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IS OBJECTIVE MEASUREMENT OF BLADDER SENSATION DURING REPEATED FILLING CYSTOMETRY REPRODUCIBLE?

Hypothesis / aims of study

The normal pattern of sensation during filling cystometry consists of 3 distinct sensations: first sensation of filling (FSF), first desire to void (FDV) and strong desire to void (SDV) (1). These parameters are subjective. This subjective nature of bladder sensation limits our ability to quantify the effect of treatment for conditions such as urgency. Using an 'urgemeter', we have measured urge intensity and assessed reproducibility on repeat filling cystometry.

Study design, materials and methods

The urgemeter is a compressible handheld device connected to a pressure transducer on a standard urodynamic machine. The device is squeezed harder, without prompting, as the urge sensation increases resulting in a continuous tracing.

30 patients with LUTS were recruited. During filling cystometry at 50ml/min, patients experiencing sensation in the bladder squeezed the urgemeter. The device is squeezed harder with increasing urge sensation.

To assess reproducibility at comparable levels of sensation, urge intensity (scale 0-200) was measured at first urge sensation volume (S-first), mid-urge sensation volume (S-mid) and maximum urge sensation volume (S-max). Total urge sensation volume and duration were measured. Percentage first sensation volume (% S-first Volume) is defined as the first urge sensation volume divided by the infused volume. Percentage mid-urge sensation volume (% S-mid Volume) is defined as the mid-urge sensation volume divided by the infused volume and percentage maximum urge sensation volume (% S-max Volume) is defined as the maximum urge sensation volume divided by the infused volume.

Results

30 patients with LUTS (mean age 60 years) were recruited. All experienced sensation of bladder filling.

	1st Cystometry	2nd Cystometry	3rd Cystometry	P-Value
Infused Volume (ml)	307.8 (21.8)	295.6 (21.2)	280.9 (21.7)	0.16
S-first Volume (ml)	125.1 (15.4)	126.3 (12.6)	98.7 (12.8)	0.07
% S-first Volume (%)	39.9 (3.7)	41.4 (2.8)	34.2 (3.9)	0.14
S-mid Volume (ml)	216.8 (16.9)	210.2 (16.1)	190.3 (15.5)	<0.0001
% S-mid Volume (%)	70.3 (1.9)	70.4 (1.5)	67.1 (2.1)	0.17
S-max Volume (ml)	269.0 (20.5)	278.7 (21.9)	259.7 (20.2)	0.48
% S-max Volume (%)	88.9 (2.9)	93.1 (2.0)	93.2 (1.7)	0.25
Total Urge Sensation Volume (ml)	181.8 (16.5)	168.8 (13.3)	173.4 916.9)	0.67
Urge Duration (s)	217.3 (19.4)	220.6 (15.4)	218.0 (18.0)	0.98
S-mid Urge Intensity*	48.4 (6.7)	34.8 (5.9)	36.3 (4.8)	0.024
S-max Urge Intensity*	101.6 (7.7)	91.4 (6.9)	84.2 (6.3)	0.08
End Fill Urge Intensity*	75.0 (5.8)	70.5 (6.2)	62.6 (5.0)	0.20
No. of Patients with Uninhibited Detrusor Contractions (%)	N = 17 (56.7%)	N = 20 (66.7%)	N = 15 (50.0%)	0.15

Values are expressed as mean (SD). * Urge intensity Scale 0 – 200.

P-value was calculated using Two-Way ANOVA.

The only significant differences were found in S-mid sensation volume and S-mid urge intensity. Otherwise, there was no significant differences (Two-Way ANOVA) found in other urge sensations, total urge sensation volume and duration between repeated filling cystometries.

Interpretation of results

Bladder sensation during filling cystometry is a continuous perception of increasing intensity and is therefore not subdivided into 3 distinct sensations (FSF, FDV and SDV). Using the urgemeter, urge sensations can be measured objectively and reproduced in repeated filling cystometries. Patients found the urgemeter device easy to use.

Concluding message

This novel method of measuring bladder sensation would be a valuable tool in measuring and grading urgency, especially in patients with overactive bladder.

References

(1) On the physiology of micturition. Brain 65: 149 – 190, 1933.

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