



'Dysfunctional voiding'; The (new) IUGA-ICS definition, is that a diagnosis and do we have a treatment?

W17B, 29 August 2011 16:00 - 17:30

Start	End	Topic	Speakers
16:00	16:15	Physiology of voiding and voiding dysfunction	<ul style="list-style-type: none">• Peter Rosier
16:15	16:30	Diagnosis of voiding dysfunction	<ul style="list-style-type: none">• Victor Nitti
16:30	17:00	Physiotherapy	<ul style="list-style-type: none">• Wendy Bower
17:00	17:30	Discussion: diagnostic strategy and treatments, including physiotherapy	All

Aims of course/workshop

The workshop aims to help understanding of the normal and the abnormal physiology of voiding and will elaborate on diagnosis and treatment of dysfunctional voiding. The workshop introduces normal and abnormal (or pathologic) lower urinary tract and pelvic floor physiology and will introduce current protocols and standards of treatment for 'dysfunctional voiding'.

Educational Objectives

The concept of 'dysfunctional voiding' appears easily understandable and readily acceptable. However only in January 2010 the first definition of this 'concept' was provided in the IUGA/ICS Joint Report on the Terminology for Female Pelvic Floor Dysfunction.

The definition that exist now is here cited from the report: 'Dysfunctional voiding: This is characterized by an intermittent and/or fluctuating flow rate due to involuntary intermittent contractions of the peri-urethral striated or levator muscles during voiding in neurologically normal women. This type of voiding may also be the result of an acontractile detrusor (abdominal voiding) with electromyography (EMG) or video-urodynamics required to distinguish between the two entities'.

This descriptive definition allows a lively discussion and educational interaction. Moreover a discussion on (the lack of a definition on) male dysfunctional voiding will be highly attractive.

'Dysfunctional voiding'

The (new) IUGA-ICS definition Is that a diagnosis and do we have a treatment?

Program:

- ✓ Introduction & Basics and urodynamic analysis of voiding **Peter Rosier**
 - Q & A
- ✓ Clinical analysis of female voiding **Victor Nitty**
 - Q & A + discussion
- ✓ Physiotherapy **Wendy Bower**
 - Q & A + discussion
- ✓ Round the Table Discussion!

To discuss:

- What is known?
- Which standards do we have;
- Scientifically and clinically?
- Problems in general

Analysis of female voiding:

- Consensus is lacking (and therefore:)
- Variation in clinical practice exists; diagnosis and treatment
- 'Normal' female bladder outlet physiology is imprecisely defined.
- No definition(s) of pathophysiology of female voiding dysfunction.
- Female bladder outlet during voiding is 'anatomically' more dynamic than in (elderly) men.

Problems:

- Female bladder outlet obstruction is 'clinically' rare
 - however postoperative /obstructive treatments?
- (Habitual) straining to empty or intermittent voiding
- Normal limits for female detrusor contraction during voiding undefined.
- Post-void residual urine?
- Predictive value of test results unknown
- Limited base for evidence based treatment

Problem

- What is normal female voiding?
 - (How) Can women void in a representative way during (v)UDI?

- 50–85% of women generally crouch over or hover rather than sit on the seats of public toilets. (Moore et al. 1991, Cai & You 1998)

What we 'know' / observe

- Some women:
 - consistently, have ineffective emptying
 - have bladder outlet obstruction
 - have consistent interruptive emptying
 - void 'without detrusor contraction'
 - have voiding difficulties after surgery (for SUI)

And also: We observe (urodynamically) 'abnormal' voiding in women without any voiding symptom.

- What we can measure:
 - Voided volume, Pdet, Pdet(max), Qmax, residual volume
 - Flow-curve/ irregularity /intermittency
 - Pressure-flow nomogram(s)
 - Bladder outlet obstruction index
 - Bladder contraction index
 - Stopflow: Pdet(max)-isovol
 -

What we discuss today

- Fundamentals of voiding physiology and analysis
- Clinical parameters of voiding analysis
- (how) can we quantify (female) bladder outlet function?
- What should we do when we diagnose abnormal female voiding?
- What should we do with dysfunctional voiding?
- What should we treat and how?

What we have accepted:

(Haylen et al:) ***Dysfunctional voiding:***

This is characterized by an intermittent and/or fluctuating flow rate due to involuntary intermittent contractions of the peri-urethral striated or levator muscles during voiding in neurologically normal women.

This type of voiding may also be the result of an acontractile detrusor (abdominal voiding) with electromyography (EMG) or video-urodynamics required to distinguish between the two entities.

- ✓ Haylen BT, de Ridder D, Freeman RM, Swift SE, Berghmans B, Lee J, Monga A, Petri E, Rizk DE, Sand PK, Schaer GN; International Urogynecological Association; International Continence Society.

An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourol Urodyn*. 2010;29(1):4-20. Review.

Basics and urodynamic analysis of voiding:

Peter Rosier

- ✓ Griffiths D. Basics of pressure-flow studies. *World J Urol*. 1995;13(1):30-3. Review.
- ✓ Abrams PH, Griffiths DJ (1979) The assessment of prostatic obstruction from urodynamic measurements and from residual urine. *Br J Urol* 51:129-134
- ✓ Griffiths DJ (1980) *Urodynamics: the mechanics and hydrodynamics of the lower urinary tract*. Hilger, Bristol
- ✓ Griffiths DJ (1991) Assessment of detrusor contraction strength or contractility. *Neurourol Urodyn* 10:1-18
- ✓ Griffiths DJ, Constantinou CE, Van Mastrigt R (1986) Urinary bladder function and its control in healthy females. *Am J Physiol* 251:R225-R230
- ✓ Hill AV (1983) The heat of shortening and the dynamic constants of muscle. *Proc R Soc London [Biol]* 126:136-193
- ✓ Schäfer W (1983) The contribution of the bladder outlet to the relation between pressure and flow rate during micturition. In: Hinman F Jr (ed) *Benign prostatic hypertrophy*. Springer, New York Berlin Heidelberg, pp 470-496
- ✓ Schäfer W (1990) Basic principles and clinical application of advanced analysis of bladder voiding function. *Urol Clin North Am* 17:553-566

ICS Workshop on Dysfunctional Voiding Suggested Readings

Victor W. Nitti

References

- ✓ Akikwala T, Fleishmann N, Nitti VW: Comparison of diagnostic criteria for female bladder outlet obstruction. *J Urol* 2006;176:2093-7
- ✓ Athanasopoulos A, Gyftopoulos K, Giannitsas K, Perimenis P: Effect of alfuzosin on female primary bladder neck obstruction. *Int Urogyn J* 2009; 20:217-222
- ✓ Blaivas JG, Groutz A: Bladder outlet obstruction nomogram for women with lower urinary tract symptomatology. *Neurourol Urodyn* 2000;19:553-64

- ✓ Brucker BM, Kelly CE, Shah S, et al: Urodynamic differences between dysfunctional voiding and primary bladder neck obstruction in women. J Urol 2011;185(4 suppl):e683
- ✓ Carlson KV, Rome S, Nitti VW: Dysfunctional voiding in women. J Urol 2001;165:143-8
- ✓ Chassagne S, Bernier PA, Haab F: Proposed cutoff values to define bladder outlet obstruction in women. Urology 1998;51:408-11
- ✓ Defreitas GA, Zimmern PE, Lemack GE, Shariat SF: Refining diagnosis of anatomic female bladder outlet obstruction: comparison of pressure-flow study parameters in clinically obstructed women with those of normal controls. Urology 2004;64: 675-81
- ✓ Lemack GE, Zimmern PE: Pressure flow analysis may aid in identifying women with outflow obstruction. J Urol 2000;163:1823-28
- ✓ Massolt ET, Groen J, Vierhout ME: Application of the Blaivas-Groutz bladder outlet obstruction nomogram in women with urinary incontinence. Neurourol Urodyn. 2005;24:237-42
- ✓ Nitti VW, Tu LM, Gitlin J: Diagnosing bladder outlet obstruction in women. J Urology 1999; 161:1535-1540

Dysfunctional voiding: Physiotherapy:

Wendy Bower

Increased urethral resistance during voiding due to an inability to fully relax

- the bladder neck,
- urinary sphincter
- pelvic floor
- or dyssynergia of the external urinary sphincter

Once urethral resistance is encountered, the detrusor may

- i) continue to contract and effect emptying,
- ii) reduce contractile activity and prolong bladder emptying, or
- iii) be completely inhibited by urethral or pelvic floor muscle activity, with bladder emptying achieved by abdominal straining. The child with either of the two last presentations is said to have detrusor underactivity (Neveus et al 2005).

Altered patterns of voiding have been considered to be independent of underlying neurological impairment i.e. a functional disorder

- learned during the toilet training years
- adopted following episodes of dysuria or constipation
- occur secondary to sexual abuse
- triggered or exacerbated by toilet conditions and privacy issues (Cooper et al 2003; Meulwaeter et al 2002).

Some suggestion (Franco 2011) that dysfunction may also come from:

- a lumbosacral rectovesical inhibitory reflex activated by rectal distension
- autonomic dysfunction, especially of bladder neck
- cross-talk between parasympathetic fibres from rectum and bladder → increased α adrenergic input

Significant morbidity results in up to 40% of patients with dysfunctional voiding (Yang et al 1997).

- filling phase anomalies (OAB, urethral instability)
- urinary tract infections
- vesicoureteric reflux
- kidney damage
- detrusor over-distension
- urinary retention
- bladder decompensation.

Urinary symptoms associated with dysfunctional voiding

- urgency \pm increased frequency
- infrequent or poor bladder emptying
- incontinence during the day
- night dysfunction (Chiozza 2002)
- Micturition that coincides with rises in abdominal activity (Nijman et al 2005).

Signs of dysfunctional voiding

- small bladder capacity

- increased detrusor thickness
- low detrusor contractility
- impaired relaxation of the external urinary sphincter during voiding
- weak or interrupted urinary stream
- large post-void residual volumes of urine
- faecal soiling
- secondary vesicoureteric reflux, constipation or obstipation

(Hoebeke et al 2001; Hellerstein et al 2003; Mazzola et al 2003; Cvitkovic-Kuzmic et al 2002, Nijman et al 2005).

Diagnostic findings of note are

- i) PF EMG trace is silent until the void is initiated and then becomes active
- ii) or PF EMG is intermittently active during the void
- iii) or the abdomen is used to generate voiding pressure.
- iv) specific dysfunction at the bladder neck on video urodynamic study (Grafstein et al 2005)

Intervention for children with urinary incontinence or dysfunctional voiding

Clinical recommendations

- Educate re normal bladder behaviour and specific changes underlying the child's symptoms
- Implement voiding routine so that child passes urine at regular intervals
- Teach PFM awareness (+/- mirror, surface perineal EMG / anal probe EMG, trans-abdominal or perineal ultrasound) and coordination to achieve PF recruitment and relaxation with minimal accessory muscle activity
- Train optimal voiding mechanics and posture (+/- biofeedback during voiding)
- Bowel management and optimal defaecation dynamics if indicated
- Adjunctive neuromodulation for overactive bladder symptoms
- Consider clean intermittent catheterization if large post-void residual volumes of urine persist (Pohl et al 2002).

Evaluate treatment efficacy

- reduction in number of wet episodes
- improvement in bladder emptying
- resolution of associated symptoms
- improved functional capacity of the bladder

References:

- ✓ Nevéus T, von Gontard A, Hoebeke P, Hjälmås K, Bauer S, Bower W, Jørgensen TM, Rittig S, Van de Walle J, Yeung CK, Djurhuus JC. The Standardization of Terminology of Lower Urinary Tract Function in Children and Adolescents. *J Urol*. 2006 Jul;176(1):314-324.
- ✓ Cooper CS, Abousally CT, Austin JC, Boyt MA, Hawtrey CE. Do public schools teach voiding dysfunction? Results of an elementary school teacher survey. *J Urol*. 2003 Sep;170(3):956-8. 2003.
- ✓ Meulwaeter J, Vandewalle C, Segaert A, Raes A, Van laecke E, Hoebeke P, Vande Walle J. Hygienic facilities in schools. *Proc of Int Child Cont Soc* 2002:39
- ✓ Franco I. New ideas in the cause of bladder dysfunction in children. *Curr Opin Urol*. 21: 0000, 2011
- ✓ Nijman RJM, Bower W, Elsworth P, Tegkul S, Von Gontard A. diagnosis and management of urinary incontinence and encopresis in childhood. In : Abrams P, Cardozo L, Khoury s, Wein A, Eds. *Incontinence*. 3rd Edition. Plymouth: health Publication Ltd. 2005
- ✓ Chiozza ML. Dysfunctional voiding. *Ped Med Chir* 2002; 24(2):137-40
- ✓ Hellerstein S, Linebarger JS. Voiding dysfunction in pediatric patients. *Clin Pediatr* 2003; 42(1):43-9
- ✓ Hoebeke P, Van laecke E, Can Camp C, Raes A, Van de Walle J. One thousand video-urodynamic studies in children with non-neurogenic bladder sphincter dysfunction. *BJU Int*. 2001; 87(6):575-80
- ✓ Mazzola BL, von Vigier RO, Marchand S, Tonz M, Bianchetti MG. Behavioral and functional abnormalities linked with recurrent urinary tract infections in girls. *J Nephrol* 2003; 16(1):133-8
- ✓ Cvitkovic-Kuzmic A, Brkljacic B, Ivankovic D, Grga A. Ultrasound assessment of detrusor muscle thickness in children with non-neuropathic bladder/sphincter dysfunction. *Eur Urol* 2002; 41(2):214-8
- ✓ Pohl HG, Bauer SB, Borer JG, Diamond DA, Kelly MD et al. the outcome of voiding dysfunction managed with clean intermittent catheterization in neurologically and anatomically normal children. *BJU Int*. 2002 Jun; 89(9): 923-7