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Frequency-volume chart & writing a report

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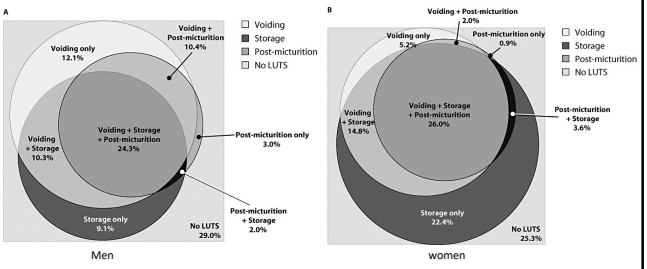
What is frequency-volume chart (FVC)?

- The recording of the time of each micturition together with the volume voided
- For at least 24 hours
- Ideally a minimum of 3 days of recording (not necessarily consecutive) will generally provide more useful clinical data

Why do we need frequency-volume chart?

Storage symptoms *vs* voiding symptoms



BJU Int. 2009 Apr;103 Suppl 3:12-23

Storage symptoms *vs* voiding symptoms

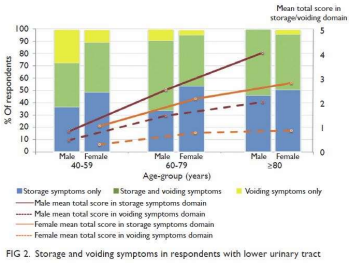
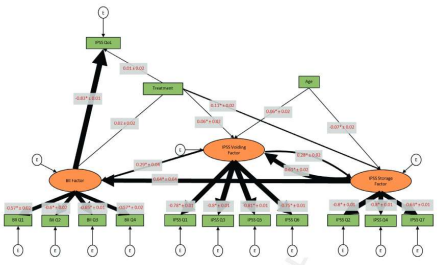


FIG 2. Storage and voiding symptoms in respondents with lower urinary tract symptoms

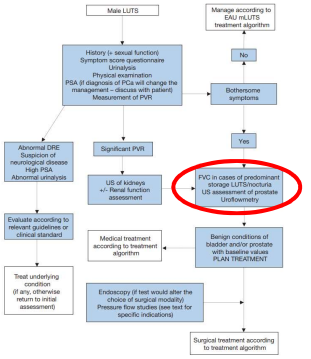
Hong Kong Med J 2019 Feb;25(1):13–20

Storage symptoms *vs* voiding symptoms



J Urol. 2016 Sep;196(3):824-30

EAU guideline



UK guideline

Adult male with LUTS suggestive of BPH

Initial assessment

- Review general medical history, co-morbidities, and current medication use
- Perform urinalysis (see main text)
- Consider urea and electrolytes test (if renal impairment is suspected), and PSA test (see main text)
- Consider use of IPSS questionnaire and FVC
- Examine abdomen (to exclude palpable bladder) and external genitalia (to exclude phimosis and meatal stenosis)
- Perform DRE (to confirm enlarged prostate and exclude signs of prostate cancer)

Conservative management

- Provide advice on fluid intake (see main text), and if appropriate on weight loss and exercise
- Consider bladder training (if the patient has storage symptoms in addition to voiding symptoms)
- Consider urethral milking (see main text)

Why do we need frequency-volume chart?

- Give a better overview of voiding pattern than from history taking alone
- Aid the diagnosis of LUTD
- Useful in future urodynamic evaluation

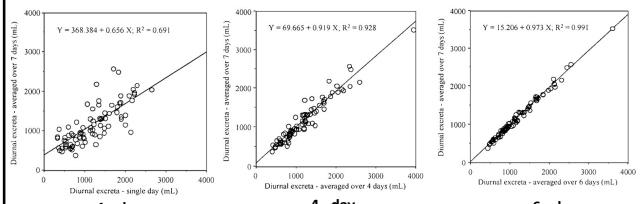
Types of frequency-volume chart?

- Micturition time chart
  - Records only the times of micturition, D&N, ≥ 24 hours
- Frequency-volume chart
  - Time of each micturition / Volume of each micturition / (*catheterized urine)* / D&N / ≥ 24 hours
- Bladder diary
  - Time of each micturition / Volume of each micturition / (catheterized urine) / D&N / ≥ 24 hours;
  - Time & Amount of urinary leakage, No. of pads used per day, Type of urinary incontinence (SUI / UUI / MI) , degree of urgency / incontinence; fluid intake; Time retiring to bed / Time of awakening +/- getting out of bed; Bladder sensation at the time of voiding (bladder fullness / urgency / pain etc)
- Controversy: bladder diary *vs* voiding diary

Duration of frequency-volume chart

- Depends of how much information is needed
- Can range from 1-14 days
- Average 7 days

4-day chart is as reliable as 7-day chart



1 - day **4 - day** **6 - day**

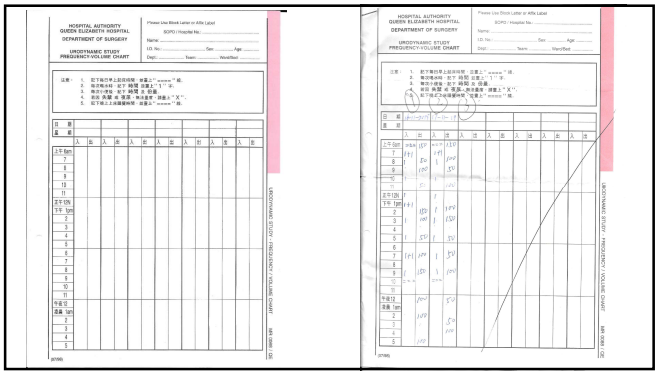
Regression of the diurnal excreta of 1-day, 4-day, and 6-day charts vs 7-day chart of the original cohort of 84 female patients

Schick et al, Neurourology and Urodynamics 2003; 22: 92 - 96

Duration of frequency-volume chart?

- Depends of how much information is needed
- Can range from 1-14 days
- Average 7 days
- Women: 4 days
- Men: 3 days

Schick E et al., Neurourol Urodyn 2003; 22(2): 92 – 96
Belal M et al., Progres en urologie June 2004; 14(3): 17



How do we interpret frequency-volume chart?

Point to note in a frequency-volume chart

- **Time** of waking up and time of intention to sleep
- Volume, timing and type of **fluid intake**
- **Daytime urinary frequency**: number of voids recorded during waking hours -- includes the last void before sleep and the first void after waking in the morning
- **Average voided volume**
- **Maximum voided volume**
- **Twenty-four hour production**: commences after the first void produced after rising in the morning and is completed by including the first void on rising the following morning
- **Nocturia** (nocturnal frequency): number of voids recorded with each void preceded and followed by intention to sleep
- **Nocturnal urine volume** (NUV) excludes the last void before going to bed but includes the first void after waking
- **Nocturnal polyuria**: NPi = NUV/24 h volume ----- 33% in elderly, 20% in younger individuals
- **Incontinence** episode / pad usage

How do we write a report for urodynamic study?

Before writing a report…

- Two principles
  - Reproduce the patients' symptoms
  - Provide a pathophysiological explanation for the patient's complaints
- Continuous dialogue between the investigator and patient
- Annotate bladder sensation and event

Writing a report

General
- Indication
- Type of procedure
- Patient position
- Type of catheters used (EMG electrodes)
- Rate of bladder filling
- Quality control
- Clinical impression

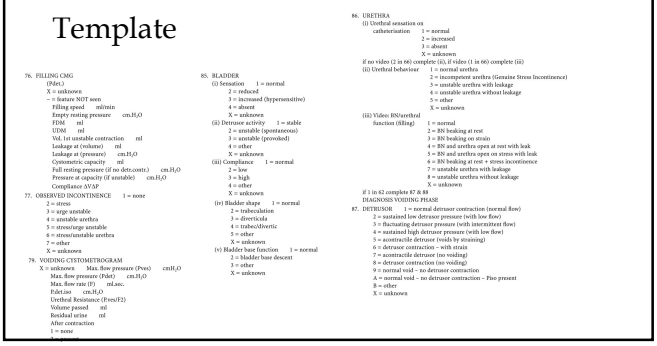
Writing a report

Filling cystometry
- Bladder sensation: first sensation, normal desire, strong desire, (pain)
- Abnormal bladder sensation: increased / reduced / absent
- Detrusor activity
- Bladder compliance: normal / poor
- Bladder capacity: maximal cystometric capacity
- Urethral function: normal / incompetent
- Artefacts

Writing a report

Voiding cystometry
- Mode of initiation of voiding: volitional / reflex / Valsalva / suprapubic pressure
- Contraction pressure at maximum flow
- Maximal flow rate
- Detrusor activity: normal / underactive / acontractile
- Urethral function: DSD / dysfunctional voiding
- Voided volume and residual urine volume
- Artefacts
- Calculation of BOOI / BCI (in men)
- (Descriptions on EMG)
- (Descriptions on fluoroscopy)

Template



76. FILLING CMG
(Pdet.)
X = unknown
– = feature NOT seen
Filling speed ml/min
Empty resting pressure $cm.H_2O$
FDM ml
UDM ml
Vol. 1st unstable contraction ml
Leakage at (volume) ml
Leakage at (pressure) $cm.H_2O$
Cystometric capacity ml
Full resting pressure (if no detr.contr.) $cm.H_2O$
Pressure at capacity (if unstable) $cm.H_2O$
Compliance ΔV/ΔP

77. OBSERVED INCONTINENCE 1 = none
2 = stress
3 = urge-unstable
4 = unstable urethra
5 = stress/urge unstable
6 = stress/unstable urethra
7 = other
X = unknown

78. VOIDING CYSTOMETROGRAM
X = unknown Max. flow pressure (Pves) cmH_2O
Max. flow pressure (Pdet) $cm.H_2O$
Max. flow rate (F) ml.sec.
Pdet.iso $cm.H_2O$
Urethral Resistance (Pves/F2)
Volume passed ml
Residual urine ml
After contraction
1 = none

85. BLADDER
(i) Sensation 1 = normal
2 = reduced
3 = increased (hypersensitive)
4 = absent
X = unknown
(ii) Detrusor activity 1 = stable
2 = unstable (spontaneous)
3 = unstable (provoked)
4 = other
X = unknown
(iii) Compliance 1 = normal
2 = low
3 = high
4 = other
X = unknown
(iv) Bladder shape 1 = normal
2 = trabeculation
3 = diverticula
4 = trabec/divertic
5 = other
X = unknown
(v) Bladder base function 1 = normal
2 = bladder base descent
3 = other
X = unknown

86. URETHRA
(i) Urethral sensation on catheterisation 1 = normal
2 = increased
3 = absent
X = unknown
if no video (2 in 66) complete (ii), if video (1 in 66) complete (iii)
(ii) Urethral behaviour 1 = normal urethra
2 = incompetent urethra (Genuine Stress Incontinence)
3 = unstable urethra with leakage
4 = unstable urethra without leakage
5 = other
X = unknown
(iii) Video BN/urethral function (filling) 1 = normal
2 = BN beaking at rest
3 = BN beaking on strain
4 = BN and urethra open at rest with leak
5 = BN and urethra open on stress with leak
6 = BN beaking at rest + stress incontinence
7 = unstable urethra with leakage
8 = unstable urethra without leakage
X = unknown
if 1 in 62 complete 87 & 88
DIAGNOSIS VOIDING PHASE
87. DETRUSOR 1 = normal detrusor contraction (normal flow)
2 = sustained low detrusor pressure (with low flow)
3 = fluctuating detrusor pressure (with intermittent flow)
4 = sustained high detrusor pressure (with low flow)
5 = acontractile detrusor (voids by straining)
6 = detrusor contraction – with strain
7 = acontractile detrusor (no voiding)
8 = detrusor contraction (no voiding)
9 = normal void – no detrusor contraction
A = normal void – no detrusor contraction – Pleo present
B = other
X = unknown

Take home messages

- Frequency-volume chart is part of urodynamic assessment
- Good practice to interpret frequency-volume chart with a template in mind
- Retrospective interpretation of urodynamic tracing cannot replace a properly performed, interactive urodynamic study
- Writing a report in a template format reduces missing information