Troubleshooting and pitfalls during urodynamic assessment

Cystometry (CMG)

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- Continuous fluid filling of the bladder
- Measurement of intravesical and abdominal pressures
- Display of detrusor pressure, including stress testing
- CMG ends with “permission to void” or incontinence of total bladder content.
What should be specified during CMG?

- The fluid type and temperature,
- Filling method and rate,
- Catheter sizes,
- Pressure recording technique,
- Patient position
Practice of Cystometry I

- **Filling rate:**
  - Maximal physiological: \( \frac{\text{Body weight (kg)}}{4} \) (20-30 ml/min)
  - Non-physiological: >30ml/min
  - Actual bladder volumes may differ from the recorded due to diuresis
  - Corrected Cystometric Capacity (ml) = VV + PVR [ml] after PFS
  - Stopping/slowing filling rate at DO/Urgency – **unnecessary**
  - Should stop filling and observe the pressure when reduced compliance is thought
Practice of Cystometry II

- **Patient Sensations:**
  - should be informed to report **prior to CMG:**
    - **First sensation of filling (FSF)** – **should be separated from urethral post catheter insertion feelings**
      
      “Tell me the moment when you perceive that your bladder is not empty anymore”
    - **First desire to void (FDV)** – **roughly associated with “typical voided volumes”**
      
      “Tell me when you have the sensation that normally tells you to go to the toilet, without any hurry, at the next convenient moment.”
    - **Strong desire to void (SDV)** – **may occur suddenly +/- fear of leakage (or + leakage)**
      
      “the moment that you, without any pain or any fear of losing urine, will not postpone the voiding; you will visit the nearest restroom also, for example, while shopping.”
Practice of Cystometry III

- **Fluid-filled external transducers and catheter system:**
  - To be leveled at the height of the upper edge of the symphysis pubis
  - Current ICS standard

- Use of **air-filled/micro-tip catheter systems** should bring into account different pressure measurements.
Practice of Cystometry IV

- **Trasurethral Catheter**
  - Use of standard UDS catheters (6-7FR)
  - Fixation of catheter as adjacent as possible to urethral meatus and anus
    - to prevent catheter expulsion
    - w/o obstructing urethral meatus

- **Abdominal Catheter**
  - Rectal / Vaginal
  - Pts with anal closure: use of abdominal stoma (more pressure artefacts)
Practice of Cystometry V

- **Patient positioning for cystometry:**
  - Most of DO missed at supine position
  - Sitting or standing:
    - The most representative for daily life situations
    - The least uncomfortable and embarrassing for a patient
    - Reliable pressure measurements
    - Smooth transition from CMG to PFS at SDV
Practice of Cystometry VI

- **Need for repeat CMG for confirmation:**
  - Not recommended if the test has been considered representative
  - Immediate repetition of the test should be done when:
    - Clinical doubt
    - Technical errors
    - Multiple artefacts
Artefacts and Errors

- **Initial resting pressure:**
  - Normally between 0-10 cmH\(_2\)O
  - High pressures could be due to blocked/kinked catheter
  - There are different resting pressures at different positions

- **Pump vibrations**
Artefacts and Errors

- Dead signal
Artifacts and Errors

- Pressure drift
Artefacts and Errors

- Rectal Contractions
Artefacts and Errors

- Catheter Expulsion
Artefacts and Errors

- Poor pressure transmission
Thanks