

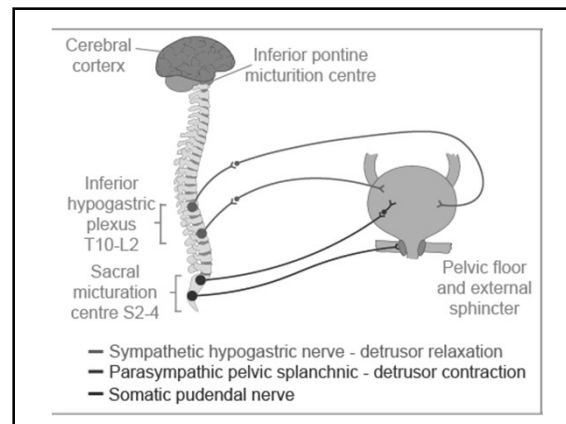
BUI Bristol Urological Institute
Improving care by advancing knowledge

Urodynamics in Children

Neurology and Urodynamics 34:640-647 (2015)



**International Children's Continence Society
Standardization Report on Urodynamic Studies of the Lower
Urinary Tract in Children**

Stuart B. Bauer, Rien J.M. Nijman, Beth A. Drzewiecki, Ulla Sillen, and Piet Hoebeke



Age achieving continence

- Around 3 yr
- Around 7 yr

15% annual resolution rate

Affect social life and low self esteem

Terminology

- Urinary incontinence
 - Daytime involuntary loss of urine at socially unacceptable place and time
- Enuresis
 - involuntary loss of urine at night
- Overactive detrusor
 - Urodynamic finding of detrusor activity on filling

Terminology

- OAB
 - Any child with urgency. Urinary frequency and urge incontinence may also be present
- Underactive bladder
 - Contraction of decreased strength or atonic on voiding phase.

Terminology

- Voided volume
 - Expected bladder volume by age averaged over multiple readings.
 - Up to 12 years of age = (age x30) + 30
 - Over 12 years 390ml
 - Previously known as functional bladder capacity.

Terminology

- Voiding dysfunction
 - any condition of micturitional dysfunction
- Dysfunctional voiding
 - Intermittent involuntary contractions of pelvic floor and external urethra on voiding in neurologically normal children.
- Detrusor sphinter dysynergia
 - Detrusor contraction with involuntary sphincter contraction during voiding in neurologically abnormal children.

Hx

- Micturition patterns
- Toileting patterns
- Fluid intake
- Stooling habits
- Incontinence patterns
- Comorbidities (febrile UTI, behavioural changes)



Fig 3. Inappropriate posture for voiding. The feet are not supported (suboptimal posture) and the feet are on the floor. Support of the feet will correct the abnormal pelvic floor muscles to make empty.

P/E

- Spine
- Abdominal
- Genitalia
- neurological



VUD in children

- much more invasive than adult (think 3 times before you order a VUD)
 - indication
- may need paediatrician's help in sedation
- infusion rate/volume
- catheters used for infusion
- GROWING (0-5 yrs, puberty)

Indications

- Congenital neurogenic bladder
 - Spina bifida
 - Cerebral palsy
- Acquired
 - Guillain barre syndrome
 - Spinal cord injury
- symptoms refractory to a significant period of engaged urotherapy and pharmacological management



Spina bifida

- Congenital defect from failure of closure of neural tube caudally
- UDS not predicted by neuro level/ skin level/ presence of BCR
- Assess; DO on filling, underactivity on voiding, USI, DSD, DLPP, PVR

Spina bifida

The image contains three diagrams of the spine illustrating different types of spina bifida: 'spina bifida occulta', 'meningocele', and 'myelomeningocele'. Below these is a photograph of a young boy with glasses sitting in a wheelchair, wearing a striped shirt and shorts.

Aims of UDS

- To identify children “at risk” from renal damage
- To define LUT function “at baseline”
- To direct management

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Timing of UDS

- Infancy
 - to predict upper tract problems
 - for specific indications
 - Upper tract dilatation
 - Palpable bladder
 - UTIs
- Childhood
 - to plan continence management
 - for specific indications, as above

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Which Children Are at Risk of Developing Renal Damage?

Adverse factors

- “bad bladders” – high pressure filling
- vesico-ureteric reflux
- urinary tract infections
- good intrinsic urethral function (MUCP)
- urethral obstruction during voiding

Protective factors

- poor intrinsic urethral function

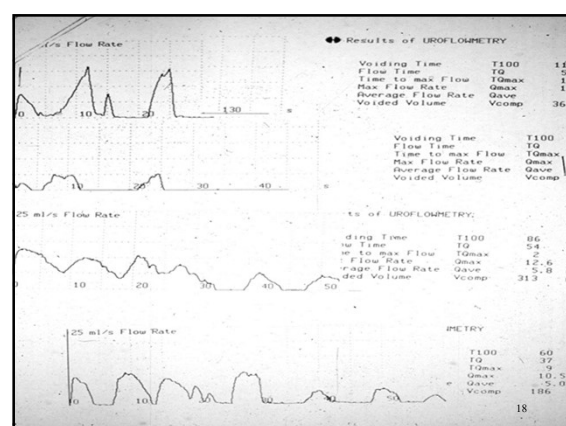
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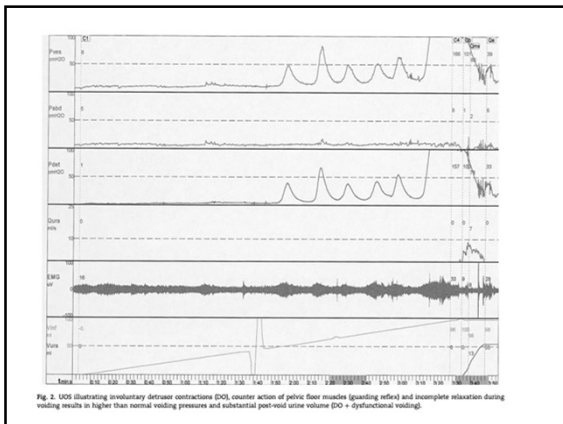
Urinary Incontinence

- Flow studies
 - to exclude dysfunctional voiding in children with persistent wetting
- Cystometry
 - ?consider in children with persistent or secondary symptoms


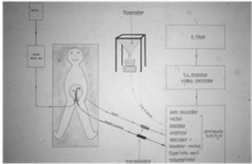
• NB *cystometry is an invasive test!*

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Cystometry

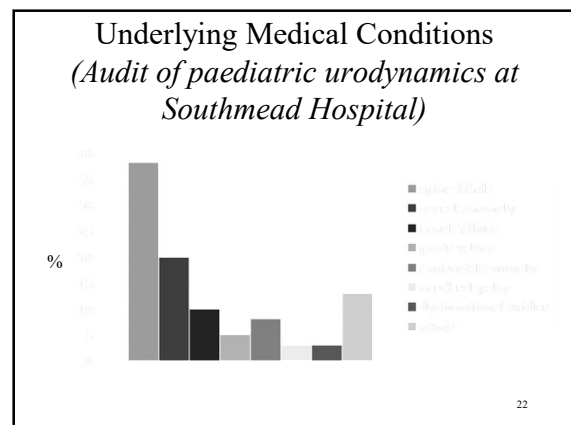



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Cystometry

- An important tool in the management of children with complex neurological and urological conditions (Kim 1997, Wen 2000)
- Classification of bladder function in spina bifida (Rickwood 1982)

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Cystometry in Children

- Can't interpret history so easily
 - Limited expression of speech, embarrassed, shy
 - Have never known "normal"
- Requires adaptation of technique
- Can present particular problems (Nijman 1995)
 - Cooperation
 - Length of test
- **Important to get test 'right first time'**

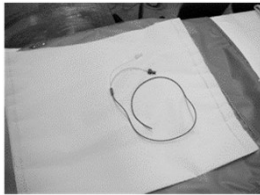
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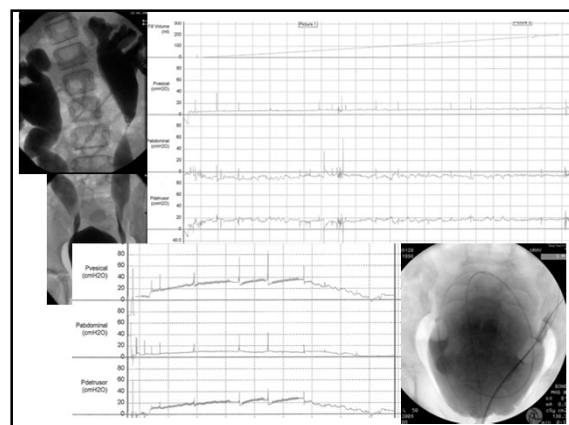


Adaptations of technique in children

- Catheter type
 - 6F
 - double lumen catheter
- Catheter siting
 - Urethral
 - suprapubic
- Filling speed
 - 2mls/5mls/min
 - Shown to affect detrusor pressure in myelodysplasia (Joseph 1992)
- Videourodynamics



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Latex and spina bifida

Understanding Natural Rubber Latex Allergy

North Bristol NHS

Type I allergy (latex proteins)

Can be life-threatening

• Blood mediated IgE immediate systemic response (5-30 minutes)

• Allergy to proteins in Natural Rubber Latex. The items on the left are similar in protein content and if an individual is allergic to any of these, suspicion re. Latex allergy is strongly advised. Patch testing is essential prior to any intervention.

• Individuals with spina bifida, urological or multiple surgery are particularly susceptible to sensitivity - rash, breathlessness, asthma, hypertension, swelling of lips and tongue, risk of anaphylaxis

• Management - Staff and patients avoid exposure to all Latex products

• Staff - report to OH and line manager

• Patients to be identified with allergy sticker and flagged on IT system

• Report on IT system

• Wear Moko-Alert bracelet or necklet

• Inform all relevant others i.e. GP, dentist etc.

• Diagnosis can be elicited by patch testing, blood tests and skin-prick tests

n.b. It is specifically an allergen in natural rubber latex from the hevea brasiliensis tree that causes natural rubber latex allergy. Please do not confuse with other "rubbers"

n.b. Use the Trust's Glove Selection Guide to select appropriate gloves for specific situations

Refer to Trust Policy and Ward and Department Protocols for further specific advice and information

Version 1.0 - July 2019

The further support and advice contact the Latex Allergy Support Group: PO Box 27, Filton, N. Yorks, Wiltshire SN15 2YF (01209) 750111

Type IV allergy (chemicals)

Not life-threatening

• T-cell mediated delayed localized response (6-48 hours)

• Allergy to chemicals used to manufacture **both Latex and synthetic gloves**

• Difficult to manage as specific chemicals hard to identify. Thiourams are particularly sensitive

• Symptoms - rash localized to hands and wrists, occurs. In more severe cases can spread further than localized areas, i.e. arms

• Management - Staff report to OH and line manager

• Change to looser fitting gloves

• Change to a glove using different chemical accelerators

• Diagnosis can be elicited by patch testing

Conclusions- VUDS

- Videocystometry gives additional information
 - Bladder outline, reflux, PF function, constrictions, post void residual
- It should be used if the additional information will actually affect management
- It is costly and gives X-ray exposure

Conclusions- neurourology

- Comprehensive history & examination
- Understand potential (lack of) benefits
- Awareness of dangers
 - Autonomic dysreflexia
 - Latex allergy
 - DSD/ renal failure
 - UTIs

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THANK YOU