provides them extra privacy and diminishes parental burden. Bowel management is done by retrograde or antegrade enema therapy. Concerning sexuality, special attention is needed to address expectations of adolescent patients. Sensibility of the glans penis can be restored by surgery in the majority of patients.

Treatment of the occult tethered spinal cord for neuropathic bladder: results of sectioning the filum terminale.

Metcalf PD, Luerksen TG, King SJ, Kaefer M, Meldrum KK, Cain MP, Rink RC, Casale AJ. Department of Pediatric Urology, James Whitcomb Riley Hospital for Children, Indiana University School of Medicine, 702 North Barnhill Drive, Indianapolis, IN 46202, USA. pmetcalf@iupui.edu J Urol. 2006 Oct;176(4 Pt 2):1826-9; discussion 1830.

PURPOSE: Occult tethered cord syndrome applies to patients with signs and symptoms consistent with a caudal spinal cord malformation despite normal neuroimaging. Although several reports of successful surgical treatment exist, controversy remains with respect to patient selection and efficacy. We present a large series with excellent clinical followup, neuroimaging and urodynamic characterization.

MATERIALS AND METHODS: We present our experience with 36 patients at a single institution with preoperative clinical findings, neuroimaging and urodynamics available. Postoperative outcomes were assessed clinically and with urodynamics. We determined predictive parameters to improve patient selection.

RESULTS: Approximately 0.04% of pediatric urology clinic visits resulted in neurosurgical referral for the potential of an occult tethered cord. They occurred after failure of a mean of 2 years of aggressive medical management. Daytime urinary incontinence was present in 83% of patients and 47% had encopresis. Preoperative urodynamics were markedly abnormal in all patients with mean bladder capacity 55% of expected capacity. Clinical improvement in urinary symptoms was seen in 72% of patients with resolution of incontinence in 42%. Bowel symptoms improved in 88% of cases, including resolution of encopresis in 53% within 3 months of surgery. Urodynamic improvements were demonstrated in 57% of cases. We were unable to determine preoperative factors that were more likely associated with surgical success.

CONCLUSIONS: In a highly select population with severe urinary and fecal dysfunction sectioning a normal-appearing filum terminale can result in significant improvement. We were unable to identify factors that may increase the chance of surgical success.

PEOPLE WITH DISABILITIES—BLADDER MANAGEMENT

Developing a strategy to reduce the high morbidity of patients with long-term urinary catheters: the BioMed catheter research clinic.

Khan AA, Mathur S, Feneley R, Timoney AG. BioMed Centre, Bristol Urological Institute, Southmead Hospital, Bristol, UK. BJU Int. 2007 Dec;100(6):1298-301.

OBJECTIVE: To assess the idea of managing patients having problems with long-term catheterization (LTC, normally used when all other methods of bladder management have failed or are unsuitable) in a dedicated clinic, to present a prospective analysis of consecutive new patients attending between February 2002 and October 2006, and to establish the incidence of bladder stones in patients who have recurrent catheter encrustation and blockage.

PATIENTS AND METHODS: Patients treated with LTC are a large heterogeneous group, mainly consisting of elderly people who have chronic disabilities, and catheter-associated complications occur in > 70% of them. In all, 260 consecutive new patients having problems with LTC were assessed; the evaluation consisted of basic demographics, a detailed history, clinical examination, urine analysis and flexible cystoscopy (FC) via the catheterization route. Patients with bladder stones were screened with FC for recurrence of stones at 3, 6 and 12 months after treatment.

RESULTS: In all, 117 men and 143 women (mean age 67.7 years, range 23-97) were assessed; 147 (55.5%) had catheter encrustation. FC showed that 66 of the 147 patients (45%) had bladder stones. Forty-eight patients (73%) were successfully treated at the same clinic appointment and their stones were removed with the help of a tip-less stone basket. Eighteen patients (27%) were referred for inpatient treatment of bladder stones under general anaesthesia. Twenty of 66 patients with bladder stones (30%) formed recurrent bladder stones at a mean (range) follow-up of 8.1 (3-18 months). In addition, 36 patients had successful insertion of suprapubic catheter (SPC) under local anaesthetic in the clinic, and 11 were referred for SPC insertion under general anaesthesia. Two patients were diagnosed with bladder transitional cell carcinoma.

CONCLUSION: The introduction of a dedicated catheter clinic, equipped with facilities such as FC and a hoist, enables patients to be treated in an environment that meets their needs and potentially reduces the risk of more complex stone removal and catheter problems at a later date. It can also act as a potential source of data for use in research and development. A significant proportion (45%) of patients with catheter encrustation and blockage had formed bladder stones. Our study provides a rationale for FC of all such patients to detect and remove stones.

A novel product for intermittent catheterisation: its impact on compliance with daily life--international multicentre study.

Bjerklund Johansen T, Hultling C, Madersbacher H, Del Popolo G, Amarenco G; LoFric Primo Study Group. Telemark Hospital, Porsgrunn, Norway. Eur Urol. 2007

Jul;52(1):213-20. Epub 2006 Nov 29. Comment in: Eur Urol. 2007 Jul;52(1):220.

OBJECTIVES: This study was undertaken to evaluate patient openness to changing and satisfaction with catheters used in intermittent catheterisation (IC) for urinary retention from neurogenic bladder dysfunction, and to compare patient response to conventional catheters and a novel packaged hydrophilic catheter: LoFric Primo.

PATIENTS AND METHODS: Of 409 patients recruited, 378 (283 males, 95 females; mean age: 43.5 yr) completed a 12-d trial of the novel catheter. The diagnoses were spinal cord lesion in 65.6%, multiple sclerosis in 9.6%, spina bifida in 2.3%, and other neurologic conditions in 22.5%; the mean duration of IC was 4.6 yr. Patients evaluated their current catheter at recruitment and the novel catheter after the 2-wk trial by questionnaire. Patient satisfaction was expressed on a Visual Analogue Scale for seven topics covering use and general satisfaction.

RESULTS: Of the 378 patients, 55.2% were happy to continue with the novel device, which was 74% of patients using standard polyvinyl chloride (PVC) catheters and 36% of those using prelubricated PVC ($p=0.04$). No individual patient factors were found to be significant in catheter choice. For the whole study population "ability to comply with daily life activities" was maintained with the novel product despite handling and general satisfaction being found more troublesome.

CONCLUSIONS: The main finding was that more than 50% of the patients wished to continue with the novel catheter and reported increased satisfaction regarding introduction of the catheter, handling, time spent, perception of IC, general satisfaction, and ability to cope with daily life.

Reinnervation for neurogenic bladder: historic review and introduction of a somatic-autonomic reflex pathway procedure for patients with spinal cord injury or spina bifida.

Xiao CG. Department of Urology, Xiehe Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China. xiaocg@mails.tjmu.edu.cn Eur Urol. 2006 Jan;49(1):22-8; discussion 28-9. Epub 2005 Nov 2.

Neurogenic bladder caused by SCI or spina bifida is a major problem. Research in restoring functional micturition has mainly focused on electrical stimulation for many decades with good progress, but it is still not the definitive solution for majority of the SCI patients. An alternative approach has been to investigate restoring innervation to the lower urinary tract after spinal SCI. Different animal and clinical studies were reviewed historically in this article, focused on mainly cross over nerve surgery for reinnervation of the bladder. An artificial somatic-autonomic reflex pathway procedure and its

mechanisms were introduced. Clinical application and the satisfactory results of the new procedure were reviewed in details in restoring voluntary bladder control in patients with SCI or spina bifida.

PEOPLE WITH SPINA BIFIDA

Long-term urologic outcome in patients with caudal regression syndrome, compared with meningocele and spinal cord lipoma.

Torre M, Buffa P, Jasonni V, Cama A. Paediatric Surgery, Istituto Giannina Gaslini, 16148 Genoa, Italy. micheletorre@hotmail.com *J Pediatr Surg.* 2008 Mar;43(3):530-3. BACKGROUND/PURPOSE: The long-term urologic outcome in a large series of patients with neural tube defects was evaluated.

METHODS: The following clinical parameters in 398 patients ranging from 1 to 37 years of age--69 with caudal regression syndrome (CRS), 244 with meningocele (MMC), and 85 with spinal lipoma (SL)--were studied: congenital renal anomalies, renal function, vesico-ureteric reflux, upper tract dilatation, urodynamic pattern, and urinary continence.

RESULTS: Single kidney was much more frequent in CRS (20.3%), compared with MMC (1.2%) and SL (0%). Vesico-ureteric reflux was found in 37.7% of patients with CRS, 43.0% of MMC, and 21.2% of SL. Patients with CRS had a higher risk of impaired renal function (8.7%), compared with MMC (5.3%) and SL (1.2%). Neuropathic bladder was found in 61% of patients with CRS, 98% of MMC, and 42% of SL. Among them, clean intermittent catheterization and drugs allowed 30% of patients with CRS, 45% of MMC, and 71% of SL to be dry for more than 4 hours.

CONCLUSIONS: Diagnosis influences the urologic outcome in neural tube defect. In CRS, the incidence of renal agenesis and vesico-ureteric reflux was unexpectedly high. The risk of renal damage and, in those with neuropathic bladder, of urinary incontinence, was similar to patients with MMC.

Minimally invasive approach for treatment of urinary and fecal incontinence in selected patients with spina bifida.

Lorenzo AJ, Chait PG, Wallis MC, Raikhlin A, Farhat WA. Division of Urology and Department of Diagnostic Imaging, The Hospital for Sick Children and University of Toronto, Toronto, Ontario, Canada. *Urology.* 2007 Sep;70(3):568-71.

OBJECTIVES: At our institution, the use of cecostomy tubes has provided a successful method for managing severe constipation in patients with spina bifida, with good patient and caretaker satisfaction and minimal morbidity. We have developed a modified technique to allow placement of the cecostomy tube under direct vision during laparoscopic appendicovesicostomy. We present our initial experience and technique.

METHODS: Patients with a normal bladder capacity and compliance who were scheduled for creation of an appendicovesicostomy and who also had refractory constipation were offered concurrent cecostomy tube placement. At the laparoscopic procedure, we performed percutaneous placement of the cecostomy tube through the abdominal wall under direct visualization. Subsequently, dissection of the appendix with its mesentery was performed. The detrusor muscle was dissected and a trough for the appendix created. Laparoscopic anastomosis of the appendix to the bladder mucosa and approximation of the detrusor over the appendix created a nonrefluxing channel.

RESULTS: Three patients have undergone concurrent cecostomy tube placement at appendicovesicostomy. No complications have been encountered thus far. On follow-up,

the cecostomy tube scar has been well concealed and appears no different from the ones placed under radiologic guidance. The patients have been using the catheterizable channel to access the bladder and dry performing intermittent catheterization without difficulties.

CONCLUSIONS: In patients with a neurogenic bladder who do not qualify for major bladder reconstructive procedures, such as augmentation cystoplasty or bladder neck repair, social continence and independence can be achieved with minimally invasive surgery. Concomitant laparoscopic appendicovesicostomy and cecostomy tube placement may be a suitable surgical option.

A multicenter evaluation of urinary incontinence management and outcome in spina bifida.

Lemelle JL, Guillemin F, Aubert D, Guys JM, Lottmann H, Lortat-Jacob S, Moscovici J, Mouriquand P, Ruffion A, Schmitt M.

Service de Chirurgie Infantile, Hôpital d'Enfants, Centre Hospitalier Universitaire de Nancy, France. J Urol. 2006 Jan;175(1):208-12.

PURPOSE: We describe urinary continence management and outcome in patients with spina bifida to identify the procedures that are most successful.

MATERIALS AND METHODS: In a multicenter retrospective cohort study medical charts were studied. At the same time in a cross-sectional survey sociodemographic characteristics, orthopedic features and urinary continence were described based on the frequency of leakage from the viewpoint of patients or close relatives using a Likert scale of 5 items, namely 1-leakage permanent to 5-leakage never.

RESULTS: A total of 421 patients were included, of whom 191 (45%) had been medically treated with a normal voiding pattern according to the patient viewpoint in 21%, clean intermittent catheterization in 61% and no specific bladder emptying method in 18%. The mean leakage score +/- SD was 2.74 +/- 1.55. On the other hand, 230 patients (55%) were surgically treated. Except for 23 patients who underwent noncontinent urinary diversion 207 were considered for treatment and continence description. The mean leakage score was 3.45 +/- 1.60. An artificial urinary sphincter in male and females, and a sling or Kropp technique in females were satisfactory when bladder enlargement was not required. In cases of bladder augmentation without continent diversion an artificial urinary sphincter in males and a bladder neck sling or cinch, Kropp and Young-Dees procedures in females have provided the best results. In cases of bladder enlargement with continent urinary diversion bladder neck closure or a wrap have provided the best results whatever the patient sex.

CONCLUSIONS: Many factors may influence the choice of a technique, such as patient sex, bladder characteristics or orthopedic conditions. However, since to our knowledge no randomized, controlled study has been yet performed, definitive conclusions on the best way to achieve urinary continence in patients with spina bifida cannot be established.

A multicentre study of the management of disorders of defecation in patients with spina bifida.

Lemelle JL, Guillemin F, Aubert D, Guys JM, Lottmann H, Lortat-Jacob S, Moscovici J, Mouriquand P, Ruffion A, Schmitt M.

Service de Chirurgie Infantile, Hôpital d'Enfants, CHU de Nancy, Vandoeuvre les Nancy, France. jl.lemelle@chu-nancy.fr Neurogastroenterol Motil. 2006 Feb;18(2):123-8.

Patients with spinal dysraphism may have severe constipation and faecal incontinence. The impact of antegrade colonic enema (ACE) in the management of patients with spina bifida (SB) is analysed. In a multicentre cross-sectional study, constipation, faecal incontinence and faecal management were described. Cases surgically treated were identified. Data were collected from 423 patients, of whom 230 did not use any manoeuvre or laxatives to assist evacuation. Conventional treatment was used in 193 patients, including digital extraction in 39%, retrograde enema in 21% and oral laxatives in 52%. For intractable constipation and overflow of faecal incontinence, 47 patients were treated with ACE, of whom 41 used the method at a mean time of interview of 4.1 +/- 1.9 years after ACE operation; six abandoned ACE for conventional management. With ACE, faecal continence was significantly improved compared with conventional management, and neither retrograde rectal enema nor digital extraction were required. The conduit was fashioned to the right colon in 32 cases and to the left colon in nine cases. This study provides information on a multicentre experience in bowel management in SB patients. Whatever the technique used, ACE has improved faecal status compared with conventional therapy.

Non-traditional management of the neurogenic bladder: tissue engineering and neuromodulation.

Lewis JM, Cheng EY. Children's Memorial Hospital, The Feinberg School of Medicine at Northwestern University, Chicago, IL, USA. jlewis@childrensmemorial.org
ScientificWorldJournal. 2007 Aug 17;7:1230-41

Patients with spina bifida and a neurogenic bladder have traditionally been managed with clean intermittent catheterization and pharmacotherapy in order to treat abnormal bladder wall dynamics, protect the upper urinary tract from damage, and achieve urinary continence. However, some patients will fail this therapy and require surgical reconstruction in the form of bladder augmentation surgery using reconfigured intestine or stomach to increase the bladder capacity while reducing the internal storage pressure. Despite functional success of bladder augmentation in achieving a low pressure reservoir, there are several associated complications of this operation and patients do not have the ability to voluntarily void. For these reasons, alternative treatments have been sought. Two exciting alternative approaches that are currently being investigated are tissue engineering and neuromodulation. Tissue engineering aims to create new bladder tissue for replacement purposes with both "seeded" and "unseeded" technology. Advances in the fields of nanotechnology and stem cell biology have further enhanced these tissue engineering technologies. Neuromodulation therapies directly address the root of the problem in patients with spina bifida and a neurogenic bladder, namely the abnormal relationship between the nerves and the bladder wall. These therapies include transurethral bladder electrostimulation, sacral neuromodulation, and neurosurgical techniques such as selective sacral rhizotomy and artificial somatic-autonomic reflex pathway construction. This review will discuss both tissue engineering techniques and neuromodulation therapies in more detail including rationale, experimental data, current status of clinical application, and future direction.

Patients with spina bifida and bladder cancer: atypical presentation, advanced stage and poor survival.

Austin JC, Elliott S, Cooper CS. Department of Urology, University of Iowa, Iowa City, Iowa 52242, USA. chris-austin@uiowa.edu J Urol. 2007 Sep;178(3 Pt 1):798-801. Epub 2007 Jul 16.

PURPOSE: Patients with neurogenic bladder dysfunction due to spina bifida have been reported to be at increased risk for bladder cancer. Recent publications suggest that bladder augmentation is also a significant risk factor. We reviewed our experience with treating patients with spina bifida and bladder cancer.

MATERIALS AND METHODS: Patients with spina bifida treated for bladder cancer between 1995 and 2005 were identified. Patient demographics, mode of bladder management, risk factors and presenting symptoms were recorded along with therapy, pathological findings and outcome. This patient cohort was combined with all prior known published studies for analysis.

RESULTS: Eight patients with a median age of 41 years were treated. Only 1 patient (13%) had undergone bladder augmentation. Locally advanced stage (T3 or greater) or lymph node metastases were present in 88% of cases. Median survival was 6 months with only 1 patient alive with no evidence of recurrence at 20 months. A total of 11 prior published cases were identified and combined with this series. Transitional cell carcinoma was present in 58% of patients. Median survival was 6 months. Only 37% of patients had undergone bladder augmentation.

CONCLUSIONS: Patients with spina bifida and bladder cancer present at a young age with variable tumor histology and advanced stage, and they have poor survival. Presenting symptoms are often atypical and bladder cancer should be a consideration in this patient population, even in young adults. Due to poor survival further study is warranted in this population to determine whether screening would be beneficial for earlier detection and improved outcomes.

Surgical implantation of the new FlowSecure artificial urinary sphincter in the female bladder neck.

García-Montes F, Vicens-Vicens A, Ozonas-Moragues M, Oleza-Simo J, Mora-Salvá A. University Hospital Son Dureta, Palma de Mallorca, Spain. fgarcia@hsd.es Urol Int. 2007;79(2):105-10.

OBJECTIVE: To report implantation of the new FlowSecure artificial urinary sphincter with conditional occlusion in a female bladder neck, describe surgical technique and suggest minor modifications to accommodate the device for universal female implantation.

PATIENT AND METHODS: A spina bifida female patient with urodynamically proven stress incontinence due to sphincteric incompetence associated to atonic detrusor was implanted with the new artificial sphincter. Operating time was one and a half hours. The cuff was adjusted to the bladder neck with no problems. Excess belt removed from the cuff was preserved and used for loose fixation of tubing and reservoirs in the right paravesical space. The control pump was placed in the right labia. The prosthesis was implanted at atmospheric pressure zero.

RESULTS: The device was easily implanted. There were no perioperative complications. Catheter was removed 24 h post-implantation and patient achieved immediate total continence. There was no need for device pressurization at subsequent follow-up. The patient needed intermittent self-catheterization for emptying her bladder because of impaired detrusor contractility.

CONCLUSIONS: Despite that the new FlowSecure artificial urinary sphincter has only been used for bulbar urethral implantation, we have successfully implanted the device in a female bladder neck with excellent clinical results. Cuff lengthening and connecting tubes shortening would probably enable all female patients to be suitable for implantation. To the best of our knowledge, this is the first time the device has been implanted in a bladder neck.

Urinary bladder adenocarcinoma arising in a spina bifida patient.

Bitar M, Mandel E, Kirschenbaum AM, Unger PD. Department of Pathology, The Mount Sinai School Of Medicine, New York, NY 10029, USA. mbitar5@aol.com Ann Diagn Pathol. 2007 Dec;11(6):453-6. Epub 2007 Jul 24.

Urinary bladder adenocarcinomas are rare malignancies accounting for approximately 2.5% of all urothelial neoplasms. Intestinal metaplasia of the urothelium indicates the presence of intestinal-type goblet cells and was generally observed to coexist with or to precede the diagnosis of bladder adenocarcinomas. Controversy continues of whether intestinal metaplasia is an acquired precancerous lesion, secondary to different insults to the urothelium, or a concomitant lesion in glandular carcinogenesis. Patients with neurogenic bladders are particularly at risk for developing bladder cancer, mostly squamous cell carcinoma and rarely adenocarcinoma. In these patients, chronic irritation of the urothelium as well as long-term indwelling urinary catheters were the most significant risk factors. Spina bifida is a congenital developmental abnormality that may result in neurogenic bladder. There is only one previously reported case of urothelial carcinoma with associated squamous metaplasia of the bladder occurring in a spina bifida patient. We report the first case of bladder adenocarcinoma associated with intestinal metaplasia occurring in a spina bifida occulta patient. The patient had a complicated clinical course and suffered recurrent urinary tract infections, renal calculi, and urinary incontinence and was managed with intermittent as well as indwelling catheterization.

Urological follow-up of adult spina bifida patients.

Ahmad I, Granitsiotis P. Department of Urology, Southern General Hospital, Glasgow, Scotland, United Kingdom. imranahmad@doctors.net.uk Neurourol Urodyn. 2007;26(7):978-80.

AIMS: The vast majority of the current urological literature understandably has concentrated on the management of children with spina bifida, because in the past the majority did not survive into adulthood. With improvements in the understanding and multidisciplinary care of spina bifida patients it has become a disease of adults. Our aim was to evaluate the current literature to attempt to formulate evidence based guidelines for the management of this difficult group of patients.

METHODS: We reviewed the literature on adult urological management of spina bifida, all relevant articles which concentrated on adults and long-term management were studied in full.

RESULTS: Renal function may begin/continue to deteriorate into adulthood, becoming the leading cause of adult death. This is thought to occur because of changes in the adult bladder, with increases in storage pressure. Medical and surgical management should aim to preserve renal function as well as the maintenance of continence in the face of the growing and changing urinary tract. Follow-up should be regular and in the context of a specialist multidisciplinary clinic. Despite being unvalidated in the follow-up

of adult spina bifida patient's annual serum creatinine, ultrasound and urodynamics are currently the best tools available.

CONCLUSIONS: There is no reason why the majority of spina bifida sufferers cannot use their own kidneys for the rest of their lives. This however relies on urological treatment being instigated soon after birth and continuing into adulthood.

PEOPLE WITH SPINAL CORD INJURY

Bladder management in persons with spinal cord lesion.

Dahlberg A, Perttilä I, Wuokko E, Ala-Opas M. Käpylä Rehabilitation Centre, Finnish Association of People with Mobility Disabilities, Nordenskiöldinkatu 18B, PO Box 103, 00251 Helsinki, Finland. Spinal Cord. 2004 Dec;42(12):694-8.

STUDY DESIGN: Cross-sectional clinical descriptive prevalence study.

OBJECTIVE: To evaluate the methods of self-reported bladder management, the frequency of urinary tract infection (UTI) and subjective disturbance of bladder problems of all those individuals with traumatic spinal cord lesion (SCL) living in Helsinki area.

SETTING: Helsinki, Finland.

METHODS: A total of 152 persons with SCL were found in the Helsinki area (546 000 inhabitants). A structured questionnaire was sent to all subjects and they were invited to a clinical visit.

RESULTS: The final study-group consisted of 129 (85%) subjects. They were defined into seven specific subgroups of bladder management: 14 (11%) subjects in the normal voiding group, 15 (12%) in the controlled voiding group, 16 (12%) in the clean intermittent catheterization (CIC) group, 30 (23%) in the mixed group, 31 (24%) in the suprapubic tapping group, 16 (12%) in the compression or straining group and seven (5%) in the catheter or conduit group. The frequency of UTI was highest in the mixed group. The bladder management was a biggest bother to the subjects in the compression or straining group.

CONCLUSIONS: This prevalence study assesses the self-reported bladder management methods in all the persons with traumatic SCL in the Helsinki area. The subjects who used CIC and other methods for bladder management had more problems than others. These subjects might manage better by using either CIC or suprapubic tapping as the only method for bladder emptying.

Preventive care in spinal cord injuries and disorders: examples of research and implementation.

Weaver FM, LaVela SL. Center for Management of Complex Chronic Care, Health Services Research (151H), VA Hospital, Hines, IL 60141, USA. frances.weaver@va.gov Phys Med Rehabil Clin N Am. 2007 May;18(2):297-316, vii.

Individuals with disabilities are less likely to receive preventive care services than those in the general population. Prevention is very important in persons with spinal cord injuries and disorders for both common conditions such as respiratory infections and for conditions common in spinal cord disorders such as neurogenic bowel, because these individuals are at increased risk for negative outcomes. Clinical practice guidelines provide evidence-based recommendations for patient care. However, dissemination of guidelines is not sufficient to increase use of recommended care. Implementation

research has identified strategies to increase use of evidence-based care and subsequently improve patient outcomes.

YOUNG ADULTS WITH SPINA BIFIDA

High prevalence of incontinence among young adults with spina bifida: description, prediction and problem perception.

Verhoef M, Lurvink M, Barf HA, Post MW, van Asbeck FW, Gooskens RH, Prevo AJ. Rehabilitation Centre De Hoogstraat, 3583 TM Utrecht, The Netherlands. Spinal Cord. 2005 Jun;43(6):331-40.

STUDY DESIGN: Cross-sectional study.

OBJECTIVES: To study the prevalence of incontinence, problem perception and determinants of urinary and faecal incontinence in young adults with spina bifida.

SETTING: Nation-wide study in the Netherlands.

PARTICIPANTS: A total of 179 of 350 invited patients participated, including 37 patients with spina bifida occulta and 142 with spina bifida aperta, of whom 119 had hydrocephalus; 41% were male and mean age was 20.4 (range 16-25 years).

METHODS: Data were collected from interviews, physical examination, neuropsychological tests and medical records.

RESULTS: Urinary and faecal incontinence was common in young adults with spina bifida (60.9 and 34.1%, respectively), regardless of the bladder and bowel management they used. The majority of urinary and faecal incontinent patients perceived this as a problem (69.7 and 77.0%, respectively). Spina bifida aperta, hydrocephalus and a level of lesion of L5 or above were associated with patients suffering from urinary and/or faecal incontinence. Predictors of perceiving urinary incontinence as a problem were, in addition to being incontinent, not having hydrocephalus and having a level of lesion of L5 or above. The only predictor of perceiving faecal incontinence as a problem was the frequency of incontinence.

CONCLUSION: A majority of young adults with spina bifida suffer from urinary and faecal incontinence and most of them perceive their incontinence as a problem. Therefore, further efforts are important to improve urinary and faecal continence.

© 2008 American Association on Health & Disability

American Association on Health and Disability (AAHD) provides the materials and links for general information, education and disease awareness purposes only. Although every effort is made to assure that information is accurate and current, knowledge in the field of disability is changing often, and all data is subject to change without notice. AAHD makes no representations or warranties and assumes no responsibility or liability as to the accuracy, completeness, reliability or usefulness of any information contained in this document. Neither AAHD nor any parties, who supply information to AAHD, make any warranty concerning the accuracy of any information in this document.

This publication was made possible, in part, by a grant from the Department of Health and Human Services, Centers for Disease Control and Prevention (U59/CCU321860-04).