男性排尿症狀的評估與治療
Clinical Evaluation and Diagnosis of Male LUTS

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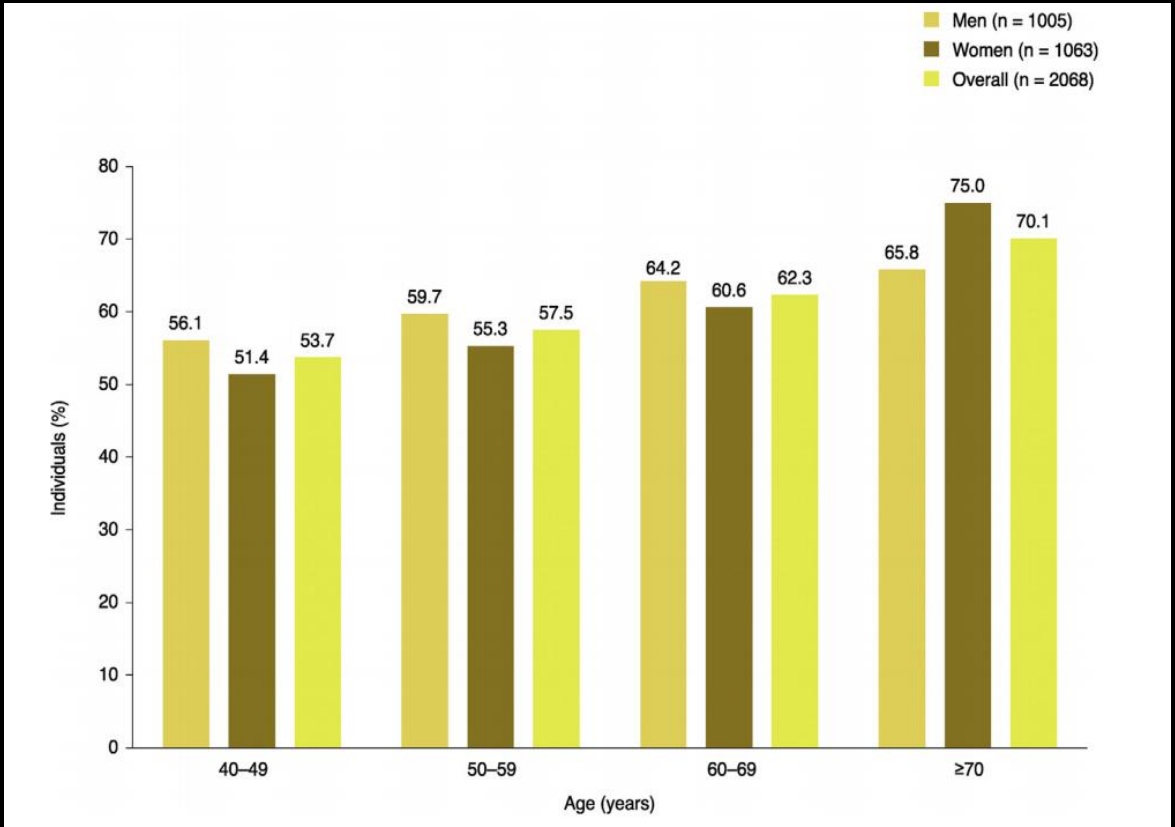
「下尿路症狀，**LUTS** (Lower urinary tract symptoms) 」在台灣盛行率

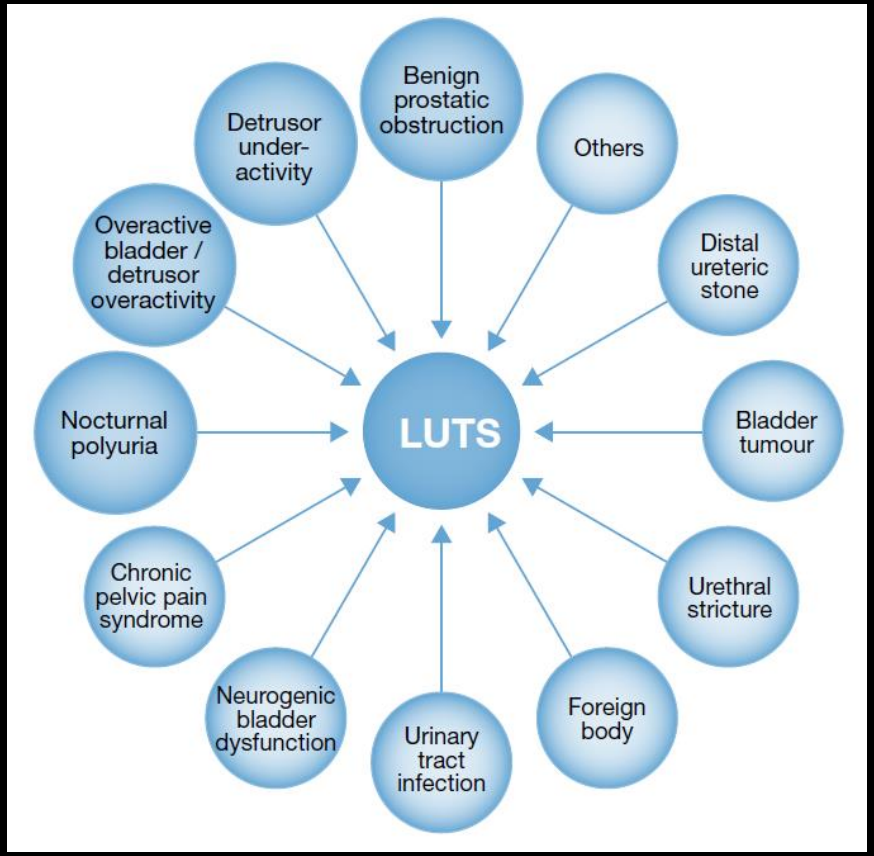


Men: 60%

Women: 57%

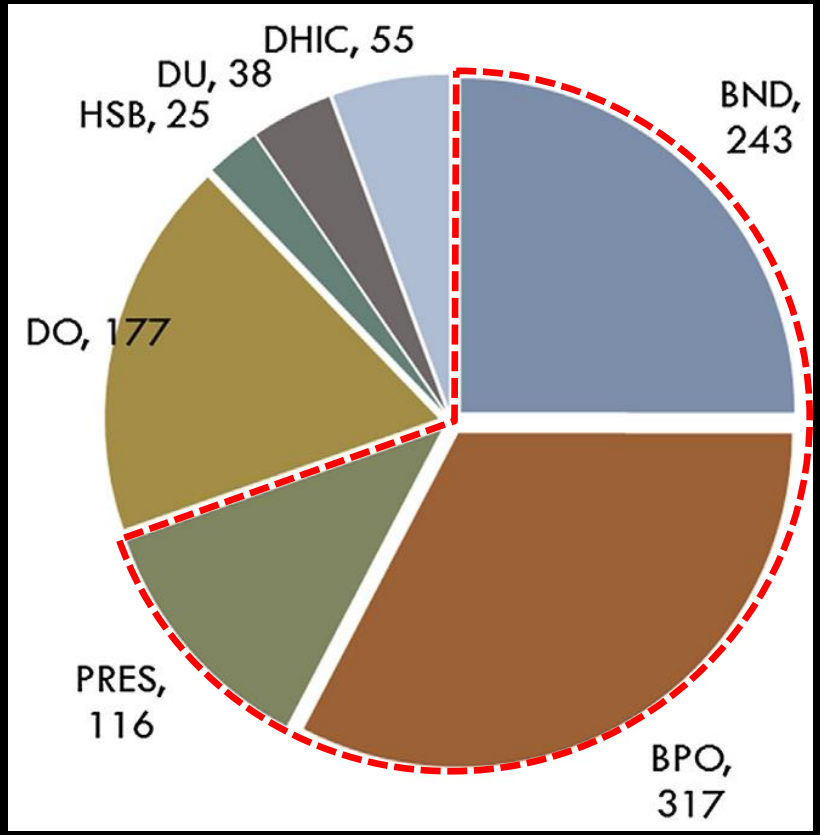
J Formos Med Assoc. 2019 Jan;118(1 Pt 1):170

Etiology of Male LUTS



EAU guidelines: Management of Non-neurogenic Male Lower Urinary Tract Symptoms

Etiology of Male (refractory) LUTS



BOO (69.6%)

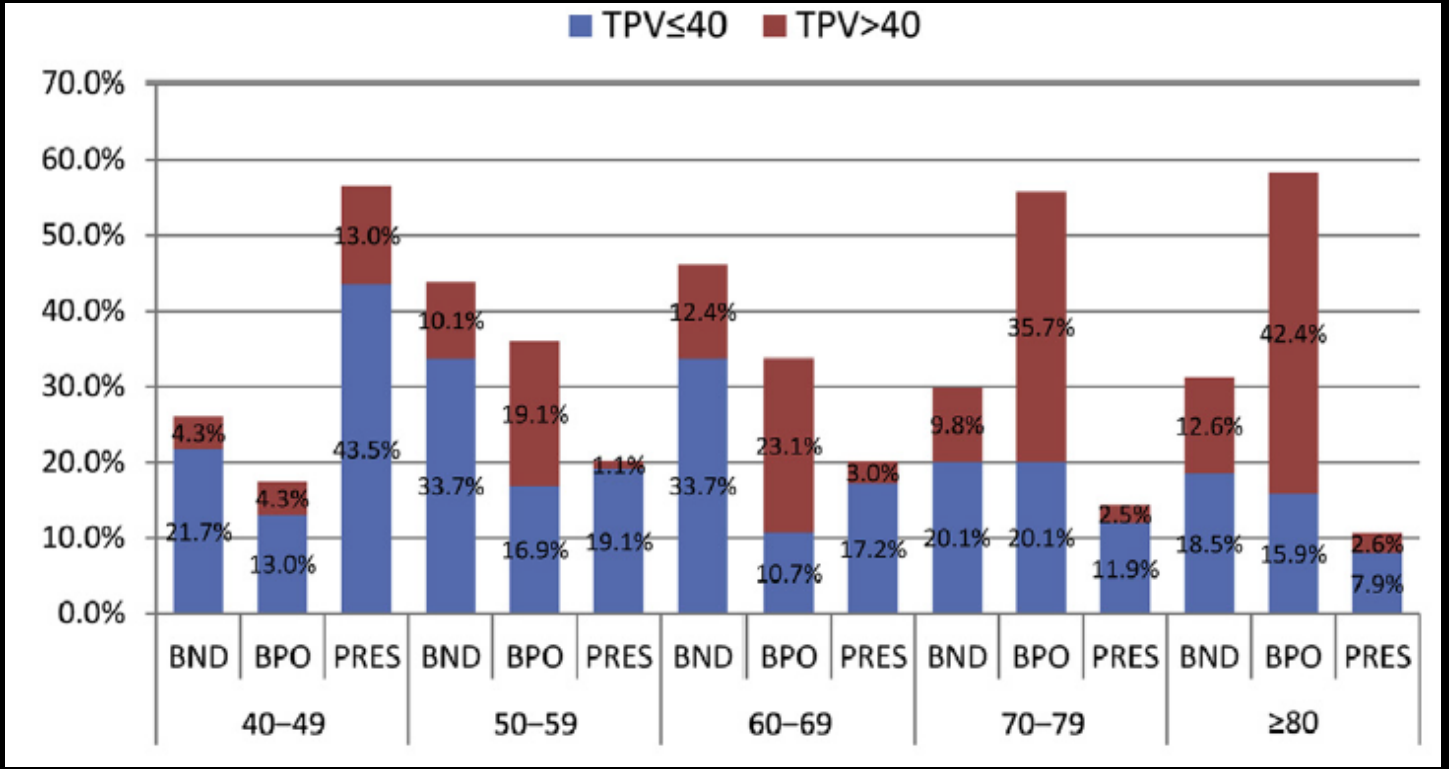
- BND: 35.9% (25.0% in male LUTS)
- **BPO: 46.8% (32.6% in male LUTS)**
- PRES: 17.1% (11.9% in male LUTS)

Bladder dysfunction (30.4%)

- **DO: 59.9% (18.2% in male LUTS)**
- HSB: 8.6% (2.6% in male LUTS)
- DHIC: 18.8% (5.7% in male LUTS)
- DU: 12.8% (3.9% in male LUTS)

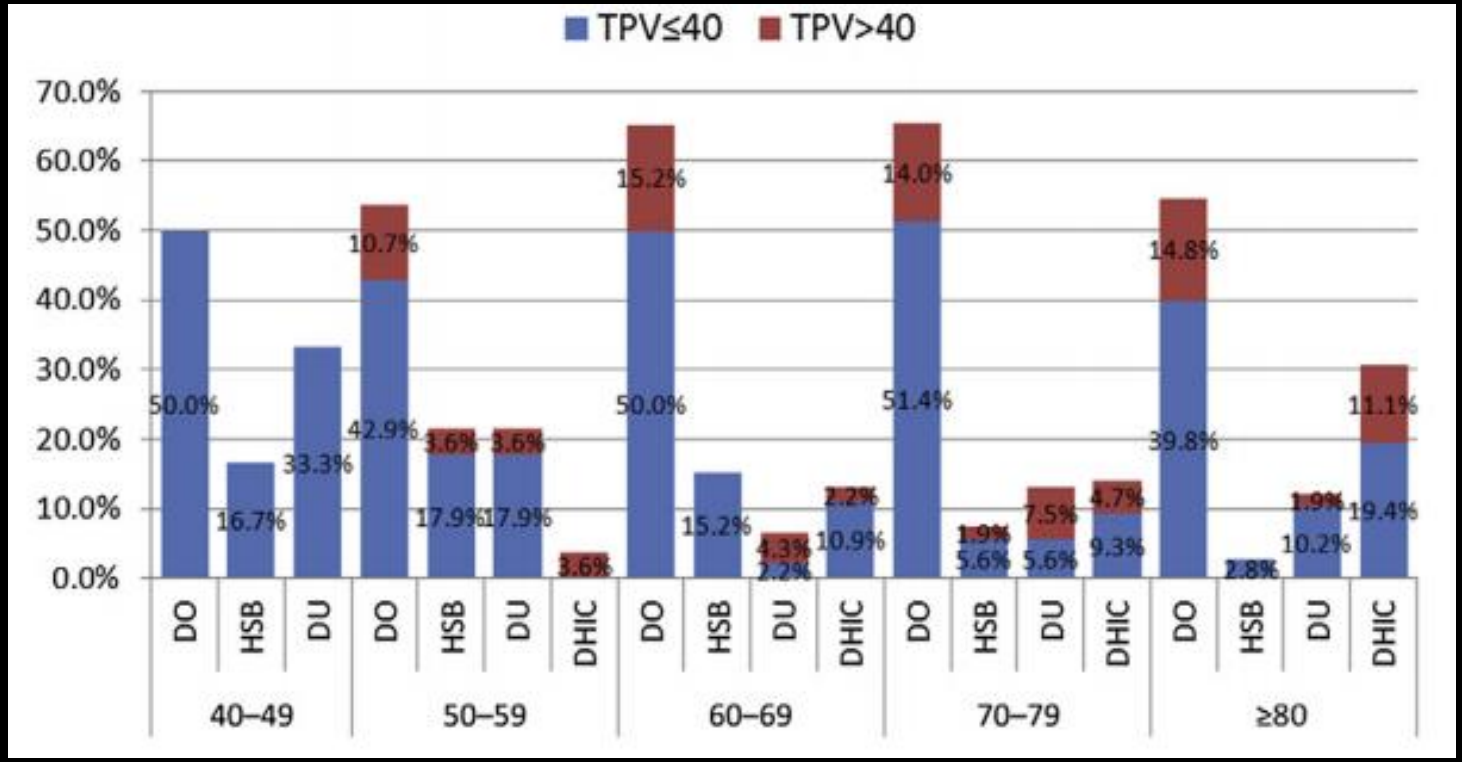
Urol Sci. 2016; 27:21

Both Age & Prostate volume:
affect the distribution of male voiding LUTD



Urol Sci. 2016; 27:21

Both Age & Prostate volume:
affect the distribution of male storage LUTD



Urol Sci. 2016; 27:21

Diagnostic Evaluation of Male LUTS

- Medical history
- PE (Physical examination), DRE (digital rectal examination), PSA (prostate specific antigen)
- Urinalysis
- Symptom score questionnaires
- Frequency volume chart and bladder diaries
- PVR (Post-void residual urine) and Uroflowmetry
- Prostate Imaging/ Cystourethroscopy
- Renal function measurement/ UUT image
- Urodynamics

Prostate-specific antigen (PSA)

- **Prediction of prostate volume (TPV)**
  - Diagnosis of TPV> 30ml: > **1.5**ng/mL (PPV 78%)
  - Diagnosis of TPV> 40ml: > 1.6, > 2.0, > 2.3 ng/mL for men with BPH in their 50s, 60s, 70s (Sen. 65-70%, Spe. 70%)

- **Probability of prostate cancer**

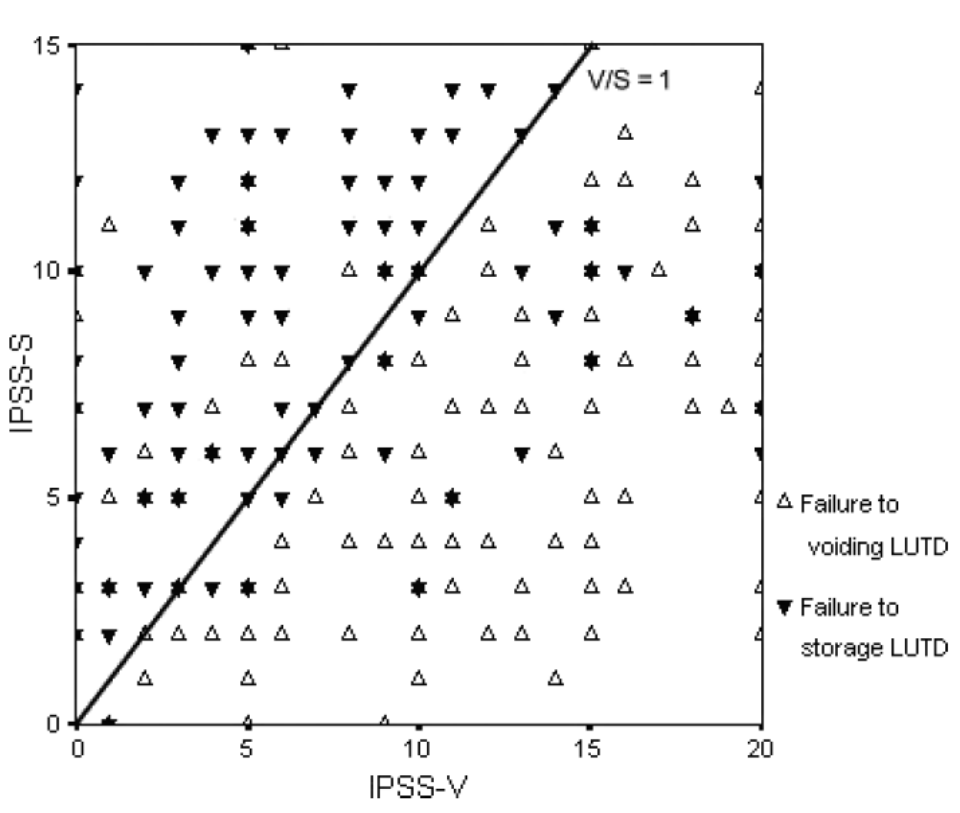
- **Prediction of BPO-related outcomes**
  - Predict risk of **AUR and BPE-related surgery**
  - Free PSA (elevated): also predict clinical BPH
  - **Olmsted County study**: PSA> **1.4**ng/mL- risk of treatment during F/U
  - **MTOPS study**: PSA > **1.1**ng/mL- risk of AUR

International Prostate Symptom Score (IPSS)

國際前列腺症狀積分表（IPSS）							
	完全沒有	五次內不到一次（偶爾）	不超過一半（三不五時）	大約一半（一半一半）	超過一半次數（經常）	都是如此（總是）	症狀的評分
1. 在過去一個月內，你是否有小便解不乾淨的感覺？ Incomplete emptying	0	1	2	3	4	5	
2. 在過去一個月內，你是否不到兩小時還要再去小便一次？ Frequency	0	1	2	3	4	5	
3. 在過去一個月內，你是否有小便斷斷續續的現象？ Intermittency	0	1	2	3	4	5	
4. 在過去一個月內，你是否有憋不住尿的感覺？（尿急就憋不住） Urgency	0	1	2	3	4	5	
5. 在過去一個月內，你是否有小便無力的感覺？ Weak stream	0	1	2	3	4	5	
6. 在過去一個月內，你是否有需要用力才能解出小便？ Straining	0	1	2	3	4	5	
	完全沒有	一次	二次	三次	四次	五次或以上	
7. 在過去一個月內，晚上睡覺時您一般需要起床小便幾次？ Nocturia	0	1	2	3	4	5	
症狀計分的總評分：							
因泌尿系統疾病的症狀而影響了生活品質							
	非常滿意	滿意	還算滿意	無所謂	不大滿意	不滿意	非常不滿意
如果您以後日常生活的小便情形都和現在一樣，你會覺得如何？	0	1	2	3	4	5	6

- 8 items: **7 symptom questions** + 1 QoL (quality of life) question
  - 0 point: asymptomatic
  - **1-7** points: mildly symptomatic
  - **8-19**: moderately symptomatic
  - **20-35** points: severely symptomatic
- 4 **v**oiding items, 3 **s**torage items
- During assessment, during and/or after treatment

IPSS V/S (Voiding/ Storage subscore ratio): useful method to differentiate male LUTD



	Failure to voiding LUTD		Failure to storage LUTD	
	ROC area	95% CI	ROC area	95% CI
IPSS-T	0.58	0.51–0.65	0.43	0.36–0.50
IPSS-V	0.72	0.66–0.78	0.71	0.65–0.77
IPSS-S	0.67	0.60–0.74	0.68	0.61–0.74
IPSS-V/S	0.81	0.75–0.87	0.80	0.75–0.86
TPV	0.74	0.65–0.79	0.72	0.66–0.78
Qmax	0.64	0.57–0.71	0.63	0.56–0.70
PVR	0.63	0.57–0.70	0.63	0.56–0.70

	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
IPSS-V/S				
≥ 0.6	85.7	45.7	61.0	76.3
≥ 0.8	81.8	61.4	67.8	77.2
≥ 1.0	80.2	69.3	72.1	77.9
≥ 1.2	72.2	85.0	82.7	75.5
≥ 1.4	65.9	89.0	85.4	72.0

Int J Clin Pract. 2012 Feb;66(2):139

IPSS V/S: help to guide the treatment for male LUTS

Table 3 Comparisons of baseline parameters between patients with GRA ≥ 1 and GRA < 1 at 1 month in both groups

	IPSS-V/S > 1 (*n* = 279) Doxazosin Tx			IPSS-V/S ≤ 1 (*n* = 116) Tolterodine Tx		
	GRA ≥ 1 (*n* = 218)	GRA < 1 (*n* = 61)	p-value	GRA ≥ 1 (*n* = 89)	GRA < 1 (*n* = 27)	p-value
Age	65.9 ± 10.6	64.5 ± 10.2	0.353	68.8 ± 11.3	67.3 ± 11.1	0.555
IPSS-T	17.9 ± 6.51	18.4 ± 6.36	0.628	14.9 ± 5.49	14.6 ± 5.22	0.774
IPSS-V	12.3 ± 4.40	12.6 ± 4.30	0.641	5.40 ± 3.59	5.00 ± 3.27	0.602
IPSS-S	5.66 ± 3.09	5.82 ± 3.13	0.723	9.49 ± 3.13	9.56 ± 2.81	0.928
TPV	40.0 ± 18.4	35.0 ± 17.7	0.062	39.8 ± 24.2	39.9 ± 20.5	0.986
TZI	0.35 ± 0.14	0.30 ± 0.13	0.037	0.34 ± 0.13	0.31 ± 0.14	0.226
PSA	2.49 ± 2.33	1.90 ± 2.02	0.072	2.86 ± 2.56	1.95 ± 2.14	0.095
Qmax	11.4 ± 6.14	11.5 ± 5.61	0.880	14.0 ± 8.75	11.1 ± 5.67	0.046
Volume	238.9 ± 140.7	256.6 ± 181.6	0.499	217.2 ± 167.9	207.1 ± 178.1	0.791
PVR	56.4 ± 59.5	45.7 ± 51.2	0.215	49.6 ± 60.1	48.6 ± 67.6	0.943

76.7%

78.1%

Int J Clin Pract. 2012 Feb;66(2):139

OAB symptom score (OABSS)

膀胱過動症症狀問卷
(Overactive Bladder Symptom Score; OABSS)

問卷

以下症狀大約的出現頻率為何？
請選出一個與最近一週內您的狀態最接近的選項，並在分數的數字上打圈。

問題	症狀	分數	頻率
Frequency 1	您早上起床後到睡前為止，大約要小便幾次？	0	7次以下
		1	8-14次
		2	15次以上
Nocturia 2	您晚上就寢後到早上起床為止，大約要醒來小便幾次？	0	0次
		1	1次
		2	2次
		3	3次以上
Urgency 3	您多常有突然想小便此種感覺難以延遲(難以憋住)?	0	無
		1	每週少於1次
		2	每週1次以上
		3	每天1次左右
		4	每天2-4次
		5	每天5次以上
UUI 4	您多常有因尿急難以延遲(難以憋住)而漏尿？	0	無
		1	每週少於1次
		2	每週1次以上
		3	每天1次左右
		4	每天2-4次
		5	每天5次以上
	合計分數		_____ 分

- **診斷為OAB的條件**
  - ✓第三題(突然想要小便)的急迫感分數 ≥ 2 +
  - ✓OABSS總分 ≥3
- **OAB症狀的嚴重程度**
  - ✓輕微: OABSS總分 ≤ 5
  - ✓中度: OABSS總分 6 –11
  - ✓嚴重: OABSS總分 ≥12

Homma et al. Urology 2006; 68(2): 318-23

2012 實用尿路動力學 Ch.6

症狀差異:
OAB (膀胱過動症) VS BPS (間質性膀胱炎)

急尿/ 及尿失禁 | 頻/夜尿 | 膀胱疼痛

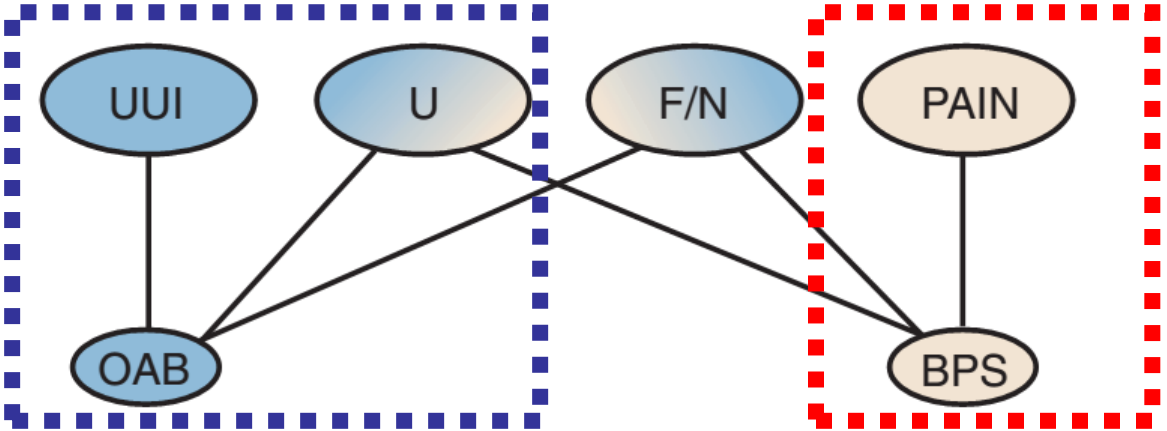
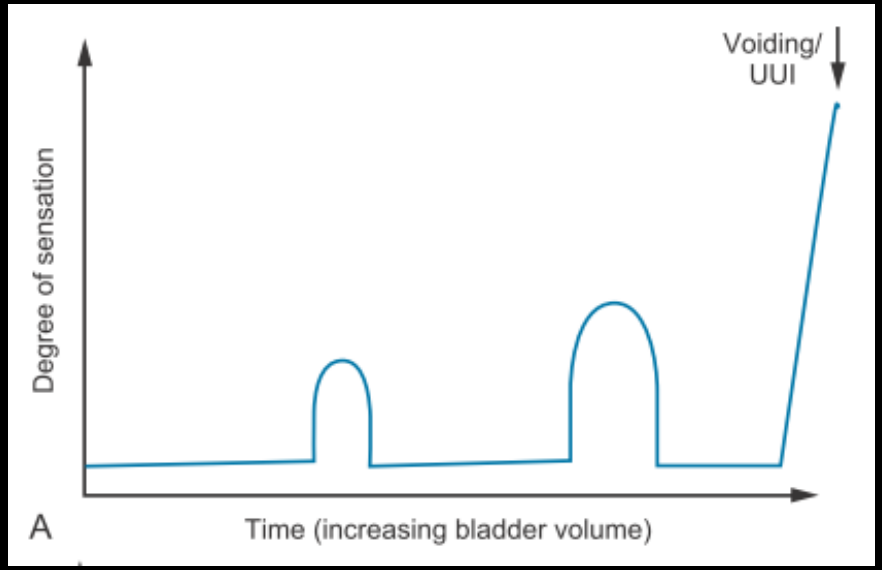
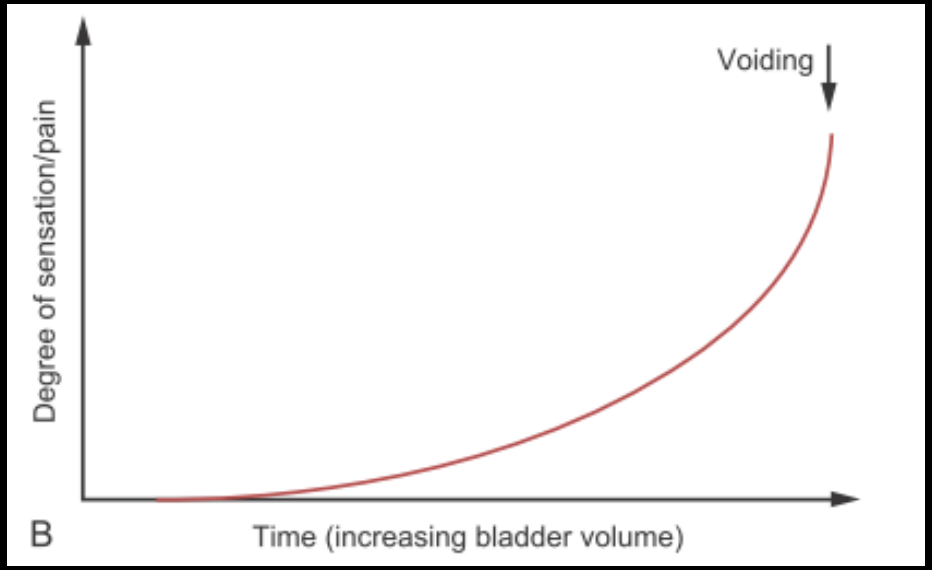


Figure 66–4. Overactive bladder (OAB) and bladder pain syndrome (BPS) both give rise to urgency (U), frequency (F), and nocturia (N); pain, but not urgency urinary incontinence (UUI), is seen in BPS.

Campbell-Walsh Urology 10th edition. Ch 66

尿路動力學差異:
OAB (膀胱過動症) vs BPS (間質性膀胱炎)





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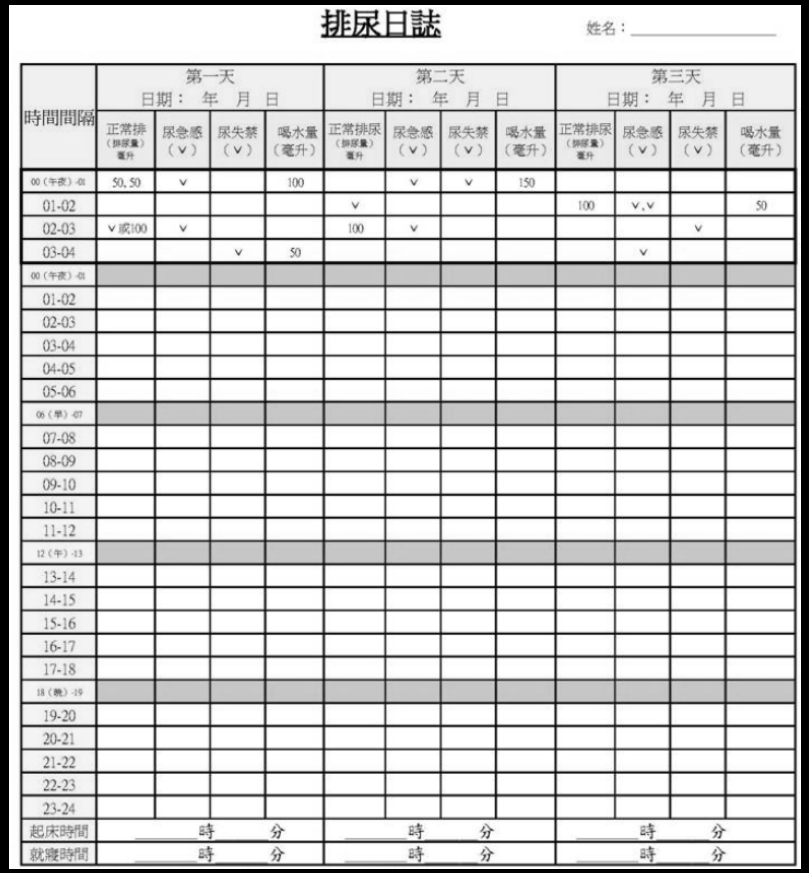
Frequency Volume Chart (FVC) & Bladder Diary



排尿日誌

姓名：_____

時間間隔	第一天 日期：　年　月　日				第二天 日期：　年　月　日				第三天 日期：　年　月　日			
	正常排尿（排尿量）毫升	尿急感（∨）	尿失禁（∨）	喝水量（毫升）	正常排尿（排尿量）毫升	尿急感（∨）	尿失禁（∨）	喝水量（毫升）	正常排尿（排尿量）毫升	尿急感（∨）	尿失禁（∨）	喝水量（毫升）
00（午夜）-01	50, 50	∨		100		∨	∨	150				
01-02					∨				100	∨,∨		50
02-03	∨或100	∨			100	∨					∨	
03-04			∨	50						∨		
00（午夜）-01												
01-02												
02-03												
03-04												
04-05												
05-06												
06（早）-07												
07-08												
08-09												
09-10												
10-11												
11-12												
12（午）-13												
13-14												
14-15												
15-16												
16-17												
17-18												
18（晚）-19												
19-20												
20-21												
21-22												
22-23												
23-24												
起床時間	_____時　分				_____時　分				_____時　分			
就寢時間	_____時　分				_____時　分				_____時　分			

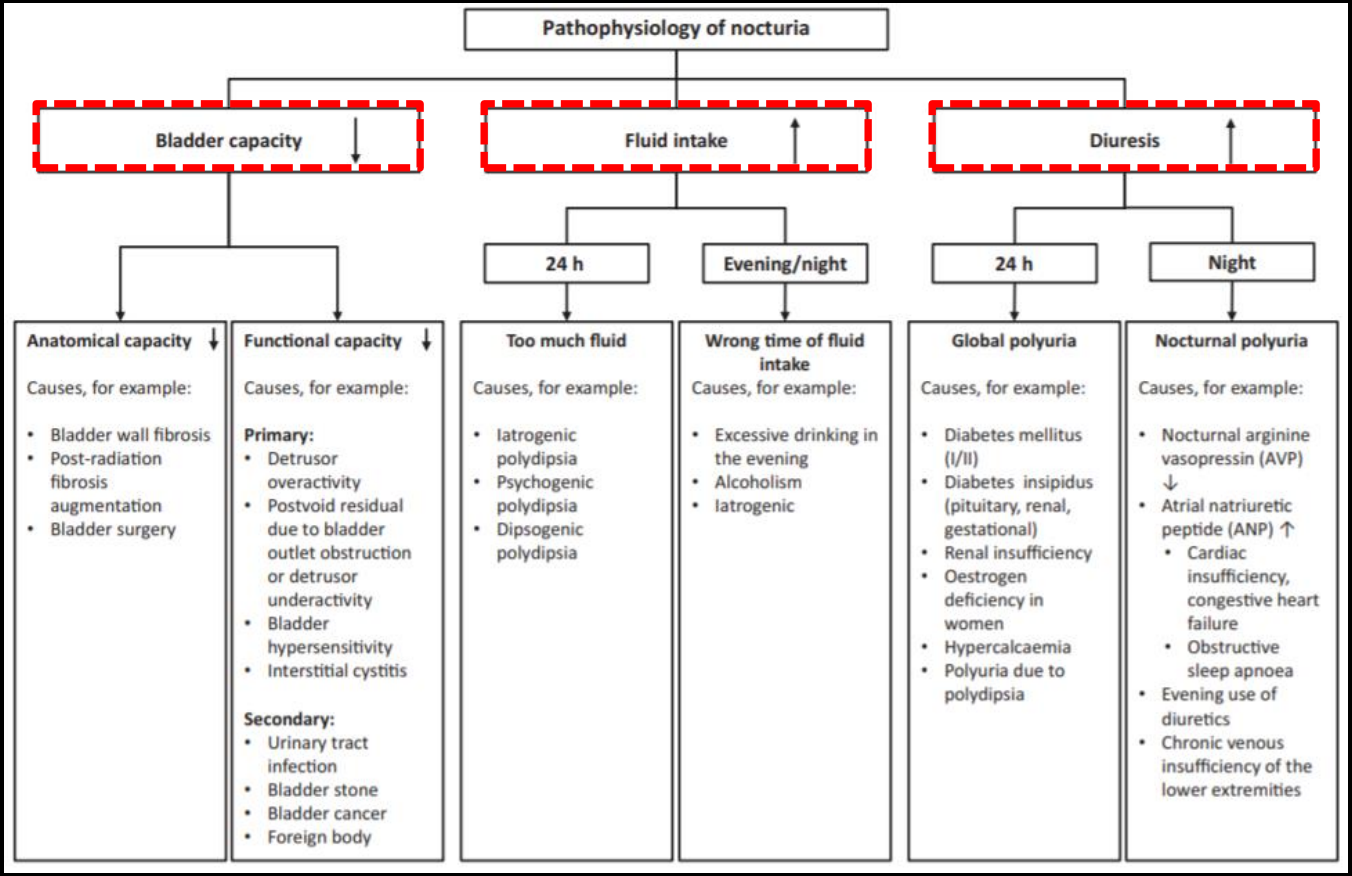
- Reduce recall bias
- **3-day**, 7-day
- To assess LUTS with

a prominent **storage** component or **nocturia**

Frequency Volume Chart (FVC) & Bladder Diary

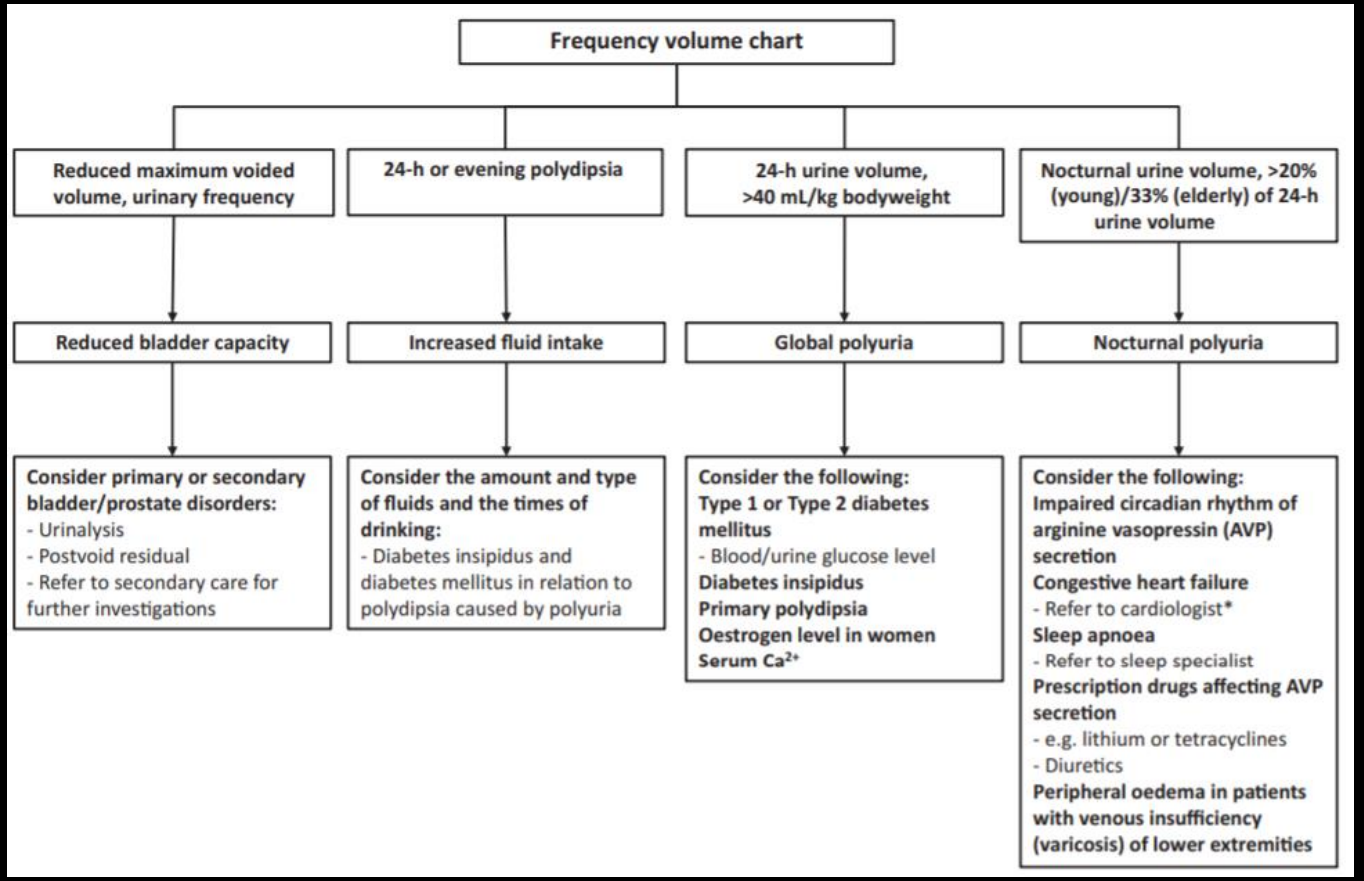
排尿型態	臨床相關病症及描述
Type 1：排尿量正常、頻率正常	一個正常的 24 小時尿量正常的患者
Type 2：排尿量正常、頻率增高	24小時尿量增加 (多尿；polyuria) 的患者，起因於水量攝取增加；亦有可能起因於尿崩症 (diabetes insipidus) 或控制不良的糖尿病
Type 3a：日間和夜間固定排尿量減少	膀胱內病變，例如間質性膀胱炎 (interstitial cystitis) 或是原位癌 (carcinoma in situ)
Type 3b：日間和夜間不固定排尿量減少	膀胱過動症
Type 4：清晨排尿量正常、不固定排尿量減少	心因性頻尿。病人夜間睡眠良好，起床時排尿量正常或增加，但日間排尿量少且尿量不固定。應力性尿失禁患者，因擔心漏尿而強迫自己常去排空尿液，亦有可能出現此種排尿型態
Type 5：夜間多尿 (nocturnal polyuria)	此類病人日間排尿頻率及尿量均正常，但夜間頻率增加，且在睡眠的 8 小時中，排尿量超過 24 小時排尿量的 33% 。起因於鬱血性心臟衰竭、抗利尿激素分泌異常或是心房利鈉素 (atrial natriuretic hormone) 分泌

Pathophysiology of Nocturia



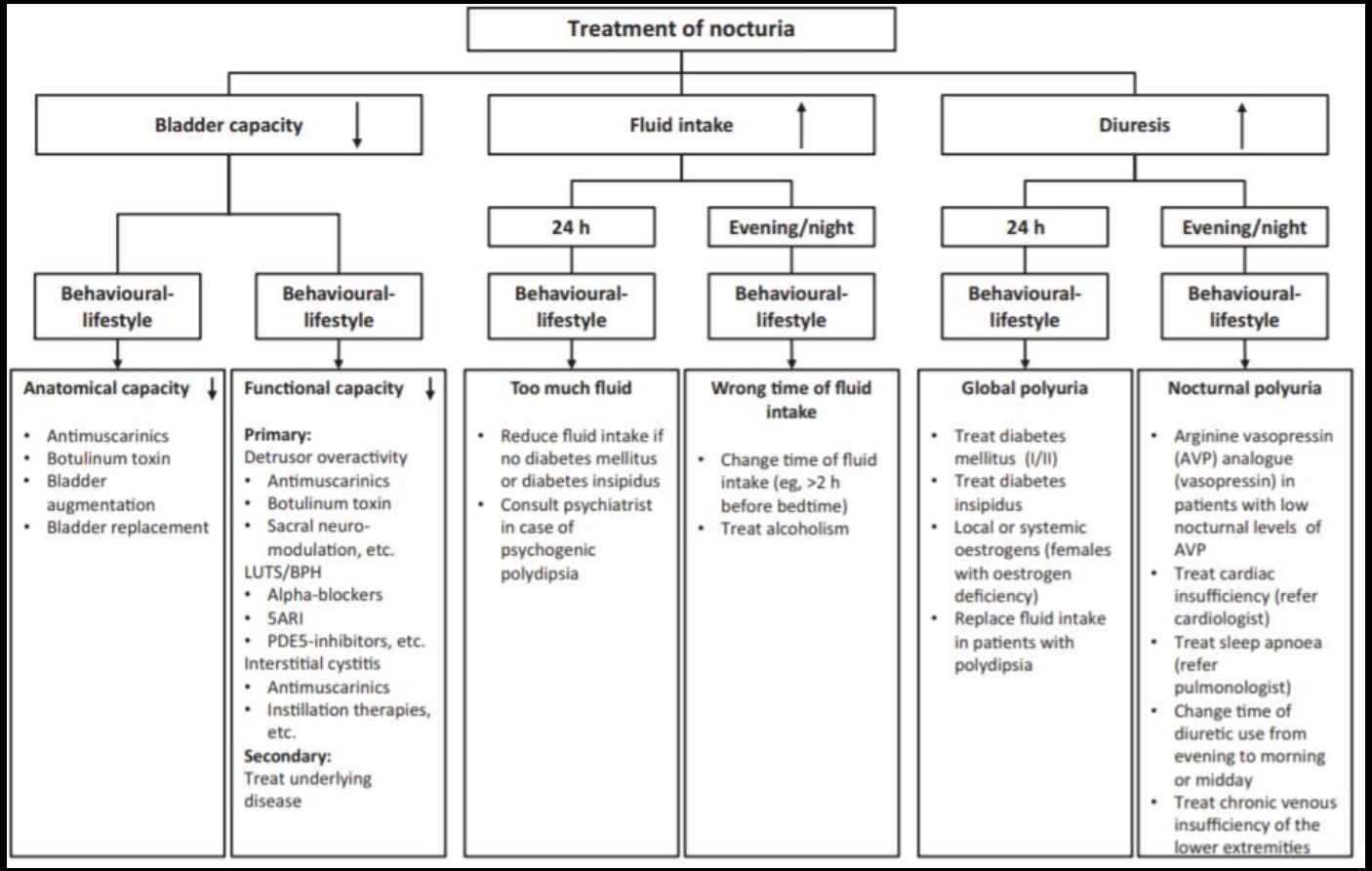
Int J Clin Pract. 2017 Nov;71(11). doi: 10.1111

Evaluation of Nocturia



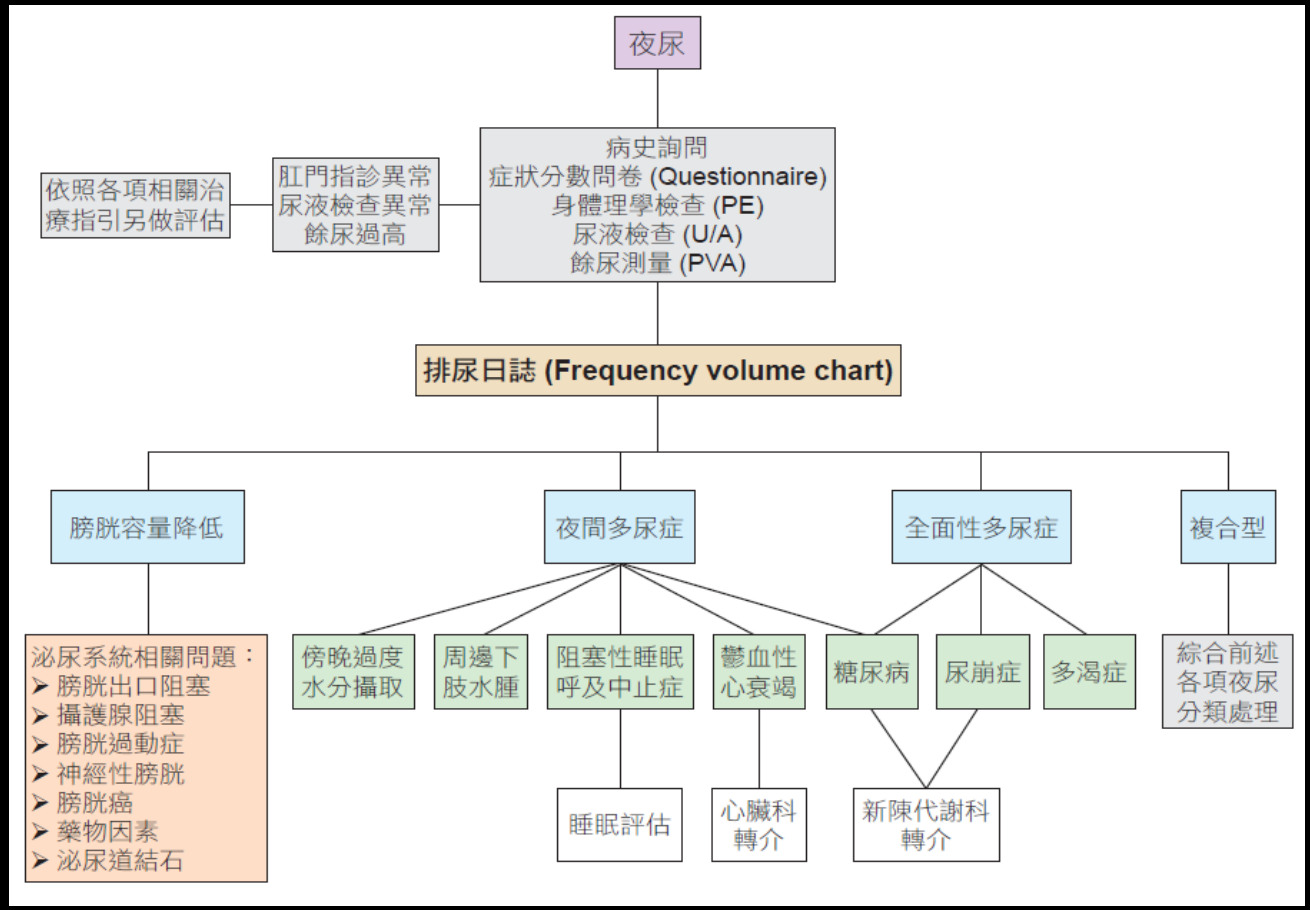
Int J Clin Pract. 2017 Nov;71(11). doi: 10.1111

Treatment of Nocturia



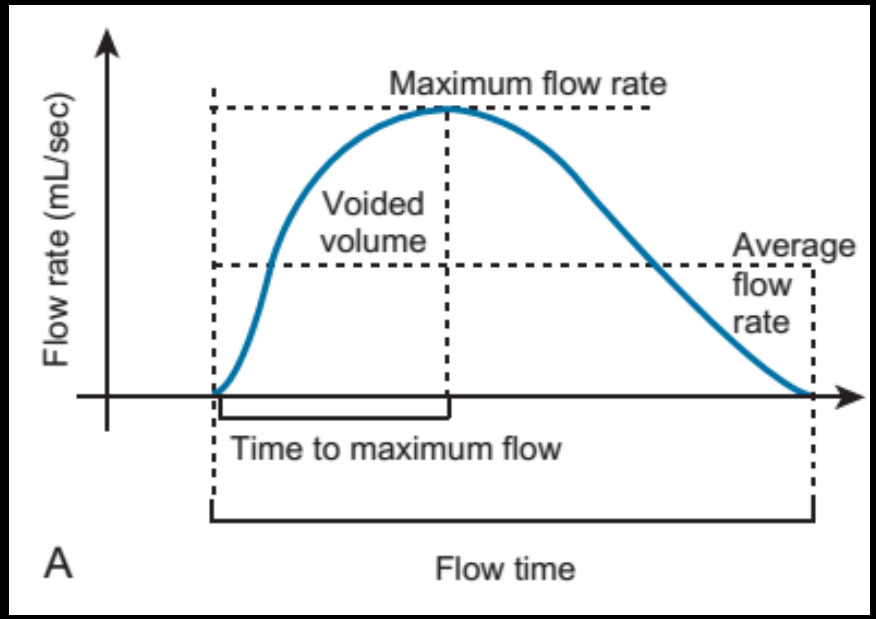
Int J Clin Pract. 2017 Nov;71(11). doi: 10.1111

TUA Guideline: Nocturia



Uroflowmetry

- **Non-invasive** urodynamic test.
  - Qmax
  - Flow pattern



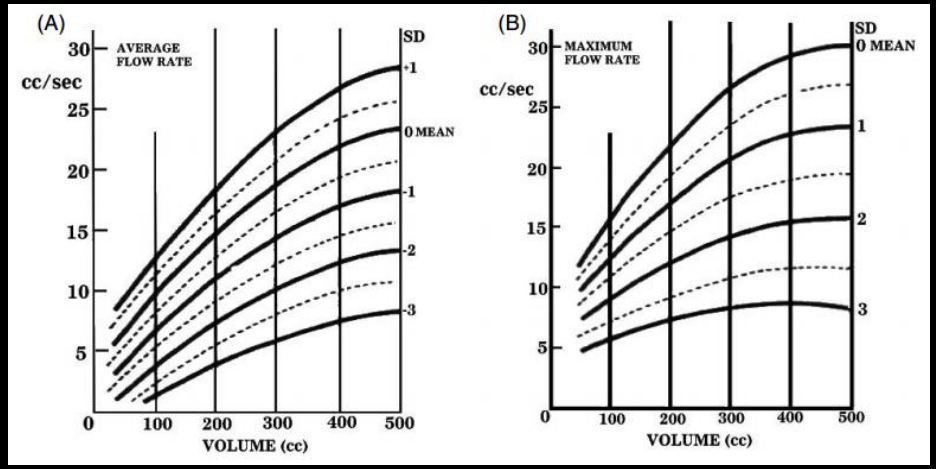
- Diagnostic accuracy for BOO
  - Qmax **< 10ml/sec**:
    Sen. 47%, **Spe. 70%, PPV 70%**
  - Qmax <15ml/sec: Sen. 82%, PPV 67%
  - Increased specificity by **repeat tests**

Uroflowmetry

- **Siroky nomogram**
- **Corrected Qmax**

  = Qmax / √voided volume

  (other: Qmax / √ (voided volume +PVR))



- **Within subject variation**
  - Preferable condition:

    voided volume **> 150mL**

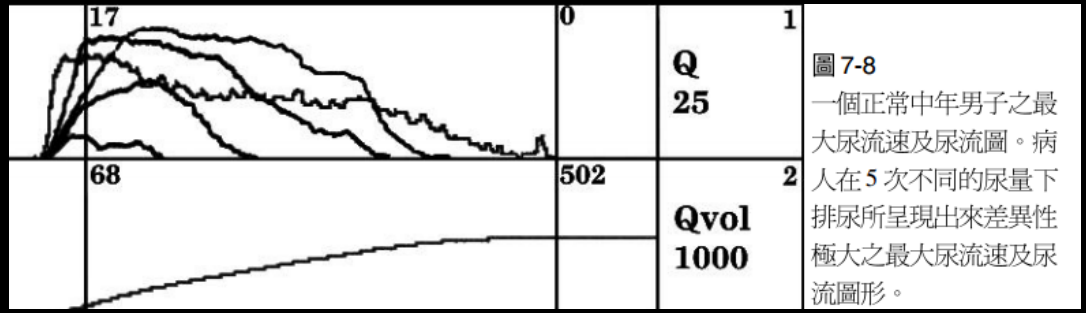


圖 7-8
一個正常中年男子之最大尿流速及尿流圖。病人在 5 次不同的尿量下排尿所呈現出來差異性極大之最大尿流速及尿流圖形。

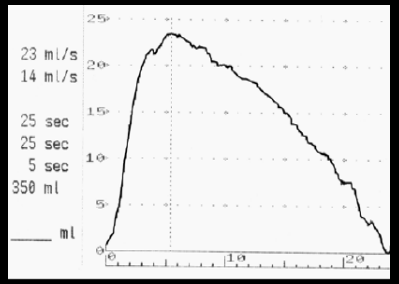
Interpretation of Uroflowmetry

Q (flow) **= P** (pressure) **/ R** (resistance)

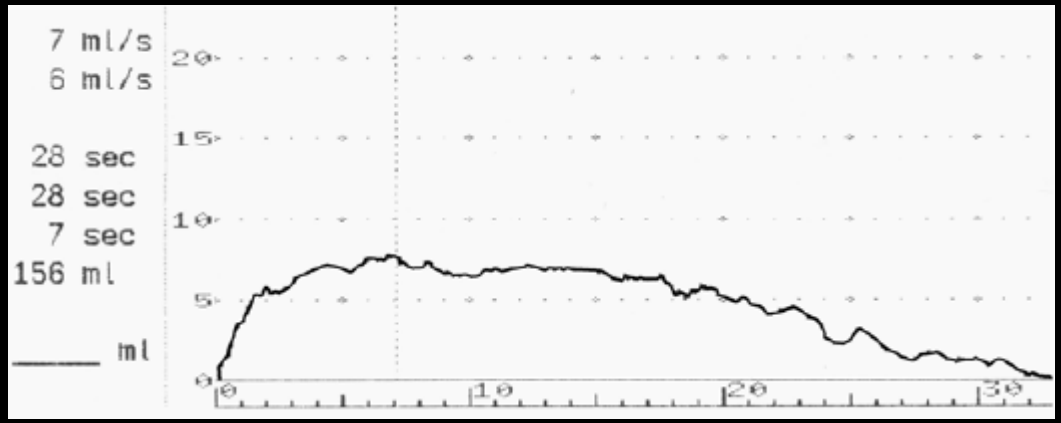
- **P: intravesical pressure**
  - Detrusor tone & strength (contractility)
  - Bladder wall compliance
  - Abdominal pressure

- **R: bladder outlet resistance**
  - Bladder neck (BN obstruction/ dysfunction)
  - Prostate (BPO)
  - External urethral sphincter (EUS) (DSD, dysfunctional voiding; ISD)
  - Urethra (stricture)

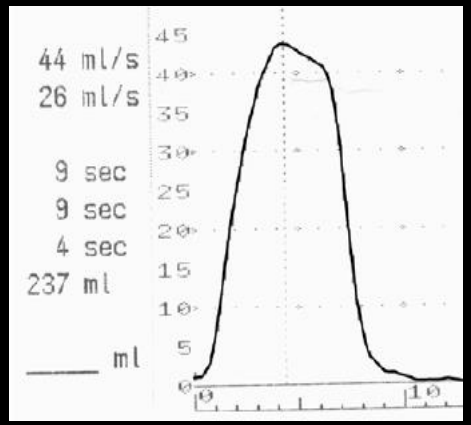
Flow patterns in Uroflowmetry



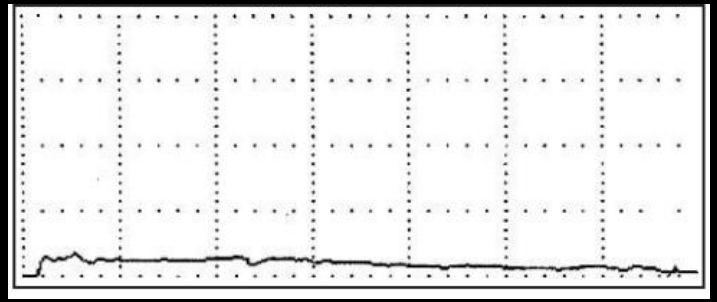
- **Bell-shape** (normal)



- **Obstructive flow** (BOO)

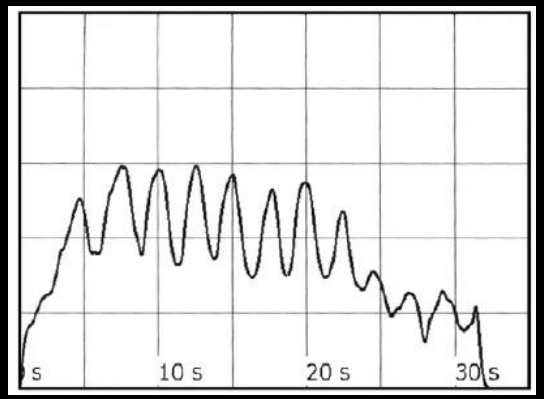


- **Tower shape** (DO/ OAB)

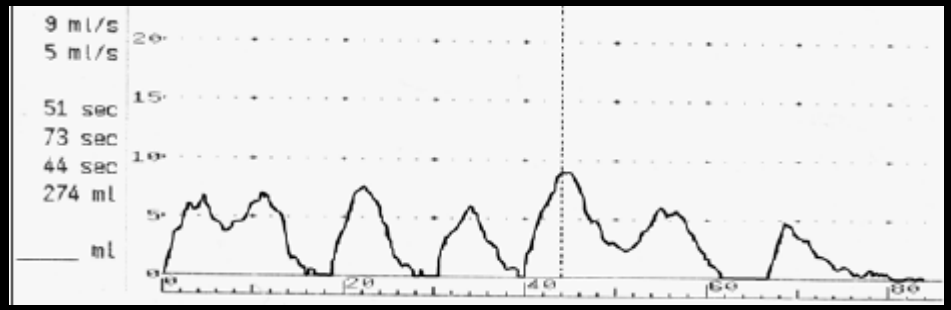


- **Constrictive/ plateau flow** (Urethral stricture)

Flow patterns in Uroflowmetry



- **Staccato/ fluctuated flow** (Weak or unsustained detrusor contractility; Dysfunctional voiding)

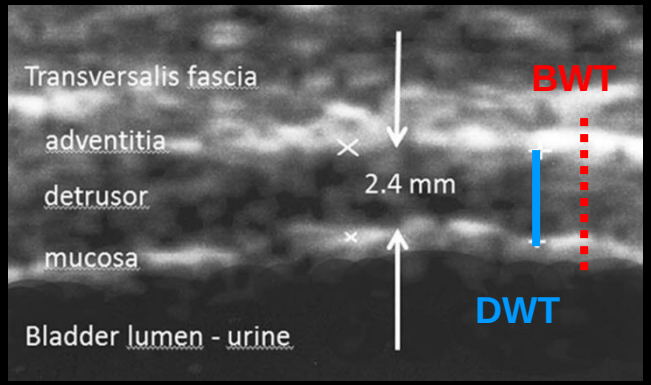


- **Intermittent / interrupted flow** (Detrusor underactivity; Dysfunctional voiding)

Bladder sonography & PVR

- **High PVR:** indicate BOO and/ or poor detrusor function
  - PVR > **50ml** for BOO: PPV 63%, NPV 52%
- **Voiding efficiency (VE)** : voided volume / (voided volume + PVR)
  - VE < **0.33**: indicate detrusor underactivity

- **Bladder wall thickness (BWT)/ Detrusor wall thickness (DWT)**



- Diagnostic accuracy for BOO
  - BWT > 5mm (under 150ml)
  - DWT > **2mm** (under 250ml): PPV 94%, Spe. 95%

Prostate Imaging

- Trans-abdominal US, **trans-rectal US (TRUS)**, CT, MRI
- Prostate size
- Prostate shape
  - **Presumed circle area ration (PCAR)**
    - **> 0.8** for BPO (Sen. 77%, Spe. 75%)

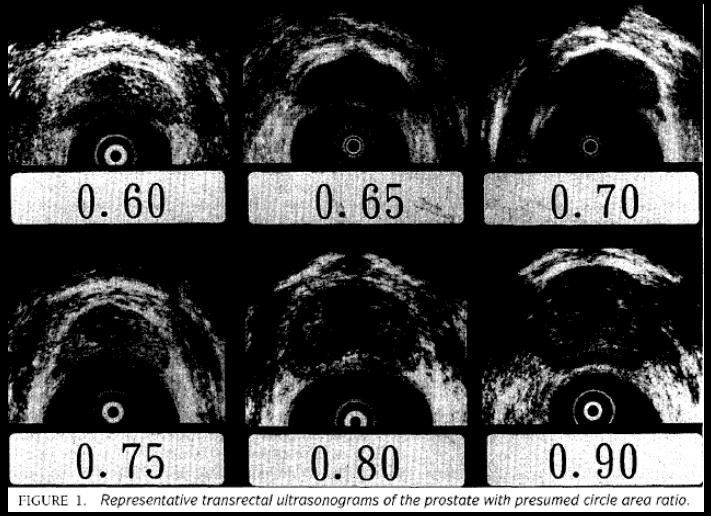
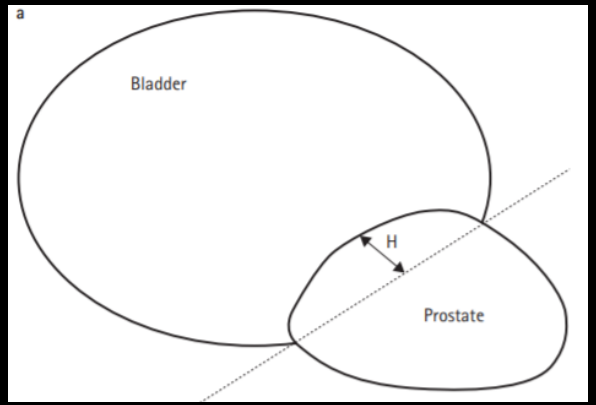


FIGURE 1. *Representative transrectal ultrasonograms of the prostate with presumed circle area ratio.*

Urology. 1997 Oct;50(4):548

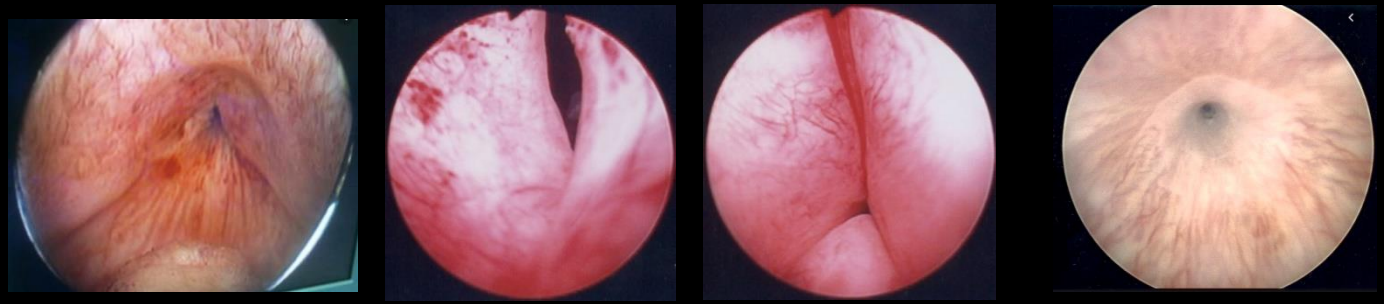
- **Intravesical prostatic protrusion (IPP)**
  - Gr.I, II, III: <5mm, 5-10mm, >10mm
  - Correlate with BPO
    (PPV 94%, NPV 79%)



BJU Int. 2003 Mar;91(4):371

Urethrocystoscopy

- Recommended in “history of microscopic or gross **hematuria, urethral stricture, or bladder cancer**, who present with LUTS”



- Detection of **bladder trabeculation**:
  - normal Qmax in 25% of patients without bladder trabeculation,
    21% of mild trabeculation, and
    12% in marked trabeculation
- Detection of **bladder diverticulum**

Renal function measurement/ UUT Imaging

Summary of evidence	LE
Men with LUTS are not at increased risk for upper tract malignancy or other abnormalities when compared to the overall population.	3
Ultrasound can be used for the evaluation of men with large PVR, haematuria, or a history of urolithiasis.	4

Recommendation	Strength rating
Perform ultrasound of the upper urinary tract in men with LUTS.	Weak

EAU guidelines: Management of Non-neurogenic Male Lower Urinary Tract Symptoms

Different clinical characteristics between bladder outlet-related and bladder-related LUTD

	Bladder outlet related LUTD	Bladder related LUTD	Total	P value
Patient number	167	131	298	
Age	71.8±9.3	73.8±8.4	72.7±9.0	0.065
IPSS-T	16.3±7.7	14.0±7.7	15.3±7.8	0.011
IPSS-V	10.1±6.0	6.5±5.4	8.5±6.0	<0.001
IPSS-S	6.2±3.6	7.6±3.8	6.8±3.8	0.001
IPSS- V/S	2.28±2.25	0.9±0.88	1.67±1.91	<0.001
TPV (ml)	48.9±27.3	43.2±23.2	46.4±25.7	0.058
TZI (%)	43.6±16.1	39.1±15.0	41.6±15.8	0.017
VUDS parameters				
CBC (ml)	313.5±132.9	285.8±146.8	301.3±139.6	0.089
Pdet (cmH2O)	53.1±24.3	33.0±15.1	44.3±23.0	<0.001
Qmax (ml/s)	9.2±4.5	12.3±6.9	10.6±5.9	<0.001
PVR (ml)	57.7±81.9	30.0±55.8	45.5±72.8	0.001

CBC: cystomeric bladder capacity, IPSS: International Prostate Symptom Score, IPSS-T: total IPSS score, IPSS-V: IPSS voiding subscore, IPSS-S: IPSS storage subscore, IPSS-V/S: IPSS voiding to storage subscores ratio, LUTD: lower urinary tract dysfunction, Pdet: detrusor pressure, PVR: postvoid residual volume, Qmax: maximum flow rate.

PLoS One. 2013;8(3):e59176

Recommendation of UDS/ VUDS in Male LUTS

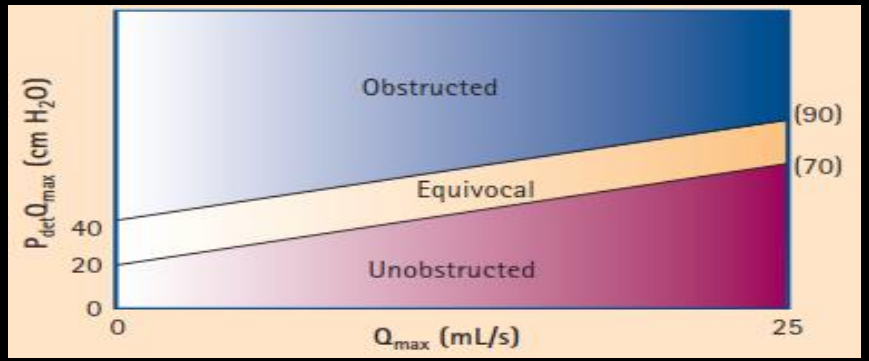
Recommendations	Strength rating
Perform pressure-flow studies (PFS) only in individual patients for specific indications prior to invasive treatment or when evaluation of the underlying pathophysiology of LUTS is warranted.	Weak
Perform PFS in men who have had previous unsuccessful (invasive) treatment for LUTS.	Weak
Perform PFS in men considering invasive treatment who cannot void > 150 mL.	Weak
Perform PFS when considering surgery in men with bothersome predominantly voiding LUTS and Q_{max} > 10 mL/s.	Weak
Perform PFS when considering invasive therapy in men with bothersome, predominantly voiding LUTS with a post void residual > 300 mL.	Weak
Perform PFS when considering invasive treatment in men with bothersome, predominantly voiding LUTS aged > 80 years.	Weak
Perform PFS when considering invasive treatment in men with bothersome, predominantly voiding LUTS aged < 50 years.	Weak

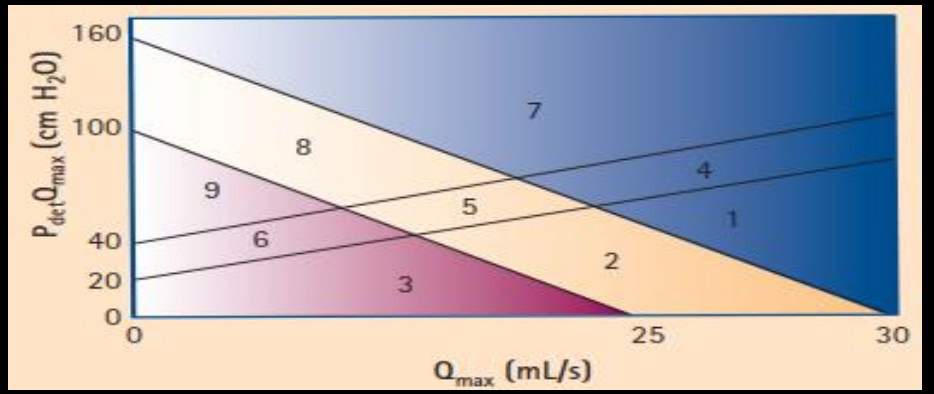
EAU guidelines: Management of Non-neurogenic Male Lower Urinary Tract Symptoms

Basic Interpretation of UDS/ VUDS

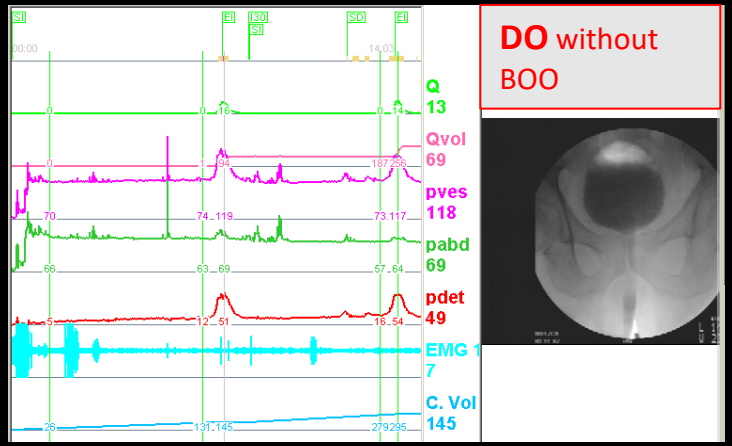
- Bladder outlet obstruction index (**BOOI**) / Abrams-Griffiths (**AG**) **number**
  = **Pdet@Qmax – 2x Qmax**
  - ≥ 40: obstructed
  - 20-40: equivocal
  - < 20: non-obstructed

- Bladder contractility index (**BCI**)
  = **Pdet@Qmax + 5x Qmax**
  - > 150: strong
  - 100-150: normal
  - < 100: weak

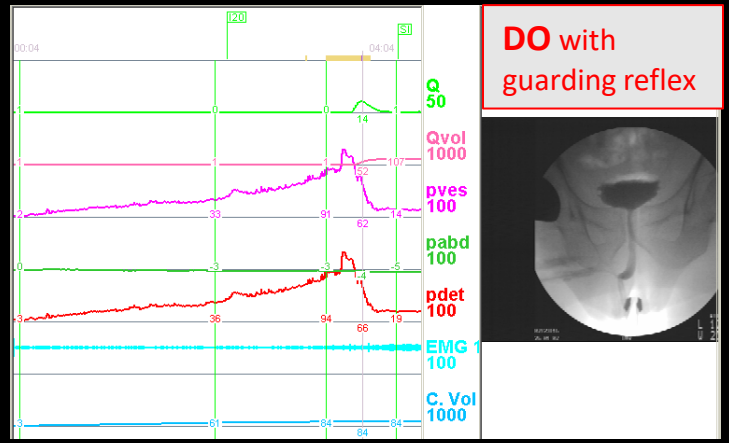




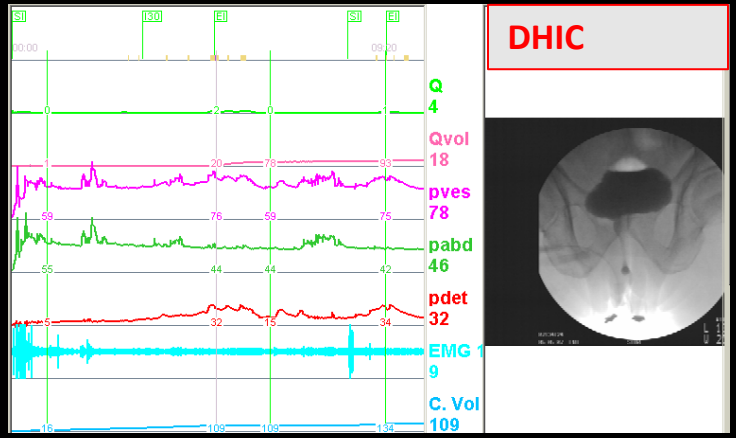
Bladder related LUTD in VUDS



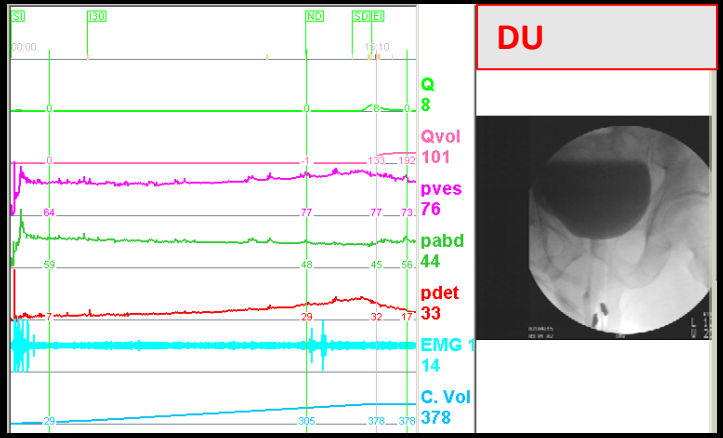
DO without BOO



DO with guarding reflex

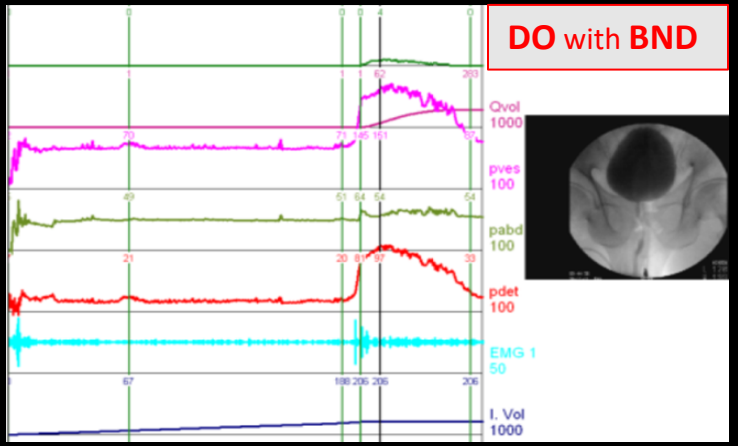


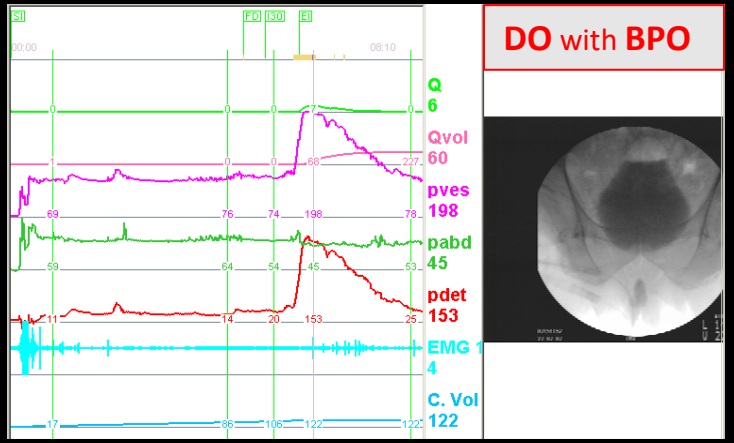
DHIC

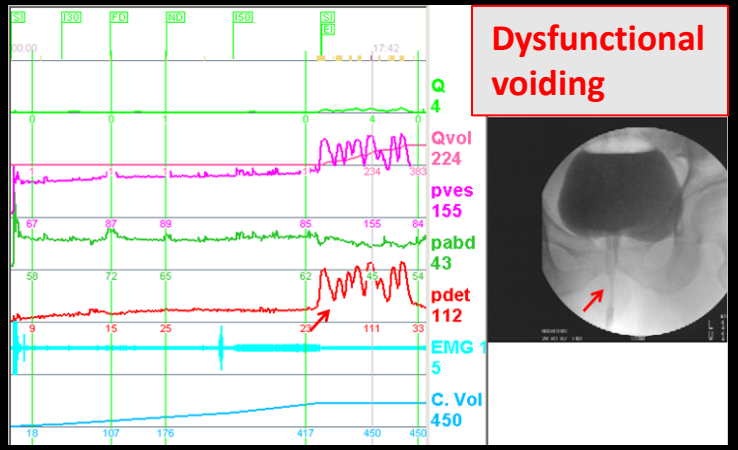


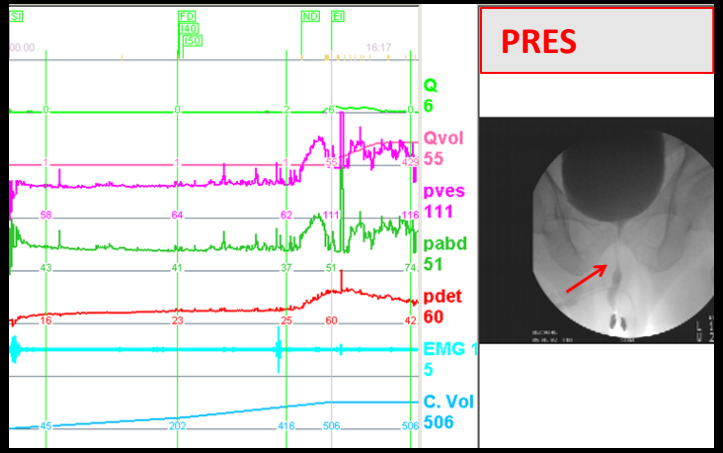
DU

Bladder-outlet related LUTD in VUDS

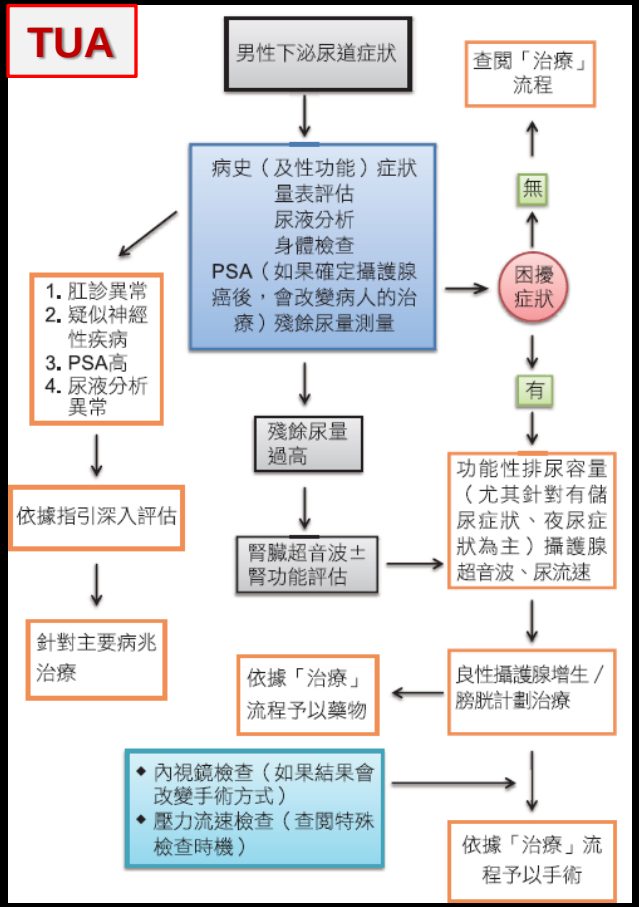


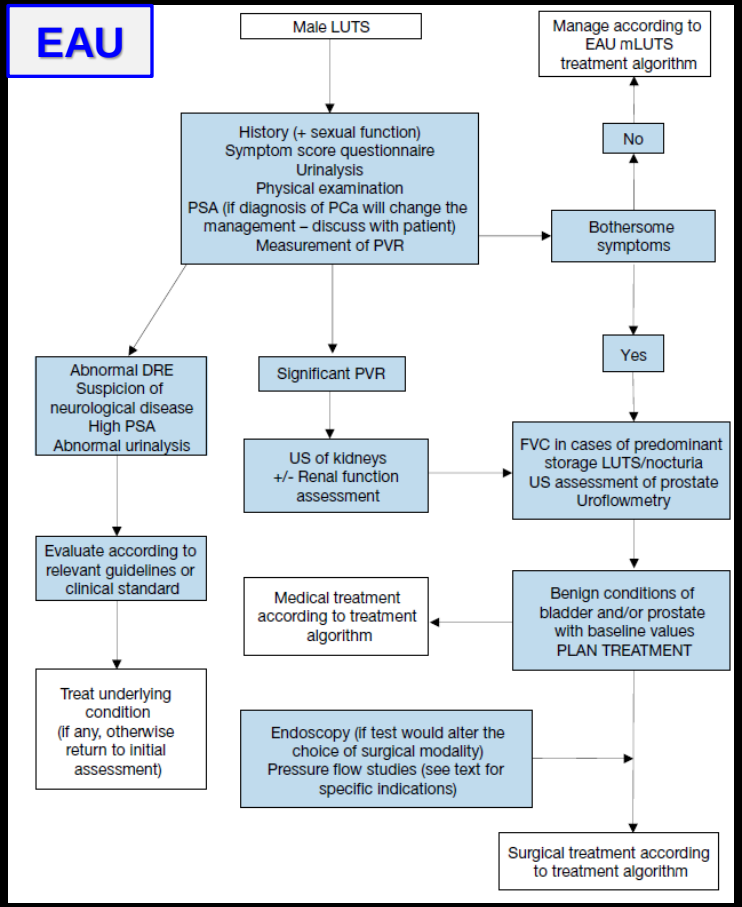






Assessment Algorithm of Male LUTS

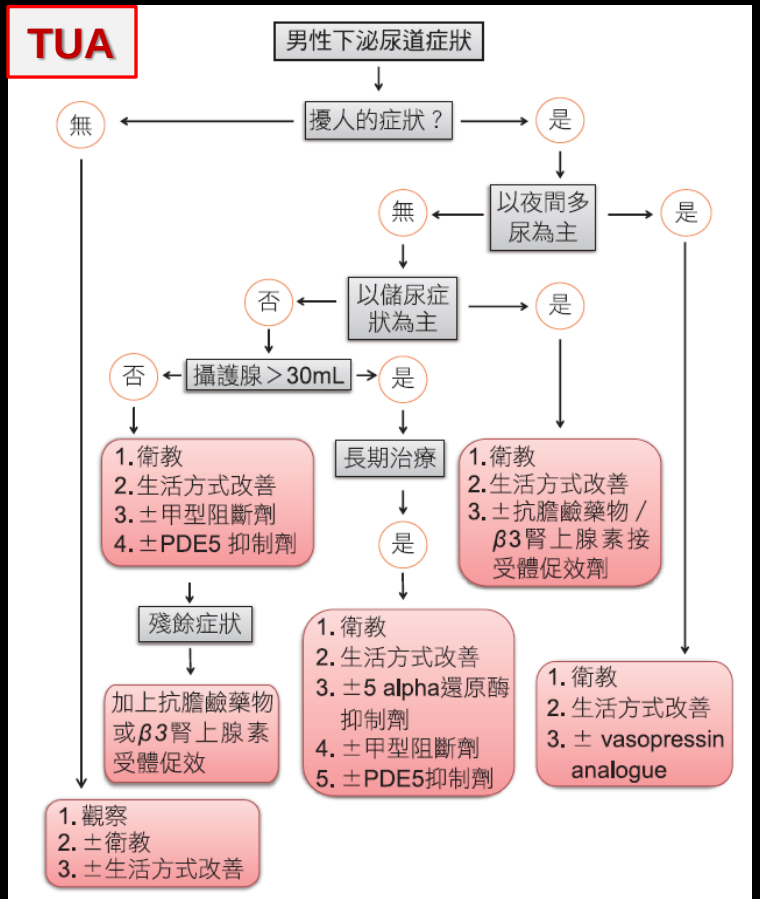




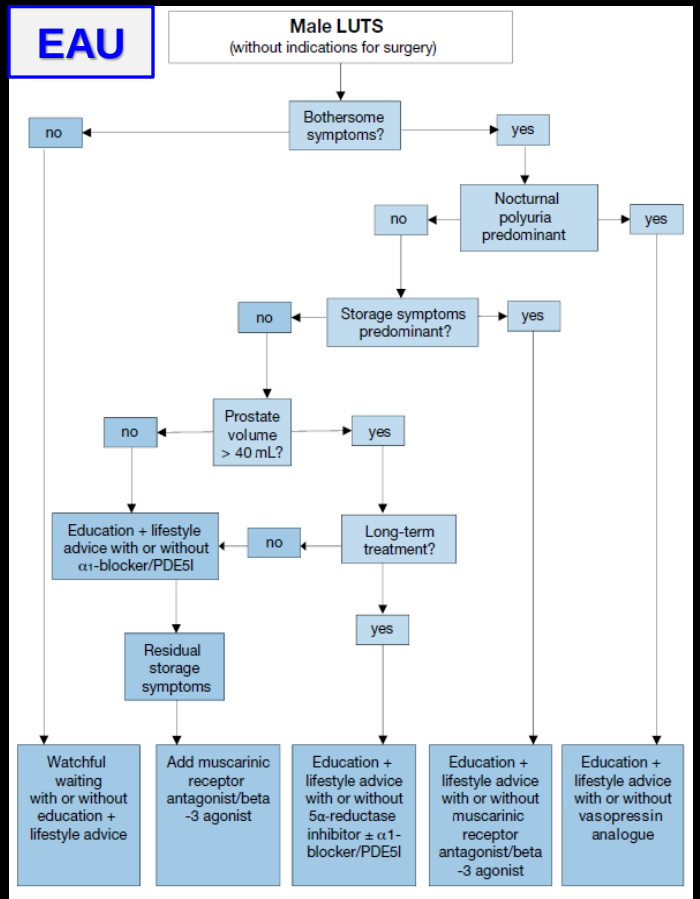
Treatment Algorithm of Male LUTS

(without indications for surgery)

TUA



EAU



Take Home Message
Clinical Evaluation & Diagnosis of Male LUTS

- Etiology from **systemic, UUT, or LUT;**
  Exams from **non-invasive to invasive**

- **Advantage and limitations** of all non-invasive & invasive exams

- **Careful interpretation** of the results based on UDS concepts