

# BOOK 1 TABLE OF CONTENTS

<b>ILLUSTRATIONS IN THIS BOOK</b> .....	<b>IV</b>
PSAP-VII EDITORIAL BOARD.....	V
WELCOME.....	VI
FACULTY POTENTIAL COI DISCLOSURE.....	VI
ROLE OF ACCP.....	VII
ROLE OF BPS.....	VII
CE AND PROGRAM INSTRUCTIONS.....	VIII
POSTTEST INSTRUCTIONS.....	VIII

<b>Critical and Urgent Care I</b> .....	<b>1</b>
<b>Critical and Urgent Care I Panel</b> .....	<b>3</b>
<b>Critical and Urgent Care I Subscriber Evaluation</b> .....	<b>5</b>

## **OBSTETRIC EMERGENCIES IN THE ICU**

**By Julie J. Kelsey, Pharm.D.**

Introduction.....	7
Pregnancy Adaptations.....	7
Supportive Care in the ICU.....	8
Trauma in Pregnancy.....	9
Cardiopulmonary Resuscitation.....	9
Obstetric Hemorrhage.....	9
Severe Preeclampsia and Its Complications.....	10
Severe Preeclampsia.....	10
HELLP Syndrome.....	12
Eclampsia.....	12
Peripartum Cardiomyopathy.....	14
Acute Fatty Liver of Pregnancy.....	15
Amniotic Fluid Embolism.....	15
Conclusion.....	15
Annotated Bibliography.....	16
Self-Assessment Questions.....	19

## **ICU CONSIDERATIONS AFTER LIVER TRANSPLANT**

**By Iman Bajjoka, Pharm.D., FCCP, BCPS;  
and Marwan M. Kazimi, M.D.**

Introduction.....	23
Pretransplant Issues.....	23
Graft Quality.....	23
Older Donors.....	23
Steatosis.....	24
Prolonged Ischemia.....	24
Donation After Cardiac Death.....	24
Marginal Livers.....	24
Donor Infections.....	25
Postoperative Issues.....	25
Neurologic Function.....	25
Hemodynamics.....	25
Sedation and Pain.....	25
Fluid Overload.....	26
Pulmonary Hypertension.....	26
Immunosuppression.....	26
Induction Therapy.....	26

Maintenance Therapy.....	27
Immunosuppression-Related Complications.....	29
Allograft Rejection.....	29
Infections.....	29
Acute Kidney Failure.....	30
Diabetes Mellitus.....	31
Conclusion.....	31
Annotated Bibliography.....	31
Self-Assessment Questions.....	34

## **MANAGING CARDIOVASCULAR SURGERY INTENSIVE CARE UNIT PATIENTS**

**By Danielle M. Blais, Pharm.D., BCPS**

Introduction.....	37
Common Types of Cardiac Surgery.....	37
Logistics of Cardiac Surgery.....	38
Preoperative Assessment.....	39
Postoperative Management.....	39
Management of Bleeding.....	39
Hemodynamic Management of Left and Right Heart Failure.....	42
Atrial Fibrillation.....	44
Stress Ulcer Prophylaxis.....	46
Anticoagulation for Valve Replacement.....	46
Drug Therapy.....	47
Education.....	48
Quality Improvement.....	48
Annotated Bibliography.....	49
Self-Assessment Questions.....	52

<b>Critical and Urgent Care II</b> .....	<b>55</b>
<b>Critical and Urgent Care II Panel</b> .....	<b>57</b>
<b>Critical and Urgent Care II Subscriber Evaluation</b> .....	<b>59</b>

## **FUNGAL INFECTIONS IN THE ICU**

**By Elizabeth S. Dodds Ashley, Pharm.D., MHS, BCPS**

Introduction.....	61
Epidemiology of Invasive Fungal Infections in the ICU.....	62
<i>Candida</i> spp.....	62
Mold Pathogens.....	62
Advances in Diagnosis of Fungal Infections.....	63
Limitations of Traditional Culture and Radiologic Methods.....	63
New and Emerging Fungal Diagnostic Methods.....	63
Antifungal Susceptibility Testing.....	64
At-Risk Patient Populations.....	65
Prophylactic, Preemptive, and Empiric Strategies.....	65
Treatment Strategies for Patients with Invasive Fungal Disease.....	67
<i>Candida</i> Infections.....	67
Invasive Mold Infections.....	68
Antifungal Pharmacotherapy.....	70
Amphotericin B.....	70

Echinocandins .....	70	Pharmacologic and Mechanical Prophylaxis .....	120
Extended-Spectrum Triazoles .....	70	Special Populations .....	121
Role of the Pharmacist .....	71	Role of Pharmacists in TP .....	122
Conclusion .....	71	Acute PE .....	122
Annotated Bibliography .....	72	Epidemiology and Risk Factors .....	122
Self-Assessment Questions .....	74	Classification .....	122
		Treatment Strategies .....	122
<b>CONTEMPORARY ISSUES AND NOVEL STRATEGIES TO MANAGE INFECTIONS IN THE CRITICALLY ILL</b>		HIT: Critical Care Issues .....	125
<b>By Steven J. Martin, Pharm.D., FCCP, FCCM, BCPS (AQ Infectious Diseases); and Sandy J. Estrada, Pharm.D., BCPS</b>		Diagnostic Strategies in the ICU .....	125
Issues Affecting Successful Treatment of		Treatment Strategies .....	125
Infection in the ICU .....	79	Recombinant Activated Factor VII in the Management of Bleeding Disorders in the ICU .....	128
Antibiotic Resistance .....	80	Spontaneous Cerebral Hemorrhage .....	129
ESKAPE Resistance .....	80	Trauma .....	129
Antibiotic Development .....	82	Other Indications .....	129
Pharmacokinetic and Pharmacodynamic Strategies to Improve Outcomes .....	85	Thromboembolic Events .....	130
Continuous- or Extended-Infusion $\beta$ -Lactams .....	85	Prothrombin Complex Concentrates .....	130
Smart Pump Technology .....	86	Summary .....	130
Molecular Diagnostics .....	86	Conclusion .....	130
PCR Testing .....	86	Annotated Bibliography .....	131
Diagnostic Assays from Positive Blood Cultures .....	87	Self-Assessment Questions .....	134
Xpert MRSA/SA Skin and Soft Tissue Infection Assay .....	89	<b>Critical and Urgent Care III .....</b>	<b>139</b>
Clinical Decision Support .....	89	<b>Critical and Urgent Care III Panel .....</b>	<b>141</b>
Target Functional Requirements .....	89	<b>Critical and Urgent Care III Subscriber Evaluation .....</b>	<b>143</b>
Benefits .....	90	<b>SAFE DRUG USE IN CRITICALLY ILL PATIENTS</b>	
Clinical Experience .....	90	<b>By Sandra L. Kane-Gill, Pharm.D., M.Sc.;</b>	
Conclusion .....	90	<b>and Mitchell Buckley, Pharm.D., BCPS</b>	
Annotated Bibliography .....	90	Introduction .....	145
Self-Assessment Questions .....	94	Overview of Medication Errors and Adverse Drug Events .....	145
<b>UPDATE IN SEVERE SEPSIS AND SEPTIC SHOCK MANAGEMENT</b>		Epidemiology: Incidence in Each Process Node .....	145
<b>By Scott T. Micek, Pharm.D., FCCP, BCPS;</b>		Severity of MEs and ADEs in the ICU Compared with General Care Units .....	147
<b>and Garrett E. Schramm, Pharm.D., BCPS</b>		Patient Safety Standards Influencing Surveillance .....	147
Introduction .....	99	Risk Factors .....	148
Assessment of the Patient .....	99	Patient and Environmental Characteristics .....	148
Determination of Sepsis Stage .....	99	Route of Drug Administration .....	149
Initial Care of the Patient .....	100	High-Alert Drugs .....	149
Pharmacotherapy .....	100	Drugs and Causes Commonly Associated with MEs and ADEs .....	149
Hemodynamic Stabilization .....	100	Active ME and ADE Surveillance .....	149
Infection Management .....	103	Proximal Causes and System Failures .....	149
Adjunctive Therapies .....	104	Methods of Detection .....	152
Quality Improvement .....	106	Analysis of Data: Sentinel Events and Root-Cause Analysis .....	153
Role of the Pharmacist .....	109	Strategies for Safe Medication Use .....	153
Conclusion .....	110	Technology .....	154
Annotated Bibliography .....	110	Education .....	155
Self-Assessment Questions .....	114	Multidisciplinary Patient Care Team .....	155
<b>THROMBOTIC AND BLEEDING DISORDERS IN THE CRITICALLY ILL</b>		Monitoring Signals/Triggers .....	155
<b>By David Williamson, M.Sc., BCPS;</b>		Medication Reconciliation .....	155
<b>and Anne Julie Frenette, M.Sc.</b>		Conclusion .....	156
Introduction .....	119	Annotated Bibliography .....	156
Thromboprophylaxis Regimens in the ICU .....	119	Self-Assessment Questions .....	159
Epidemiology and Risk Factors .....	120		

## **ADVERSE DRUG REACTIONS IN CRITICALLY ILL PATIENTS**

By Krystal K. Haase, Pharm.D., BCCP, BCPS

Introduction .....	163
Hypersensitivity Reactions .....	164
Classification .....	164
Management of Life-Threatening Hypersensitivity Reactions .....	164
Hypersensitivity Issues with Antimicrobial Therapy .....	169
Preventive Strategies .....	170
Drug-Induced Arrhythmias .....	170
QT Prolongation and Torsades de Pointes .....	170
Bradyarrhythmias .....	172
Tachyarrhythmias .....	172
ICU Care and Nephrotoxins .....	172
Epidemiology and Effect on Care .....	172
Drug-Induced Nephrotoxicity .....	173
Nephropathy Prevention .....	174
Role of the Pharmacist .....	174
Annotated Bibliography .....	174
Self-Assessment Questions .....	177

## **MEDICAL EMERGENCIES LEADING TO ICU ADMISSION**

By Jaclyn M. LeBlanc, Pharm.D., BCPS;  
and Marc M. Perreault, Pharm.D., BCPS

Introduction .....	181
Hypertensive Emergencies .....	181
Definitions .....	181
Etiology .....	182
Signs and Symptoms .....	182
Treatment .....	182
Acute Chronic Obstructive Pulmonary Disease Exacerbation .....	185
Treatment .....	185
Diabetic Ketoacidosis .....	186
Introduction .....	186
Signs and Symptoms and Laboratory Evaluation .....	186
Treatment .....	187
Status Epilepticus .....	188
Introduction .....	188
Update on Pathophysiology .....	188
Etiology in Adults .....	189
Pharmaceutical Care .....	189
Summary .....	192
Conclusion .....	192
Annotated Bibliography .....	192
Self-Assessment Questions .....	196

## **UPDATES IN TOXICOLOGY**

By Steven Pass, Pharm.D., FCCM, BCPS

Introduction .....	199
Epidemiology .....	199
Initial Management .....	200
Decontamination .....	200
Toxins .....	200
Acetaminophen .....	200

Alcohols .....	202
Cardiovascular Agents .....	204
Oral Hypoglycemics .....	205
Other Agents .....	207
Antidote Stocking .....	208
Role of the Pharmacist .....	210
Conclusion .....	210
Annotated Bibliography .....	210
Self-Assessment Questions .....	214
Reference Values for Common Laboratory Tests .....	220