Interpretation and Pitfalls of Urodynamics
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Aim of Urodynamics
• To provide a pathophysiological explanation for patient’s symptoms
• Should be performed in a SAFE and SCIENTIFIC manner

Terminology (ICS 2002)
• Detrusor overactivity
  – Is a urodynamic observation characterised by involuntary detrusor contractions during the filling phase which may be spontaneous or provoked

• Urodynamic stress incontinence
  – Is the involuntary leakage of urine during increased abdominal pressure, in the absence of a detrusor contraction

Urodynamics
• Should be performed interactively
  • Continuous observation of signals as they are collected
  • Artefacts should be corrected where possible

Quality Control
• Vital during the test

• Difficult to correct for poor traces retrospectively

• May need to reject poor quality traces
  (Lewis 2000)

(Remember this is an invasive test – be efficient, do a good test first time and maintain as much of the patients dignity as is possible.)

Quality Control Checks
• Check resting pressures are within acceptable limits – remain stable throughout the test

• Pves and Pabd should be positive (5 – 50 cm H2O)– varying pressures dependent on position; standing, sitting and supine.

• Pdet (-5 to +10 cm H2O) (Sullivan et al 2012)

• Check equal transmission from Pves to Pabd
Cough Test
• Check equal transmission from pves and pabd

What is happening here?

Trouble shooting
• Normally a process of elimination which is used to isolate possible causes of problems
• It is the systematic search for the source of a problem so that it can be solved
• Every day practice in Urodynamics.

Systematic Approach
• Define the problem
• Gather the information
  • Define the cause
  • Create options
  • Make a decision

Common problems with test:
– Unequal transmission of pressures
– Pressures not within acceptable range
Poor Pressure Transmission

Poor pressure transmission has occurred when the ratio of the smaller to larger cough signal peaks on $p_{cm}$ and $p_{max}$ is less than 70%. 

Causes
- Tap not open to pressure transducer and/or patient, or tap open between syringe and pressure transducer
- Air bubble
- A tube or catheter becomes kinked or occluded if, for example, the patient sits on it
- The catheter in the bladder rests against the bladder wall
- The catheter in the bladder becomes displaced from the bladder into the urethra

Trouble shooting
- Flush catheter — air doesn’t transmit well

Flushing

• Often the pressure lines have not been flushed (primed) enough! If in doubt flush again...
  - As a general guide – use 2 – 5ml to flush the line
  - After flushing, ask the patient to cough, check lines
  - If OK continue, if not repeat flush – sometimes several attempts are needed

Trouble shooting
- Flush catheter — air doesn’t transmit well
- Check domes – reference level
- Re-zero to atmospheric pressure
- Start filling up to 50ml — catheter against bladder wall
- Re-site catheter
- Change catheter (double lumen/solid state)

Example 1
Common Artefacts

- Artefactual poor compliance (filling rate)
- Drop in pabd on voiding
- Rectal contractions
- Lines expelled
Filling

- What are the resting pressures?
- Record pressure changes - compare start of filling (empty) to the end (full) pressures
- Were there any technical difficulties - annotate!

Voiding

- Check bladder line (P\text{ves})- has the pressure changed?
- Check abdominal/vaginal line (P\text{abd})- has the pressure changed?
- Remember the detrusor pressure (P\text{det}) is only a reflection of what is happening in the bladder and the abdominal pressure lines

Concluding points

- Take time to check quality control and troubleshoot - the patient's management may be based on your interpretation
- Annotate
- Perform QC checks every 2 mins/100mls infused
- Correct problems immediately
- Look at each line individually
- A true change in detrusor pressure will reflect the vesical pressure