

## TECHNIQUE, INTERPRETATION AND CLINICAL RELEVANCE OF URETHRAL PRESSURE VARIATION DURING FILLING PHASE OF URODYNAMIC INVESTIGATION: SYSTEMATIC REVIEW OF THE LITERATURE

### Hypothesis / aims of study

The clinical relevance of urethral pressure variations (UPV), an observation during the filling phase of urodynamic investigation - also referred to as urethral instability- in the pathophysiology of OAB syndrome has remained controversial to date. Some studies report an association with over active bladder syndrome (OAB) and / or detrusor over activity (DO). OAB has a prevalence of 16% to more than 50% of the population and has great socio-economic impact. Fundamental clinical research has demonstrated that “crosstalk through neurotransmitters, mediators and epi- urothelial signal substances” between urethra and detrusor can be relevant in the pathophysiology of DO and/or OAB. Recently, the International Consultation on Incontinence - Research Society recommended new clinical research to be performed on this topic. We provide a systematic review of the literature regarding urethral pressure variations to further specify this recommendation.

### Study design, materials and methods

Literature search was performed in PubMed, Embase, Web of Science, Cochrane, Central, Cinahl, Academic Science Premier, ScienceDirect and WileyOnline using a sensitive search string combination. Studies were selected by predefined selection criteria. Only fully published papers were included. No papers were excluded because of their language published in. All authors independently reviewed and scored the full text papers according STARD-checklist and consensus about methodological quality was obtained according to Oxford Level of Evidence (LoE).

### Results

487 abstracts were screened. Twenty-five papers met all predefined selection criteria and were included. Incidence figures of UPV varied between 2 and 95%. Studies are of poor methodological quality with Oxford LoE score of 3B and 4 and have been performed with very heterogeneous and poorly defined –retrospective single centre- patient populations. Only two studies were performed after permission of local ethics committee. Measurement methods and techniques show a large variety in measurement time, patient position, cystometry and measurement equipment and are shown in table 1. The above mentioned association of DO/OAB with UPV is however rather consistently reported.

Catheter used (N)	Position sensor (N)	Position of patients (N)	Filling cystometry
Dual sensor, microtip (18)	Ventral (2)	Supine (7)	Continuous medium fill rate (11)
2 separate catheters (2)	Lateral (6)	Sitting (2)	Fixed volume (5)
3 sensors urethra (2)	Not Specified (17)	Sitting + tilt (2)	No filling (1)
5 sensors urethra (1)		Standing +sitting (6)	Not specified (8)
Open water filling (1)		Not specified (8)	
'microtip' not specified (1)			

### Interpretation of results

Fundamental and clinical research very consistently suggests that UPV may occur in association with OAB to a significant extend. The precise pathophysiology and –clinical- relevance for the association of UPV with detrusor over activity is however yet undetermined. Furthermore it is to date impossible to conclude whether UPV may be present in patients with OAB, without DO. Because of the large variety in measuring techniques reported the performed studies cannot easily be pooled. Clinical relevance of UPV and consequences for treatment are therefore yet difficult to establish.

We consider that it is necessary to standardize urodynamic testing to increase further knowledge and to improve clinical diagnosis and management.

We suggest, on the basis of the literature evidence, that a new provisional standard protocol should encompass medium filling rate saline cystometry with patients in upright sitting position with continuous –at least one sensor- urethral pressure registered at the point of maximal urethral pressure as determined at the start of the cystometry. UPV should be analysed over the full cystometry until strong but not uncomfortable need to void. Patient groups should preferably be –consecutive- women over 40y with symptoms and or signs lower urinary tract dysfunction (without relevant neurological abnormalities).

### Concluding message

We have systematically analysed relevant literature about urethral instability (its current ICS term). Clinical studies are of low quality and moreover very inconsistent in the technique or patient recruitment. ‘Circumstantial evidence’ however suggests that UPV is a clinically relevant phenomenon that deserves better analysis. We recommend prospective research with better defined patient populations and standardized urodynamic testing. Such standardized urodynamic observations should also be correlated to symptoms and signs by validated questionnaires to lead the way to personalised therapy for patients with OAB.

### Disclosures

**Funding:** no disclosures **Clinical Trial:** No **Subjects:** HUMAN **Ethics not Req'd:** it is an systematic review of the literature **Helsinki not Req'd:** Not applicable, review of literature **Informed Consent:** No