

## A PROSPECTIVE STUDY TO FIND EVIDENCE FOR THE ICS DEFINITION OF URGENCY

### Hypothesis / aims of study

ICS has defined 'urgency' as 'the complaint of a sudden compelling desire to pass urine which is difficult to defer'.<sup>(1)</sup> Urgency is ('...with or without urge incontinence usually with frequency and nocturia, can be described as...') associated with the 'overactive bladder syndrome' according to the 'syndromes' paragraph of the ICS terminology document. The definition is however never formally tested. We have evaluated the validity of the ICS definition of urgency with the aim to provide a scientific basis for this definition.

### Study design, materials and methods

In a 3 month period all (126) patients for urodynamic investigation (UDI) were included. Of these 73 had a normal lower urinary tract sensation.<sup>(1)</sup> Indications for UDI were: LUTS, incontinence, recurrent urinary tract infections, storage symptoms and/or micturition symptoms. The remaining 53 patients with reduced, altered or absent sensation<sup>(1)</sup> due to cauda equina syndrome and/or meningocele; spinal cord injury; neurological disease, 'chemical/pharmacological' cystitis or painful bladder syndrome and some due to communication problems, were excluded.

We performed transurethral saline (65°F/18°C) filling with non-physiologic rate ( $\pm 10\%$  of largest voided volume on voiding diary per minute) UDI in all patients. Patients were instructed (through a written hand out while the investigation was planned and verbally at the start of the investigation) to indicate 'first sensation of filling', 'first desire to void' and 'strong desire to void' during the investigation.<sup>(1)</sup> Furthermore patients were asked to describe exactly when sensation was changing, especially 'sudden changes' and also when their desire to void was 'compelling, and difficult to defer'. This desire was operated by the question 'Are you willing to stop your car and risk a fine\* for public – roadside- urination?' (\*equivalent of US\$75.) Furthermore patients were asked to indicate 'fear of leakage' and after strong desire to void, when filling was stopped it was specifically asked by the investigator.

### Results

Mean age was 54.0 years (18.5-82.4). Filled volumes were from 40- 750ml, mean 436ml. Thirty-one patients (43%) demonstrated detrusor overactivity and 3 patients (4.2%) had a low compliance. One patient (not known with painful bladder syndrome) mentioned 'pain' during filling. The table provides numbers of patients (and%) that have indicated 'yes' on: 'compelling desire to urinate- willing to risk a fine' (compelling desire); have reported a sudden change (increase of 'need') (sudden change) or have reported fear of leakage, grouped by urodynamic diagnosis of detrusor (over-)activity. Mean (and range) of filled volumes and first volume and maximum pressure at detrusor overactivity are provided.

	Filled volume (ml)	Volume at first overactive contraction (ml)	Maximum pressure of overactive contraction (cmH <sub>2</sub> O)	Compelling desire? Yes: N(%) patients:	Sudden change? Yes: N(%) patients	Fear of leakage? Yes: N(%) patients
Overactive detrusor (N=31)	<b>381</b> (40-700)	<b>284</b> (30-650)	<b>32</b> (8-95)	<b>28</b> (90.3%)	<b>1</b> (0.9%)	<b>13</b> (41.9%)
Normal detrusor function (N=41)	<b>478</b> (200-750)			<b>34</b> (82.9%)	<b>1</b> (0.9%)	<b>5</b> (12.2%)

### Interpretation of results

Almost all patients had a compelling desire at the end of filling *during urodynamic investigation* regardless whether the patient had detrusor overactivity or not. Also, independent of detrusor overactivity, almost no patient indicated a 'sudden change'. Relatively many but not all patients with detrusor overactivity indicated fear of leakage. On the contrary, patients without detrusor overactivity also feared leakage sometimes.

The results are understandable in the view of detrusor anatomy and physiology. Filling (cystometry) according to ICS clinical practice and terminology is continued until 'strong desire to void'.<sup>(1,2)</sup> This *by consequence* results in the 'compelling desire to pass urine which is difficult to defer'. This study makes clear that this point is reached in almost all patients, regardless of the diagnosis of detrusor overactivity. Therefore this part of the definition is very unspecific.

A *sudden* change is not indicated by almost any of the patients not even by those with detrusor overactivity. This observation is explainable, knowing that bladder filling sensation depends on mechano-stretch receptors<sup>(3)</sup>. Bladder wall stretch is related to intravesical volume and the 'signal of filling' is gradually increasing as a result of (continuous) bladder filling and associated increasing volume and wall stretch. Only the shape of the bladder changes during an overactive bladder contraction without leakage. Total bladder volume and therefore 'total wall stretch', remains unaffected. Local changes in the detrusor shape presumably give only minor changes in 'total' bladder wall tension and little change in afferent signal, perceived as filling sensation (-change).

Is this related to clinic? 'Clinical observation' nevertheless gives the impression that patients with an overactive detrusor have more or other bladder storage symptoms. (The overactive bladder syndrome) We list the scores on IPSS questionnaire of the patients in this study:

Table 2: **Symptoms** (Number of IPSS question and mean answer in both groups)

	IPSS Q1	IPSS Q2	IPSS Q3	IPSS Q4	IPSS Q5	IPSS Q6	IPSS Q7
Overactive	2.39	3.28	2.67	2.94	2.83	1.44	3.41
Normal	1.92	2.88	1.88	1.67	2.42	1.33	3.54
t-test	.349	.390	.165	.017	.442	.813	.688

In his study-cohort, as can be seen in the table, is observed that IPSS question 4 (.... have you found it difficult to postpone urination?) scored significantly higher in the urodynamically overactive group, and thus occurs more frequent. Also the difference in question 2 (... urinate again less than two hours after you finished urinating?) is relatively large. These results are corresponding to the 'overactive bladder syndrome'.

#### Concluding message

The word 'sudden' in the contemporary ICS definition of urge lacks a scientific basis since sudden changes in the sensation of fullness do not appear to exist neither in relation to detrusor activity, nor in relation to bladder fullness. In fact: 'sudden changes' in bladder fullness are neither anatomically nor physiologically very well explainable, apart from voiding sensation. The words 'compelling desire to pass urine...' in this definition are, furthermore, relatively meaningless because when the bladder is full enough, almost everyone experiences this sensation. This sensation is urodynamically unrelated to detrusor -pressure increasing- activity. A 'compelling desire to pass urine' is, by itself, an unspecific sign.

A certain group of patients has complains of difficulty to postpone urinating and reports to visit the toilet because of a compelling desire to pass urine *relatively frequent; 'more than others', or 'more than before'*. These patients also might mention that they visit the toilet because of the fear of leakage *relatively frequent*. The difference of patients with detrusor overactivity with others is probably the frequency in which this 'compelling desire with fear of leakage' occurs. It is this group of patients that might show an association with (urodynamic) detrusor overactivity, however we need more investigation to quantify: 'relatively frequent'. We propose to elaborate on a more specific and scientifically sensible ICS definition of 'urgency'.

1: Neurourol Urodyn. 2002;21(2):167-78.

2: Neurourol Urodyn. 2002;21(3):261-74.

3: Exp. Physiol 1999; 84: 131-6

**FUNDING: NONE**

**DISCLOSURES: NONE**

**CLINICAL TRIAL REGISTRATION:** This clinical trial has not yet been registered in a public clinical trials registry.

**HUMAN SUBJECTS:** This study did not need ethical approval because only extra questions were asked during routine investigation but followed the Declaration of Helsinki Informed consent was not obtained from the patients.