
TABLE OF CONTENTS

VOLUME I

<i>Foreword</i>	<i>viii</i>
<i>Introduction</i>	<i>ix</i>
Cardiovascular Disorders	1
Head, Ear, Eye, Nose, and Throat Disorders	95
Abdominal and Gastrointestinal Disorders	163
Thoracic and Respiratory Disorders	223
Traumatic Disorders	293
Orthopedic Emergencies	339
Musculoskeletal Disorders (Nontraumatic)	391
Nervous System Disorders	409
Gynecologic and Obstetric Disorders	451

VOLUME II

Pediatric Emergencies	507
Toxicologic Disorders	561
Endocrine, Metabolic, and Nutritional Disorders	617
Environmental Disorders	661
Psychobehavioral Disorders	701
Hematologic Disorders	739
Oncologic Disorders	769
Systemic Infectious Disorders	785
Immune System Disorders	811
Renal and Urologic Disorders	831
Cutaneous Disorders	861
Emergency Medical Services	899
Procedures and Skills Integral to the Practice of Emergency Medicine	919
Other Components of the Practice of Emergency Medicine	985

CARDIOVASCULAR DISORDERS

Michael McCrea, MD, FACEP

DYSRHYTHMIAS	9
Basic Principles of Cardiac Conduction Disturbances.....	9
Standard ECG and Rhythm Strips.....	9
Normal Morphology.....	9
Causes of Abnormal Morphologies.....	9
General Approach to Dysrhythmias	14
Unstable Patients.....	14
Stable Patients	15
Specific Rhythm Assessments	15
Sinus Rhythm	15
Premature Atrial Contractions.....	16
Sinus Tachycardia.....	16
Sinus Bradycardia.....	17
Supraventricular Tachycardia.....	17
Atrial Fibrillation	19
Atrial Flutter	20
Multifocal Atrial Tachycardia.....	21
Junctional Premature Contractions	22
Premature Ventricular Contractions	22
Ventricular Tachycardia	23
Ventricular Fibrillation.....	25
Pulseless Electrical Activity.....	26
Bundle-Branch Blocks	27
Sick Sinus Syndrome	27
Atrioventricular Blocks.....	28
Preexcitation Syndromes.....	30
Pacemakers	31
Emergency Pacing Techniques	31
Indications for Temporary Cardiac Pacing.....	31
Tips for Temporary Transvenous Pacemaker Placement	31
Pacemaker Failure	31
Automatic Implantable Cardioverter Defibrillators.....	33
ACUTE CORONARY SYNDROME	34
Definition.....	34
Clinical Presentations and Risk Factors	34
Diagnosis	35
Management	40
Complications.....	43
CONGESTIVE HEART FAILURE.....	45
Etiology, Precipitating Factors, and Signs and Symptoms	45
Diagnostic Evaluation	46
Management	46
LEFT VENTRICULAR ASSIST DEVICES (LVADs).....	48
Basic Principles of LVADs.....	48
Complications.....	49
Special Considerations	51

CARDIOMYOPATHIES AND SPECIFIC HEART MUSCLE DISEASES	51
Cardiomyopathies	51
Definition.....	51
Idiopathic Dilated (Congestive) Cardiomyopathy.....	51
Restrictive Cardiomyopathy.....	52
Hypertrophic Cardiomyopathy.....	53
Specific Heart Muscle Diseases.....	55
PERICARDIAL DISORDERS.....	56
Pericarditis.....	56
Pericardial Tamponade.....	59
MYOCARDITIS.....	60
Etiology.....	60
Clinical Presentation.....	61
Diagnostic Evaluation.....	61
Management.....	62
VALVULAR HEART DISEASE.....	62
Mitral Valve Prolapse (“Click Murmur Syndrome”).....	62
Mitral Stenosis.....	63
Mitral Regurgitation.....	64
Aortic Stenosis.....	65
Aortic Regurgitation.....	66
Tricuspid Stenosis.....	68
Tricuspid Regurgitation.....	68
Prosthetic Valves.....	69
Conditions Necessitating Antibiotic Prophylaxis for Infective Endocarditis.....	70
ENDOCARDITIS.....	71
Definition.....	71
Pathophysiology.....	71
Clinical Presentation.....	72
Diagnostic Evaluation.....	72
Diagnosis.....	73
Management.....	74
THORACIC AORTIC DISSECTIONS AND ABDOMINAL AORTIC ANEURYSMS.....	75
Thoracic Aortic Dissections.....	75
Epidemiology.....	75
Pathophysiology.....	75
Natural History.....	76
Classification System.....	76
Clinical Presentation.....	76
Diagnostic Evaluation.....	77
Management.....	78
Abdominal Aortic Aneurysms.....	78
Definition and Anatomic Location.....	78
Pathogenesis.....	79
Risk Factors.....	79
Clinical Presentation.....	79
Diagnosis and Management.....	79
DEEP VENOUS THROMBOSIS.....	80
Pathogenesis.....	80
Clinical Presentation.....	80
Acute Deep Venous Thrombosis.....	80
Massive Deep Venous Thrombosis.....	80
Prevalence and Risk.....	81
Predicting Pretest Probability for DVT: The Well’s Clinical Criteria.....	82

Diagnostic Evaluation 82
Pharmacologic Therapy 83
Disposition—Admission Criteria 85
HYPERTENSIVE EMERGENCIES AND URGENCIES 85
Hypertensive Emergencies 85
 Definition 85
 Clinical Presentation 85
 Management 85
Hypertensive Urgencies 87
 Definition and Etiology 87
 Management 87

HEAD, EAR, EYE, NOSE, AND THROAT DISORDERS

Matthew Ball, MD, and Sandra Najarian, MD, FAAEM

OTOLOGIC EMERGENCIES	105
Anatomy	105
Sensory Supply to the Ear	105
Auditory Transmission	105
Infections	105
Acute Otitis Externa (Swimmer’s Ear)	105
Malignant (Necrotizing) Otitis Externa	105
Posttraumatic Perichondritis	106
Acute Otitis Media	106
Bullous Myringitis	107
Mastoiditis	107
Sudden Hearing Loss	108
Vertigo	109
Trauma	110
EYE EMERGENCIES	111
Conjunctivitis	111
Viral Conjunctivitis (“Pink Eye”)	111
Bacterial Conjunctivitis	112
Chlamydial (Inclusion) Conjunctivitis	113
Vernal Conjunctivitis	113
Inflammatory Disorders of the Eyelids and Cornea	113
Anterior Blepharitis	113
Hordeolum (Stye)	114
Chalazion	114
Dacryocystitis	114
Corneal Ulcers	115
Herpes Simplex Keratitis	116
Herpes Zoster Ophthalmicus	116
Ultraviolet Keratitis	117
Periorbital and Orbital Cellulitis	118
Acute Eye Pain	119
Acute Iritis (Acute Anterior Uveitis)	119
Acute Angle Closure Glaucoma	120
Acute Visual Loss	121
Central Retinal Artery Occlusion	121
Central Retinal Vein Occlusion	122
Optic Neuritis	123
Eclipse Burn (Solar Retinopathy)	123
Retinal Detachment	124
Vitreous Hemorrhage	125
Functional Blindness	125
Temporal (Giant Cell) Arteritis	126
Nonacute Visual Loss	126
Primary Open Angle Glaucoma	126
Cytomegalovirus Retinitis	126
Trauma	127
Chemical Burns	127
Lid Lacerations	127

Corneal Injuries.....	128
Ruptured Globe.....	129
Hyphema	129
Lens Subluxation and Dislocation	130
Blowout Fractures of the Orbit.....	130
Orbital Compartment Syndrome.....	131
Intraocular Foreign Body	131
Traumatic Iritis/Iridocyclitis.....	131
Traumatic Miosis and Mydriasis	132
Anisocoria.....	132
Ophthalmic Medications.....	133
Packaging.....	133
Topical Anesthetics.....	133
Mydriatics and Cycloplegics.....	133
Miotics.....	134
Topical Antibiotics.....	134
Antivirals.....	134
Topical Steroids.....	134
Hyperosmotic Agents	134
Carbonic Anhydrase Inhibitors	135
Topical Adrenergic Agents (β -blockers or α 2-agonists).....	135
Tonometry.....	135
NASAL TRAUMA.....	135
Nasal Fractures	135
Major Complications.....	136
Septal Hematoma.....	136
CSF Rhinorrhea	136
Hemorrhage.....	137
NASAL FOREIGN BODIES.....	137
Clinical Presentation	137
Diagnosis and Treatment	137
EPISTAXIS	138
Vascular Supply to the Nose	138
Etiology.....	138
Clinical Presentation.....	138
Treatment.....	139
Complications.....	139
FACIAL INFECTIONS	140
Sinusitis.....	140
Parotitis.....	141
FACIAL FRACTURES.....	142
Mandibular Injuries.....	142
Hallmarks of Mandibular Dysfunction.....	142
Mandibular Fractures.....	142
Mandibular Dislocation.....	143
Temporomandibular Joint Dysfunction	143
Midfacial Fractures	144
Midfacial Area.....	144
Isolated Zygomatic Arch Fractures.....	144
Zygomatic-Maxillary Complex (“Tripod”) Fractures	144
Orbital Floor Fractures.....	144
Multiple Facial Fractures.....	144

ACUTE AIRWAY OBSTRUCTION	145
Clinical Presentation	145
Differential Diagnosis	146
ORAL AND PHARYNGEAL INFECTIONS	149
Oral Infections	149
Masticator Space Abscess.....	149
Ludwig Angina	150
Pharyngeal Space Infections	150
Parapharyngeal Abscess.....	150
Peritonsillar Abscess	151
Retropharyngeal Abscess.....	151
Prevertebral Infection	152
PHARYNGITIS	153
Trauma	153
Irritant Inhalant	153
Viruses	153
Infectious Mononucleosis.....	153
Herpes Simplex Pharyngitis.....	153
Bacteria	154
Group A β -Hemolytic Streptococci (GABHS).....	154
Group C and G Streptococci	154
Diphtheria.....	155
Gonorrhea.....	155
Fungi	155
DENTAL EMERGENCIES	156
Neuroanatomy of the Face	156
Facial and Oral Anesthesia	157
Anatomy of a Tooth	158
Dental Emergencies	158
Trauma	158
Hemorrhage.....	159
Orofacial Pain	159
Systemic Diseases with Oral Manifestations	160
Infections	160
Autoimmune/Inflammatory States.....	160
Toxic/Metabolic States.....	160
Granulomatous Diseases.....	160
Benign Tumors and Tumor-Like Lesions	161
Blood Dyscrasias.....	161
HIV/AIDS.....	161

ABDOMINAL AND GASTROINTESTINAL DISORDERS

Joseph Martinez, MD, FACEP, FAAEM

Upper Gastrointestinal Bleeding.....	169
Evaluation	169
Blatchford Score.....	170
Specific Treatment of Ruptured Esophageal Varices.....	170
Treatment of Bleeding Due to Peptic Ulceration	170
Special Considerations	170
Esophageal Disorders.....	171
Functional Anatomy	171
Dysphagia	171
Esophageal Perforation	173
Esophageal Foreign Body Ingestion.....	174
Peptic Ulcer Disease	176
Pathophysiology	176
Predisposing Factors	176
Clinical Presentation	176
Diagnostic Evaluation.....	177
Management of Uncomplicated Peptic Ulcer Disease	177
Complications.....	178
Perforated Viscus.....	179
Gallbladder Perforation	179
Small-Bowel Perforation	179
Large-Bowel Perforation	179
Management of a Known or Suspected Perforated Viscus	179
Acute Abdomen	180
Appendicitis	180
Bowel Obstruction	182
Volvulus.....	184
Mesenteric Vascular Ischemia/Infarction	184
Hernias	186
Ileitis and Colitis.....	187
Irritable Bowel Syndrome	190
Colonic Diverticular Disease.....	191
Anorectal Disorders.....	192
Hemorrhoids.....	192
Anal Fissure.....	193
Perirectal (Anorectal) Abscesses.....	193
Miscellaneous Anorectal Disorders.....	194
Fistula-in-Ano	194
Rectal Prolapse	194
Pilonodal Sinus	194
Anorectal Tumors	195
Rectal Foreign Bodies.....	195
Diarrhea and Food Poisoning.....	196
General Information	196
Viral Diarrheal Diseases	196
Bacterial Diarrheal Diseases.....	196
Parasitic Gastrointestinal Infections.....	204

Biliary Tract Disorders.....	207
General Information	207
Cholelithiasis.....	208
Cholecystitis.....	208
Variations and Complications of Cholecystitis	209
Hepatitis	210
Viral Hepatitis	210
Toxic Hepatitis (Drug-Induced Liver Injury)	212
Alcoholic Liver Disease.....	212
Syndromes	212
Complications.....	213
Pancreatitis	214
Etiology.....	214
Clinical Presentation	214
Diagnostic Evaluation.....	215
Management	215
Estimating Severity	216
Complications.....	216

THORACIC AND RESPIRATORY DISORDERS

Sreeja M. Natesan, MD, FACEP

Pneumonia	228
Overview	228
Atypical Pneumonia	238
Viral Pneumonia.....	241
Types of Pneumonia: Classic Clinical Scenario and Etiology.....	244
Aspiration Pneumonia	244
Foreign Body Aspiration	247
Patient Assessment and Risk Stratification: The Pneumonia Severity Index	247
Lung Abscess	249
Pleural Effusion	251
Empyema	254
Tuberculosis	255
Pneumothorax	259
Asthma	262
Chronic Obstructive Pulmonary Disease (COPD)	270
Acute Respiratory Distress Syndrome (ARDS)	274
Hemoptysis	277
Pulmonary Embolism	279

TRAUMATIC DISORDERS

Mark L. Gustafson, DO, FACEP

General Information	299
General Approach to the Trauma Patient.....	300
Hemorrhagic Shock	304
Common Injuries by Anatomic Location	304
Traumatic Brain Injury (Head Injury).....	304
Overview	304
Specific Types of Head Injuries.....	306
Diffuse Brain Injuries	306
Focal Brain Lesion	307
Cerebral Edema	308
Herniation Syndromes.....	309
Skull Fractures	309
Complications of Head Injuries	310
Management.....	311
Facial Injuries.....	311
Adult Spinal Trauma	313
Spinal Cord Injury.....	313
Vertebral Spine Trauma	317
Pediatric Vertebral and Spinal Cord Injuries	319
Thoracic Trauma.....	319
Abdominal Injuries.....	323
Pelvic and Extremity Injuries.....	325
Unique Situations.....	325
Electrical Injury	325
Rhabdomyolysis.....	327
Thermal Burns.....	327
Trauma in Pregnancy.....	328
Penetrating Trauma	330
Blast Injuries.....	331
Additional Pearls	332

ORTHOPEDIC EMERGENCIES

Michael C. Bond, MD, FACEP, FAAEM

General Principles of Fracture and Dislocation Management	345
Classification and Definitions	345
Salter-Harris Classification of Epiphyseal Fractures	346
Complications of Fractures/Dislocations	347
Upper Extremity Trauma	348
Shoulder Dislocations and Ligamentous Tears	348
Scapular Fractures	352
Humeral Fractures	353
Elbow Injuries	355
Radial and Ulnar Injuries.....	359
Hand and Wrist Injuries	360
Pelvis and Hip Injuries	369
Essential Anatomy	369
Pelvic Fractures	370
Hip Dislocations	372
Hip Fractures.....	373
Pediatric Hip Disorders	374
Knee Injuries	376
Essential Anatomy	376
Mechanisms of Knee Injury	377
Hemarthrosis.....	377
Physical Examination of the Knee.....	377
Knee Dislocation.....	378
Rupture of the Quadriceps Mechanism	379
Patellar Subluxation/Dislocation.....	379
Patellar Fracture.....	379
Tibial Plateau Fracture.....	380
Baker Cyst.....	380
Osgood-Schlatter Disease.....	380
Chondromalacia Patellae.....	380
Lower Leg Injuries.....	381
Soft Tissue Compartments.....	381
Anterior Compartment Syndrome.....	382
Stress Fractures of the Fibula.....	382
Ankle Injuries.....	382
Essential Anatomy	382
Sprains (Ligamentous Injuries)	383
Ankle Dislocations	384
Tendon Injuries.....	385
Ankle Injuries in Children.....	386
Foot Injuries	386
Essential Anatomy	386
Fractures.....	386

MUSCULOSKELETAL DISORDERS (NONTRAUMATIC)

Joseph P. Tagliaferro, III, DO, FACEP

Arthritis.....	395
Classification.....	395
Conditions Associated with Symmetric Polyarticular Joint Pain	395
Conditions Associated with Asymmetric Polyarticular Joint Pain	395
Conditions Associated with Monoarticular Joint Pain.....	396
Conditions Associated with Migratory Arthritis	397
Synovial Fluid Analysis.....	397
Tendinitis and Tenosynovitis	397
General Background	397
Stenosing Tenosynovitis or “Trigger Finger”	397
De Quervain Stenosing Tenosynovitis	398
Carpal Tunnel Syndrome	398
Dupuytren Contracture.....	398
Ganglion Cyst	398
Charcot Joint.....	398
Back Pain.....	399
Differential Diagnosis.....	399
General Background	399
Lumbar Disc Syndromes.....	399
Spondylolisthesis.....	400
Low Back Pain Management.....	400
Spinal Infections.....	400
Spinal Malignancy.....	401
Hand and Wrist Infections	401
Paronychia	401
Felon.....	401
Herpetic Whitlow.....	401
Human Bite Infections Involving the Metacarpophalangeal Joint (“Fight Bites”)	402
Pyogenic Flexor Tenosynovitis	402
Deep Palmar Space Infection.....	402
High-Pressure Injection Injuries.....	402
Compartment Syndrome (Volkmann Ischemia) of the Upper Extremity.....	403
Rhabdomyolysis	404

NERVOUS SYSTEM DISORDERS

Danya Khoujah, MBBS, MEHP, FACEP, FAAEM

Stroke	412
Seizures	421
Coma	424
The Altered Patient	427
Neuropathies (Disorders that Affect Peripheral Nerves)	429
Disorders of the Neuromuscular Junction	431
Myasthenia Gravis.....	431
Lambert-Eaton Syndrome	432
Botulism (Food-Borne).....	432
Myopathies	433
Peripheral Neuropathies	433
Trigeminal Neuralgia (Tic Douloureux).....	433
Bell Palsy.....	433
Mononeuropathies	434
Diabetic Neuropathies	434
Myelopathies (Disorders of the Spinal Cord)	435
Vertigo	435
Headache	437
Infections and Inflammatory Disorders of the Brain	441
Meningitis	441
Encephalitis.....	443
Neurosyphilis.....	443
Hydrocephalus	444
Other Conditions of the Brain	445
Parkinson Disease	445
Cerebral Venous Thrombosis.....	445
Transient Global Amnesia.....	446

GYNECOLOGIC AND OBSTETRIC DISORDERS

Sarah Sommerkamp, MD

Bartholin Gland Duct Abscess	456
Genital Ulcer Infections	456
Herpes Simplex Virus	456
Syphilis	457
Chancroid	458
Lymphogranuloma Venereum	459
Human Papillomavirus	459
Noninfectious Vaginitis	460
Bacterial Vaginosis	460
Foreign Body	460
Infectious Vaginitis	460
Fungal Infections	460
Trichomoniasis	461
Cervicitis/Endocervicitis	461
<i>Neisseria gonorrhoeae</i>	461
<i>Chlamydia trachomatis</i>	462
Pelvic Inflammatory Disease	463
Ovary	464
Torsion	464
Ovarian Cysts and Tumors	465
Uterus	465
Vaginal Bleeding	465
Cervical Bleeding.....	466
Endometriosis.....	466
Pelvic Organ Prolapse	466
Tumors	467
Emergency Contraception	467
Sexual Assault	467
Normal Pregnancy	468
Drugs and Radiation Exposure in Pregnancy	470
Complications of Pregnancy	471
First Trimester Bleeding.....	471
Abortion.....	472
Ectopic Pregnancy.....	472
Rh Isoimmunization	474
Infections in Pregnancy	475
Hyperemesis Gravidarum/Nausea and Vomiting of Pregnancy.....	476
Gestational Diabetes	476
Chronic and Gestational Hypertension.....	476
HELLP Syndrome.....	476
Preeclampsia.....	477
Eclampsia.....	477
Hemorrhage, Antepartum.....	478
Abruptio Placentae.....	478
Placenta Previa	478
Thromboembolism	479
Aortic Dissection.....	479
Maternal Cardiac Disease.....	479

Cardiac Arrest	479
Perimortem Cesarean Section	480
High-Risk Pregnancy	480
Assisted Reproductive Therapies	480
Stages of Normal Labor and Delivery.....	480
Complications of Labor	480
Fetal Distress	480
Premature Labor.....	480
Premature Rupture of Membranes	481
Rupture of Uterus.....	481
Complications of Delivery.....	481
Malposition of Fetus	481
Nuchal Cord	482
Prolapse of Cord.....	482
Postpartum Complications	483
Postpartum Hemorrhage.....	483
Uterine Inversion.....	483
Pituitary Infarction (Sheehan Syndrome)	483
Postpartum Fever	483
Mastitis.....	484

PEDIATRIC EMERGENCIES

Michael J. Stoner, MD, FACEP, FAAP

Life-Threatening Cardiac Dysrhythmias	513
Cardiopulmonary Resuscitation	513
Airway.....	513
Breathing.....	515
Circulation	516
Chest Compressions	516
Defibrillation and Cardioversion	517
Vascular Access.....	517
Life-Threatening Cardiac Dysrhythmias	518
Unique Issues in Neonates and Infants	520
Risk Factors Associated with Neonatal Cardiopulmonary Arrest.....	520
APGAR Scoring.....	521
Meconium Staining	521
Neonatal Seizures	521
Congenital Diaphragmatic Hernia	522
Tracheoesophageal Fistula.....	523
Omphalocele and Gastroschisis	523
Necrotizing Enterocolitis	523
Cyanosis.....	524
Congestive Heart Failure	524
Jaundice in the Newborn.....	525
Brief Resolved Unexplained Events	525
Sudden Infant Death Syndrome.....	526
Congenital Heart Disease.....	527
Cyanotic Heart Lesions.....	527
Acyanotic Heart Lesions.....	528
Ductal Dependent Lesions	528
Congestive Heart Failure	529
Airway Emergencies	529
Upper Airway.....	529
Lower Airway	532
Pediatric Infectious Diseases.....	536
The Febrile Child.....	536
Systemic Inflammatory Response Syndrome (SIRS)	537
Meningitis	537
Pneumonia.....	539
Pertussis (Whooping Cough).....	541
Otitis Media	542
Urinary Tract Infection.....	544
Kawasaki Disease (Mucocutaneous Lymph Node Syndrome).....	545
Multisystem Inflammatory Syndrome in Children (MIS-C).....	547
Pediatric Seizures.....	548
Cerebrospinal Fluid Shunts	550
Pediatric Gastrointestinal/Genitourinary Emergencies.....	552
Child Abuse.....	556
Physical Abuse	556
Sexual Abuse.....	557
Child Neglect.....	557
Factitious Disorder Imposed on Another (formerly Munchausen Syndrome by Proxy).....	558

TOXICOLOGIC DISORDERS

Hong K. Kim, MD, MPH

General Approach to the Poisoned Patient	566
History	566
Physical Examination	566
Toxidromes.....	567
Major Toxic Signs	570
Diagnostic Evaluation.....	573
General Treatment Measures	573
Other Complications.....	576
Specific Overdoses and Poisonings	577
Analgesic Agents	577
Acetaminophen (APAP).....	577
Opioids.....	578
Salicylates	579
Antidepressants	581
Tricyclic Antidepressants	581
Other Antidepressants	582
Lithium	583
Antiepileptics	584
Phenytoin.....	584
Valproic acid.....	584
Other Antiepileptic Agents	585
Cardiovascular Agents	585
β -Adrenergic Antagonists (β -Blockers)	585
Calcium Channel Blockers	586
Cardiac Glycosides: Digoxin/Digitalis	587
Clonidine.....	588
Ethanol and Toxic Alcohols.....	588
General Principles.....	588
Ethanol.....	589
Ethylene Glycol.....	590
Methanol	590
Isopropanol.....	591
Metals	592
Lead.....	592
Iron.....	593
Mercury	594
Mushroom Poisoning.....	594
Phenothiazines.....	596
Recreational/Illicit Substances	597
Amphetamines and Amphetamine-Like Drugs.....	597
Cocaine	598
Hallucinogens.....	599
Other Designer Drugs	599
Sedative-Hypnotics	600
Barbiturates.....	600
Benzodiazepines.....	600
Gamma Hydroxybutyrate (GHB).....	601
Sulfonyleureas.....	601

Other Chemical Agents	602
Carbon Monoxide	602
Caustic Ingestions	603
Cyanide	605
Hydrocarbons	606
Aromatics (Solvents)	607
Halogenated Hydrocarbons	607
Organophosphates and Carbamates	608

ENDOCRINE, METABOLIC, AND NUTRITIONAL DISORDERS

Bennett Myers, MD, FACEP

ADULT FLUID VOLUMES	622
Normal Values.....	622
Patient Assessment	622
FLUID AND ELECTROLYTE DISORDERS	622
Basic Science Review	622
Total Body Water/Fluid Compartments	622
Water Regulation	622
Sodium Regulation	624
Potassium Regulation	624
Calcium Regulation.....	624
Magnesium Regulation.....	624
Chloride Regulation	625
Hydrogen-Potassium Exchange to Maintain Electrolyte Balance	625
The Anion Gap.....	625
Pathophysiology of Acid-Base Disorders	626
Electrolyte Disorders.....	627
Hyponatremia	627
Hypernatremia	629
Dehydration	630
Hypokalemia.....	631
Hyperkalemia	632
Hypocalcemia.....	633
Hypercalcemia.....	634
Hypomagnesemia	635
Hypermagnesemia	636
Hypochloremia	637
Hyperchloremia	637
Key Concepts in Electrolyte Disorders	637
Acid-Base Disorders.....	637
General Approach to Acid-Base Abnormalities	637
Metabolic Acidosis	639
Metabolic Alkalosis	641
Respiratory Acidosis	641
Respiratory Alkalosis	642
Important Points to Remember in Management of Acid-Base Disorders	642
Clinical Situations and Associated Laboratory Findings.....	642
ENDOCRINE/METABOLIC DISORDERS	643
Hypoglycemia	643
Diabetic Ketoacidosis.....	644
Hyperosmolar Hyperglycemic State	647
Alcoholic Ketoacidosis	649
Thyroid Storm	649
Myxedema (Hypothyroid) Coma.....	651
Adrenal Insufficiency (Addison Disease) and Crisis.....	653
Pheochromocytoma	655

ENVIRONMENTAL DISORDERS

David F. Toro, MD, FACEP, FAWM, FAAEM

Burns	666
Pathophysiology	666
Diagnostic Evaluation.....	666
Management	667
Inhalation Injuries	669
Chemical Injuries	670
Electrical Injuries.....	670
Lightning Injuries.....	672
Heat Disorders	674
Cold Disorders	677
Frostbite	677
Hypothermia.....	679
Bites and Stings	683
Human Bites	683
Dog Bites	684
Cat Bites.....	684
Venomous Snake Bites	685
Bee Stings, Ant Bites, and Other Insect Bites and Stings	686
Black Widow Spider.....	686
Brown Recluse Spider	687
Scorpion Stings.....	688
Jellyfish Stings	688
Altitude Disorders	688
High-Altitude Disorders.....	688
Acute Mountain Sickness	688
High-Altitude Pulmonary Edema (HAPE).....	689
High-Altitude Cerebral Edema (HACE)	689
Dysbarism.....	689
Submersion Injury	691
Other Environmental Hazards	696
Radiation Injuries	696
Crush Syndrome.....	696
Volcanic Eruptions	697

PSYCHOBEHAVIORAL DISORDERS

John Casey, DO, MA, FACEP, FACOEP

Clinical Approach to the Psychiatric Patient	705
Recognition.....	705
Triage.....	705
Safety	705
Medical Evaluation.....	706
The Psychiatric Interview.....	708
Treatment.....	709
Management of the Agitated Patient	709
Crisis Intervention	713
Psychopharmacology	714
Specific Behavioral Disorders	720
Psychosis.....	720
Depression.....	721
Suicide.....	722
Mania and Hypomania.....	724
Catatonia.....	725
Panic Attacks/Disorder.....	726
Somatoform Disorders.....	727
Insomnia and Sleep Disorders	728
Eating Disorders	729
Intoxication and Withdrawal	731
Delirium and Dementia.....	734
“Medical Mimickers” of Psychiatric Illness	735

HEMATOLOGIC DISORDERS

Sarah Dubbs, MD, FACEP

Recognition of Bleeding Disorders.....	742
Pathophysiology of Hemostasis.....	742
Laboratory Tests for Evaluation of Hemostasis.....	742
Bleeding Disorders and Their Clinical Parameters.....	745
Bleeding Disorders Associated with Platelet Function Problems and/or a Decreased Platelet Count.....	746
Platelet Disorders.....	746
Heparin-Induced Thrombocytopenia.....	749
Disseminated Intravascular Coagulation.....	751
Bleeding (Coagulation) Disorders Associated with an Increased Partial Thromboplastin Time (PTT) and Normal Prothrombin Time (PT).....	752
Hemophilia.....	752
von Willebrand Disease.....	753
Sickle Cell Disease.....	753
Anemia.....	755
Clinical Presentation.....	755
Diagnostic Evaluation.....	756
Nonhereditary Anemia: Hemolytic Anemia.....	758
Acquired Nonhemolytic Anemias.....	758
Hereditary Anemia.....	759
Blood Transfusions.....	760
Blood Products.....	760
Transfusion Methods.....	761
Complications.....	761
Reversal of Drug-Induced Anticoagulation.....	762
Reversal of Warfarin-Induced Coagulopathy.....	762
Reversal of Heparin and Low-Molecular-Weight Heparin (LMWH).....	764
Reversal of Newer Anticoagulants.....	764
Reversal of Thrombolysis.....	765

ONCOLOGIC DISORDERS

Linda Katirji, MD

Upper Airway Obstruction.....	772
Tamponade Secondary to Malignant Pericardial Effusion.....	772
Superior Vena Cava Obstruction	773
Acute Spinal Cord Compression.....	774
Hypercalcemia Secondary to Malignancy	774
Syndrome of Inappropriate ADH Secretion (SIADH)	776
Acute Tumor Lysis Syndrome.....	777
Hyperviscosity Syndrome.....	777
Adrenal Insufficiency	778
Neutropenia, Immunosuppression, and Infection in the Presence of Malignancy	778
Leptomeningeal Carcinomatosis	779

SYSTEMIC INFECTIOUS DISORDERS

Joel Hamm, MD, MPH

Sepsis and Septic Shock	788
HIV/AIDS	789
Tetanus	792
Rabies	794
Influenza	795
Vector-Borne Infections	796
Lyme Disease	796
Rocky Mountain Spotted Fever	798
West Nile Virus.....	799
Zika Virus	800
Malaria.....	801
Biological Warfare Agents	801
Smallpox.....	801
Anthrax	803
Other High-Priority Biologic Agents	805
<i>Legionella pneumophila</i>	805
Ebola	806
COVID-19	808

IMMUNE SYSTEM DISORDERS

R. Gentry Wilkerson, MD, FACEP

RHEUMATOLOGIC DISORDERS	814
Raynaud Phenomenon	814
Reactive Arthritis (Formerly Reiter Syndrome).....	814
Scleroderma (Systemic Sclerosis).....	815
Systemic Lupus Erythematosus.....	816
ALLERGIC EMERGENCIES (REACTIONS AND ANAPHYLAXIS)	817
Types of Allergic (Hypersensitivity) Reactions	817
Type I – Immediate (Anaphylactic) Hypersensitivity Reactions.....	817
Type II – Cytotoxic (Antibody-Dependent) Reactions.....	817
Type III – Immune Complex–Mediated Reactions.....	818
Type IV – Delayed Cell-Mediated (Antibody-Independent) Reactions.....	818
Clinical Manifestations of Allergic (Hypersensitivity) Reactions	819
Urticaria.....	819
Angioedema.....	820
Erythema Multiforme.....	820
Stevens-Johnson Syndrome/Toxic Epidermal Necrolysis.....	821
Allergic Drug Reactions.....	821
Adverse Food Reactions	824
Anaphylaxis	824
Anaphylactoid Reactions.....	825

RENAL AND UROLOGIC DISORDERS

Danielle Matonis, MD, and Kerri Kraft, MD

Acute Kidney Injury/Failure	834
Chronic Kidney Disease	840
Dialysis-Related Conditions	841
Complications Associated with Kidney Transplantation	842
Urinary Tract Infections	843
Nephrolithiasis.....	846
Male Genital Conditions	848
Urethritis	848
Orchitis	848
Acute Bacterial Prostatitis.....	849
Genital Ulcers.....	849
Fournier Gangrene	852
Balanoposthitis.....	853
Phimosis.....	853
Paraphimosis	854
Constriction Injuries to the Penis/Tourniquet Syndrome	854
Fracture of the Penis	854
Peyronie Disease.....	854
Carcinoma	854
Priapism.....	855
Testicular Torsion.....	855
Torsion of Appendices Epididymis and Testis	856
Epididymitis	856
Urethral Stricture.....	857
Urethral Foreign Bodies.....	857
Urinary Retention.....	857

CUTANEOUS DISORDERS

Laura Bontempo, MD, MEd, FACEP, and Brian Browne, MD, FACEP

Introduction.....	865
General Approach to the Patient Presenting with a Rash	865
Stevens-Johnson Syndrome and Toxic Epidermal Necrosis	865
Staphylococcal Scalded Skin Syndrome	867
Toxic Shock Syndrome	868
Necrotizing Fasciitis.....	869
Rocky Mountain Spotted Fever.....	870
Pemphigus Vulgaris	871
Bullous Pemphigoid.....	871
Exfoliative Dermatitis/Erythroderma.....	872
Cutaneous Abscess.....	874
Urticaria	875
Cellulitis/Erysipelas.....	875
Herpes Simplex	877
Herpes Zoster (Shingles)	879
Erythema Multiforme	880
Psoriasis	881
Fungal Disorders	882
Impetigo.....	885
Erythema Nodosum.....	887
Contact Dermatitis: Allergic (Toxicodendrons) and Irritant	888
Eczema (Atopic Dermatitis)	889
Pityriasis Rosea	889
Aphthous Ulcers	890
Mulloscum Contagiosum.....	891
Pressure Ulcers (Decubitus Ulcers).....	891
Dermatologic Cancers	892

EMERGENCY MEDICAL SERVICES

Ben Lawner, DO, MS, EMT-P, FACEP

Background Information	903
Definition.....	903
Origin of the Current EMS System	903
EMS System Models/Design.....	905
Planning for EMS System Demands	905
Components of an Emergency Medical Services System	906
Prevention.....	906
Manpower.....	906
Education and Training of EMS Providers and Scope of Practice	906
Communications.....	907
Specialty Service Categorization and Regionalization.....	907
Medical Control	907
Transport.....	908
Medical-Legal Considerations	908
EMS Worker Occupational Injury Management and Prevention.....	909
Air Medical Services.....	910
Disaster Planning and Operations.....	911

PROCEDURES AND SKILLS INTEGRAL TO THE PRACTICE OF EMERGENCY MEDICINE

Kirsten Schulte, DO, and Matthew Tabbut, MD, FACEP

Adult Cardiopulmonary Resuscitation.....	923
Universal Algorithm	923
Bystander CPR.....	923
Healthcare Provider CPR.....	923
Synchronized Cardioversion.....	924
Pacing	924
Postresuscitative Care	924
Resuscitation Procedures	926
Noninvasive Positive-Pressure Ventilation	926
Tracheal Intubation.....	927
Rapid Sequence Intubation.....	927
Surgical Airway Management.....	931
Venous and Intraosseous Access in Adults	933
Intraosseous and Central Venous Access in Children and Neonates	938
Arterial Catheter Insertion.....	939
Needle Decompression	940
Tube Thoracostomy	940
Thoracotomy in the ED.....	942
Pericardiocentesis.....	944
Perimortem Cesarean Section.....	945
Lateral Canthotomy	945
Diagnostic Procedures	946
Lumbar Puncture.....	946
Paracentesis.....	947
Thoracentesis	948
Arthrocentesis	948
Pain Management.....	949
Acute Pain Management in Adults.....	949
Pain Management in Children and Neonates.....	951
Procedural Sedation and Analgesia.....	953
Regional Anesthesia	955
Cutaneous Diagnostic and Therapeutic Procedures	956
Wound Management.....	956
Wound Closure Techniques	959
Incision and Drainage	962
Nail Trephination	963
Escharotomy.....	963
Ultrasound	964
Bedside Ultrasound	964
Trauma eFAST	966
Cardiac Ultrasound	968
Lung Ultrasound.....	970
Aortic Ultrasound.....	970
Pelvic Ultrasound.....	971
Biliary Ultrasound	973
Renal Ultrasound	975

Deep-Vein Thrombosis Ultrasound	976
Ocular Ultrasound	977
Soft-Tissue and Musculoskeletal Ultrasound	978
Procedural Ultrasound Uses	980

OTHER COMPONENTS OF THE PRACTICE OF EMERGENCY MEDICINE

Alisa Wray, MD, MAEd, and Luke Walls-Smith, MD

EMERGENCY DEPARTMENT ADMINISTRATION	989
General Statistics (US)	989
The Emergency Department Director	990
Rules Governing Emergency Department Operation	990
Record Keeping.....	992
Quality Assurance and Chart Audits	992
ETHICAL-LEGAL ASPECTS OF EMERGENCY MEDICINE	993
Consent to Treatment.....	993
Statutes Affecting the Practice of Emergency Medicine	996
Liability	999
Medical Records	1002
Resuscitation Issues	1003
Miscellaneous Issues.....	1004
PHYSICIAN–PATIENT INTERACTION.....	1007
Medical Errors	1007
Families of the Critically Ill or Injured and Families of Patients Who Die.....	1007
Patient Disposition	1008
PROFESSIONALISM.....	1011
Advocacy	1011
Diversity Awareness.....	1012
Ethical Principles	1012
Electronic Communications and Social Media	1013
Leadership and Management Principles.....	1014
Well-Being	1014