

# Understanding Uroflow and Urodynamic Testing

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- Consulting: Hansen, Boston Scientific, Medtronic, Dfine, Neuwave



# Objectives

- Uroflowmetry
- Urodynamics
  - Overview
  - Advantages and Pitfalls
  - Recommendations

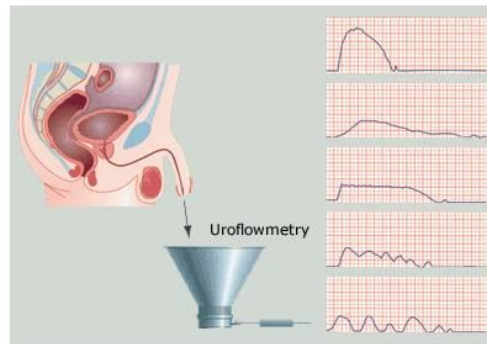
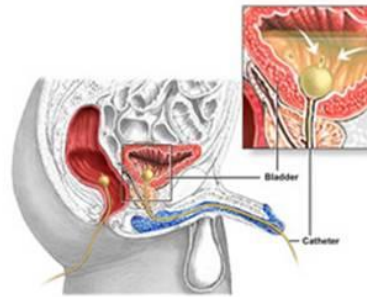


# What is Uroflowmetry?

- Office based
- Non-invasive
- Screening for flow rate/pattern



**Urodynamic Study**



# Overview

- **Uroflowmetry** and Postvoid residual urine volume (PVR) are simple tests
- Raise or lower the suspicion of bladder outlet obstruction (BOO), but neither can make a definitive diagnosis



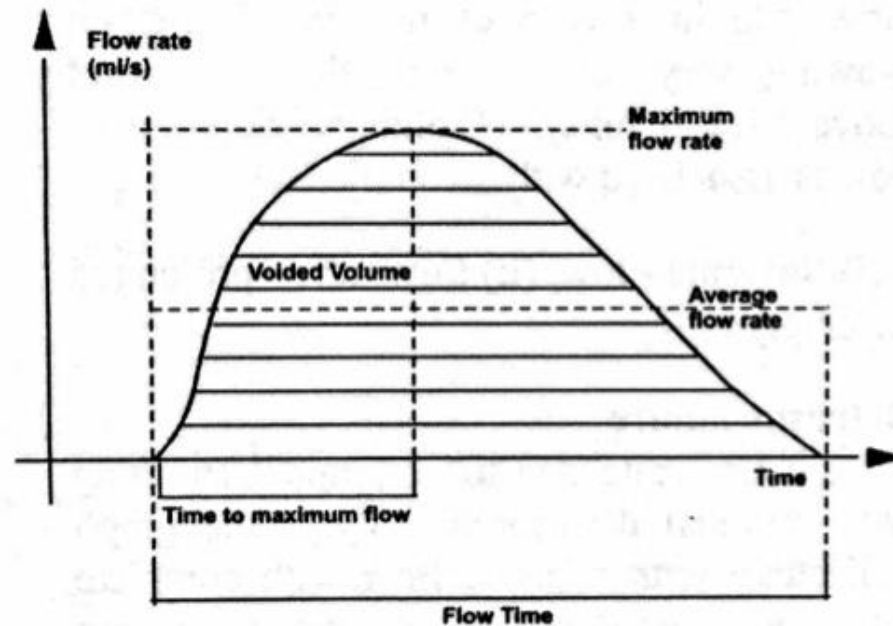
# Uroflowmetry

- Most men with BOO have diminished flow rates
- 90% of men with a maximum flow rate (Q<sub>max</sub>) of less than 10 mL/sec are obstructed
- Conversely, 25% to 30% of men with decreased flow are not obstructed



# Flow Patterns

## NORMAL



Measures maximum flow rate, average flow rate, maximum flow time, flow time and total volume voided.



# Parameters

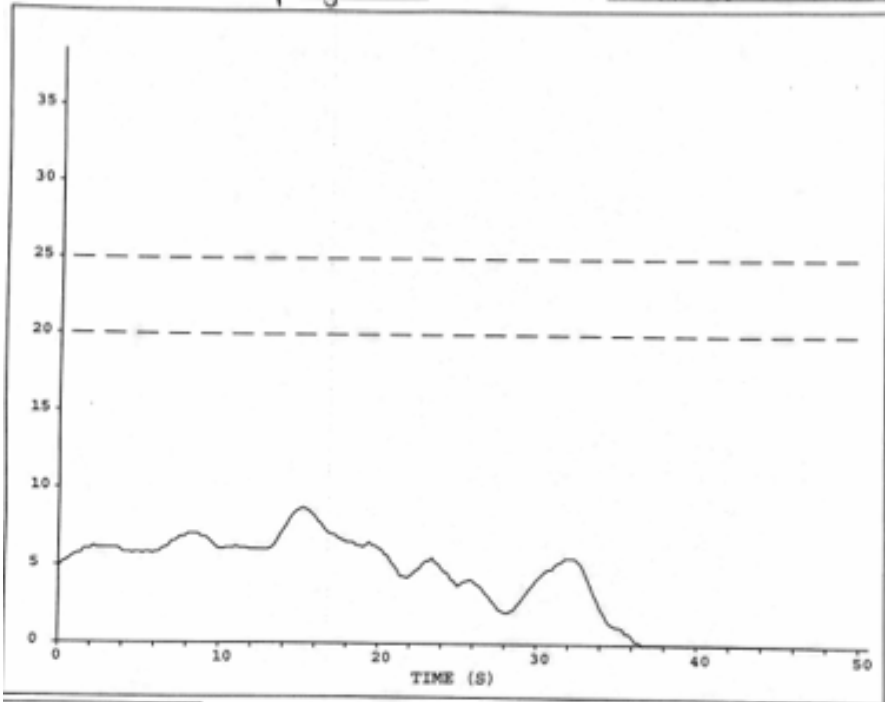
- $Q_{max}$
- $Q_{ave}$
- $Q_{1s}$
- Volume corrected  $Q_{max}$
- Time between  $Q_{max}$  time and 95% empty





DOCTOR: Dr. Sandeep Bagla

MEDICATIONS (S): Flomax



MAXIMUM FLOW  
8.6 ml/s

AVERAGE FLOW  
5.7 ml/s

TOTAL VOLUME  
202 ml

TOTAL TIME  
35 s

PEAK FLOW AT  
15 s

Patient Notes: \_\_\_\_\_

\_\_\_\_\_

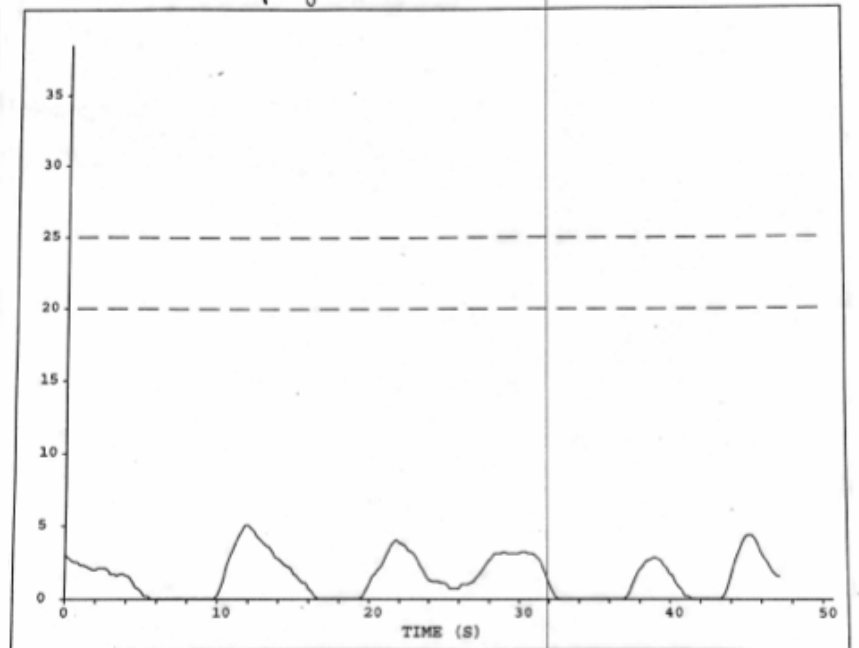
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

DOCTOR: Dr. Sandeep Bagla

MEDICATIONS (S): None



MAXIMUM FLOW  
5.0 ml/s

AVERAGE FLOW  
1.8 ml/s

TOTAL VOLUME  
87 ml

TOTAL TIME  
47 s

PEAK FLOW AT  
12 s

Patient Notes: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

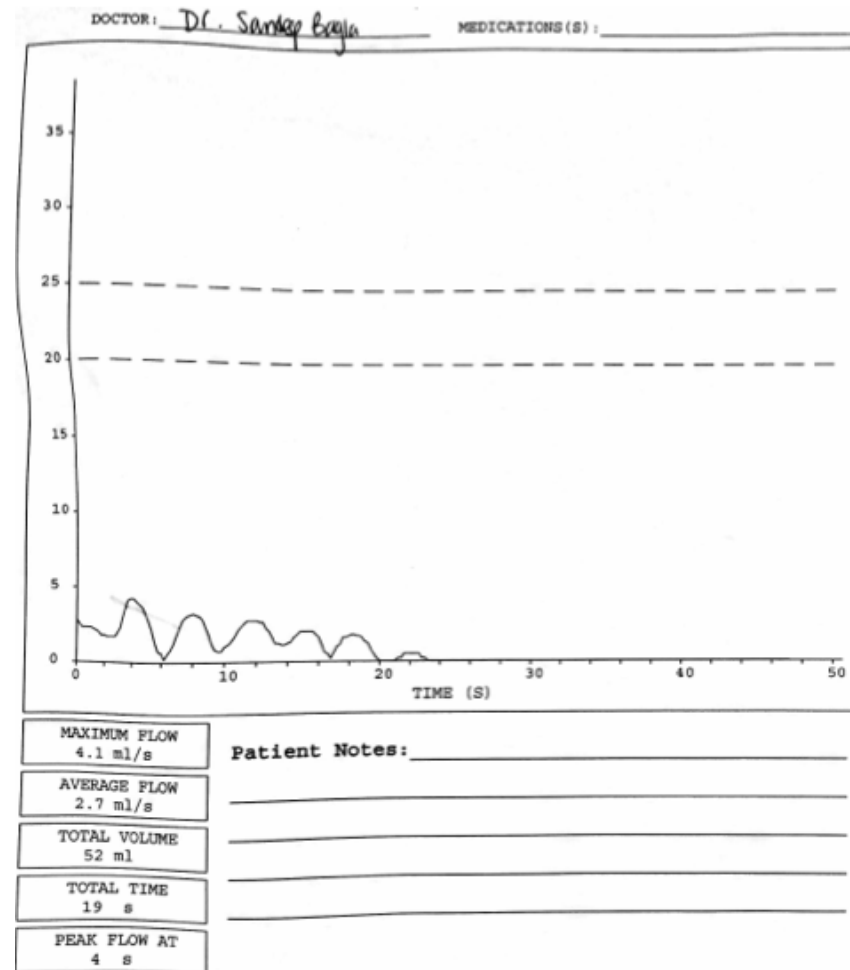


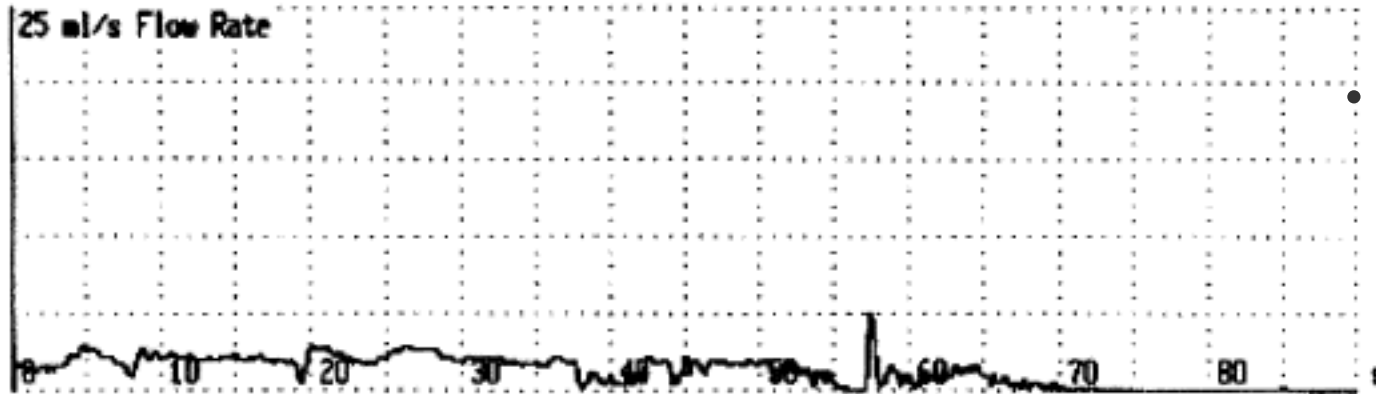
# Pitfalls

- Only 18% of elderly men have normal flow curves
- Inter-observer variability
  - Disagreement in 20% of curves
- Voiding situation (ie. Psychological stress)
- Patient influenced learning
- Voided volume (150 cc min)
- Cannot distinguish between bladder outlet obstruction and impaired detrusor function (chancellor 1991)

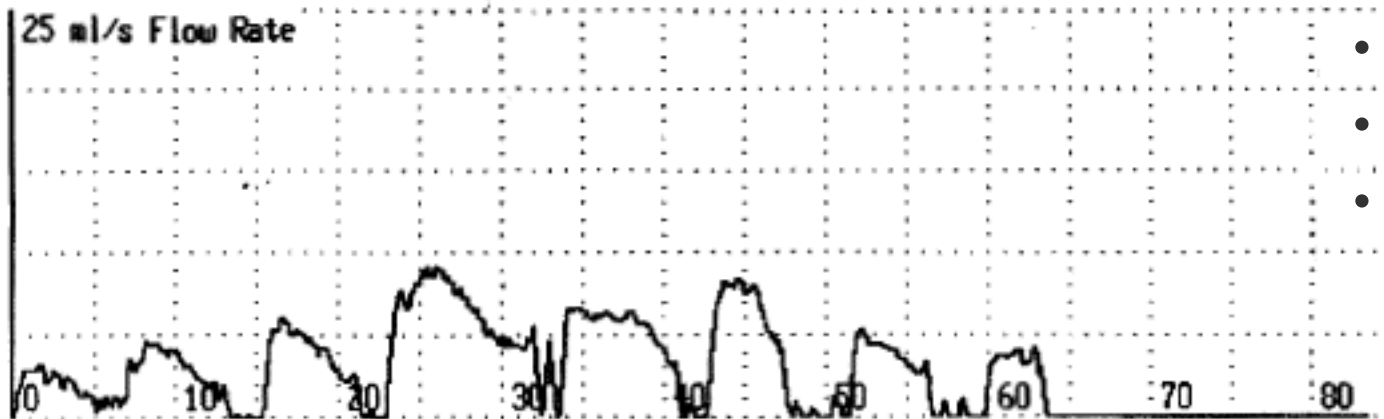


# Pitfalls (volume voided)





• BOO



- Straining
- BOO
- High PVR
- Detrusor Hyperactivity and Poor Contractile Function



# Uroflow

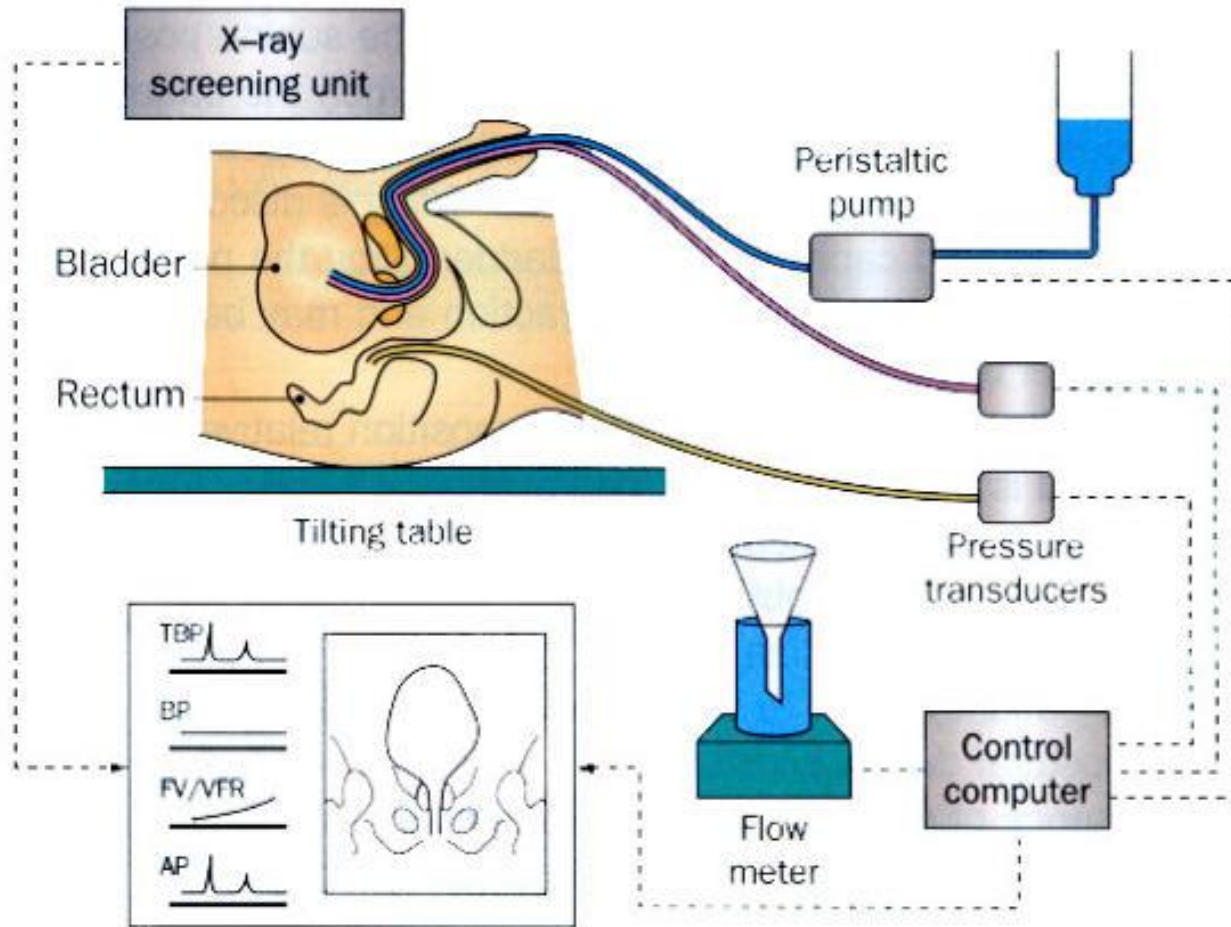
- Screening Test
- When intervention is planned



# Urodynamics



# Urodynamics Study



# Urodynamics





# Phases

- Filling/Storage phase
  - Bladder compliance
  - Detrusor Overactivity
- Voiding Phase
  - Obstruction
  - Detrusor Function



# 3 Voiding States

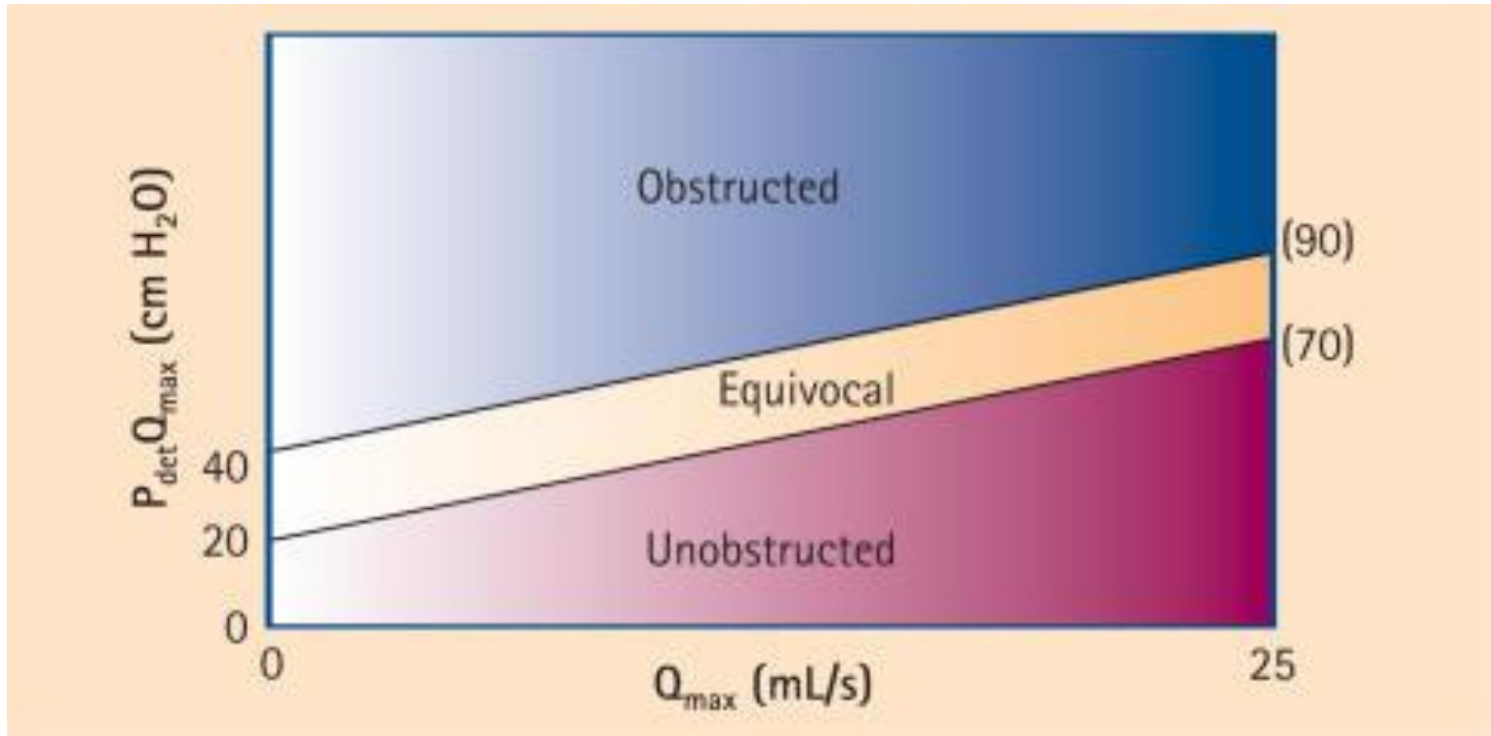
- Low detrusor pressure and high flow rate (unobstructed)
- High detrusor pressure and low flow rate (obstructed)
- Low detrusor pressure with low flow rate (poor detrusor contractility).



# Measures of Outlet Resistance and Obstruction

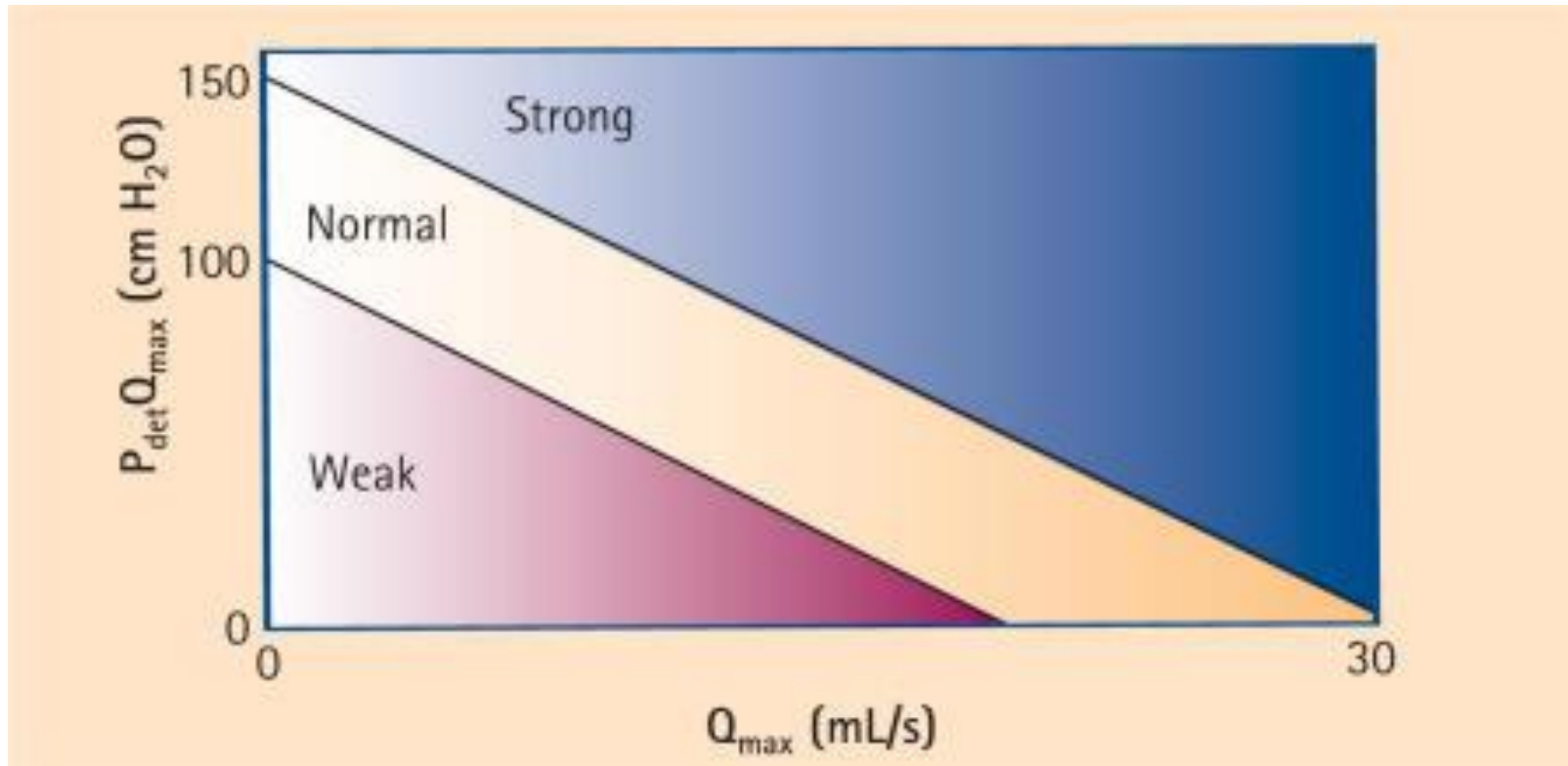
- Bladder outlet obstruction index (BOOI)
  - Previously the Abrams-Griffiths
- Represented by the equation:
  - $BOOI = P_{det} @ Q_{max} - 2 Q_{max}$
- $BOOI > 40$  = obstructed;  $BOOI 20-40$  = equivocal; and  $BOOI < 20$  = unobstructed





- The ICS nomogram. Patients are divided into 3 classes: unobstructed, equivocal, and obstructed, based on the Bladder Outlet Obstruction Index (BOOI).





- Bladder contractility nomogram. Patients are divided into 3 classes: strong, normal, and weak contractility according to the Bladder Contractility Index (BCI)



# Urodynamics

- Urodynamic testing is an objective tool that helps to clarify **confusing or complex** urinary tract symptoms.
- Urodynamic testing is **not recommended** prior to
  - (a) conservative management
- Urodynamic testing is recommended
  - (a) when the **diagnosis remains uncertain** after an initial history and physical examination.
  - (b) when patient symptoms **do not correlate** with objective physical findings.
  - (c) if the patient **fails** to improve with treatment.
  - (d) in a **clinical trial** setting
- Evidence was not sufficient to show whether invasive urodynamic tests led to better patient outcomes. Some evidence suggests that these tests did alter management decisions, resulting in fewer men undergoing surgery. No evidence indicates whether this change in management led to fewer symptoms in men after treatment, and it is not known whether patients reported a better quality of life.



# Cochrane Review: Urodynamics and BPH

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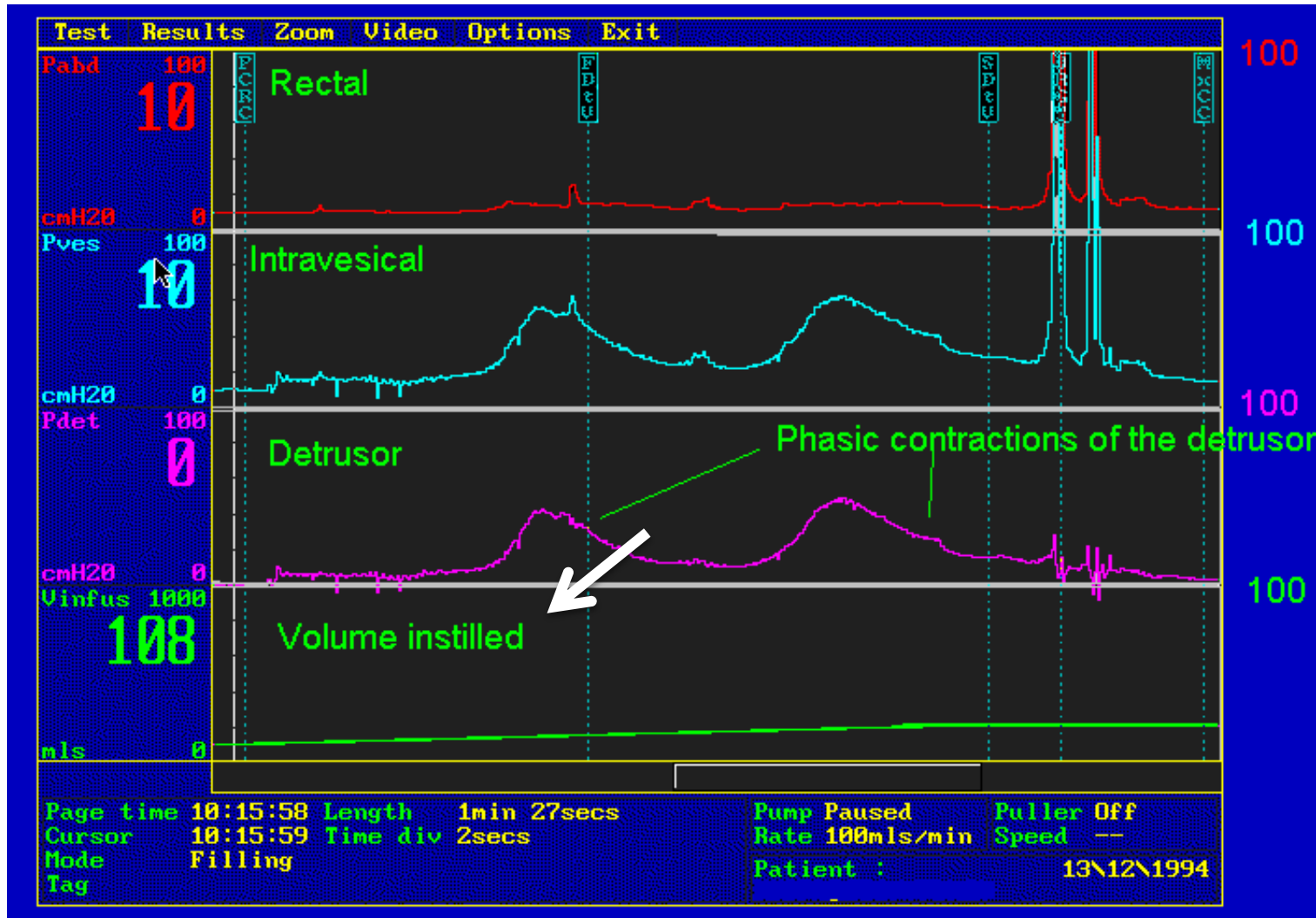
# Urodynamics (Pressure-Flow Study)

- Interventional Therapy and Peak flow >10 cc/sec
- Men who failed prior invasive therapy
- Known neurological dx
  - Parkinsons, neuropathy
- High PVR with concern for detrusor function





# Detrusor Instability



# Urodynamics-Disads

- Invasivene
- Time consumption
- Expense
- Patient discomfort
- Anxiety
- Symptoms are not always reproduced



# Conclusion

- Uroflow
  - Noninvasive screening test
  - Cannot distinguish BOO from Detrusor Fxn
- Urodynamics
  - Invasive
  - Problem solving technique
  - May allow for better discussion with pt



# Thank you



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