Urodynamics

January 2023

Lower Urinary Tract

- **Urodynamic studies (UDS) use a set of measurements to assess the function and dysfunction of the lower urinary tract**
- LUT has two essential functions: the storage of urine at low pressure and the voluntary evacuation of urine.
- number of conditions and diseases affect the lower urinary tract and disrupt the storage and/or evacuation of urine.
- UDS are composed of a number of dynamic tests that are individually or collectively used to gain information about the transport, storage, and evacuation of urine.

Role of UDS

- To identify or rule out factors contributing to lower urinary tract dysfunction (e.g., urinary incontinence) and assess their relative importance
- To obtain information about other aspects of lower urinary tract function or dysfunction whether or not expressed as a symptom or a recognizable sign
- To allow a prediction of the possible consequences of lower urinary tract dysfunction for the upper urinary tract
- To allow a prediction of the outcome, including undesirable side effects, of a contemplated treatment
- To confirm the effects of intervention or understand the mode of action of a particular type of treatment for lower urinary tract dysfunction, especially a new and/or experimental (not routine) one
- To understand the reasons for failure of previous treatments for urinary incontinence or for lower urinary tract dysfunction in general (after unsatisfactory treatment)

Abnormalities

- Functional abnormalities
  - *Storage dysfunction:* (failure to properly store urine)
  - *Emptying dysfunction:* (failure to empty the bladder normally)
  - *Combined dysfunction:* (failure to store and empty)
- Anatomic abnormalities
  - *Bladder dysfunction:* overactive (causing failure to store) vs underactive (causing failure to empty)
  - *Bladder outlet dysfunction:* overactive (causing failure to empty) vs underactive (causing failure to store)
  - *Combined*

Indications

- Level 1 evidence supporting indications is lacking
- Indications for use are limited, but it **is most important is that the clinician has clear-cut clinical questions to answer by performing the study. This information obtained will be used to guide treatment and/or follow-up.**
  - *H&P, simple tests not sufficient to make diagnosis*
  - *Determine the impact of a disease that has potential to cause serious damage*
  - *Predict the impact of a contemplated treatment*
  - *Identify/rule out factors contributing to lower urinary tract dysfunction*
  - *Understand the reasons for failure of previous treatment*

Defining the clinical question

- Decide on questions to be answered before starting
  - What information needs to be obtained?
- Design the study to answer these questions
  - should be done on or off medication?
- Customize the study as needed

AUA/SUFU Guidelines Statements

2012

SUI/Prolapse

- 1. Clinicians who are making the diagnosis of urodynamic stress incontinence should assess urethral function. (Recommendation; Evidence Strength: Grade C)
  - *get a VLPP*
  - *Some anti-incontinence procedures less successful with very low VLPP*
- 2. Surgeons considering invasive therapy in patients with SUI should assess PVR urine volume. (Expert Opinion)
  - *More likely to have post-op voiding difficulties w/ elevated PVR*
  - *Allows baseline to compare if having new symptoms post-op*

SUI/Prolapse

- 3. Clinicians may perform multi-channel urodynamics in patients with both symptoms and physical findings of stress incontinence who are considering invasive, potentially morbid or irreversible treatments. (Option; Evidence Strength: Grade C)
  - *NOT NECESSARY though. SUI demonstrable on exam can be enough*
  - *Not shown to correlate with outcomes of various interventions in data*
  - *Can help tailor treatment and provide objective information aside from H&P*
- 4. Clinicians should perform repeat stress testing with the urethral catheter removed in patients suspected of having SUI who do not demonstrate this finding with the catheter in place during urodynamic testing. (Recommendation; Evidence Strength: Grade C)
  - *50% of women and 35% of men subsequently had SUI when catheter removed*

SUI/Prolapse

- 5. In women with high grade POP but without the symptom of SUI, clinicians should perform stress testing with reduction of the prolapse. Multi-channel urodynamics with prolapse reduction may be used to assess for occult stress incontinence and detrusor dysfunction in these women with associated LUTS(Option; Evidence Strength: Grade C)
  - *Reduce w/ pessary, forceps, or vaginal pack (not manually)*
  - *PVR can also change with POP reduced*

Overactive Bladder (OAB), Urgency Urinary Incontinence (UUI), Mixed Incontinence

- 6. Clinicians may perform multi-channel filling cystometry when it is important to determine if altered compliance, detrusor overactivity or other urodynamic abnormalities are present (or not) in patients with urgency incontinence in whom invasive, potentially morbid or irreversible treatments are considered.(Option; Evidence Strength: Grade C)
  - *Especially if considering a 3rd line OAB treatment*
  - *Not always DO, look at bladder sensation and compliance*

Overactive Bladder (OAB), Urgency Urinary Incontinence (UUI), Mixed Incontinence

- 7. Clinicians may perform pressure flow studies in patients with urgency incontinence after bladder outlet procedures to evaluate for bladder outlet obstruction. (Expert Opinion)
  - *High pressure, low flow*
- 8. Clinicians should counsel patients with urgency incontinence and mixed incontinence that the absence of DO on a single urodynamic study does not exclude it as a causative agent for their symptoms.(Clinical Principle)
  - *Look at history, exam, voiding diaries, etc as well*

Neurogenic Bladder

- 9. Clinicians should perform PVR assessment, either as part of complete urodynamic study or separately, during the initial urological evaluation of patients with relevant neurological conditions (such as spinal cord injury and myelomeningocele) and as part of ongoing follow-up when appropriate. (Standard; Evidence Strength: Grade B).
  - *Both at time of diagnosis and to follow progression (MS, Parkinson's, etc.). Other neurologic issues are more fixed (spinal injury, stroke)*
- 10. Clinicians should perform a complex cystometrogram (CMG) during initial urological evaluation of patients with relevant neurological conditions with or without symptoms and as part of ongoing follow-up when appropriate. In patients with other neurologic diseases, physicians may consider CMG as an option in the urological evaluation of patients with LUTS. (Recommendation; Evidence Strength: Grade C)
  - *Absolutely in SCI (after spinal shock period) and myelomeningocele*
  - *Relative in other conditions like MS, CVA, and Parkinson's*

Neurogenic Bladder

- 11. Clinicians should perform pressure flow analysis in patients with relevant neurologic disease with or without symptoms, or in patients with other neurologic disease and elevated PVR or urinary symptoms. (Recommendation, Evidence Strength: Grade C)
  - *Don't forget about common things when eval of neurogenic patients*
- 12. When available, clinicians may perform fluoroscopy at the time of urodynamics (videourodynamics) in patients with relevant neurologic disease at risk for neurogenic bladder, or in patients with other neurologic disease and elevated PVR or urinary symptoms. (Recommendation; Evidence Strength: Grade C)
  - Bladder diverticula, bladder outlet abnormalities, and bladder stones
  - DESD, DSD, specific bladder neck outlet obstruction

Neurogenic Bladder

- 13. Clinicians should perform EMG in combination with CMG with or without PFS in patients with relevant neurologic disease at risk for neurogenic bladder, or in patients with other neurologic disease and elevated PVR or urinary symptoms. (Recommendation; Evidence Strength: Grade C)

LUTS

- 14. Clinicians may perform PVR in patients with LUTS as a safety measure to rule out significant urinary retention both initially and during follow up. (Clinical Principle)
  - *T*here are no relevant studies that have identified the usefulness of PVR for guiding clinical management, improving patient outcomes in patients with LUTS or predicting treatment outcomes in men and women.
  - But can identify high risk patients, reduce morbidity, and monitor treatment outcomes.
- 15. Uroflow may be used by clinicians in the initial and ongoing evaluation of male patients with LUTS that suggest an abnormality of voiding/emptying. (Recommendation; Evidence Strength: Grade C)
  - *no data suggesting it is predictive of outcomes*
  - *But can be used for monitoring*

LUTS

- 16. Clinicians may perform multi-channel filling cystometry when it is important to determine if DO or other abnormalities of bladder filling/urine storage are present in patients with LUTS, particularly when invasive, potentially morbid or irreversible treatments are considered. (Expert Opinion)
- 17. Clinicians should perform PFS in men when it is important to determine if urodynamic obstruction is present in men with LUTS, particularly when invasive, potentially morbid or irreversible treatments are considered. (Standard; Evidence Strength: Grade B)
  - *UDS diagnosis of BOO versus non identified BOO better predicts outcomes of surgery for BPH*

LUTS

- 18. Clinicians may perform PFS in women when it is important to determine if obstruction is present. (Recommendation; Evidence Quality: Grade C)
  - *no clear nomograms / values for BOO in women as in men*
- 19. Clinicians may perform videourodynamics in properly selected patients to localize the level of obstruction particularly for the diagnosis of primary bladder neck obstruction. (Expert Opinion)

Pediatric Use

- UDS is used in children involve anatomic and neurologic abnormalities in which lower urinary tract function is variable and unpredictable.
- UDS is used to establish as clearly as possible the baseline situation so that changes as a result of treatment and/or growth can be assessed and some guidance is obtained in the choice of treatment, even if the result of UDS testing is not necessarily the deciding factor

THE SETUP

Definitions

- PVR – post void residual
- Uroflowmetry – rate of urine flow over time
- Cystometrogram (CMG)– the pressure/volume relationship of the bladder during bladder filling
- *Pdet = Pves – Pabd*
- Filling phase - starts when filling starts, end when urodynamicists gives “permission to void”
- Electromyography (EMG)– study of electronic potentials produced by depolarization of muscle membranes. In UDS = striated muscles of perineum
- Urethral pressure profile (UPP) – a graph indicating the intraluminal pressure along the length of the urethra
  - *Urethral pressure = fluid pressure needed to just open a closed urethral*
  - *Obtained by withdrawal of a pressure catheter along the length of the urethra*
- Pressure flow studies (PFS) – relationship between pressure in the bladder and urine flow rate during voiding phase
- Voiding phase – starts when “permission to void is given” or uncontrollable voiding begins and ens when patient considers voiding has finished

Patient Preparation

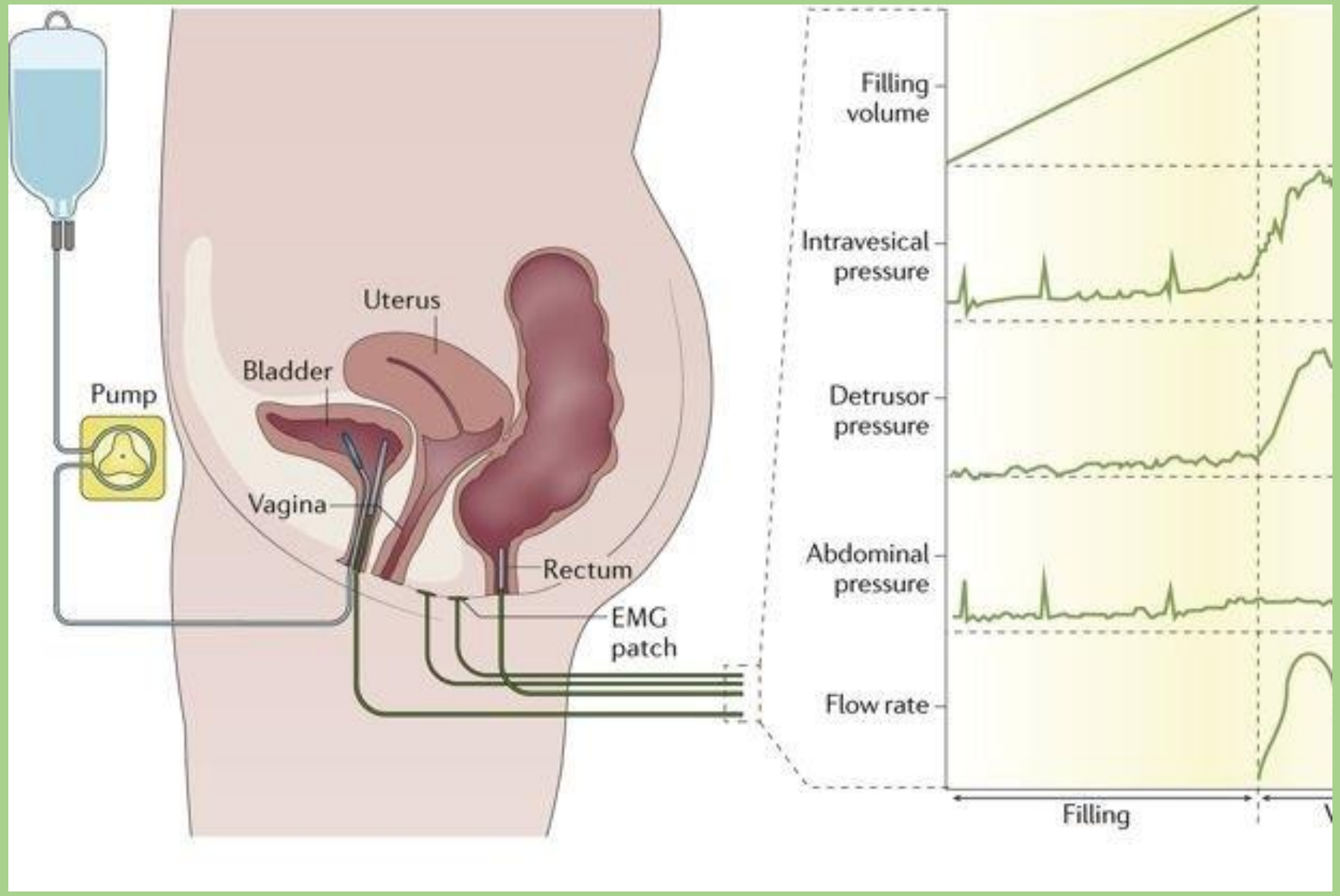
- **Patients should be properly prepared and told why the test is being done, how the results may affect treatment, and what to expect during the actual UDS.**
- UDS was associated with minimal to moderate degrees of anxiety, discomfort, and embarrassment.
- Younger age has been found in studies to portend higher pain and anxiety during UDS
- The most common complaint after UDS was micturition pain.

UTI?

- Best practice recommends that a urinalysis should be performed on all patients before invasive UDS (level 4 evidence)
- In patients with a symptomatic UTI, urodynamics should be delayed until the patient completes treatment.
- AUA Best Practice Policy Statement on Urologic Surgery Antimicrobial Prophylaxis states that prophylactic antibiotics are not routinely indicated before UDS for patients without UTI risk factors

Equipment

- Pressure measurement
  - Consist of pressurized tubing extending from transducer to catheter
  - Traditionally water-filled systems
    - depends on the transmission of pressure through fluid (water)
    - important to have no bubbles
    - transducers are usually set at the level of the patient's bladder
  - Newer ”air-charged catheters” – air filled balloon surrounds catheter
    - External forces on the balloon of the catheter are transmitted to the air-filled catheter lumen and communicated to an external semiconductor transducer
    - no need to position anything at the level of the symphysis pubis, no need to flush the system through to exclude air, no artefactual fluctuations in pressure produced when the patient moves.
- Flow measurement = uroflowmeters
  - Weight transducer or Load cell method - voided weight over time
  - Rotating disc - power needed to keep a disc rotating at a constant rate
- EMG/electromyography = muscle depolarization measured with electrodes placed near muscle
  - Surface – more comfortable
  - Needle – more accurate and precise


Pump
Uterus
Bladder
Vagina
Rectum
EMG patch
Filling volume
Intravesical pressure
Detrusor pressure
Abdominal pressure
Flow rate
Filling

Steps

- Empty bladder
- Insert catheters and patches in sterile fashion
- Check that catheters & patches are reading
- May need to calibrate or "zero" catheters
- Run test

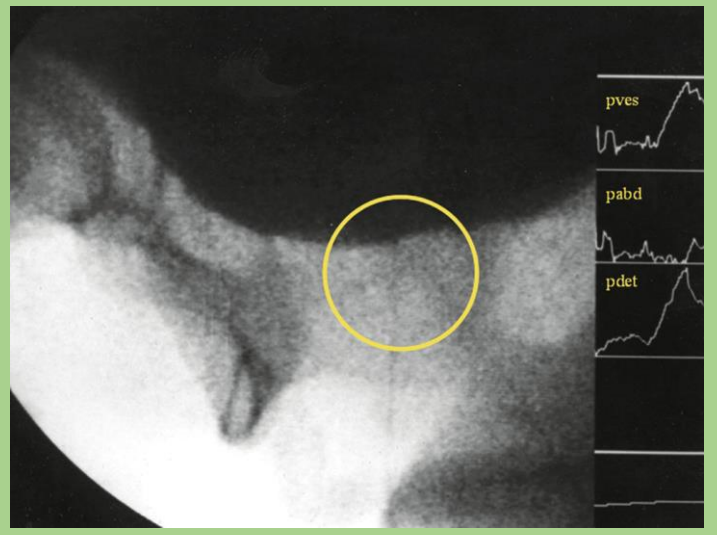
Cystometrogram

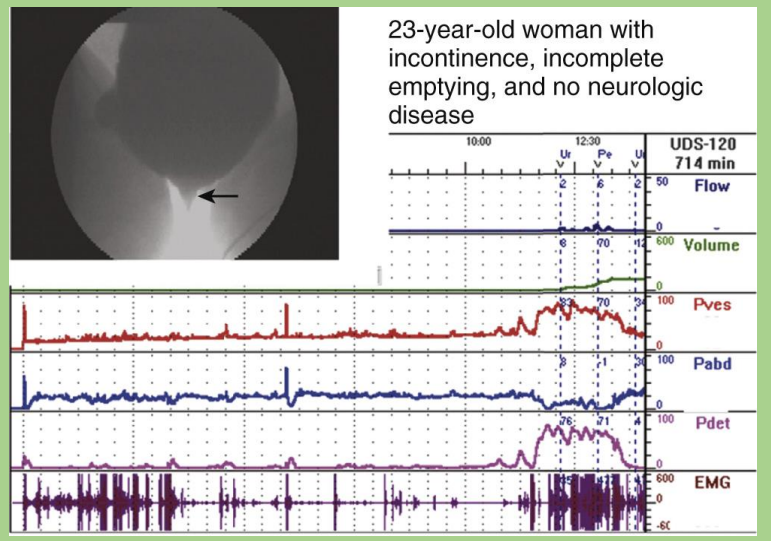
- **Filling Cystometry** or **cystometrogram (CMG)**, is the method by which the pressure/volume relationship of the bladder is measured during bladder filling.
- PDet is performed by measuring both the total vesical pressure (p_{ves}) and p_{abd} (measured by a catheter placed in the rectum or vagina).
- $\boldsymbol{p}\mathbf{det}=\boldsymbol{p}\mathbf{ves}-\boldsymbol{p}\mathbf{abd}$

- **Pelvic muscle electromyography (EMG)** is the study of the electronic potentials produced by the depolarization of muscle membranes. EMG measurement of the striated sphincter muscles of the perineum is done to evaluate possible abnormalities of pelvic floor muscle function, which are often associated with lower urinary tract symptoms and dysfunction.
  - EMG can also be obtained by vaginal probe (vaginal EMG), anal probe (anal EMG), or needle electrodes (needle EMG).
- **Urethral pressure profile (UPP)** is a graph indicating the intraluminal pressure along the length of the urethra. Urethral pressure is defined as the fluid pressure needed to just open a closed urethra. UPP is obtained by the withdrawal of a pressure sensor (catheter) along the length of the urethra.
- **Pressure-flow studies (PFS)** of voiding are the method by which the relationship between detrusor pressure and urine flow rate is measured during bladder emptying (voiding).

Videourodynamics

- simultaneous measurement of UDS parameters and fluoroscopic imaging of the lower urinary tract
- VUDS is the diagnostic tool of choice for documenting bladder neck dysfunction in men and women. In addition, patients at high risk for complicated voiding dysfunction, such as those with known or suspected NLUTD, unexplained urinary retention in women, prior radical pelvic surgery, urinary diversion, prerenal or postrenal transplant, or prior pelvic radiation, should be considered for referral to a center with VUDS capabilities if a complete and accurate diagnosis cannot otherwise be obtained



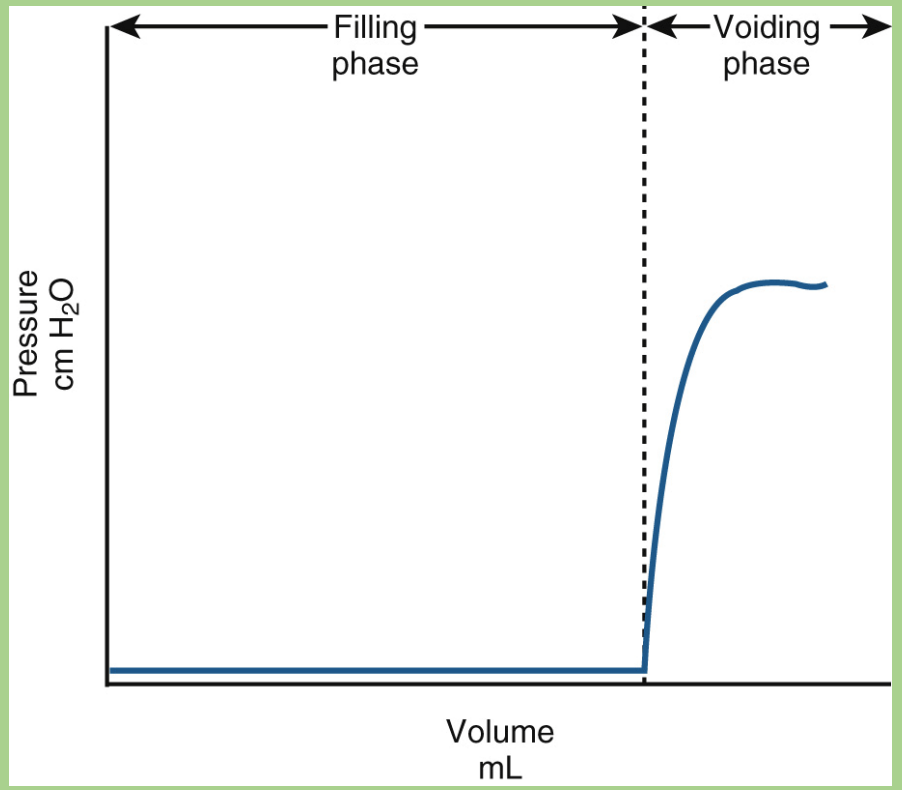


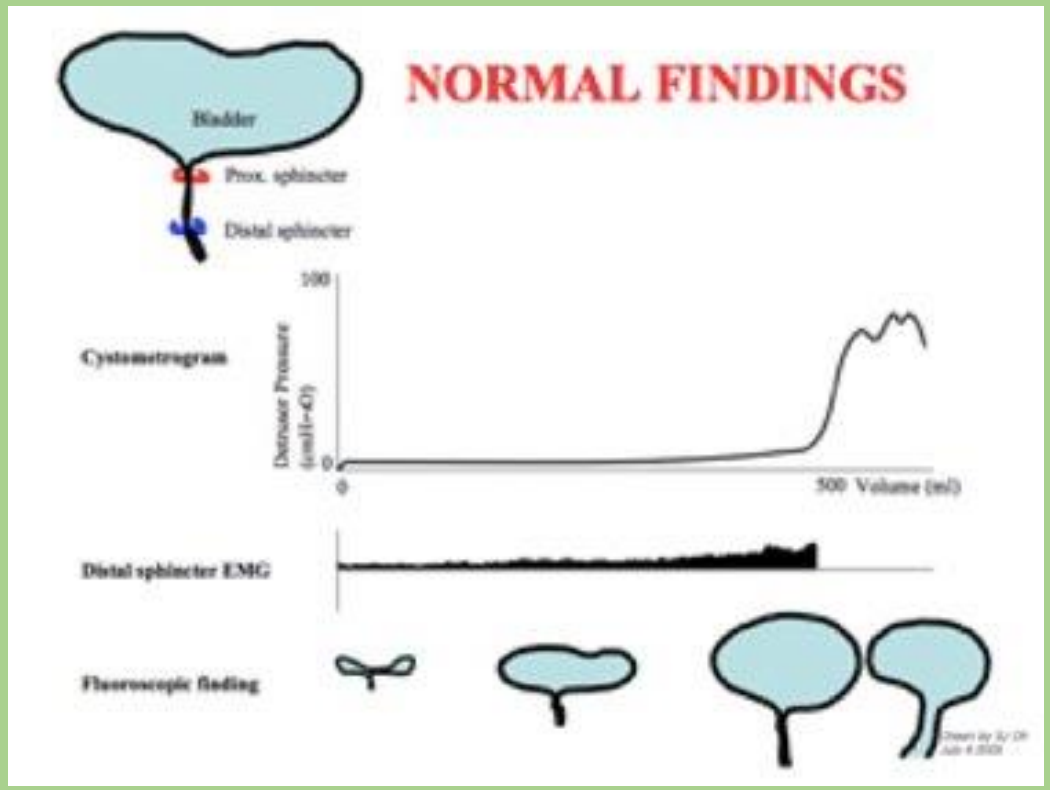
Interpretation

Filling & Storage Phase

Normal filling and storage

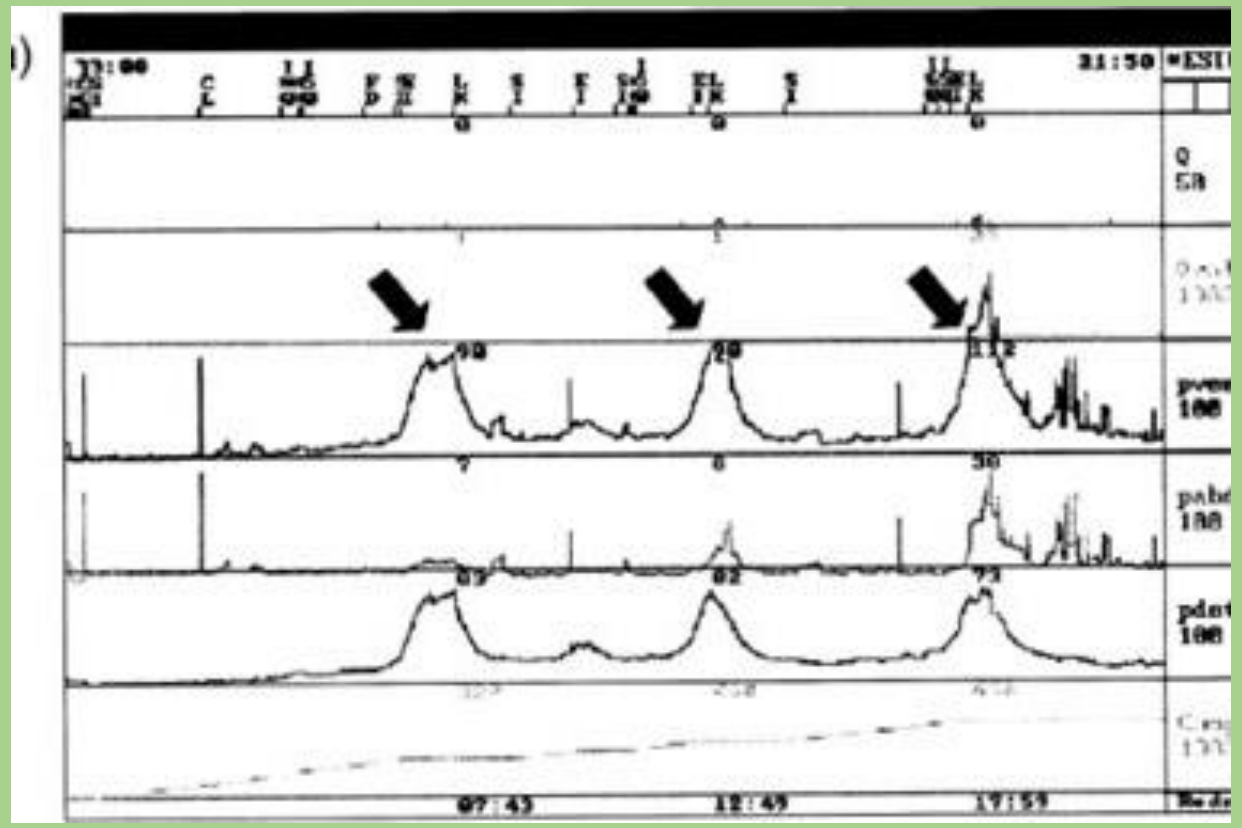
- Normal detrusor pressure should remain near zero during filling cycle until voluntary voiding is initiated
- Baseline pressure stays constant and there are no involuntary contractions
- Once capacity is reached or voluntary voiding is desired, intravesical pressure will increase (voluntary detrusor contraction)

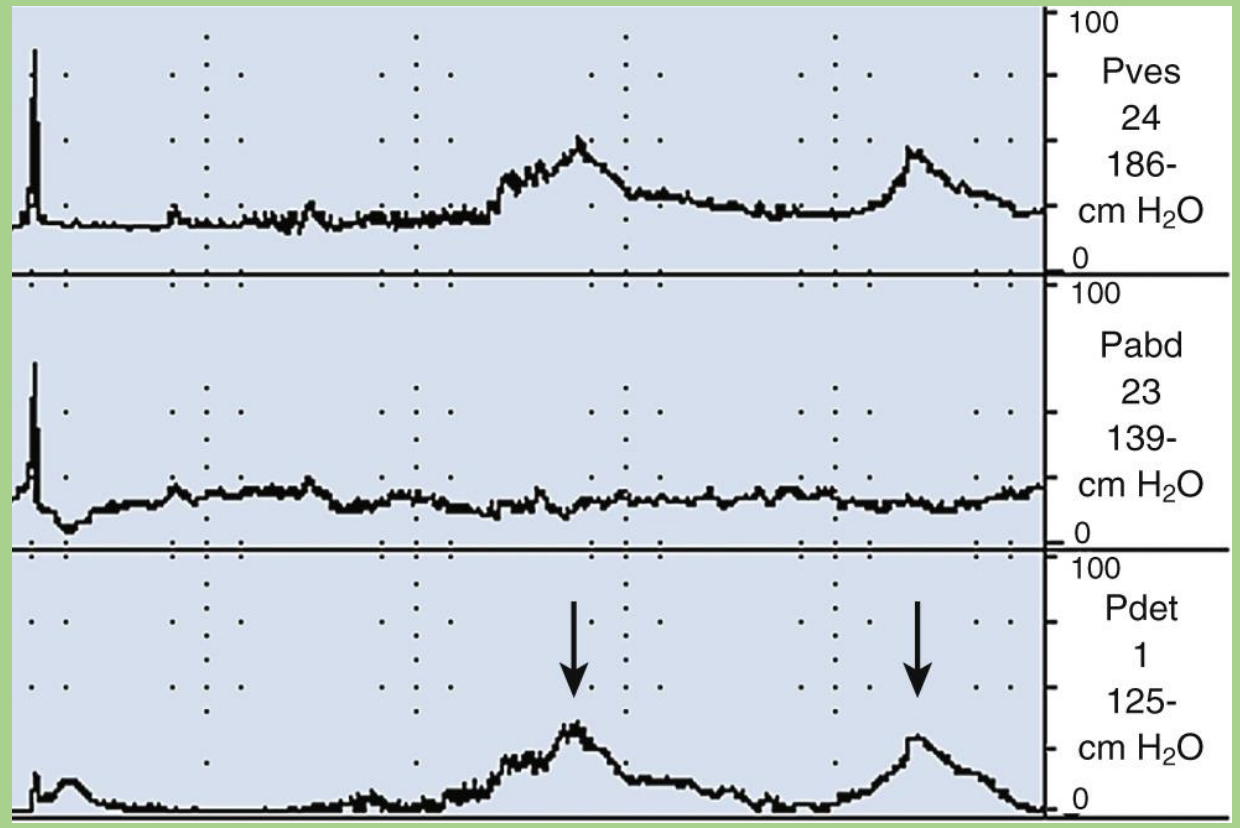

Filling phase
Voiding phase
Pressure cm H_2O
Volume mL


NORMAL FINDINGS
Bladder
Prox. sphincter
Distal sphincter
Cystometrogram
100
0
0
500 Volume (ml)
Distal sphincter EMG
Fluoroscopic finding

Detrusor overactivity

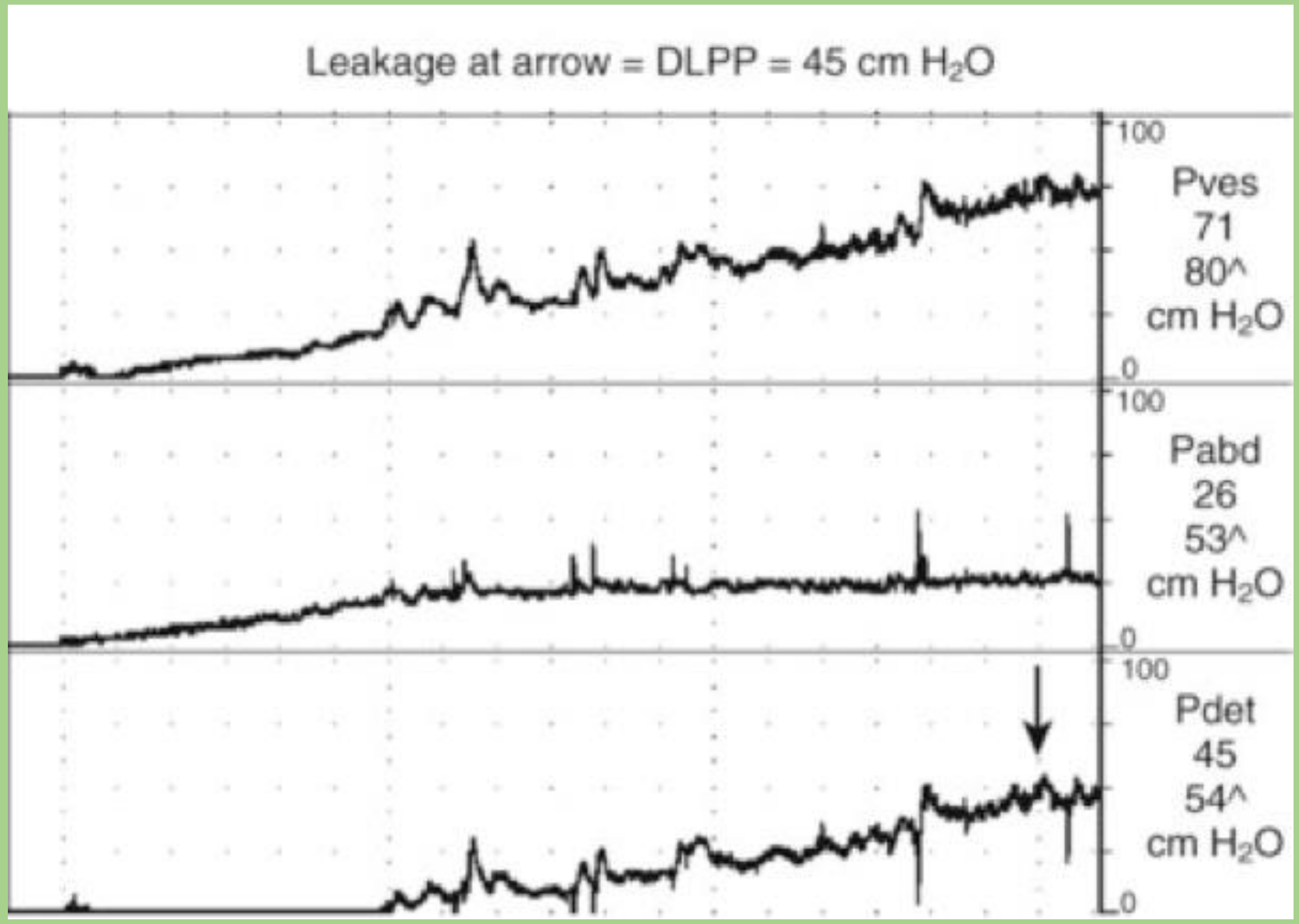
- **DO**= URODYNAMIC OBSERVATION characterized by involuntary detrusor contractions (IDC's) during the filling phase, spontaneous or provoked
- **Neurogenic DO** = DO associated with a relevant neurologic condition (SCI, MS, etc.)
- **Idiopathic DO** = non-neurogenic




100
Pves
24
186-
cm H2O
0
100
Pabd
23
139-
cm H2O
0
100
Pdet
1
125-
cm H2O
0

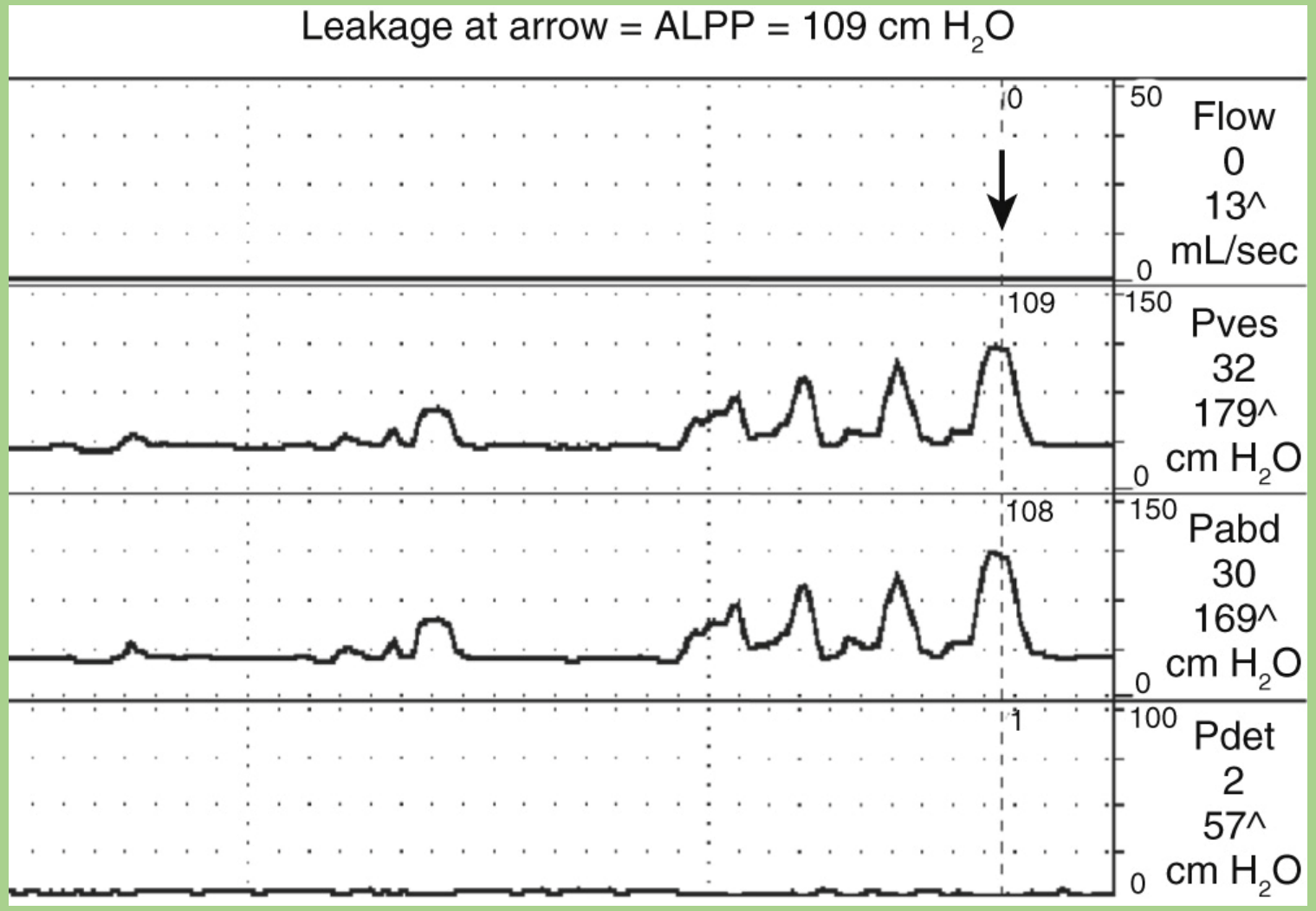
Impaired compliance

- **Compliance** = delta Vol / delta Pressure
- Bladder due to viscoelastic properties is highly compliant. As the bladder fills, there is little change in pressure
- prolonged storage at high pressures can lead to upper tract deterioration
- “normal compliance” is highly variable
  - *46 – 124 ml/cm H2O*
  - *High variation (11 – 150) in one study*
- Absolute pressure is probably more useful!
  - *>40 cm H2O is associated with harmful effects on upper tracts (McGuire et al)*


Leakage at arrow = DLPP = 45 cm H2O
100
Pves
71
80^
cm H2O
0
100
Pabd
26
53^
cm H2O
0
100
Pdet
45
54^
cm H2O
0

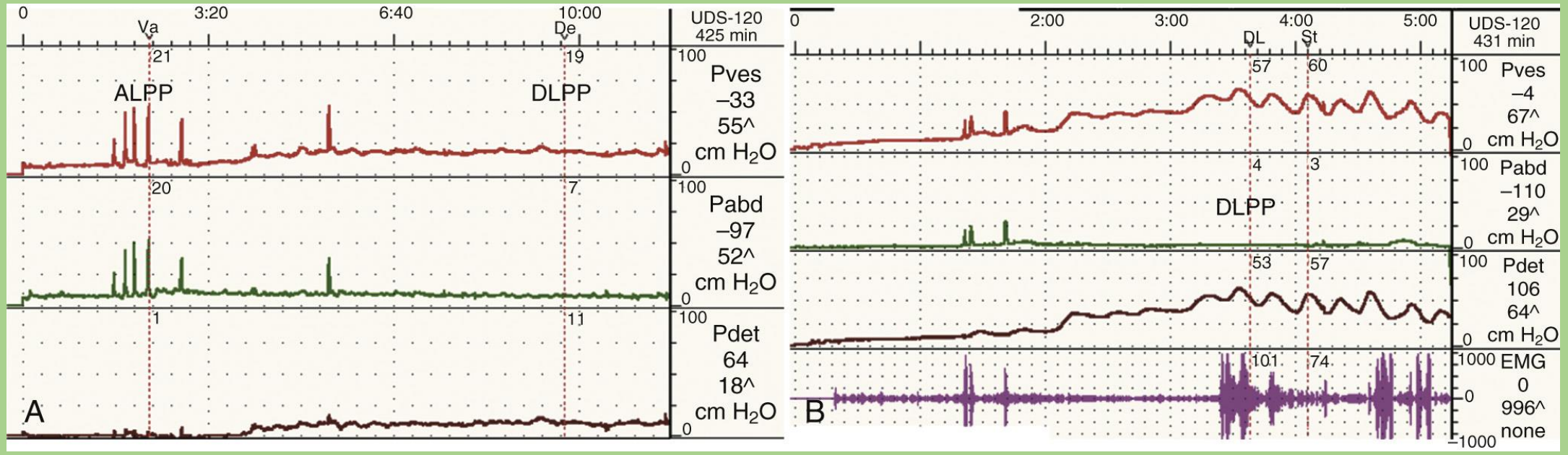
Leak Point Pressures

- **Pves** = Pressure at which urine leakage occurs due to increased abdominal pressures in absence of a detrusor contraction
- **Abdominal LPP**= Measure of sphincteric strength, or ability of sphincter to resist increases in abdominal pressure
- Traditionally measured at a volume of 150 cc + 50 cc intervals until capacity
- **ALPP < 60 = ISD.** high grade incontinence (81% continuous leakage, 75% fixed urethra)
- **60 < ALPP < 90** = equivocal, (80% w/ urethral hypermobility and moderate to high grade incontinence)
- **ALPP > 90** = little or no ISD


Leakage at arrow = ALPP = 109 cm H_2O
0
50
Flow
0
13^
mL/sec
0
109
150
Pves
32
179^
cm H_2O
0
108
150
Pabd
30
169^
cm H_2O
0
1
100
Pdet
2
57^
cm H_2O
0

Detrusor Leak Point Pressure

- **DLLP**= lowest detrusor pressure at which urine leakage occurs in absence of either a detrusor contraction or increased abdominal pressure
- Measure of detrusor pressure in patients with decreased bladder compliance
- If DLPP > 40 cm H2O, 85% of hydronephrosis or VUR
- **elevated DLPP means that bladder pressures are getting too high before the "pop-off" mechanism of urethral leakage occurs.** In most cases, treatment is aimed at lowering bladder pressures so the DLPP is never reached


0
3:20
6:40
10:00
Va
De
UDS-120
425 min
ALPP
DLPP
21
19
20
7
1
11
100
0
Pves
–33
55^
cm H2O
Pabd
–97
52^
cm H2O
Pdet
64
18^
cm H2O
A
0
2:00
3:00
4:00
5:00
DL
St
UDS-120
431 min
57
60
4
3
53
57
101
74
1000
–1000
Pves
–4
67^
cm H2O
Pabd
–110
29^
cm H2O
Pdet
106
64^
cm H2O
EMG
0
996^
none
B

Urethral Pressure Profilometry

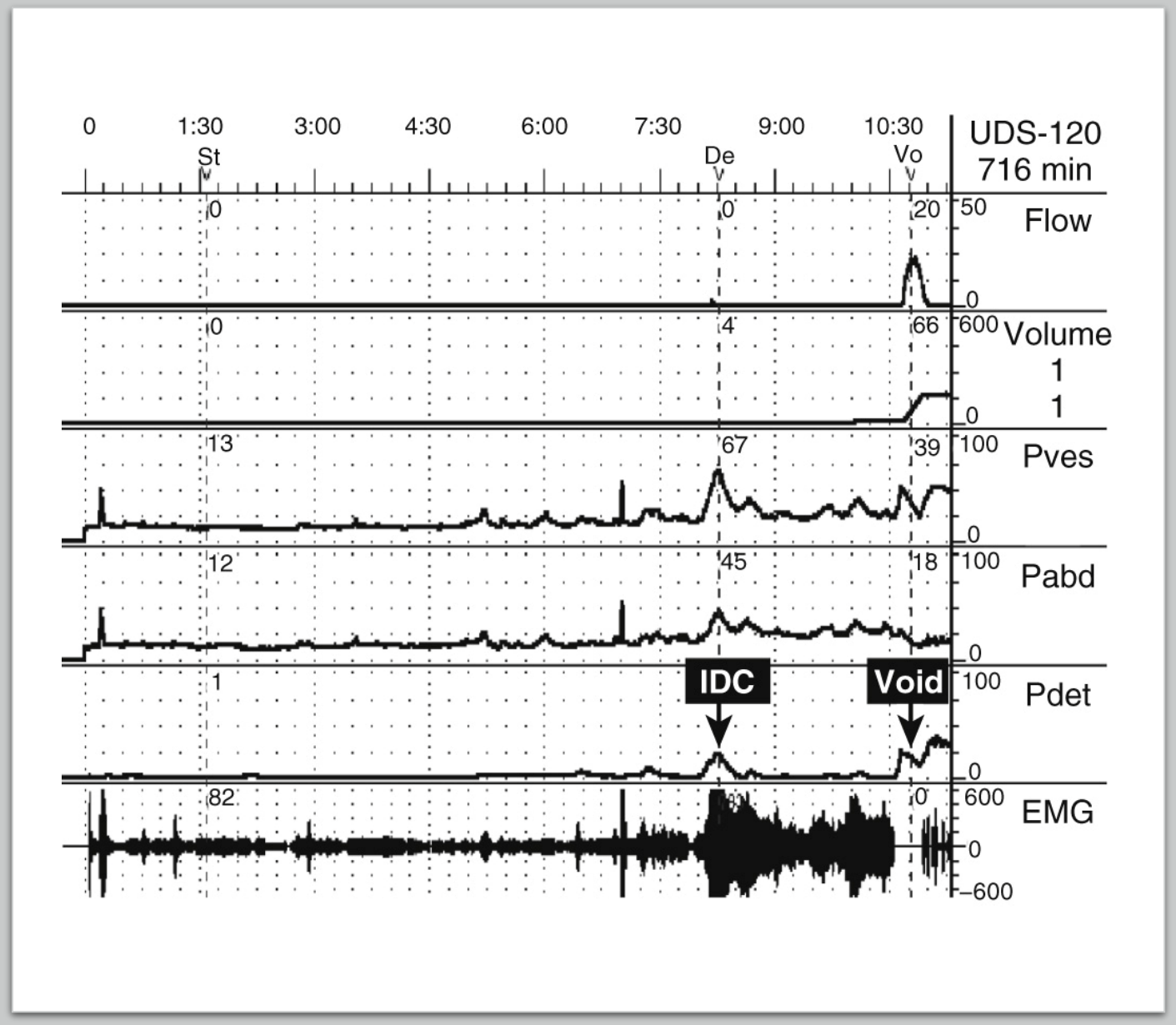
- **urethral pressure** = fluid pressure needed to open a closed urethra
- **urethral closure pressure (UCP) profile** is obtained by subtracting intravesical pressure from urethral pressure.
- **Maximum urethral closure pressure (MUCP)** = maximum difference between the urethral pressure and intravesical pressure
  - MUCP < 20 = ISD
- Utility is unclear and infrequently used

Voiding & Emptying Phase

Bladder dysfunction

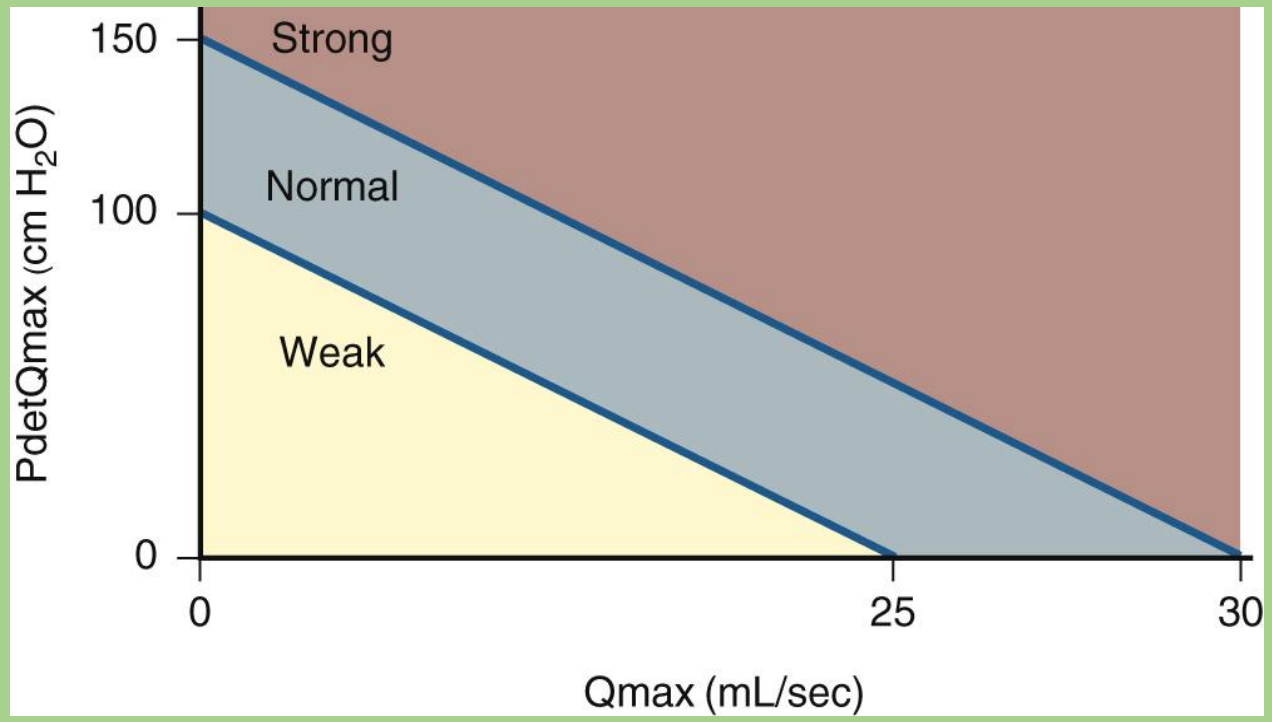
Normal voiding

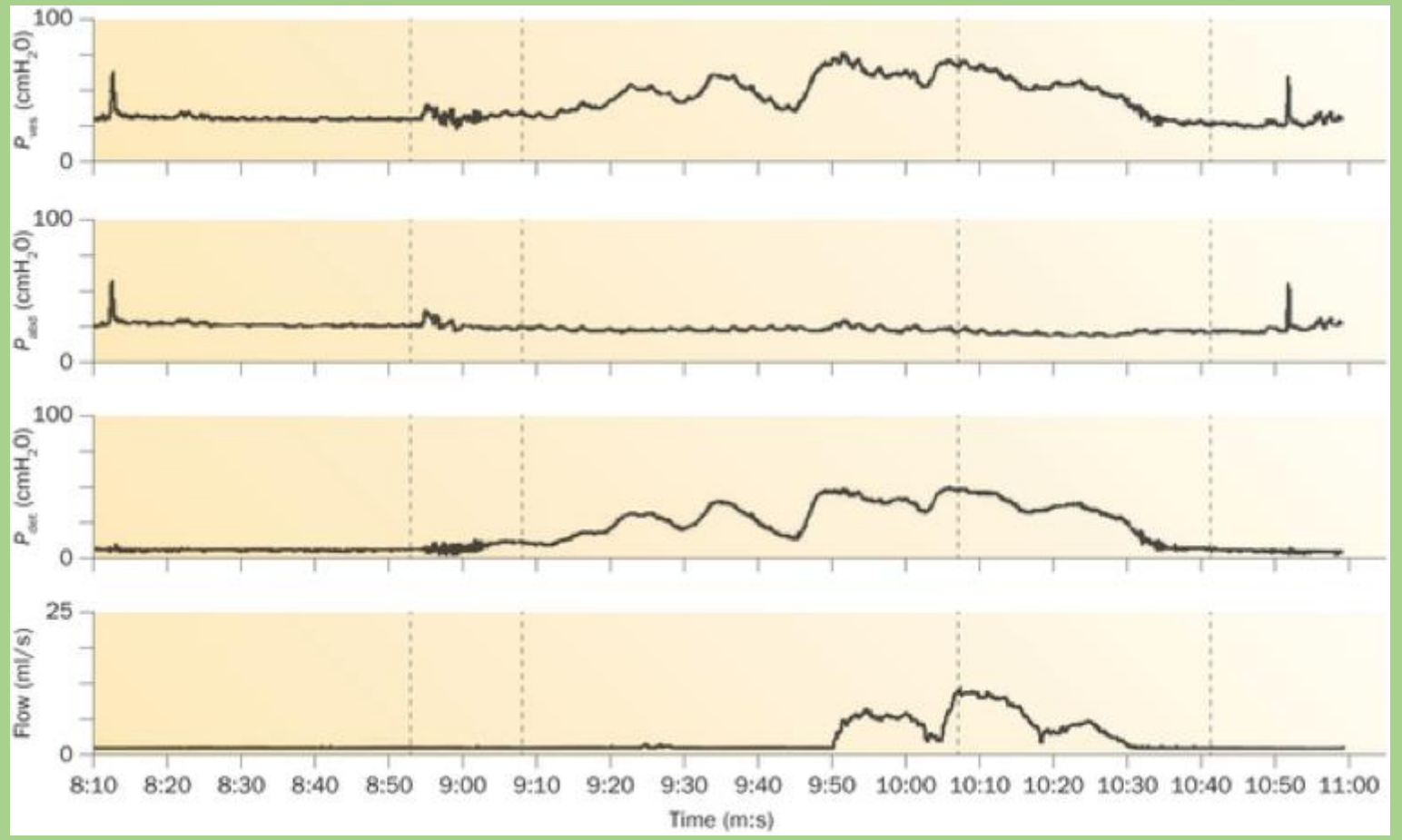
- A voluntarily initiated continuous contraction that leads to complete bladder emptying within a normal time span in the absence of obstruction
- A synchronized mechanism of detrusor contraction with striated sphincter relaxation + opening of vesical neck and urethra



Detrusor Underactivity

- = Reduced strength or duration of contraction resulting in prolonged bladder emptying or failure to complete emptying
- **Acontractile detrusor** = no demonstrable contraction during UDS
- Bladder contractility index
  - *PdetQmax+ 5(Qmax)*
  - *> 150: strong*
  - *100-150: normal*
  - *<100: weak*



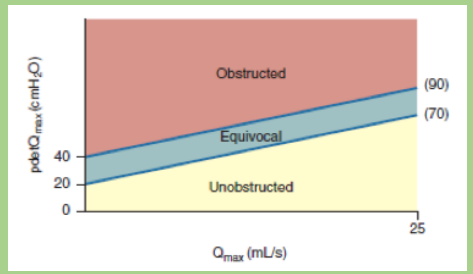

100
P_{ves} (cmH_2O)
0
100
P_{abd} (cmH_2O)
0
100
P_{det} (cmH_2O)
0
25
Flow (ml/s)
0
8:10
8:20
8:30
8:40
8:50
9:00
9:10
9:20
9:30
9:40
9:50
10:00
10:10
10:20
10:30
10:40
10:50
11:00
Time (m:s)

Voiding & Emptying Phase

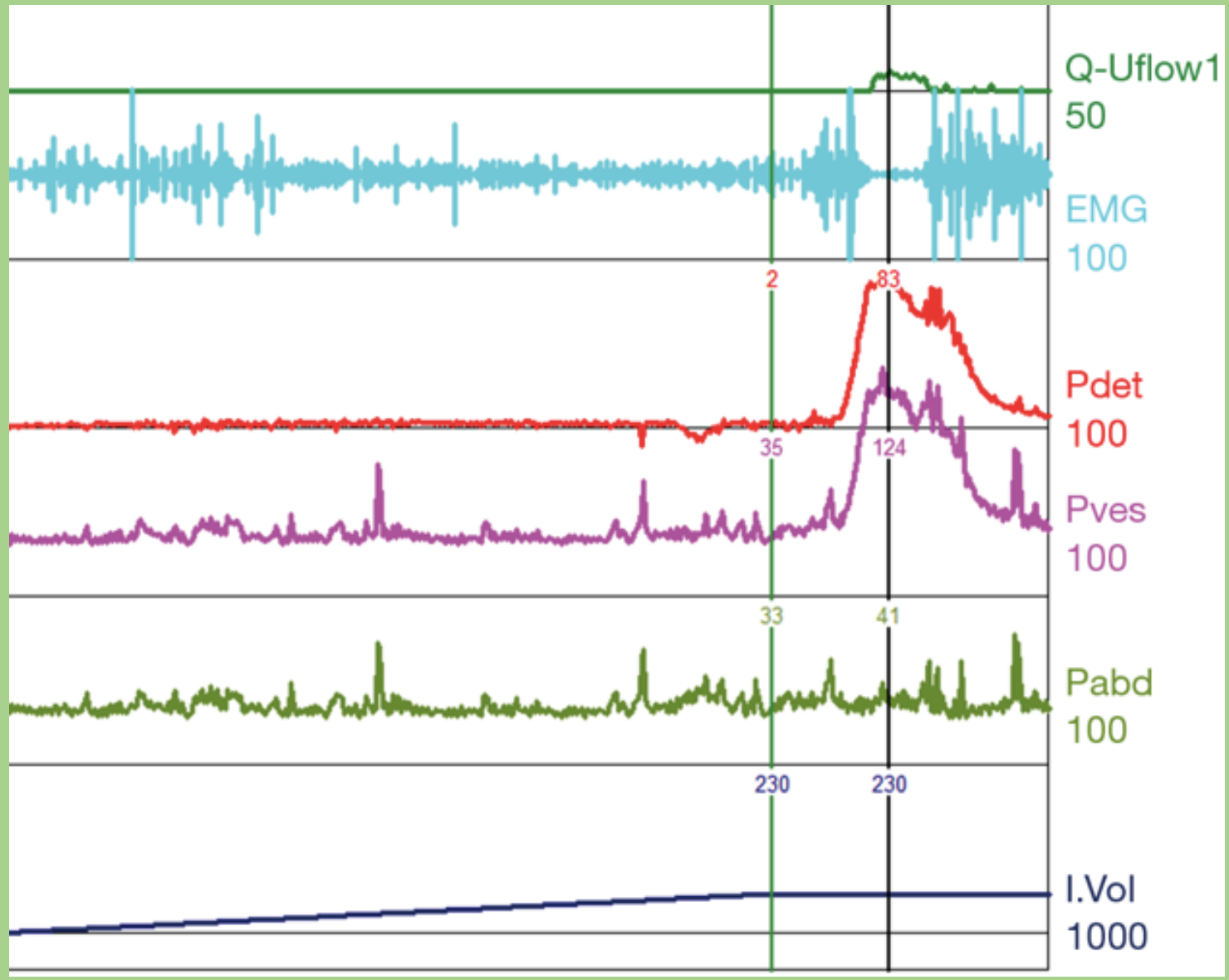
BOO

Bladder Outlet Obstruction

- Urodynamic finding of high pressure and low flow voiding.
- Bladder outlet obstruction index (BOOI)
  - *Derived from slope of the line dividing obstructed from equivocal in the ICS nomogram*
  - *> 40 : BOO*
  - *20 – 40 : equivocal*
  - *< 20 : no BOO*

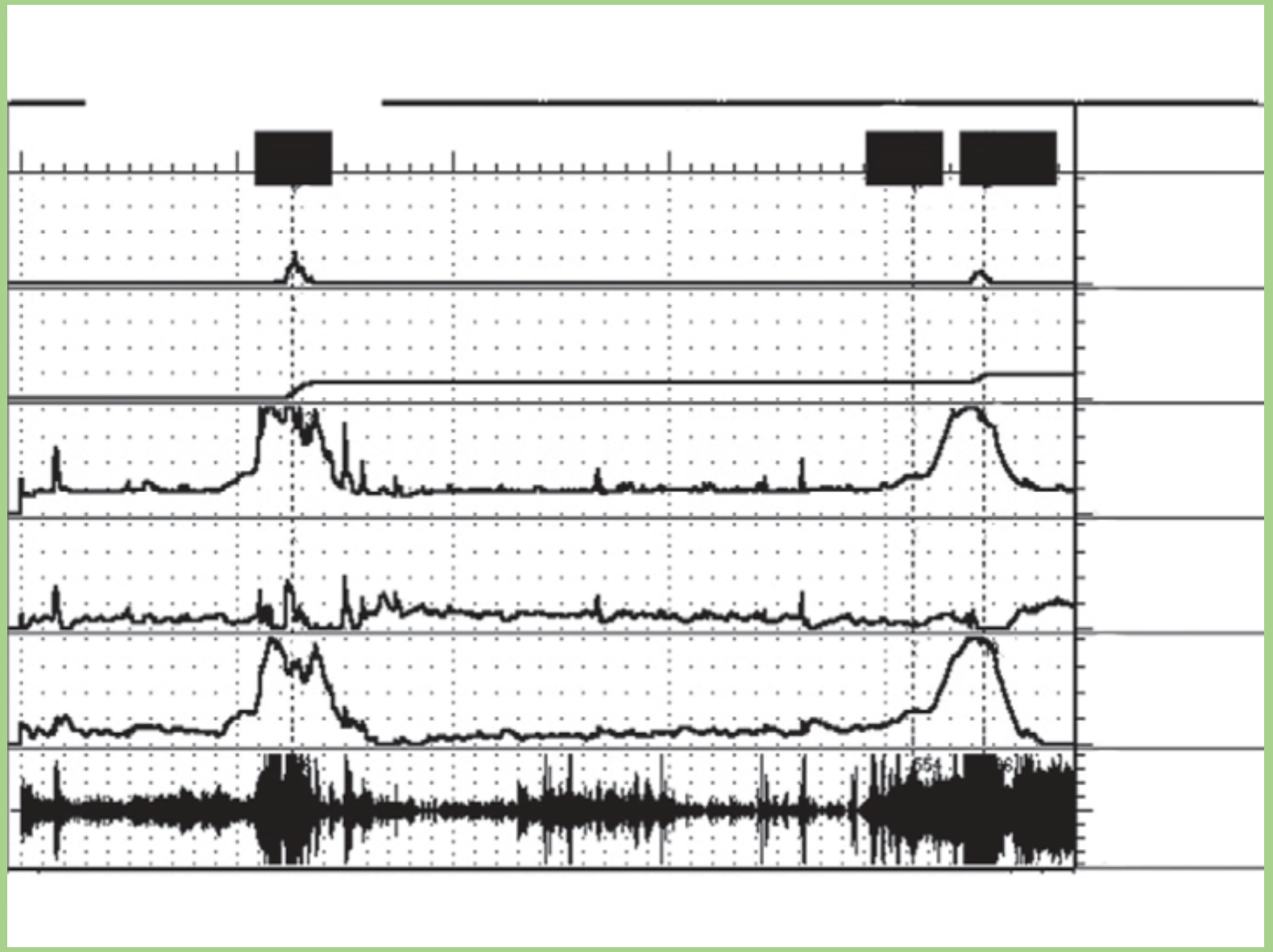


- Obstruction in women cannot be defined by the ICS nomogram or the BOOI, as these will grossly underestimate female BOO.


Q-Uflow1
50
EMG
100
2
83
Pdet
100
35
124
Pves
100
33
41
Pabd
100
230
230
I.Vol
1000

Detrusor Sphincter Dysenergia

- Failure of the sphincter to relax or stay completely relaxed during micturition
- Can be a result of the external sphincter or internal sphincter
- DESD – caused by neurologic lesion in the suprasacral spinal cord
- DISD – if lesion is above level of the sympathetic ganglia (T10-L1), can occur in conjunction with DESD

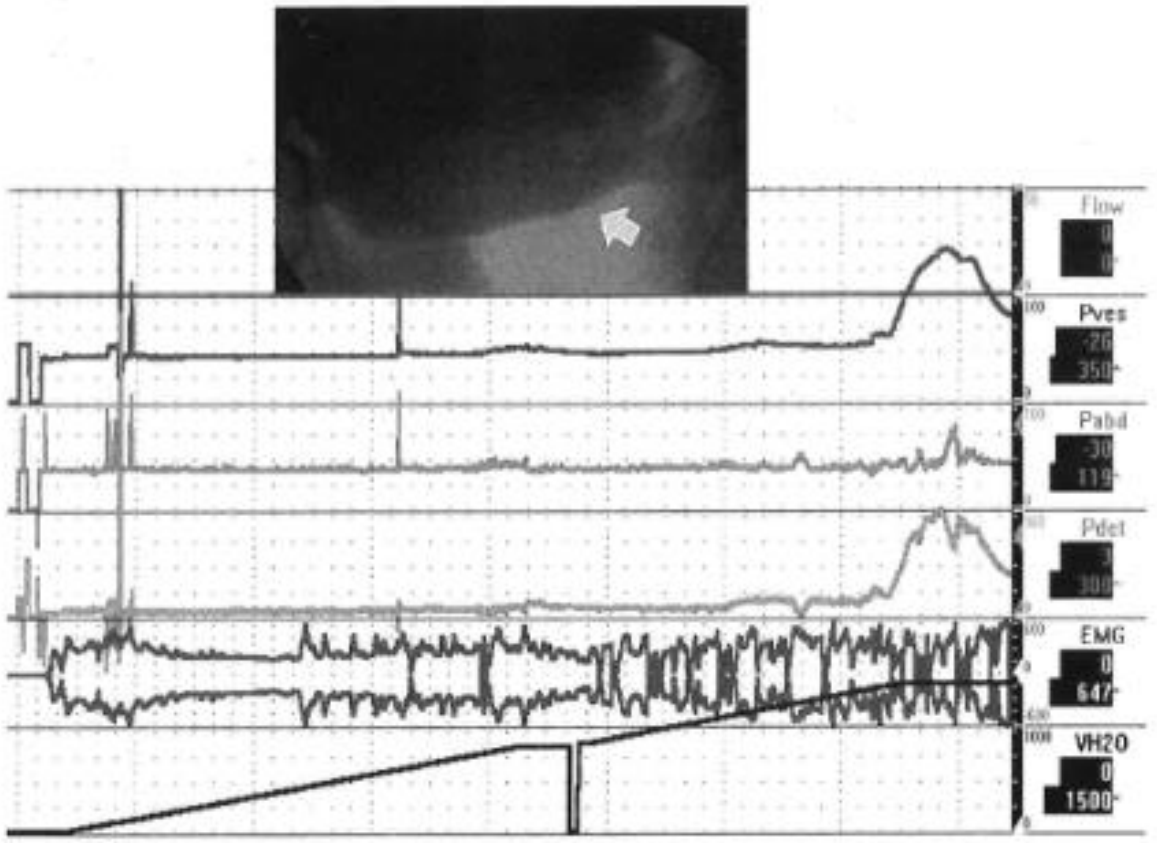


Examples

2021

39. Despite tamsulosin and solifenacin, a 27-year-old man has progressive severe urgency and frequency. Videourodynamics with fluoroscopic images are shown. The arrow shown in the image points to the bladder neck during voiding phase. The next step is:

A. cervical and cranial MRI scan.
B. retrograde urethrogram.
C. pelvic floor muscle training.
D. TUIP.
E. neuromodulation.



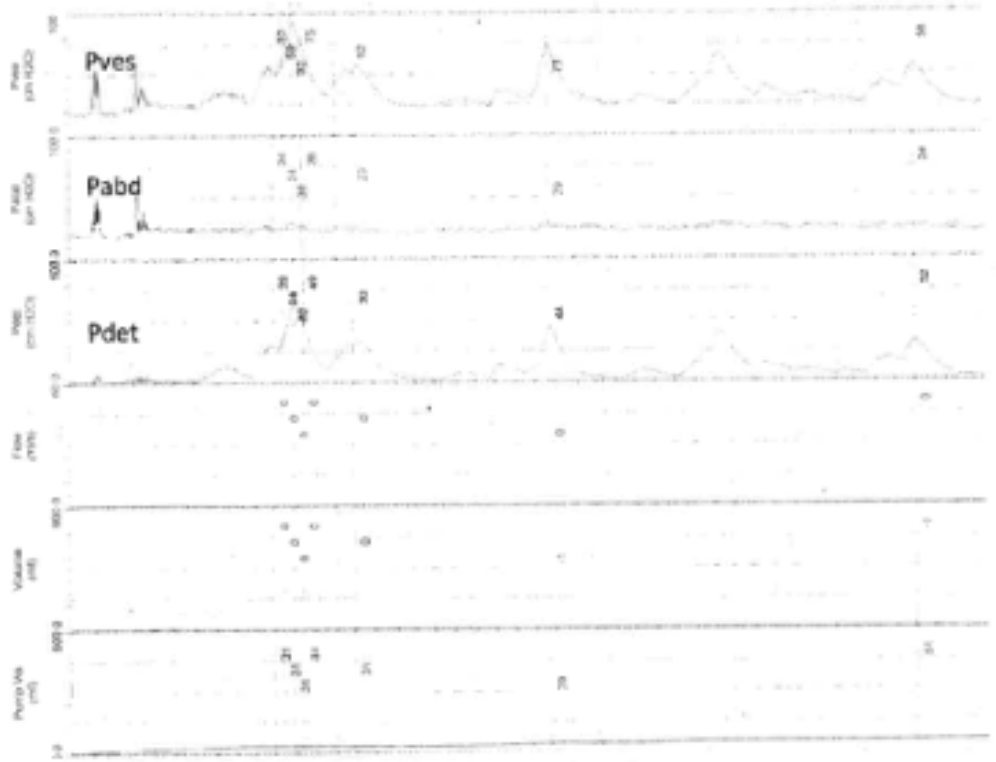
Question #39 **ANSWER=D**

The patient has primary bladder neck obstruction, noted by a closed bladder neck during attempt to void and elevated voiding pressures with low flow rate. Further neurological evaluation is not warranted in this setting but might be if the obstruction were more distal at the level of the sphincter (suggesting detrusor external sphincter dyssynergia). Pelvic floor muscle training (PFMT) will not be helpful in this setting as pelvic floor dysfunction is not noted (fluoroscopically, the obstruction would be at the level of the pelvic floor, much more distally). Neuromodulation would not be indicated in the setting of obstruction. TUIP is generally favored over TURP in a young man due to a lower incidence of retrograde ejaculation.

Helo S, Welliver RC Jr, McVary KT: Minimally invasive and endoscopic management of benign prostatic hyperplasia, in Partin AW, Peters CA, Kavoussi LR, Dmochowski RR, Wein AJ (eds): CAMPBELL WALSH WEIN UROLOGY, ed 12. Philadelphia, Elsevier, 2020, vol 3, chap 146, pp 3434-3435.

83. After XRT for prostate cancer and a channel TURP, a 74-year-old man has urinary incontinence. Urinalysis is normal, voided volume is 200 mL, and PVR is 40 mL. His urodynamic study is shown. The next step is:

A. tamsulosin.
B. solifenacin.
C. onabotulinumtoxinA injection.
D. male sling.
E. artificial sphincter.



Question #83 **ANSWER=B**

This urodynamics shows detrusor overactivity (DO) and no evidence of stress incontinence. Therapies should be geared accordingly for urgency urinary incontinence (UUI). Though behavioral modification and pelvic floor training are recommended for first line therapy for UUI, given the frequent episodes of DO at low volumes, an antimuscarinic (or beta agonist), such as solifenacin, may provide more immediate improvement. Botulinum toxin injection could be considered for refractory symptoms as third line therapy. A sling and an artificial urinary sphincter would not be considered as these therapies are meant to address stress urinary incontinence. Tamsulosin is used for obstructive LUTS.

Al-Mousa RT, Hashim H: Evaluation and management of men with urinary incontinence, in Partin AW, Peters CA, Kavoussi LR, Dmochowski RR, Wein AJ (eds): CAMPBELL WALSH WEIN UROLOGY, ed 12. Philadelphia, Elsevier, 2020, vol 3, chap 113, p 2539.

Gormley EA, Lightner DJ, Burgio KL, et al: Diagnosis and treatment of non-neurogenic overactive bladder (OAB) in adults: AUA/SUFU GUIDELINE ALGORITHM. Published 2012; Amended 2014, 2019.
https://www.auanet.org/documents/education/clinical-guidance/OAB-Algorithm.pdf

12. A 48-year-old man undergoes radical cystectomy with a Studer orthotopic neobladder. Three months postoperatively, he has urinary frequency and day and nighttime incontinence. A videourodynamic study (image shown) demonstrates a capacity of 300 mL, detrusor pressure at capacity is 10 cm H_2O, Valsalva LPP is 130 cm H_2O, and PVR is 75 mL. The next step is:

A. observation.
B. alpha-blocker therapy.
C. CIC every two to three hours.
D. placement of an artificial urinary sphincter.
E. augmentation of his orthotopic diversion.

Question #12 ANSWER=A

The length of time postoperatively after orthotopic diversion influences continence results. The image demonstrates a smooth walled bladder without reflux. The reservoir capacity can and typically does increase over the first six to twelve months, and even longer in patients with anti-refluxing afferent limbs (e.g., Studer type). CIC will decrease incontinence but too frequent CIC will prevent the reservoir from increasing its capacity over time. Alpha-blocker therapy may relax the proximal urethra and exacerbate incontinence. At this point, it is premature to perform interventions such as sphincter placement as well as augmentation.

14. A 58-year-old man has incontinence one year following radical prostatectomy. Urodynamic evaluation demonstrates normal bladder capacity and no detrusor overactivity. At 250 mL, Valsalva maneuver increases bladder pressure to 150 cm H_2O without evidence of urine leakage. The next step is:

A. remove catheter and repeat Valsalva maneuver.
B. repeat urodynamic study with suprapubic catheter.
C. uroflowmetry.
D. retrograde urethrogram.
E. cystoscopy.

Question #14 ANSWER=A

The patient most likely has stress incontinence. The catheter could be occluding the bladder neck, preventing demonstration of stress incontinence, and the Valsalva should be repeated after catheter removal. A repeat urodynamic study with a suprapubic catheter would be overly aggressive and is not necessary since the bladder capacity is known to be normal and there is no evidence of detrusor overactivity. Cystoscopy and retrograde urethrogram would demonstrate an anastomotic stricture, but would not demonstrate stress incontinence. Likewise, uroflowmetry is unlikely to add additional information when a pressure-flow study has been performed. If stress urinary incontinence is demonstrated with catheter removal, and the patient is interested in proceeding with surgical intervention, cystoscopy should then be done to evaluate his anatomoisis.

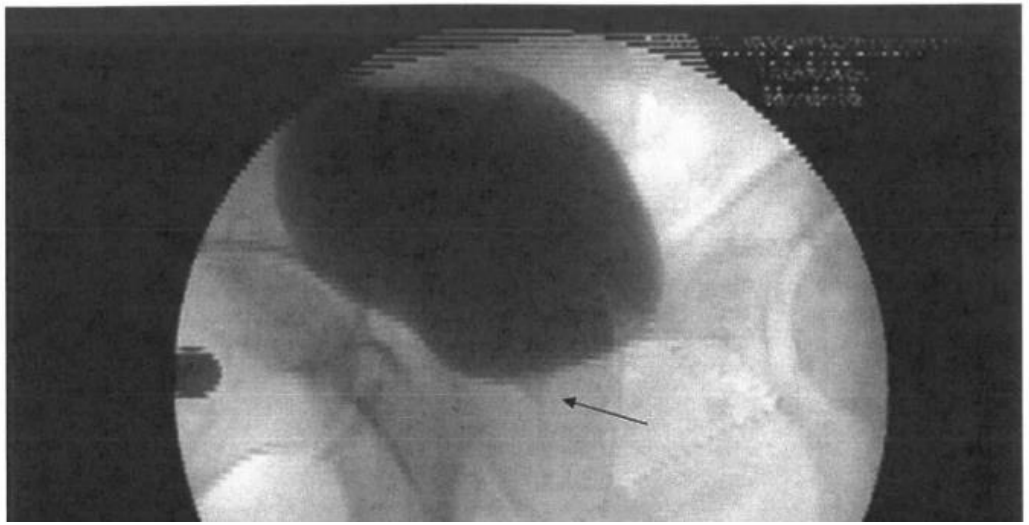
Sandhu JS, Breyer B, Comiter C, et al. Incontinence after prostate treatment: AUA/SUFU GUIDELINE. Published 2019.
https://www.auanet.org/guidelines/incontinence-after-prostate-treatment

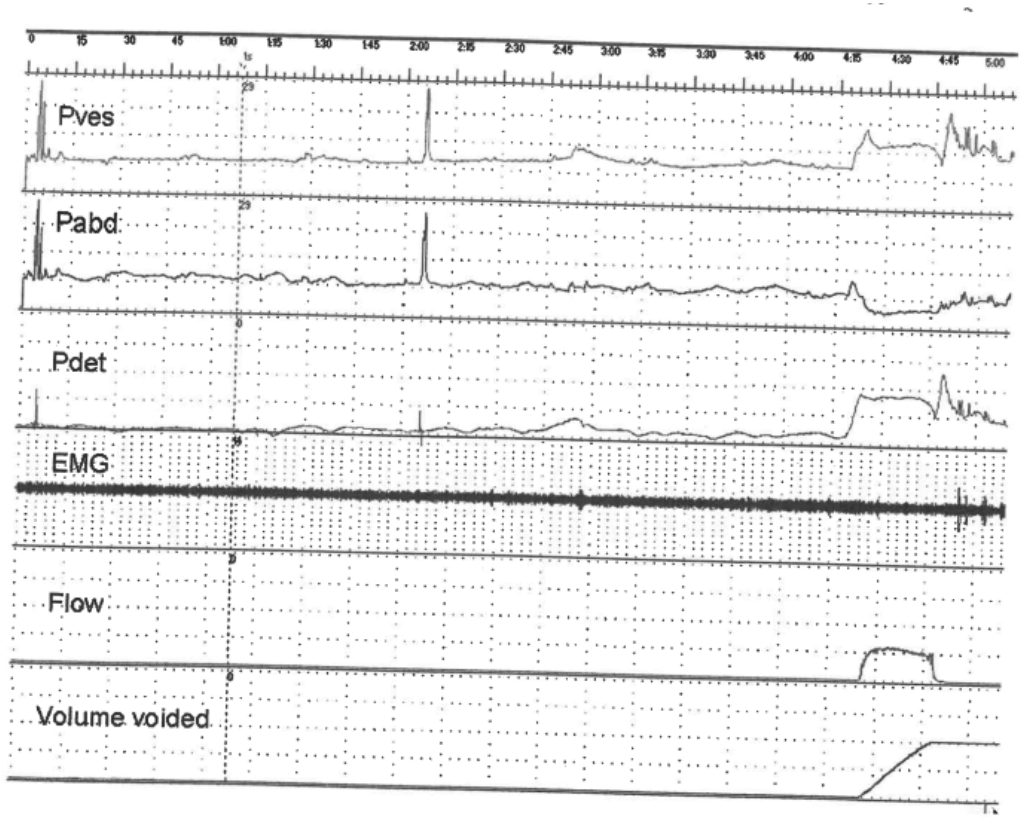
Nitti VW, Bruskewitz RM. Urodynamic and video-urodynamic evaluation of the lower urinary tract. In Wein AJ, Kavoussi LR, Partin AW, Peters CA (eds): CAMPBELL-WALSH UROLOGY, ed 11. Philadelphia, Elsevier, 2015, vol 3, chap 73, pp 1727-1728.

2022

17. A 52-year-old man with erectile dysfunction undergoes videourodynamics for voiding dysfunction. A videourodynamic image, taken early in filling (at the point indicated by dotted line in the UDS tracing), is shown. The videourodynamics suggests a diagnosis of:

A. bladder neck dyssynergia.
B. cervical spinal stenosis.
C. Parkinson's disease.
D. multiple system atrophy (Shy-Drager Syndrome).
E. multiple sclerosis (MS).





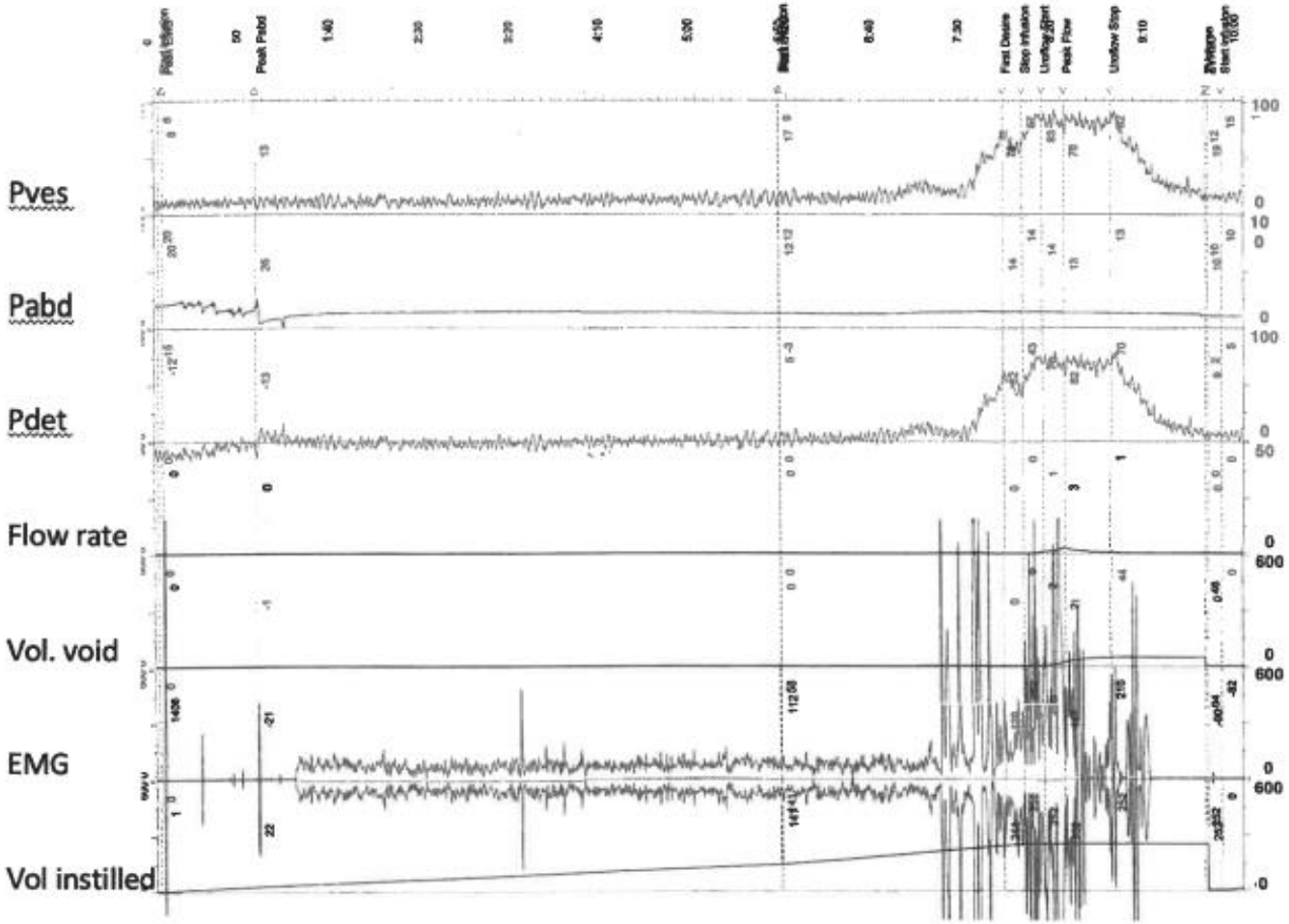
Question #17 **ANSWER=D**

The cystogram demonstrates an open bladder neck at rest. The UDS tracing shows that there was no detrusor activity at the instant the image was obtained. An open bladder neck at rest in a male is highly suggestive of multiple system atrophy (MSA-formerly known as Shy Drager Syndrome) in the absence of prior prostate surgery. Although other neurological diseases may result in an open bladder neck at rest,

none of these are listed except MSA. Erectile dysfunction is often found in MSA, and this finding in concert with the open bladder neck at rest distinguishes this condition from Parkinson's disease (PD) which is often clinically similar in many other respects. Other symptoms of MSA may include other autonomic dysfunctions. Bladder neck dyssynergy would have a closed bladder neck with filling. Cervical spinal stenosis and MS would not typically have an open bladder neck at rest. A further distinction between PD and MSA is that bladder symptoms occur earlier in the course of MSA compared to PD patients.

119. A 47-year-old man with relapsing remitting multiple sclerosis (MS) has severe urinary frequency and incontinence. He has been treated with tamsulosin for six months with no improvement in his symptoms. Examination reveals a 40 gram smooth prostate. UDS is shown. The next step is:

A. renal ultrasound.
B. videourodynamics.
C. MRI scan of the spine.
D. TRUS.
E. cystoscopy.

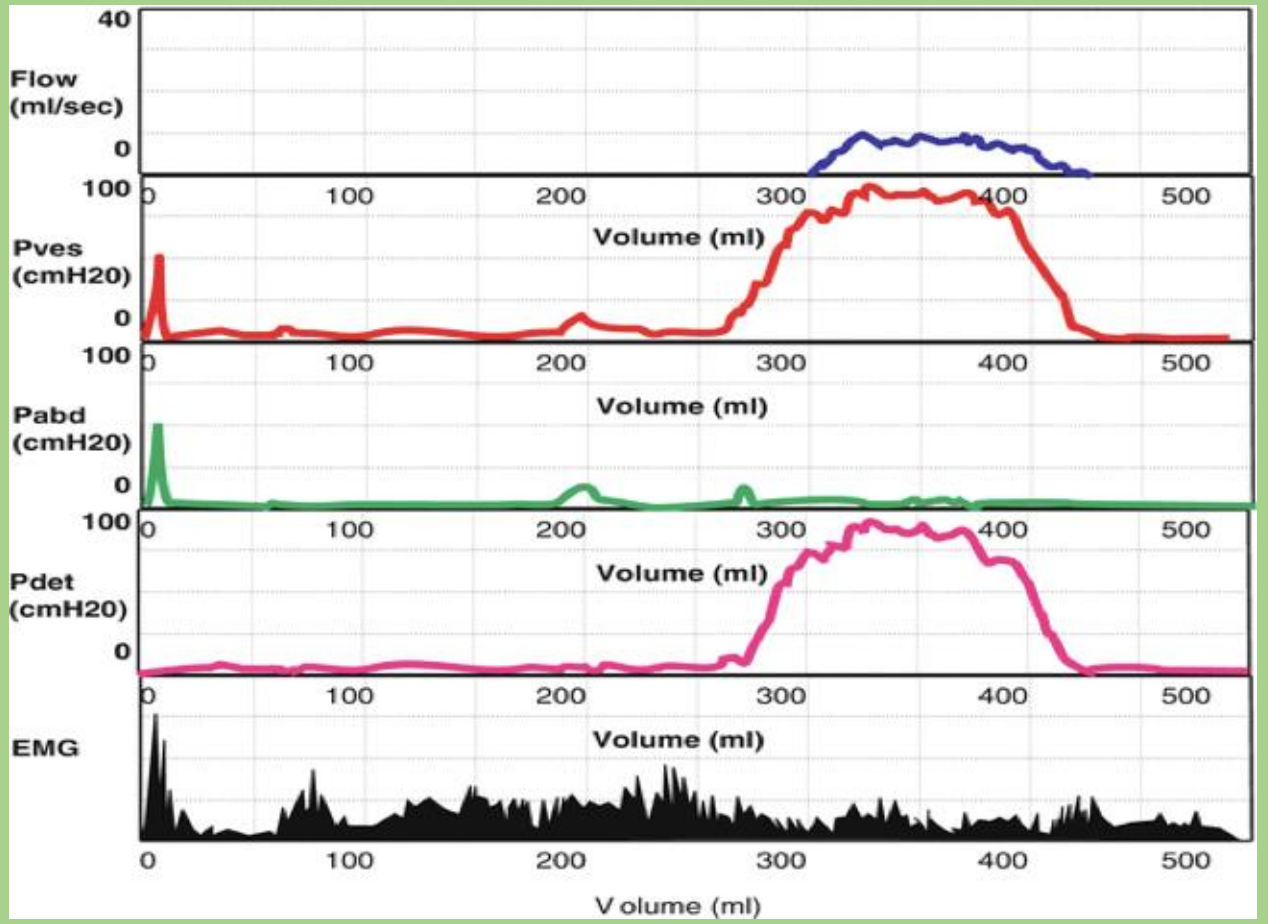


Question #119

ANSWER=A

This UDS documents neurogenic detrusor overactivity and detrusor external sphincter dyssynergia (DESD) in a patient with MS. Male MS patients with DESD appear to be at greatest risk for urological complications including upper tract deterioration and the upper tracts must be assessed early in this patient. At this time, videourodynamics would be redundant and unnecessary, while cystoscopy is unlikely to influence treatment planning and would not be the most appropriate first step. MRI scan of the spine may be indicated in the scenario of unknown pre-existing neurogenic disease but is unnecessary with a diagnosis of MS. His obstruction appears to be secondary to DESD, so there is no reason to size his prostate with a TRUS for a subsequent outlet procedure.

Kowalik CCG, Wein AJ, Dmochowski RR: Neuromuscular dysfunction of the lower urinary tract, in Partin AW, Peters CA, Kavoussi LR, Dmochowski RR, Wein AJ (eds): CAMPBELL WALSH WEIN UROLOGY, ed 12. Philadelphia, Elsevier, 2020, vol 3, chap 116, pp 2607-2608.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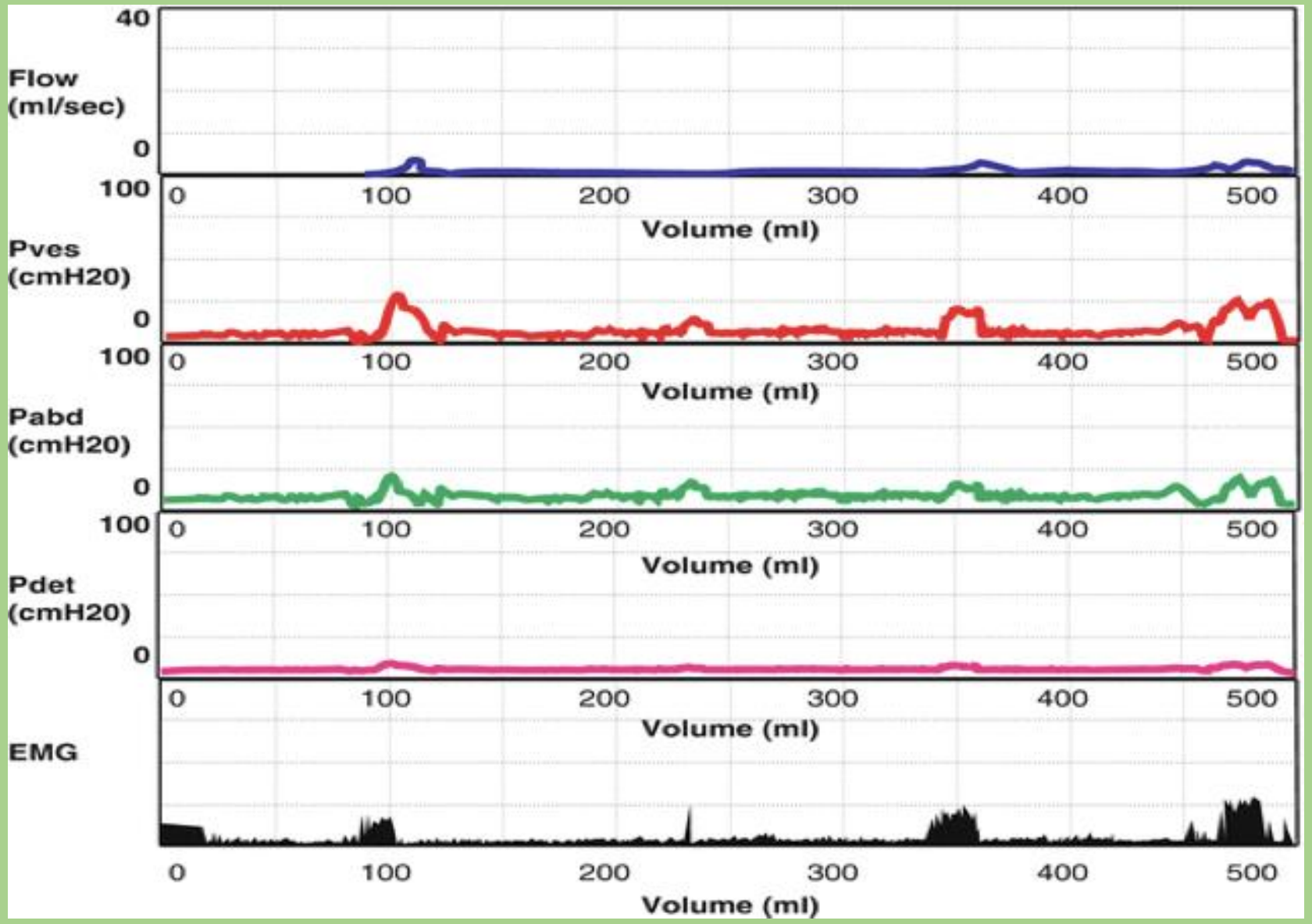
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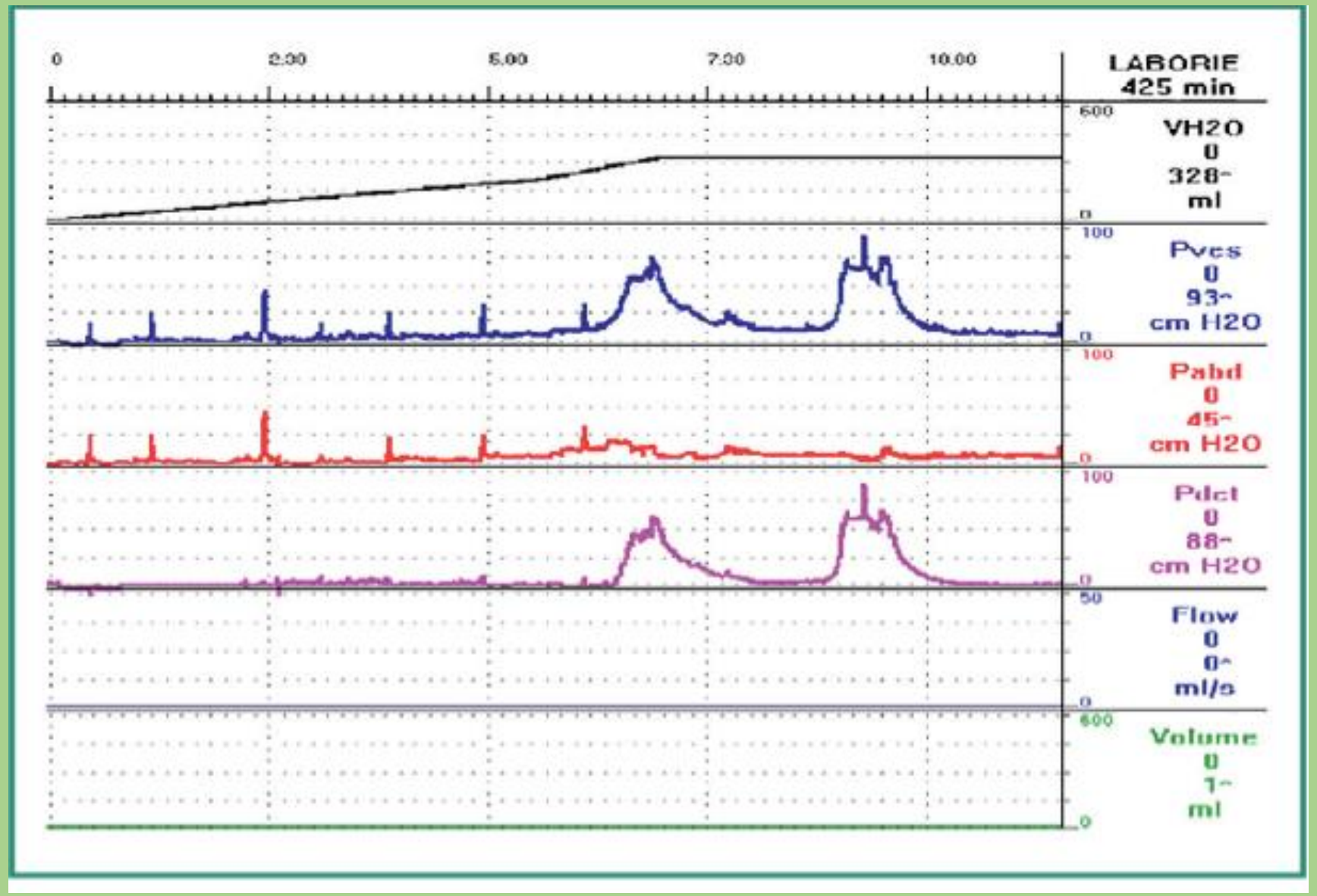
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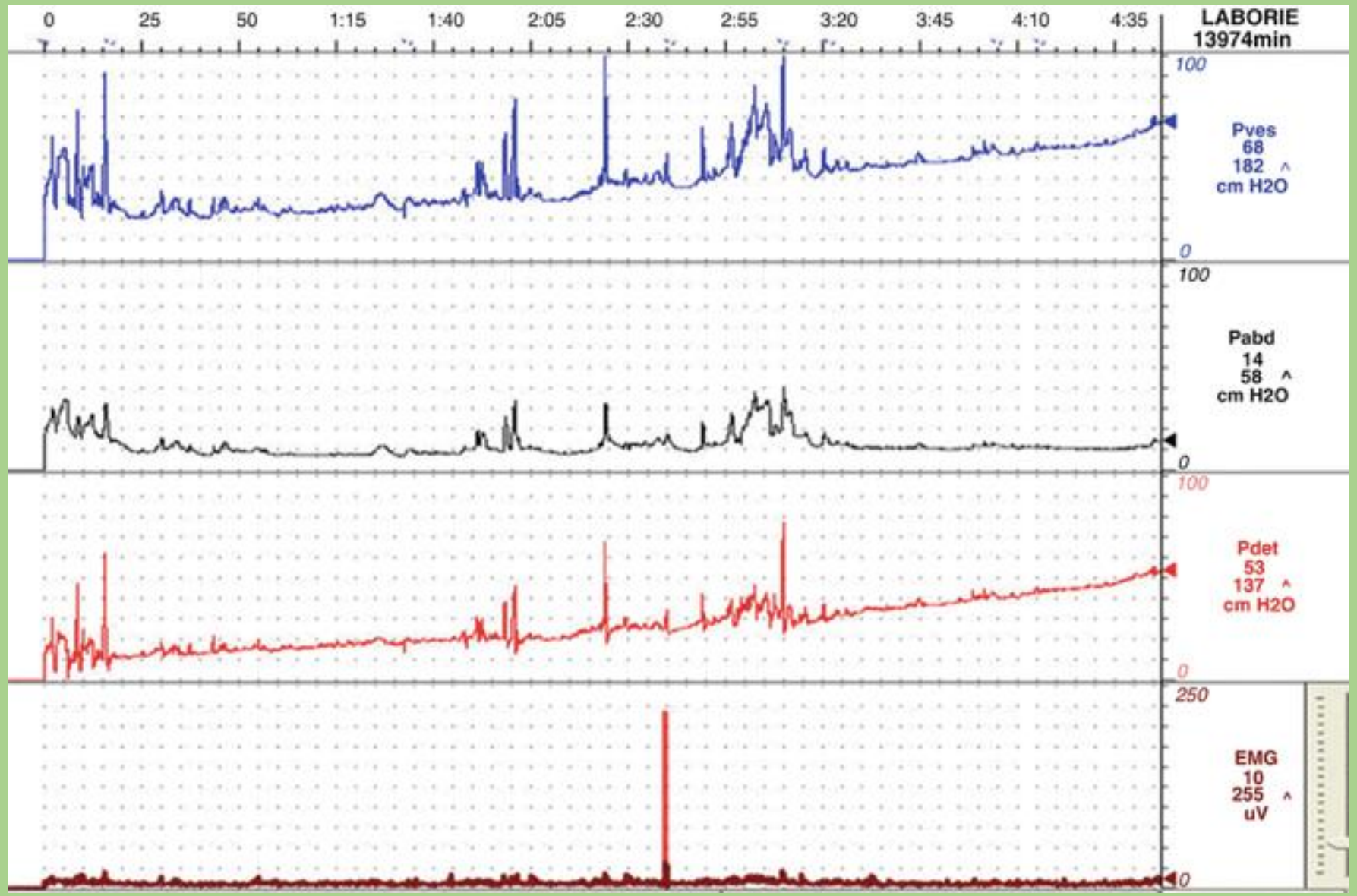
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