

Index

A

- Abdominal leak point pressure (ALPP), 55
- Abrams-Griffiths nomogram, 115, 120
 - bladder outlet obstruction, 114, 115
 - detrusor pressure, 114
 - post-operative pressure-flow curve, 115
 - pressure-flow plot, 114
- Acetylcholine (ACh), 3
- Advanced urodynamics, 10, 12, 14–17, 19
- Ambulatory urodynamic monitoring (AUM)
 - bladder outlet obstruction, 131
 - catheters, 128, 132
 - characteristics, 126–127
 - definition, 126
 - ICS, 127
 - indications, 126
 - intravesical and intra-abdominal pressures, 127
 - intravesical device, 132
 - leakage events, 127
 - limitations, 127
 - micro-tip transducer, 127–128
 - natural filling, 126
 - neurogenic bladder, 131, 132
 - overactive bladder syndrome, 129
 - remote devices, 127
 - stress incontinence, 130
 - Valsalva maneuver, 128
 - voiding occasions, 128
 - vs. SU, 126
- Analog signal, 18
- Anticholinergic therapy, 146
- Areflexic bladder, 37
- AUM *See* Ambulatory urodynamic monitoring (AUM)
- Autonomic nervous system, 3

B

- Basic metabolic panel (BMP), 23
- Basic urodynamics, 12–13, 126
- BCI *See* Bladder contractility index (BCI)
- Bedside urodynamics, 137, 138, 140
 - catheterization, 138
 - components, 136
 - cystometry, 139–141
 - drawback, 141
 - patient selection, 136
 - PVR, 138
 - uroflowmetry
 - average flow rate, 137
 - interpretable flow test, 137
 - noninvasive test, 137
 - urinary stream, 138
 - voiding dysfunction, 135
- Benign prostatic enlargement (BPE), 67
- Benign prostatic obstruction (BPO), 67, 68
- Bernoulli's equation, 62, 63
- Bladder contractility index (BCI), 66, 72
- Bladder exstrophy, 156
- Bladder neck, 94, 95, 97–99, 107, 110
- Bladder outlet obstruction (BOO), 35
 - AUM, 131
 - females, 69–70
 - fluoroscopy, 96–98
 - males, 67–69
 - nomograms, 114, 115, 120–123
- Bladder outlet obstruction index (BOOI), 64, 65, 120, 122
- Bladder overactivity (OAB), 51, 104, 114, 129
- Bladder scanner, 12
- Bladder ultrasonography, 138
- Bladder ultrasound, 145, 150
- Bladder-output relation (BOR), 65–66

BladderScan, 103, 150
 Blaivas-Groutz nomogram, 120–123
 BMP *See* Basic metabolic panel (BMP)

C

Carbon dioxide cystometry, 50
 Catheters
 atmospheric cap, 46
 AUM, 128
 in children, 148–151
 pressure transducer, 46
 stopcock, 46
 urodynamics labs, 47
 Catheter-tip transducer, 44
 Concentric needle electrodes (CNE), EMG, 78
 Condom catheter method (CCM), 39
 Cough leak point pressure (CLPP), 55
 Cystografin, 50
 Cystometrogram (CMG), 15, 108–110
 air-charged catheter, 44
 bladder and rectal pressures, 43
 bladder filling
 carbon dioxide cystometry, 50
 cystografin, 50
 fluoroscopy, 49
 physiologic filling, 51
 videourodynamics, 50
 BOO, 70
 catheters
 atmospheric cap, 46
 pressure transducer, 46
 stopcock, 46
 urodynamics labs, 47
 catheter-tip transducer, 44
 definition, 43
 detrusor pressure, 43, 49
 electric signal (voltage), 45
 external pressure transducer, 44
 ICS, 44
 leak point pressure, 55–56
 Micro-Tip Catheter, 44
 obstructive conditions, 45
 provocative maneuvers, 51–53
 rectal catheter, 47–48
 storage, 53, 54
 suprapubic pressure measurements, 45
 transurethral double-lumen fluid-filled catheter, 45
 troubleshooting, 56, 57
 urodynamic testing, 44, 104
 Valsalva leak point pressure, 45
 vesical pressure, 44

Cystometry
 bedside urodynamics, 139–141
 filling, 151–153
 voiding, 153–154
 Cystoscopy, 10, 24, 25

D

Detrusor instability (DI), 129, 130
 Detrusor leak point pressure (DLPP), 55, 153
 Detrusor overactivity (DO), 52, 129–131
 Detrusor pressure, 43, 49
 Abrams-Griffiths nomogram, 114, 115
 cystometry, 151, 153
 leak point pressures, 55
 PFS, 61
 vs. flow rate curves, 116, 117
 Detrusor sphincter dyssynergia (DSD), 36, 83, 85
 Detrusor underactivity (DU), 71, 72
 Detrusor wall thickness (DWT), 38
 Digital signal, 18
 Dysfunctional elimination syndrome (DES), 144

E

Electrical capacitance, 33
 Electromyography (EMG), 15
 CMG, 109
 CNE, 78
 concentric needles, 78
 DSD, 83
 dysfunctional voiding, 83, 84
 electrical noise, 79
 guarding reflex, 81, 82
 history of, 77–78
 infra-sacral denervation injury, 85
 in children, 148–151
 needle electrodes, 78
 neurologic conditions, 86
 neurogenic disorders, 82
 neuromodulation device, 80
 Parkinson's disease, 85
 pelvic floor muscle function, 77
 sacral injury, 85
 SNM, 80
 sphincter bradykinesia, 85
 surface electrodes, 78, 79
 technical factors, 80
 urodynamics test, 81
 Valsalva/Crede voiding, 83
 Electronic medical (EMR) record, 18

F

Flow controlling zone (FCZ), 63, 68

Fluid dynamics

liquids and gasses, 5

Pascal's Law, 5–6

Fluoroscopic urodynamics (FUDS)

See Video urodynamics (VUDS)

Fluoroscopy, 49, 70, 83

anatomy, 92

benefits, 107–108

BOO, 96–98

business models, 107

c-arm machines, 106

contrast media, 98, 99

costs and effort, 106

facility requirements, 91

incontinence, 95

licensing, 90

lower urinary tract, 90

machine requirements, 91

physical plant, 106

post-void image, 94

radiation safety, 91–92

radiographic study, 92

resting image, 93

scout film, 93

strain (Valsalva)/cough image, 94

troubleshooting, 99

VCUG, 94, 96

Food and Drug Administration (FDA), 91

H

Hyperglycemia, 102

I

International Consultation of Incontinence

Questionnaire Short Form on

Urinary Incontinence

(ICIQ-UI), 22

International Continence Society (ICS), 44,
126

AUM, 127, 128

guidelines, 47

nomogram, 118–120, 122

recommendation, 45

terminology, 63

Interstitial cystitis/bladder pain syndrome

(IC/BPS), 51, 53

Intravesical pressure, 48, 57, 99, 111

Israeli urogynecologist Asnat Groutz,
121

L

LaPlace's Law, 7

Leak point pressure, 55–56, 95, 110, 153

Linearized passive urethral relation curve
(LinPURR), 117

Lower urinary tract

anatomy, 1, 2

biomechanics, 6–7

fluoroscopy, 90

function, 1, 31

neural control

ACh, 3

autonomic nervous system, 3

bladder filling, 3

longitudinal muscle layers, 4

micturition event, 4

postganglionic parasympathetic

neurons, 3

purposes of, 3

urethra-spinal-bladder reflex, 4

urethra-spinal-urethra reflex, 4

urethra-spinobulbospinal-bladder
reflex, 4

Lower urinary tract symptoms (LUTS),
26, 97, 114

PFS, 67

UFM, 32

M

Microscopic hematuria, 23

Micro-Tip Catheter, 44

Micro-tip transducer, 127, 128

Motor unit potential (MUP), 85

Multi-channel urodynamics, 92

N

Near infrared spectroscopy (NIRS), 39

Neural control

ACh, 3

autonomic nervous system, 3

bladder filling, 3

longitudinal muscle layers, 4

micturition event, 4

postganglionic parasympathetic neurons, 3

purposes of, 3

urethra-spinal-bladder reflex, 4

urethra-spinal-urethra reflex, 4

urethra-spinobulbospinal-bladder reflex, 4

Neural tube defects, 155

Neurogenic bladder, 26, 110, 131, 132,
144–145

- Neurologic disease, 21
 NIU *See* Noninvasive urodynamics (NIU)
- Nomograms**
 abdominal and intravesical pressures, 67
 Abrams-Griffiths nomogram
 bladder outlet obstruction, 114, 115
 detrusor pressure, 114
 post-operative pressure-flow curve, 115
 pressure-flow plot, 114
 BCI, 66
 Bernoulli's equation, 62, 63
 bladder outlet obstruction, 120–123
 Blaivas-Groutz, 120–123
 BOOI, 64, 65
 detrusor pressure, 65, 66
 FCZ, 63
 ICS, 118–120, 122
 mathematical analysis, 62
 pressure-flow, 113
 PURR, 64
 rigid system, 63
 Schäfer nomogram, 116–119
 URR, 64
 volitional voiding, 66
- Noninvasive urodynamics (NIU)**
 CCM, 39
 DWT, 38
 NIRS, 39
 penile cuff test, 38
 urinary flow and bladder conditions, 31
 uroflowmetry, 31
 average flow rate, 34
 bladder function and dysfunction, 32
 BOO, 35
 continuous flow curves, 35
 dysfunctional voiding, 35
 electrical capacitance, 33
 flow rate, 34
 flow time, 34
 indications, 32
 intermittent flow curve, 36
 maximum flow rate, 34
 normal curve, 35
 preparation, 33
 PVR, 34, 37
 rotating disc, 33
 technique, 34
 time to maximum flow, 34
 toy erector set, 32
 urine flow rate, 32, 34
 voided volume, 34
 voiding time, 34
 weight, 33
- Non-neurogenic bladder, 143, 144**
- O**
 Overactive bladder (OAB), 51, 104, 114, 129
- P**
 Pad weight testing, 24
 Parkinson's disease, 85
 Pascal's Law, 5–6
 Passive urethral resistance relation (PURR),
 64, 116, 118
 Pelvic floor muscle function, 77
 Penile cuff test, 38
 Periprocedural antibiotic treatment, 27–28
 Post void residual (PVR), 25, 34, 37, 138, 149
 Posterior urethral valve, 155
 Postganglionic parasympathetic neurons, 3
 Pressure flow study (PFS)
 BOO
 females, 69–70
 males, 67–69
 detrusor pressure, 61
 nomograms
 abdominal and intravesical pressures,
 67
 BCI, 66
 Bernoulli's equation, 62, 63
 BOOI, 64, 65
 detrusor pressure, 65, 66
 FCZ, 63
 mathematical analysis, 62
 PURR, 64
 rigid system, 63
 URR, 64
 volitional voiding, 66
 underactive detrusor contraction and
 Valsalva voiding, 71–73
 Pressure-flow nomogram, 113
 Provocative maneuvers, 43, 51–53
 PURR *See* Passive urethral resistance relation
 (PURR)
 PVR *See* Post void residual (PVR)
- R**
 Radiology, 10, 90
 Rectal catheter, 47–48, 150
- S**
 Sacral neuromodulation (SNM), 80
 Schäfer nomogram, 116–119
 Silver-chloride surface electrode, 79
 Sonography, 151
 Speculum, 22

Sphincter bradykinesia, 85
 Standard urodynamic (SU) testing, 125–127
 Stress urinary incontinence (SUI), 51, 53, 130
 Suprapubic pressure measurements, 45

T

Triple lumen catheters, 149

U

UDS *See* Urodynamics (UDS)
 UFM *See* Uroflowmetry (UFM)
 Underactive detrusor contraction, 71–73
 Urethral opening pressure, 62, 116
 Urethral resistance relation (URR), 64
 Urethral sphincter function, 146
 Urethra-spinal-bladder reflex, 4
 Urethra-spinal-urethra reflex, 4
 Urethra-spinobulbospinal-bladder reflex, 4
 Urinalysis (UA), 22
 Urinary tract infections (UTI), 144–146
 Urodynamics (UDS)
 advanced, 12, 14–16
 basic, 12–13
 biomechanics, 6–7
 bladder pressure curve, 108, 109
 BMP, 23
 clinical tests, 101
 CMG, 104, 108–110
 compliance, 6, 7
 correlation and clinical data, 11
 cystoscopy, 10, 24, 25
 data processing, 18
 data storage, 18
 definition, 21
 development of, 9–12
 diagnostic tests, 102
 education, 26–27
 fluid dynamics
 liquids and gasses, 5
 Pascal's Law, 5–6
 fluoroscopy
 benefits, 107–108
 business models, 107
 c-arm machines, 106
 costs and effort, 106
 physical plant, 106
 goals of, 89
 history, 21–22
 hyperglycemia, 102
 imaging studies, 25
 in children, 151
 anesthetic effect, 148
 anticholinergic therapy, 146

bladder exstrophy, 156
 bladder function, 146
 catheter, 148–151
 child-friendly atmosphere, 146
 cystometry *see* Cystometry
 fluoroscopy, 150
 neural tube defects, 155
 neurogenic bladder, 144–145
 non-neurogenic bladder, 143, 144
 Pabd and Pves transducers, 148
 physical examination, 145
 pink plastic tape, 150
 posterior urethral valve, 155
 pre-study room set up, 147
 PVR, 149
 surface electrodes, 149
 urethral sphincter function, 146
 UTI, 146
 VCUG, 145
 voiding and stooling diary, 145
 voiding dysfunction, 156–157
 laboratory, 47, 105–106
 LaPlace's Law, 7
 lower urinary tract symptoms, 26
 neurogenic bladder dysfunction, 25
 neurogenic bladder patients, 110
 neurologic disease, 21
 non-neurogenic incontinent patients, 111
 OAB, 104
 pad weight testing, 24
 patient preparation, 26–27
 periprocedural antibiotic treatment, 27–28
 physical examination, 22
 preoperative studies, 26
 pressure flow test, 104
 PVR, 25
 radiology, 10
 room and personnel, 10, 11
 stress and strain, 7
 stress incontinence test, 104
 testing, 10, 81
 UA, 22
 uroflow and post-void residual, 103
 voiding diary, 23
 VUDS *see* Video urodynamics (VUDS)
 Uroflowmetry (UFM), 12, 13, 31
 average flow rate, 34, 137
 bladder function and dysfunction, 32
 BOO, 35
 continuous flow curves, 35
 dysfunctional voiding, 35
 electrical capacitance, 33
 flow rate, 34
 flow time, 34
 indications, 32

- Uroflowmetry (UFM) (*cont.*)
 intermittent flow curve, 36
 interpretable flow test, 137
 maximum flow rate, 34
 noninvasive test, 137
 normal curve, 35
 preparation, 33
 PVR, 34, 37
 rotating disc, 33
 technique, 34
 time to maximum flow, 34
 toy erector set, 32
 urinary stream, 138
 urine flow rate, 32, 34
 voided volume, 34
 voiding time, 34
 weight, 33
- Urogenital Distress Inventory Short Form (UDI-6), 22
- UTI *See* Urinary tract infections (UTI)
- V**
- Valsalva leak point pressure (VLPP), 45, 55, 95, 103, 111, 153
- Valsalva maneuver, 73, 81, 128
- Valsalva voiding, 71–73
- VCUG *See* Voiding cystourethrogram (VCUG)
- Vesicoureteral reflux (VUR), 94, 107, 145, 157
- Video urodynamics (VUDS), 50, 89
- BOO, 70
- components of, 12
- cystogram, 17
- fluoroscopy, 16
- lead-lined room, 17
- VCUG, 17
- vs.* UDS, 17
- VLPP *See* Valsalva leak point pressure (VLPP)
- Voiding cystourethrogram (VCUG), 17, 94, 96, 97, 144, 145
- Voiding dysfunction, 156–157
- VUDS *See* Video urodynamics (VUDS)
- VUR *See* Vesicoureteral reflux (VUR)
- W**
- Watt factor (WF), 72