Urodynamics – What is it?

An overview
Phil O’Loingsigh
Definition

Urodynamics is the study of pressure and flow relationships during the storage and transport of urine within the urinary tract

Chapple, MacDiarmid and Patel 2009
Urinary System

Male

Female
Optimal Function of Lower Urinary Tract

<table>
<thead>
<tr>
<th>Storage</th>
<th>Voiding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Pressure</td>
<td>Voluntary Start</td>
</tr>
<tr>
<td>Stable Bladder</td>
<td>Powerful stream</td>
</tr>
<tr>
<td>Adjustment of sphincter/</td>
<td>No Post Void Residual</td>
</tr>
<tr>
<td>End Filling desire to void</td>
<td>Coordination of detrusor-contraction and relaxation of pelvic floor</td>
</tr>
<tr>
<td>Empty of Upper Urinary Tract</td>
<td>Capable of interruption of flow</td>
</tr>
<tr>
<td>Low pressure in Upper Urinary Tract</td>
<td></td>
</tr>
</tbody>
</table>
Urodynamic Tests

• Uroflow Studies
• Full Urodynamic Study
• Urethral Pressure Profile
## Reasons for performing Urodynamics

<table>
<thead>
<tr>
<th>Voiding Problems</th>
<th>Storage Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign Prostatic Hypertension-BPH</td>
<td>OAB wet (Sensory urge)-incontinence</td>
</tr>
<tr>
<td>Pelvic Organ Prolapse-POP</td>
<td>OAB Dry (Sensory urge) - Reduced Capacity</td>
</tr>
<tr>
<td>Urethral Strictures</td>
<td>Bladder Outlet Obstruction - BPH POP - Pelvic Organ Prolapse Stricture</td>
</tr>
<tr>
<td>Pelvic Floor Dysfunction</td>
<td>Reduced Compliance</td>
</tr>
<tr>
<td>Detrusor Sphincter Dyssynergia</td>
<td>Reflux</td>
</tr>
<tr>
<td>Hypocontractile Bladder (residue formation and recurrent UTIs)</td>
<td>Bladder Ca</td>
</tr>
<tr>
<td>Neurogenic Bladder</td>
<td>Interstitial Cystitis and other bladder inflammatory conditions</td>
</tr>
</tbody>
</table>
Why choose a Urodynamic Study?

• Urodynamics Investigations should only be performed if it would influence the treatment or therapy for the patient
• Objectives: to diagnose Storage or Voiding Problems
• Control Treatment Efficacy: Neurogenic Bladder
• If therapy fails and there is doubt as to the underlying cause of Lower Urinary Tract Symptoms
• Full Urodynamic Study is an Invasive Investigation
Other Tests

- History
- Frequency/ Volume Chart
- International Prostate Symptom Score - IPPS
- Physical Examination
- Digital Rectal Exam (DRE)
- MSU (Clear)
- Cystoscopy
- Radiological exam - U/S, CT, MRI
Urodynamics Department

- Situated in OPD
- Urodynamics MMS Machine
- Commode and Flowmeter
- Remote Flowmeter
- Bladder Scanner
Remote Flowmeter
Uroflow Investigation

• The aim is to get a typical flow for the patient albeit in a strange environment
• Discuss the patient history and explain the procedure carefully
• Frequency Volume Chart
• IPSS Score (Male)
• Uroflow - When patient has good urge to void, fully empties into a collection funnel which is attached to the computer.
• Post Void Residual Scan (PVRS) U/S Scan
• Performed Twice as minimum
## Frequency Volume Chart

- Mostly assesses storage problems
- Urgency/Frequency
- Nocturia
- Pain
- Incontinence – frequency and severity
- Functional bladder capacity - large/small
- Fluid Intake – large/small/ type

### Frequency Volume Chart Instructions

- **TIME:** Record in this box the time you take fluid or pass urine.
- **IN:** Measure and record in this box the amount of fluid taken (1 cup = 150ml).
- **OUT:** Measure and record in this box the amount of urine you pass.
- **E (Estimate):** If unable to measure accurately (e.g., at work) simply mark E in the OUT box when you passed urine, but where possible please measure.

### Data Table

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 4</th>
<th>Day 4</th>
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<tbody>
<tr>
<td>Time</td>
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<td>OUT</td>
<td>Wt</td>
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<tr>
<td>05:00</td>
<td>150</td>
<td>150</td>
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</tbody>
</table>

**Total No. of pads used in 24 hours:**

- Day 1: 30
- Day 2: 25
- Day 3: 20
- Day 4: 35

*Note: Frequency and Urgency/Frequency can vary daily.*
### International Prostate Symptoms Score - IPSS

**Measures Lower Urinary tract Symptoms (LUTS)**

- Incomplete emptying
- Frequency
- Intermittency
- Urgency
- Weak Stream
- Straining
- Nocturia

**Score:**
- 1-7 – Mild
- 8-19 – Moderate
- 20-35 – Severe

**QOL Score:** 0 - 6
Normal Flow

- 52yr old Male
- PVRS 5mls
Post Void Residual Scan

• This Ultrasound Scan is performed immediately after the flow.
• Ask if that was a typical flow for the patient and whether they feel empty post flow.
• Normal PVR < 40 mls
• The aged bladder can have larger residuals > 100mls. (Check Kidney function prior to Rx)
Post Void Residual Scan
26yr old female    Uncontrolled IDDM    Recurrent UTIs    PVRS 375 mls

Cystoscopy showed Urethral Stricture. Rx Urethral dilatation and CISD – Clean Intermittent Urethral Dilatation
74 yr old male with Benign Prostate Hyperplasia (BPH)
IPSS -18 QOL - 4 PVRS 3mls
90yr old male TURP 20-25yrs ago  IPSS – 29  QOL-5  PVRS 277mls  
Nocturia x 5  Rx options Conveen continence system,  
long-term catherisation or Repeat TURP
Full Urodynamic Study

• **Filling Cystometry** – filling sensations, adequate Stress Tests, adequate monitoring of Detrusor Overactivity

• **Pressure Flow** – good posture, full bladder, good timing of voiding command

• **Urethral Pressure Profile (UPP)** - Females - Resting and Stress Profile
Placement of catheters

• Bladder probe - double lumen catheter
  Bladder - Vescicle Pressure $P(ves)$

• Rectal Probe – placed into rectum
  Abdominal Pressure $P(Abd)$
  Test by asking patient to squeeze buttocks
Urodynamics Set
ICS 2002 Definition of Sensations

- First sensation
- First desire to void
- Normal desire to void
- Strong desire to void
- Urgency
Full Study - Normal

41yr old female, Para 3, Mild Stress Incontinence
Detrusor Overactivity

70 yr old IDDM male with LUTS  IPSS -18  Rx Medication +/- TURP
Detrusor Overactivity with Stress Induced Contractions

39yrs old Female with Mixed Incontinence
Compliance

• Reduced in Neurogenic patient with long-term Detrusor Overactivity and Detrusor Sphinc ter Dyssynergia
• Reduced post radiation of prostate
• Normal compliance < 5cmH2O increase over 100mls
63yr male c/o Frequency and Urgency, not feeling empty post void.
Urethral Pressure Profile

- Measures the length of the Urethera and the Detrusor Sphincter Pressure.
- Used to diagnose Detrusor Sphincter Insufficiency < 20mmH2O.
- Urethral Strictures
- Important pre op study for Colpo- suspension (Sling Op)
Normal Urethral Pressure Profile

53yr old Urethral Length 2.5 cms
Maximum Urethral Closure Pressure 62 cmH2O
Stress Urethral Pressure Profile

67yrs with hx of Stress Incontinence  X 1-2 years Hysterectomy 20 yrs ago
Urethral Length 3cms Maximum Urethral Closure Pressure 24 cmH2O
Post Procedure

• Advise patient that they may see some blood stain as they Pass urine. Drink extra water to flush it out

• 3% of patients develop UTI – advise to go to GP for antibiotics if symptomatic

• Patients can contact Urodynamics Dept for any concerns
In Practice

• MSU 10 days – a week prior to Study and results faxed to OPD 0214342093
• Frequency Volume Charts
• Michigan Incontinence Symptom Index
• IPSS
Sources of Information

• www.ic-network.com
• www.ics.org
• www.iaun.ie
• Company Nurse Advisors Hollister, BBraun, SCA Hygeine (Tena)
• Urodynamics department  BSH 0214801942

THANK YOU
“Ladies and Gentlemen, presenting the Queen of Soul, the Sister of Secretion... Urethra Franklin...”