Standardization of Terminology of Urodynamics And Good Urodynamic Practices

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Good Urodynamic Practices Antalya 2015

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Introduction

• The ICS Standardisation Steering Committee has initiated a working group (WG) to update the International Continence Society Good Urodynamic Practice 2002 (GUP2002) with the aim to include new evidence and information on urodynamic practice and urodynamic quality control and the revised ICS standard on urodynamic equipment. Following the traditional ICS Standardisation style, while including the new method and structure, we will indicate when changes of current standards are recommended and provide arguments for making these changes.

• This report will provide evidence based and specific recommendations for clinical routine urodynamic testing, and includes expert consensus wherever evidence is lacking. Conclusions and recommendations are highlighted in the text and can be used for summary and express reading.

• We define ‘ICS standard’ as: 'Best practice, based on evidence, with the use of standard terms and standard techniques, evaluated and reported clinically or scientifically, in a complete and validated manner'. In individual cases and or in research settings the decision may be made to not adhere to this standard.

• Many of the recommendations in this document may be considered relevant, generalizable or applicable for patients with relevant neurological abnormalities, for video -urodynamics or for urodynamics in research settings and or for patients with urine deviations and may, moreover, also be helpful for the performing of urodynamics in children. The WG however recommends this ICS standard specifically for evaluation of the function of the lower urinary tract (LUT) of adult persons without relevant neurological abnormalities and with intact ‘normal’ anatomy of the LUT.
Standards

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Definitions of terms for Urodynamic Tests

Conclusions
• A significant variety of synonyms are used for urodynamic tests and studies in the scientific literature as well as in lay texts.
• We conclude that the use of currently existing standard terms is not yet routine in scientific literature.

Recommendation
• The WG proposes that the following terms are ICS standard:
Terms:

• **Urodynamics:**
  – The general term to describe all the measurements that assess the function and dysfunction of the LUT by any appropriate method. Urodynamics allows direct assessment of LUT function by the measurement of relevant physiological parameters.
    • (GUP2002 not changed)

• **Invasive Urodynamics:**
  – Any test that involves insertion of one or more catheters into the bladder and or other body cavities.

• **Non-invasive Urodynamics:**
  – All urodynamics done without the insertion of catheters: e.g. uroflowmetry, PVR, penile compression-release test, penile cuff, condom catheter.

• **Ambulatory Urodynamics:**
  • see ST2002 not further discussed in this standard.
Terms

- **ICS Standard Urodynamic Test (ICS-SUT):**
  - Uroflowmetry and PVR plus transurethral cystometry and pressure-flow study:
    - All performed in the patient’s preferred or most usual position; usually comfortably seated and or standing if physically possible. The patient(s) may be reported as having had an ICS standard urodynamic test’.

- **ICS-SUT may be supplemented**
  - with EMG, with imaging (see below); with continuous urethral pressure(s) and or with urethral pressure profile measurement. Cystometry may be done via a suprapubic catheter (specify supplements).

- **ICS Standard Urodynamics Protocol (ICS-SUP) includes:**
  - Clinical history (a valid symptom and bother score), relevant clinical exam, (3 days-) bladder diary and an ICS-SUT.
Terms:

**Recommendation:**

- The WG suggests all ICS-SUT –data as a minimum, and preferably complete ICS-SUP –data as elements to be reported or summarized for the total cohort of patients in all research reports that contain (invasive) urodynamic results.

- Also the WG suggests to refer to the current manuscript (ICS-GUP2015) when research is reported as ‘...according to ICS Standard Good Urodynamic Practices’ when ICS-SUT or ICS-SUP data are reported.
**Uroflowmetry:**
- A test that produces the [Citation from GUP2002]: …flow rate of the external urinary stream as volume per unit time in millilitres per second (ml/s). ICS uroflowmetry minimally reports, the maximum flow rate and the volume voided and also includes post void residual volume. (GUP2002, not changed.) Other characteristics, such as flow pattern (specify) and other parameters may be added.

**Post-Void Residual volume (PVR):**
- (GUP 2002)The remaining intravesical fluid volume determined directly after completion of the voiding. Specify: the technique (e.g. ultrasound or catheter).

**Voided percentage (Void%):**
- The numerical description of the voiding efficacy or efficiency which is the proportion of bladder content emptied. Calculation: [(volume voided / volume voided + PVR) *100].
- The WG suggests Void% to be used especially in the reporting of cohorts of patients managed to evaluate (management of) voiding as additional to (changes in) voided volume and PVR.
**Terms**

- **Cystometry:**
  - Transurethral or suprapubic continuous fluid filling of the bladder; minimally with intravesical and abdominal pressure measurement and display of detrusor pressure, including cough (stress) testing.
  - Cystometry ends with ‘permission to void’ or with incontinence (involuntary loss) of the total bladder content.
  - Specify: fluid type, fluid temperature; filling method and rate, catheter sizes and pressure recording technique, patient position, assessment and documentation of sensations, observations etc.

- **Cysto-Urethrometry:**
  - A cystometry is done with continuous urethral pressure measurement (specify technique).

- **Pressure-Flow study:**
  - The intravesical and abdominal pressures are measured, from the moment of ‘permission to void’ while uroflowmetry is performed with a transurethral (or suprapubric) catheter in place.
    - Specify: the position of the patient, the catheter sizes and the pressure and flow recording technique, correct for: pressure-flow delay.
Terms:

- **Pelvic Muscle ElectroMyoGraphy (EMG)**
  - (New): Pelvic muscle kinetics is judged with surface electrodes.
  - ICS Standard: Two skin electrodes on the perineal surface with an appropriate reference (= Pelvic muscle EMG).
  - Specify: Other type e.g. vaginal probe: ‘vaginal EMG’ ‘anal EMG’ or ‘needle EMG’ etc. and or if not ICS standard: number, position and orientation of electrodes.

- **Urethral Pressure Profile:**
  - See ICS-Standardisation of urethral pressure measurement.

- **Urodynamics may be combined:**
  - with imaging (specify). Invasive urodynamics performed with contrast fluid as the filling medium is Video Urodynamics: X-ray (image amplifier) pictures or cine-loops are made at relevant moments. Specify contrast medium and report patient radiation dose.

  - Video-urodynamics is not further discussed in this document.
Patient information and preparation of the patient for invasive urodynamics:

Conclusions
• Some evidence exists that information leaflets about urodynamic investigations are too difficult for patients to understand.
• Young adults and patients with a pelvic pain syndrome may have a relatively negative experience with urodynamic investigation.
• Conflicting evidence exists about which precise appropriate information to give patients is helpful before urodynamic testing to reduce distress.

Recommendation
• Providing quality means communicating effectively with patients so that they become actively engaged in –the test and- their care delivery.
• A leaflet with the ICS standard points may facilitate informed decision making.
• The WG suggests, but not on the basis of good evidence, that an explanatory leaflet about urodynamic investigation that uses positive words will be appreciated by the majority of the patients and should include the items listed here to be ICS standard information leaflet content:
Leaflet contents:

• What is a urodynamic investigation
• What is the usefulness of urodynamics; why is it done
• What are the different steps of urodynamic investigation and how they are performed (e.g. uroflowmetry, cystometry, urethral pressure measurement and pressure-flow)
• Additional information including length of the investigation, sterility of relevant parts of equipment, lack of ‘injections’

• How are dignity, communication and comfort during the investigation maximized

• What are the symptoms that may occur following the investigation, what do these indicate and how can they be handled or prevented; e.g. the fact that mild discomfort, frequency, dysuria and haematuria may be experienced; and a urinary tract infection may rarely develop

• What the patient should do before the test (e.g. arrive, if possible, with a full bladder for uroflow if possible and an empty bowel.)
• Whether the patient should continue medication before the test, or (what) not.
  – Note: This should be individualized, e.g. with a tick box or a written instruction of the requester.

• What the patient should do after the test
  – e.g.: Immediately drink one portion of ½ - 1L extra fluid to ensure prompt voiding again, thus to rapidly relieve the urethral irritation.
  – And also: All usual activities are permitted again.
Urodynamic practice protocols:

Conclusions
• Published evidence to support implementation of practice standards is scarce and the conclusion on the basis of simple implementation strategies towards the achievability of practice improvement is not very encouraging.

Recommendations
• We recommend that departments develop urodynamic practice protocols on the basis of the best available standards and facilitate specific training in and evaluation of urodynamic practice.
• We recommend that centres should –ideally on a nationwide level-decide on individual accreditation and recertification (e.g. required minimum number of tests) as well as the level of authority and autonomy to perform urodynamic tests.
Clinical practice pre-testing information

Conclusion

• We conclude that clinical practice guidelines and expert ‘first principles’ agree that prior to invasive urodynamics, history, physical exam and urinalysis should be completed.

• The usefulness of a FVC-BD to help anticipate cystometric capacity and appropriate fill rate has never been formally investigated.
  – It is however the WG’s conclusion that the FVC-BD voided volumes should be considered relevant to evaluate the representativeness of the cystometry volumes (see GUP2002).

Recommendation

• The WG advises that apart from the routine clinical information, the information from the (3-day) FVC or BD and the uroflowmetry and PVR are utilized while performing invasive urodynamics.

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Practice of uroflowmetry

Conclusions
• The WG concludes that it is desirable to allow patients to perform uroflowmetry in their own preferred position.

Recommendations
• The WG recommends permitting patients to perform uroflowmetry in their preferred position and to strive for a minimum physical discomfort and anxiety for the patient as well as for a maximum of dignity.
• The WG recommends checking if the voiding is representative, based on the patient’s report and also on the association with the patients FVC or BD volumes.
• The position of the patient during voiding studies should be reported.
• The WG recommends considering repetition of the uroflowmetry if the result has not been representative for the patient or if the result indicates abnormality. Particularly if the voided volume and or flow rate are unexpectedly low or the PVR is (much) larger than expected or explainable in both women and in men.
Practice of cystometry

1. What determines filling rate?
2. How is the patient instructed to report sensations?
3. Fluid-filled external transducers
   (remain ICS standard)
4. Catheters (intravesical and abdominal)
5. Position of patient
6. Immediate repetition
Conclusions

- Current ST2002 cystometry (pump-) filling rate above physiological filling is defined but without a recommended value or range for the preferred rate.
- Filling rate, especially when very fast or until too large volumes, may influence the results or the representativeness of the cystometry. Evidence that filling rate should be changed during the cystometry is lacking.
- Diuresis, occurring during cystometry, adds volume that is not recorded by the urodynamics system with automated filling volume recording but may be relevant for interpretation of the results.
- Correction of filled volume for diuresis in retrospect should be considered with regard to reporting of filling sensation parameters, compliance and cystometric capacity (=pressure-flow voided volume plus PVR; and assuming the diuresis to be constant).
Filling rate

Recommendations

• The WG recommends that the person doing the cystometry knows the FVC-BD results as well as the results of uroflowmetry with volume voided and PVR prior to initiating invasive urodynamics.

• The WG suggests that ICS non physiological filling rate may be harmonized on the basis of the individual patient’s typical voided volumes (including the estimation of the PVR volume) as recommended earlier to prevent too fast and filling and or too large volumes.

• Parameters during cystometry depending on volumes should be corrected for diuresis if relevant for clinical management or for scientific purposes. (NEW)

• The WG recommends that ‘permission to void’ is indicated on the urodynamic graph to mark the beginning of the pressure-flow study if there is a delay between stopping the filling and this permission, to allow correct interpretation of the graphs after the test.
Conclusions
• The ST2002 expert based recommendation for the assessment of sensations during cystometry has appeared to be reasonable and applicable in various studies.

Recommendations
• The WG recommends to mark FSF, FDV, and SDV, during cystometry as recommended by ST2002, in as standard a possible manner on the basis of explicit verbal instructions and communication before and during the test, and to report the results.
Pressure recording system

Conclusions

• ICS standard urodynamic pressure, is the excess pressure above atmosphere at the hydrostatic level of the upper edge of the symphysis pubis. This is valid for all pressures recorded according to GUP2002 with fluid filled lines.

• Studies that have compared micro-tip catheter systems (multicentre group averages) or air–filled catheters in vitro or in vivo (pairwise averages of two measurements) with ICS standard fluid filled systems have shown that both systems give different results and cannot be considered interchangeable.
Pressure recording system

Recommendations

• ICS standard cystometry is done with a fluid filled system with external transducers at the reference level of the upper edge of the symphysis pubis.

• Urodynamic laboratories should be aware of potential artefacts of fluid filled measuring system and should be able to prevent these, or recognize and correct as needed.

• Urodynamic laboratories should ensure that the equipment, including the catheters and transducers, meet the requirements as explained in the ICS guideline on equipment performance.

• Urodynamic laboratories should check the performance of the system at regular intervals and calibrate (as advised in the ICS –guideline on equipment performance).
Transurethral catheter:
• ICS standard invasive urodynamics is done with an as thin as possible (6-7F) transurethral double or triple lumen catheter or a suprapubic catheter (ST2002, GUP2002).

Recommendation
• Based on GUP2002, ICS standard invasive urodynamics is done with an as thin as possible double lumen catheter however on the basis of the lack of evidence for inferiority of two catheter techniques this alternative is regarded acceptable.
• The WG recommends to find evidence in specific studies to direct practice standardisation and harmonisation for the catheters to be used for invasive urodynamics.
• The WG recommends fixation of the catheter as adjacent as possible to (the anus and) the urethral meatus with a tape, without blocking the outlet.
Abdominal pressure catheter: rectal versus vaginal

Conclusions

• Although there exists single centre evidence that women may prefer vaginal reference catheter placement the WG concludes that evidence is insufficient to demonstrate that this is a reliable alternative.

Recommendations

• The WG recommend that rectal placement of the catheter to measure abdominal pressure is ICS standard and that vaginal or stoma placement is used alternatively only if rectal catheter placement is impossible.
Position

Conclusions
• The detection of detrusor overactivity, the detection of urodynamic stress incontinence as well as bladder filling sensation are influenced by the position of the patient and that sitting or standing position appears to have a higher sensitivity to detect abnormalities.

Recommendations
• ICS standard cystometry is done in the upright position (standing or normally seated) whenever physically possible.

• A pressure-flow study is done comfortably seated (women, some men) or standing if that is preferred position (men).
Conclusions
• Predominantly single-centre evidence suggests that immediate or longer term test-retest variation is sometimes large for specific parameters (like sensation) but lesser with regard to pressure-flow variables, especially in elderly men.
• There is no convincing evidence that the clinical diagnosis on the basis of the first cystometry is often changed because of repetition of the test. There is a lack of evidence that immediate repetition of an adequately performed urodynamic test ‘for confirmation’ is required.

Recommendations
• The WG does not recommend routine immediate repetition of invasive urodynamics ‘for confirmation’ if the test was technically adequate and has answered the clinical question.

• The WG recommends to immediately repeat the test when doubt exists whether the test has answered the clinical question.
• The WG recommends immediate repetition of a urodynamic test when (technical) artefacts have (not been corrected during the test and) been observed at analysis.
Practice of pressure-flow studies and an update of terms.

Recommendation
• The WG recommends especially for the purpose of pressure-flow analysis an as short as possible meatus to flowmeter distance, adjusted for the voiding position, but recommends to correct for delay between pressure and flow as recommended earlier.

Discussion and suggested terms
• ST1997 recommends to present pressure-flow studies with a plot of the flow rate (mL/s) on the X-axis and the synchronous detrusor pressure(cm H2O) on the Y-axis in addition to the time based graphs.
• ST1997 introduced ‘urethral function‘ and ‘urethral resistance (relation)’ without precisely defining these term. New standard terms to acknowledge the relevance of the anatomical structures adjacent to the anatomically defined urethra per se, during micturition (with or without further detailing anatomy) may be desirable and should be introduced in a new (ICS)standard of pressure-flow study analysis - practice and terms.
The term **Bladder Outlet Obstruction (BOO)** is already frequently used and defined here as: **A (specified) cut-off of bladder outlet resistance that is considered clinically relevant.**

- (The WG does not define cut-off values but advises that the term should be preferred for both gender and all ages.)

**ST1997 defined ‘(passive) urethral resistance relation’; with analysis principles and methods and a recommendation.**

**The WG suggests:**

**Normal voiding function (NEW):**

- (can be described in phenomenological terms as):

**Flow rate and pressure-rise are within normal limits, begin more or less directly after permission to void, and voiding ends with an empty bladder.**

**ST1997 has also introduced that the urethral function during voiding can be ‘overactive’.**
• **Bladder Outlet Obstruction** (defined here above) may be further specified:
  – Bladder outlet physical properties may or may not vary during one course of voiding and,….
  – the WG suggests that new terms are introduced when analysis methods and cut-off values or pattern descriptions are provided to describe ‘overactive urethral function during voiding’ (as introduced in ST1997).

• New terms should (in this regard) preferably also take into account that structures around the urethra may be relevant during voiding.

• We conclude that no commonly agreed parameters to clinically quantify or qualify ‘overactive urethral function’ are available yet.
• ST1997; ST2002 have defined
  • ‘underactive detrusor’ and ’acontractile detrusor’ as different from ‘normal detrusor’ during micturition;
  • GUP2002 has introduced that contraction during micturition may vary, or may be variable.
  • The WG discussed that voiding is influenced by mental state and, although evidence is lacking in the uro-gynecological literature, anxiety in the test situation for the patient may plausibly influence the initiation of the voiding reflex and consequently affect detrusor function.

• The WG suggests ‘Situational inability to void (as usual)’ when in the opinion of the person performing the test, in communication with the patient, the (-attempted) voiding has been not representative.
The WG here introduces the terms

- **‘detrusor voiding contraction’**
  - for any analysis of combined pressure and flow (+/- other variables) that qualifies or quantifies the actually observed voiding.

- **‘detrusor contractility’**
  - can be used for any method that (aims to) diagnose ‘intrinsic’ detrusor muscle properties (e.g. potential (maximum) force or velocity) by any method.
  - We here refer to e.g. stop-flow or interrupted-voiding tests and mathematical or graphical analysis methods of pressure, flow and or other parameters.
Acknowledging the GUP2002 we suggest that the terms ‘unsustained contraction’ or ‘fading contraction’ may be used when analysis methods and cut-off values or pattern descriptions are provided.

We also acknowledge that no parameters to clinically demarcate normal, stable or sustained detrusor contraction; unsustained contraction or fading contraction are available yet.

**Recommendations**

- The WG has suggested some terms with the aim to improve communication with regard to pressure-flow analysis.

- **However the WG strongly recommends an update of the ICS standard for pressure-flow analysis** to ensure optimal ICS standardisation of quantitative analysis (and standardisation of diagnosis) of bladder outlet function as well as of detrusor voiding contraction diagnosis and or detrusor contractility -analysis for all patient groups.

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Technical and clinical quality control during invasive urodynamics.

Conclusions

• Expert evidence confirms that recognition, prevention and management of artefacts are important elements of urodynamic quality control.
• Urodynamic quality management, including plausibility is relevant before, during and after the test as well as while reporting the test.

Recommendations

• The WG recommends that everyone performing or evaluating urodynamics is able to recognize usual pressure patterns and is able to perform continuous quality control during the test.
• The WG recommends that training and a process of continuous knowledge maintenance as the base for performing (standard good-) urodynamic practice should be established.
• Terms related to the cystometry observations and evaluation.
Recommended terms for most common features and or artefacts during invasive urodynamics

• Initial Resting Pressure (NEW)
  • Is the $p_{ves}$ and the $p_{abd}$ pressure at the beginning of the cystometry.
  • To prevent reading measurements from a kinked catheter in an empty bladder with the catheter holes blocked with (insertion) gel and or pushed against the bladder surface the WG recommends (GUP2002) gentle flushing and or filling 20-30mL, before the initial resting pressures are considered to be ‘established’.
  • Initial resting pressures should be within the physiological limits specified in previous ICS documents (GUP2002) and subsequently the pressures should show good and balanced cough/effort pressure response.

• Dead Signal (NEW):
  • A signal that is not showing small pressure fluctuations and is not adequately responding on coughing is reported as a dead signal.
  – Previously (ST2002): ‘In principle, a good $p_{det}$ signal requires only that $p_{ves}$ and $p_{abd}$ show the same fine structure and quality of signals before filling, during filling, and after voiding’.

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• **Pressure drift (NEW):**
  - Continuous slow fall or rise in (one of either) pressure, that is physiologically inexplicable indicates an artefact.

• **Poor pressure transmission (NEW):**
  - Poor pressure transmission has occurred when the cough/effort pressure peak signals on pves and pabd are unequal.
    - Note: The WG does not define a new limit for ‘unequal’, or for not ‘almost identical’ (GUP2002).
    - Note: Pressure drift and or dead signal are associated with poor pressure transmission.
• Expelled Catheter (NEW):
  • When a catheter is expelled this is observed as a sudden drop in either $p_{ves}$ or $p_{abd}$, usually to zero (or below zero if the catheter-end drops below the external pressure sensor).
  
  – Previously published definition: ‘If a sudden drop or increase occurs in either $p_{ves}$ or $p_{abd}$ signal, the usual cause is movement, blockage, or disconnection of a catheter.’
  
  – Expelled catheter is usually simply visible during the test and should provoke correction or repetition of the test however this term is to be used in reporting or during post-test evaluation.
• Catheter Flush (NEW):
  – A catheter flush is not always necessary after a careful performed set-up but suggested in GUP2002.
  – Flushing of the catheter measuring channel may be considered necessary to wash away entrapped air, or the gel used during insertion or other debris, from the measuring hole.
  – The rectal catheter can only be flushed when an open catheter is used. If done, it is characterized by an abrupt and large increase in a single pressure trace, maintained for some seconds, when the lines are being flushed with fluid, followed by a normalisation of pressure.
  – A catheter flush should be marked accordingly but flushes are normally unnecessary after the cystometry has continued after the first mL of filling.
• **Tube Knock (NEW):**
  - Tube Knock is observable as high frequency, short duration spikes visible in $p_{ves}$, $p_{abd}$, or both and if tubes move asynchronous, with spikes usually visible in $p_{det}$ also.

• **Pump Vibrations (NEW):**
  - Pump vibrations are visible as stable frequency oscillations of small but constant amplitude, visible on the $p_{ves}$ (and $p_{det}$) traces.
    - Pump vibrations may be visible if the filling tube rests on a pressure connecting tube and the pump is switched on (switching of the pump can ascertain the situation).
    - Note: ICS standard is double lumen catheter, and despite that the channels are side by side with the usual filling rate and measuring scale, oscillations are not observable.
Cough pressure peak (NEW):
• A cough pressure peak is recognizable during post-test evaluation as a phasic positive pressure change observed in $p_{ves}$ and in $p_{abd}$.

Urodynamic stress test (NEW):
• Urodynamic stress test is used for any physical effort of the person tested, to elevate abdominal pressure, during cystometry with the aim to test for (urodynamic) stress urinary incontinence.
  – ICS has defined urodynamic stress incontinence.
    • Evidence with regard to the preferred technique of stress testing is lacking.
  – Note: The provocation method, the pressure measuring catheter(-size) and method, the leak detection method as well as the absolute or relative (percentage of cystometric capacity) intravesical volume(s) while testing may be reported.
• **Leak point pressure (NEW):**
  • The leak point pressure is the pressure (spontaneous or provoked) that has caused fluid to be expelled from the bladder at the moment that it is visible outside the urethra (may also be used for extra-urethral urine loss or stoma).
  • This may be Abdominal, Cough or Valsalva LPP or Detrusor LPP:
    – See ST2002; ICS/IUGA2009 and AUA-SUFU.
  • Provocation and pressure recording (‘type of LPP’) should be reported.
  – **Diverse methods of leak point pressure measurement are published with a variety of combinations of provocation or pressure recording site/type and or technique.**
    • Detrusor and Valsalva LPP are defined in ST2002.
    • No standard technique or protocol is however available and a variety of terms and techniques are used.
      – (Counts in PubMed (April 2015): Cough LPP: 21; Valsalva LPP: 226; Detrusor LPP: 64; Abdominal LPP: 98; Overactivity LPP: 0.)
Cough associated detrusor overactivity (NEW):

- Cough associated DO is reported when the onset of the DO (with or without leakage) occurs immediately following the cough pressure peak.

- No precise definition of cough associated detrusor activity is available, however 'cough induced DO' is sometimes reported however its pathophysiology remains speculative.

- Since the urodynamic observation is that the cough is immediately followed by DO and because the (patho-)physiology has remained unclear, the WG presents a descriptive definition.
• Position Change (NEW):
  • A change in patient position, either active or passive (e.g. tilting), is visible on the cystometry trace by a lasting change of equal magnitude in both $p_{ves}$ and $p_{abd}$.

– Notes: A position change should be (is readily) noted during the test and followed by a readjustment of the external pressure sensors height to the standard so that the physiological $p_{ves}$ and $p_{abd}$ are observed again.

– A position change should not affect $p_{det}$. The Position Change -pattern should be recognized during post-test evaluation of the cystometry.

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• **Rectal Contractions (NEW):**
  - Rectal contractions are temporary phasic increases in $p_{abd}$ without synchronous change in $p_{ves}$ (resulting in negative deflections of $p_{det}$).
  - Published description GUP-2002: ‘Rectal activity’ or ‘Rectal contractions are usually of low amplitude and may or may not be felt by the patient’.

• **Dropped $p_{abd}$ at Void (NEW):**
  - A drop in $p_{abd}$ during voiding, is reported when during the voiding time, $p_{abd}$ decreases below the previous resting pressure.
  - Note: The WG considers that this phenomenon will affect pressure-flow analysis result. This observation should be differentiated from expelled catheter.
• **Straining (NEW):**
  - Straining is observable as a temporary increase in both $p_{ves}$ and $p_{abd}$ pressure. Straining may be associated with (patient -active) position change (like repositioning from leaning backward to upright).
  
  – Note: A short abdominal strain peak may in retrospect be indistinguishable from a position change or a cough and v.v.

• **After-contraction (NEW):**
  - An after-contraction, is a continued or new detrusor pressure rise immediately after flow ended.
  
  – Note: Cough checking of (intravesical) catheter position is always required after pressure-flow (GUP2002). To separate the after-contraction -pattern from catheter slipping out or catheter tip (with measuring hole) bending in the outlet when the bladder empties, this cough check is specifically important when a $p_{ves}$ increment after voiding is observed.
  
  – Previously published description: A pressure increase after flow ceases at the end of micturition.
The urodynamic graphs and the urodynamics report

Recommendations

• The WG recommends that, in addition to the GUP2002 standard urodynamic graph, a [cited form ST1997] ‘plot of detrusor pressure against flow rate during voiding’ is provided according to the example in ST1997.

• For the ‘ICS-SUT’ the WG recommends both (NEW) an
  – ‘ICS standard urodynamic (time based) graph’
  – as well as an
  – ‘ICS standard pressure-flow plot’
  – to be required elements in the ICS standard urodynamics report.
The WG recommends furthermore to report:

• Uroflowmetry: Voiding position and representativeness as reported by the patient (especially if not).
• Introduction of catheters: sensation; (if occurring; pain), muscular (pelvic or adductor) defence and -perceptible unusual-obstruction(s) during insertion.
• Position during cystometry.
• Patient’s ability to report filling sensations and or urgency and or urine loss.
• Method of urodynamic stress test (if applicable).
• Pressure-flow: position and representativeness as reported by the patient.
....and to report:

• Accessory tests or measurements (if applicable - no further standard).
• Overall judgement of the technical quality and the clinical reliability of the test as judged by the investigator.
• Representativeness of the test protocol to reflect the ‘usual LUT behaviour’ as reported by the patient.
• Filling sensation diagnosis or urodynamic condition (ST2002).
• Cystometry (detrusor) pressure pattern diagnosis.
• Pressure-flow diagnosis (compared with uroflowmetry) includes:
  – Bladder outlet function, or obstruction
  – Detrusor contraction,
    Voiding efficiency diagnosis (Void%).

The WG recommends development of an ICS standard urodynamics report -template.
Conclusion

• The Working Group initiated by the ICS Standardisation Steering Committee has updated the International Continence Society Good Urodynamic Practice.

• This evidence based ICS GUP2015 has defined terms and standards for the practice of urodynamics labs in general as well as for the (individual) practice of quality control during and after cystometry and pressure-flow analysis as well as for the reporting.
• Furthermore the working group has included recommendations for **pretesting information and for patient information and preparation**.

• On the basis of earlier ICS standardisations and the available evidence, the practice of uroflowmetry, cystometry and pressure-flow study are further detailed.

• The WG expresses the hope that implementation of this Good Urodynamic Practices helps to increase the individual clinical, as well as the research quality of urodynamics.
What can you do?

- Local ICS-SUT -protocols /teaching /training
- National standards (accreditation/certification)
- (National) patient leaflet
- Urodynamics report template
- (Translate ICS Good Urodynamic Practices 2015)