Journal of Pediatric Urology (2016) 12, 76–87

Review article

British Association of Paediatric Urologists consensus statement on the management of the neuropathic bladder

B. Lee [a], N. Featherstone [b], P. Nagappan [c], L. McCarthy [d], S. O'Toole [a]

[a]Department of Paediatric Surgery and Urology, Royal Hospital for Children, Glasgow, UK

[b]Department of Paediatric Surgery and Urology, Great Ormond Street Hospital for Sick Children, London, UK

[c]Department of Paediatric Urology, Royal Manchester Children's Hospital, Manchester, UK

[d]Department of Paediatric Urology, Birmingham Children's Hospital, Birmingham, UK

Correspondence to: S. O'Toole, Department of Paediatric Surgery and Urology, Royal Hospital for Children, Govan Road, Glasgow, G51 4TF, UK, Tel.: +44 141 451 6532; fax: +44 141 201 2215.

stuart.o'toole@ggc.scot.nhs.uk (S. O'Toole)

Keywords
Neuropathic bladder; Anticholinergics; Botolinum toxin A; Augmentation; Surveillance

Received 6 October 2015
Accepted 6 January 2016
Available online 29 January 2016

Summary

Introduction
A large number of children with spina bifida develop a neuropathic bladder and this group of patients still forms the largest group of children who require urological management.

Although there are published guidelines on the management of the neuropathic bladder, they are not specific to children. It is unsurprising, therefore, that the initial investigation, assessment and management of children with spina bifida vary considerably.

The 2014 British Association of Paediatric Urologists (BAPU) meeting was devoted to the management of the neuropathic bladder. The aim was to produce a consensus on the appropriate investigation and management of a child with a neuropathic bladder.

Methods and Materials
A questionnaire was devised and the members were polled on their current practice. Six paediatric urology fellows presented an evidence-based literature review on different aspects of the neuropathic bladder.

At the end of the session, the members of the organisation present were polled again using the same questions.

Results
The BAPU felt that the use of urodynamics in the neuropathic bladder should be selectively determined by clinical parameters. Regarding CIC, the group was evenly split between universal use or only when poor emptying was established.

Oxybutinin was the first-line anticholinergic of choice. Most paediatric urologists routinely used Botox and were happy to use it repeatedly. The surgical intervention most frequently employed was determined to be an ileocystoplasty, with most surgeons deferring the need for surveillance cystoscopy until at least 10 years after surgery.

Conclusion
It was felt that a consensus statement is not a guideline or a way to establish best practice; however, it serves as a way of surveying current practice and providing a benchmark for clinicians involved in the management of these patients.

Introduction

The incidence of spina bifida and neural tube defects in the G8 nations is 3/10,000 live births [1]. Before the 1970s, the survival of children with myelodysplasia was extremely low. With developments in neurosurgery, this cohort of children began to live longer and required management of their associated anomalies. A large number of children with spina bifida develop a neuropathic bladder and this group of patients still forms the largest group of children who require urological management. In the 1970s, the standard surgical management was a urinary diversion to preserve upper tract function [2]. However, with the advent of CIC, the bladder could be preserved or a continent diversion created [3].

Although there are published guidelines [4,5] (National Institute for Clinical Excellence, NICE 2012, European Association of Urology, EAU 2011) on the management of the neuropathic bladder, they are not specific to children. The International Children's Continence Society (ICCS) produced two papers in 2012, with recommendations for the management of congenital bladder and bowel dysfunction in children [6,7]. However, without child-specific guidelines, it is unsurprising that the initial investigation, assessment and management of children with spina bifida vary considerably.

http://dx.doi.org/10.1016/j.jpurol.2016.01.002

The 2014 British Association of Paediatric Urologists (BAPU) meeting was devoted to the management of the neuropathic bladder. The aim was to come to a consensus on the appropriate investigation of a child with a presumed neuropathic bladder, and the subsequent medical and surgical management of the condition. The medical and surgical management of poor outlet resistance secondary to neuropathic causes was not the focus of this consensus statement.

Methods

Prior to the meeting, full members were approached to provide areas of neuropathic bladder management where they felt that controversy existed. A questionnaire was then devised and the membership polled on their current practice (using a commercial immediate polling application (mQlicker). The consensus session was focused primarily on the management of the non-compliant bladder. After the session, the audience was then re-polled using the same questions. The results of both polling sessions are presented within the tables, throughout this article.

Investigation, diagnosis and surveillance

The primary aim of neuropathic bladder management is to provide the patient with the best long-term quality of life with preservation of normal renal function. Within any healthcare system, and particularly in state-funded ones, this has to be achieved with efficient use of resources.

All infants and children with a neuropathic bladder in the UK and Ireland are clinically assessed and undergo a renal and bladder ultrasound. Controversy exists within urological practice on further radiological investigations, the routine use of urodynamics and ongoing surveillance after initial diagnosis.

The utilisation of urodynamics varies greatly in the literature, with some using it routinely and others selectively. There are also those who utilise a hybrid approach, with routine use initially then tailoring to selective use based on risk factors.

Proponents of routine urodynamics argue that by measuring the bladder pressure in all children, directly appropriate management can be started earlier and long-term complications prevented. Kessler et al. [8] used this approach in their cohort and found that the younger the patients were evaluated and appropriate management instituted, the lower the need for surgery. However, other authors have questioned the reproducibility of urodynamic investigation in this age group and highlighted the risk of over diagnosing the hostile bladder [9].

A more hybrid approach was outlined in 1984 by Bauer and colleagues [10]. They utilised early urodynamics in their initial assessment and risk stratified the patients. The risk stratification was based on synergy of the detrusor and sphincter. High-risk patients had dyssnergia and low-risk patients had complete denervation of the sphincter. The high-risk group had urodynamics repeated every 6 months for 2 years and yearly for 3 years thereafter. The low-risk group had yearly ultrasound scans (USS), with urodynamics reserved for those patients developing deterioration clinically or on ultrasound. This approach combined the early risk stratification of patients with appropriately tailored investigations thereafter [11].

Other researchers have used a more selective approach. Teichman et al. [12] only used urodynamics in the event of clinical deterioration or change in ultrasound features. They found a renal deterioration rate of 5%, which was confirmed on DMSA scan. There was no difference between newborns who had normal or abnormal urodynamic findings. As such, urodynamics did not predict the at-risk patients who would go on to have renal changes in their cohort.

Hopps et al. [13] reviewed their patients and recommended selective use of urodynamics. The study (1975—2000) included 83 patients who had presented at $\leq$6 months of age. The cohort of patients were risk stratified into two groups: high risk or low risk. The high-risk patients were those found to have hydronephrosis or clinical evidence of urinary retention and all the other patients were categorised as low risk. There were 18 (22%) high-risk patients and 65 (78%) low-risk patients at initial assessment. High-risk patients underwent a VCUG and urodynamic evaluation. All patients were followed at 2—4 monthly intervals with physical examination, urine culture and USS. They were converted from the low-risk to high-risk group if they developed any adverse clinical signs such as hydronephrosis, febrile UTI, UTI, urinary retention or incidental VUR, noted at time of evaluation for continence. At a mean of 3.1 years, 45% of the low-risk patients had been converted to the high-risk group. Only two kidneys, both high risk, showed renal deterioration. One kidney was originally in the high-risk group and one kidney was a conversion from the low-risk to high-risk group. There were no cases of renal deterioration in the persistently low-risk group. The low-risk group, therefore, escaped the need for invasive urodynamics, with no cases of renal deterioration in a mean follow-up of 10.4 years.

The later studies supported the selective use of urodynamics, suggesting that close monitoring and prompt intervention was effective at protecting the upper tracts. The consensus questions addressed the role of urodynamics, but also looked at the frequency and role of other radiological investigations (Table 1).

Consensus view

There was no consensus regarding whether babies born with spina bifida should have a cystogram at initial evaluation. However, with regards to the use of urodynamics, a more selective approach was preferred.

The BAPU believe that

- During the initial investigation of a newborn baby with spina bifida, it is reasonable to perform invasive urodynamics on a select few, based on clinical and radiological assessment.
- For the stable neuropathic bladder patient who is on clean intermittent catheterisation (CIC), invasive urodynamics can be reserved for those who develop a clinical or radiological indication.