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Pediatric urodynamics: baseline audit and effect on management

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Abstract **Objectives** To undertake a baseline audit of our pediatric urodynamic service, identifying areas for improvement, and to determine whether clinical management was affected by urodynamic results.
Patients and methods All pediatric urodynamic studies during one calendar year were reviewed to determine the quality of reports that were issued and to assess any problems encountered. A postal questionnaire was sent to all referring doctors to determine whether the urodynamic report had influenced management.
Results In all, 48 children attended for videocystometry, with successful tests in 39 (81%); 97% of written reports were judged to contain adequate information. In all, 33 postal questionnaires were returned (85%); in 30 (91%) the referring clinician felt that the urodynamic result had directly influenced management.
Conclusion The audit highlighted areas for improvement, which have been addressed. The response from the postal questionnaire showed that urodynamics directly influenced the management of children with complex urological and neurological abnormalities.

Introduction

Urodynamic studies (UDS) are well recognized as having an essential role in managing adults with lower urinary tract dysfunction [1]. UDS are equally important in determining the management of children with complex urological and neurological conditions [2–4]. Cystometry has been

Abbreviations: UDS, Urodynamic studies; CIC, Clean intermittent catheterization.

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described as having a role in managing children with wetting disorders who are neurologically normal [5], but in our department the investigation of these children is usually confined to noninvasive urodynamics. Videocystometry [6] can give both structural and functional information and is therefore often used in children in preference to standard cystometry, in view of the children's underlying pathology. Indeed video-UDS have been used to classify bladder function in children with spina bifida [7].

The urodynamic unit at Southmead Hospital offers a wide variety of urodynamic investigations and provides a pediatric urodynamic service to the South-west of England, supporting two pediatric urologists and four pediatric nephrologists. UDS are used by experienced urodynamicists and before UDS a familiarization visit is arranged for the family wherever possible. Children are sometimes assessed by the Continence Advisor and either they, or their parents, may be taught clean intermittent catheterization (CIC) as a prelude if CIC is likely to be used in their future management. Their suitability for UDS can also be determined, but this was not a routine practice at the time of the audit. Regular review meetings are held every 3 months when all pediatric urodynamic investigations are reviewed.

UDS can be traumatic for any child, as the study is invasive, and cooperation may be hard to achieve [8]. Interpreting the traces can be difficult [9] and achieving good quality control is more challenging, particularly as a child is unlikely to permit a second study. Pediatric urodynamic technique has consequently developed from that used in adults, in response to these practical issues [10].

This study details results from a baseline audit of our current pediatric urodynamic practice, undertaken both for the purpose of setting standards for further audits and to identify areas for improvement. In addition, we were unable to identify any published study that assessed specifically whether a child's management was affected by the results obtained from UDS, and we therefore decided to assess the effect of UDS on patient outcome.

Patients and methods

All pediatric UDS during the calendar year 1999 were reviewed retrospectively; during this period the unit's policy had been to sedate infants aged 0.5—2 years and to insert suprapubic catheters in children aged ≥ 3 years who had normal urethral sensation. Referral letters were assessed to determine whether they contained information about underlying diagnosis or medication.

Documentation related to the UDS was assessed to evaluate the type of catheter used, whether sedation was used, and whether any technical or practical difficulties were encountered during the investigation. The quality of reports was assessed to see if adequate information about urodynamic variables and anatomical structure was given. In particular the reports were re-read to check that they included information on the presence of detrusor overactivity, comments on compliance, detailing the change in detrusor pressure from empty to full, and the volume over which that change took place, and any leakage.

Finally a postal questionnaire was sent to the referring doctor for completion, at least 6 months after the test, to determine whether and how the test had influenced management.

Results

In all, 83 children (39 girls and 44 boys) attended the urodynamic unit during the audit period, of whom 35 had uroflowmetry only and were excluded from the study. The 48 children remaining had attended for video-UDS and successful tests were completed in 39 (81%, 18 girls, 21 boys) with a median (range) age of 5.75 (0.2—17) years. Nine (19%) tests were not completed, four as a result of complications with suprapubic lines (one of which fell out, two did not record satisfactorily during UDS despite troubleshooting, and one child had clot retention); two children refused catheterization. One was a girl aged 3 years who vomited the sedative and the other was a boy aged 6 years who declined to be catheterized; both children had normal urethral sensation. The failed catheterizations were a result of abnormal anatomy, in a child with an anorectal anomaly (aged 3 months) and one with a lipomeningocele (aged 15 months), and to severe leg spasms in a child with a hemivertebra at L2 (aged 8 years).

Urethral catheters were used in 31 children (79%), with suprapubic catheters used in eight others, who the referring consultant felt would not tolerate or cooperate with urethral catheterization, as they were aged >1 year and had normal urethral sensation. Underlying medical conditions included spina bifida (15), sacral anomalies (eight), renal failure (four), anorectal anomalies (three), PUV (two), cerebral palsy and dysfunctional voiding (one each) and other (five) (see Fig. 1). Written referral letters were identified in 38 children and contained information about the underlying medical condition in only 28 (74%) and about medication in only 14 (37%) (see Fig. 1).