

Section I: Fundamentals of Critical Care

1. Respiratory Physiology in Critical Illness

Richard A. Oeckler, MD, PhD

2. Basic Mechanical Ventilation

Amelia A. Lowell, RRT, RCP, and Michael J. Day, RRT, RCP

3. Advanced Modes of Mechanical Ventilation

Amelia A. Lowell, RRT, RCP, Pritesh K. Patel, MD, and Bhavesh M. Patel, MD

4. Cardiovascular System in Critical Illness

Courtney E. Bennett, DO

5. Kidney Function in Critical Illness

Pramod K. Guru, MBBS, MD

6. Nutrition in Critical Illness

Mireille H. Hamdan, DCN, RDN, LD/N, and Angela N. Vizzini, RDN, LD/N

Section I: Questions and Answers

Section II: Fundamentals of Neurocritical Care

7. Neurologic Examination in Neurocritical Illness

Eelco F. M. Wijdicks, MD, PhD

8. Intracranial Pressure

Eelco F. M. Wijdicks, MD, PhD, and William D. Freeman, MD

9. Cerebrospinal Fluid Physiology

Joseph Zachariah, DO, and Tia Chakraborty, MD

10. Cerebral Circulation and Cerebral Blood Flow

Arnoley S. Abcejo, MD, and Jeffrey J. Pasternak, MD, MS

11. Consequences of Anoxia and Ischemia to the Brain

Jennifer E. Fugate, DO, and Lauren K. Ng, MD

12. Consequences of Acute Metabolic Changes to the Brain

Sherri A. Braksick, MD, and Sara E. Hocker, MD

13. Neurologic Consequences of Acute Hypertension

Ahmed Koriesh, MB, BCh, and Sherri A. Braksick, MD

14. Coma and Other Altered States of Consciousness

Eelco F. M. Wijdicks, MD, PhD

15. Neuromuscular Respiratory Failure

Maximiliano A. Hawkes, MD, and Eelco F. M. Wijdicks, MD, PhD

16. Neurogenic Breathing Patterns

Eelco F. M. Wijdicks, MD, PhD

17. Neurogenic Cardiac Manifestations

Sherri A. Braksick, MD, and Eelco F. M. Wijdicks, MD, PhD

18. Paroxysmal Sympathetic Hyperactivity

Farwa Ali, MBBS, and Eelco F. M. Wijdicks, MD, PhD

Section II: Questions and Answers

Section III: Critical Care Disorders

Pulmonary Disorders

19. Acute Respiratory Distress Syndrome

Richard K. Patch III, MD, and Richard A. Oeckler, MD, PhD

20. Pulmonary Embolism: An Overview

Brandon T. Nokes, MD, and Rodrigo Cartin-Ceba, MD, MSc

21. Asthma in the Critically Ill Patient

Sreeja Biswas Roy, MBBS, and Cyril Varghese, MD, MS

22. Chronic Obstructive Pulmonary Disease Exacerbation

Abdelmohaymin A. Abdalla, MBBS, and Rodrigo Cartin-Ceba, MD, MSc

23. Pleural Diseases in Critical Care Medicine

Neal M. Patel, MD

24. Pulmonary Malignancy

Varun Bansal, MD, and Margaret M. Johnson, MD

25. Pulmonary Hypertension and Right-Sided Heart Failure in Critically Ill Patients

Hollie Saunders, MD, John E. Moss, MD, and Charles D. Burger, MD

Cardiovascular Disorders

26. Anaphylaxis and Anaphylactic Shock

Michael E. D'Netto, MD, Megan S. Motosue, MD, and Gerald W. Volcheck, MD

27. Cardiogenic Shock

Meir Tabi, MD, and Jacob C. Jentzer, MD

28. Acute Coronary Syndrome

Siva S. Ketha, MD, and Juan Carlos Leoni Moreno, MD

29. Cardiac Rhythm and Conduction Disturbances

Fred Kusumoto, MD

30. Hypertensive Emergencies

Luke J. Matzek, MD, Denzil R. Hill, MD, and James A. Onigkeit, MD

31. Cardiopulmonary Resuscitation

Richard K. Patch III, MD, and Alice Gallo de Moraes, MD

32. Vascular Emergencies of the Aorta

Houssam Farres, MD

Acute Endocrine Disorders

33. Pituitary Apoplexy

Sherri A. Braksick, MD, and Tia Chakraborty, MD

34. Arginine Vasopressin Deficiency and Resistance

Dana Erickson, MD, and Lucinda M. Gruber, MD

35. Hypopituitarism

Lucinda M. Gruber, MD

36. Thyroid Disorders in the Intensive Care Unit

Naina K. Sawal, MD, and John E. Moss, MD

37. Glycemic Control in Neurocritically Ill Patients

Nayla Ahmed, MBBS, and Alice Gallo de Moraes, MD

38. Adrenal Insufficiency in Neurocritically Ill Patients

Susan L. Samson, MD, PhD, Levi W. Howard, DO, and Carla P. Venegas, MD

Gastrointestinal Disorders

39. Acute Gastrointestinal Hemorrhage

Pablo Moreno Franco, MD, Philip E. Lowman, MD, and Michael F. Harrison, MD, PhD

40. Paralytic and Obstructive Ileus

John M. Zietlow, MD

41. Acute Liver Failure

Alexandra L. Anderson, MD, Sarvie Esmailzadeh, MB, BCh, BAO, James Y. Findlay, MB, ChB, and Eelco F. M. Wijdicks, MD, PhD

42. Acute Perforations of the Gastrointestinal Tract

Naina K. Sawal, MD, and Alice Gallo de Moraes, MD

43. Acute Vascular Disorders of the Intestine

Omar Y. Mousa, MBBS, MD, and Surakit Pungpapong, MD

44. Abdominal Compartment Syndrome

Irving A. Jorge, MD, Peter F. Johnston, MD, and Daniel J. Johnson, MD

Kidney Disorders

45. Acute Kidney Injury: Pathophysiology, Diagnosis, and Management

Jacob Ninan, MD, MS, and Kianoush B. Kashani, MD, MS

46. Acid-Base Disorders

Urbee Disha Peterson, DO, and Alice Gallo de Moraes, MD

47. Drug Dosing in Kidney Dysfunction

Mariam Charkviani, MD, Caitlin S. Brown, PharmD, RPh, and Erin F. Barreto, PharmD, RPh

48. Principles of Kidney Replacement Therapy

Swetha Reddy, MBBS, MD, and Juan Pablo Domecq Garces, MD

49. Disorders of Water and Electrolyte Balance

Michael Bernaba, Suman Misra, MD, and Mira T. Keddis, MD

Hematologic and Inflammatory Disorders

50. Anemia and Blood Transfusion

T. N. Diem Vu, MD, John M. Zietlow, MD, and Myung S. Park, MD, MS

51. Hematologic and Oncologic Complications in the Intensive Care Unit

Janhavi Athale, MD, and Leslie J. Padnos, MD

52. Thrombocytopenia and Thrombocytopeny in the Intensive Care Unit

Janhavi Athale, MD, and Leslie J. Padnos, MD

53. Disseminated Intravascular Coagulation

Leslie J. Padnos, MD, and Janhavi Athale, MD

54. Diagnosis and Management of Acquired Bleeding Disorders

Meera Sridharan, MD, PhD, and Rajiv K. Pruthi, MBBS

55. Anticoagulation and Antiplatelet Therapy

Theresa N. Kinard, MD

56. Therapeutic Plasma Exchange for Acute Hematologic Disorders

Jill Adamski, MD, PhD

57. Rheumatologic Conditions in Critical Care

Alain Sanchez Rodriguez, MBBS, Gabriel Figueroa-Parra, MD, and Alí A. Duarte García, MD

Sepsis and Other Infectious Diseases

58. Infectious Diseases Complicating Critical Care

Aditya S. Shah, MBBS, and Josh Clement, PharmD, RPh

59. Antibiotics in the Intensive Care Unit

Aditya S. Shah, MBBS, and Josh Clement, PharmD, RPh

60. Sepsis and Septic Shock

Philippe R. Bauer, MD, PhD

Dermatologic Concerns

61. Dermatologic Emergencies in the Intensive Care Unit

Matthew R. Hall, MD

Trauma and Burns

62. Initial Approach to the Management of Multisystem Trauma

David S. Morris, MD, and T. N. Diem Vu, MD

63. Chest and Abdominal Trauma

Joy D. Hughes, MD, and David S. Morris, MD

64. Skeletal Trauma

John M. Zietlow, MD

65. Burns and Electrical Injuries

Brandon T. Nokes, MD, and Ayan Sen, MD

Cardiothoracic Critical Care

66. Cardiothoracic Surgery and Postoperative Intensive Care

Arun L. Jayaraman, MD, PhD

67. Mechanical Circulatory Assist Devices

Bhavesh M. Patel, MD

68. Extracorporeal Membrane Oxygenation

Pramod Guru, MBBS, MD, and Gregory J. Schears, MD

69. Cardiac Pacing in the Intensive Care Unit

Joshua M. Hauser, MD, MPH, Michael R. Boswell, MD, and Harish Ramakrishna, MD

Transplant Critical Care

70. Clinical Management of Heart Transplant

Senthil Anand, MBBS, and Lisa M. LeMond, MD

71. Clinical Management of Heart-Lung and Lung Transplant

Sadia Z. Shah, MD, and Francisco Alvarez, MD

72. Clinical Management of Liver Transplant

Amanda F. Ambrose, MD, and Bhargavi Gali, MD, MHA

73. Clinical Management of Kidney Transplant

James A. Onigkeit, MD, Ryan M. Benjamin, DO, and Kyle J. Haselton, MD

74. Small Intestinal Transplant

Ayan Sen, MD

Toxicity and Toxins

75. Serotonin Syndrome

Farwa Ali, MBBS, and Eelco F. M. Wijdicks, MD, PhD

76. Neuroleptic Malignant Syndrome and Hyperthermia

John A. Fanous, MBBS, and Aaron B. Skolnik, MD

77. Toxicology of Selected Illicit Substances and Chemical and Biological Warfare Agents

Matthew D. Sztajnkrycer, MD, PhD

Section III: Questions and Answers

Section IV: Neurocritical Illness

Acute Cerebrovascular Disorders

78. Diagnosis and Management of Hemispheric Infarction

Carlos Perez Vega, MD, Sanjeet S. Grewal, MD, and W. Christopher Fox, MD

79. Basilar Artery Occlusion

Maximiliano A. Hawkes, MD, and Jennifer E. Fugate, DO

80. Carotid Artery Disease

Samir Kashyap, DO, Al-Wala A. Awad, MD, Nnenna Mbabuibe, MD, and Rabih G. Tawk, MD

81. Adult Primary Central Nervous System Vasculitis

Carlo Salvarani, MD, Robert D. Brown Jr, MD, MPH, and Gene G. Hunder, MD

82. Intracerebral and Intraventricular Hemorrhage

Oana M. Dumitrascu, MD

83. Aneurysmal Subarachnoid Hemorrhage

Kristen M. Scheitler, MD, and Eelco F. M. Wijdicks, MD, PhD

84. Intracranial Arteriovenous Malformations

Kelly D. Flemming, MD, and Giuseppe Lanzino, MD

85. Cerebral Venous and Dural Sinus Thrombosis

Christopher R. Marcellino, MD, and Sara E. Hocker, MD

86. Cervical Arterial Dissection

Gyanendra Kumar, MD, and Bart M. Demaerschalk, MD

Traumatic Brain and Spine Injury

87. Traumatic Brain Injury and Spinal Cord Injury

Nikita Lakomkin, MD, and Jeremy L. Fogelson, MD

88. Traumatic Intracranial Epidural and Subdural Hematomas in Adults

Kristen M. Scheitler, MD, and John L. D. Atkinson, MD

89. Unstable Spinal Fractures

Zachary A. Pennington, MD, William E. Clifton III, MD, and Mark A. Pichelmann, MD

Acute Central Nervous System Infections

90. Encephalitis

Allen J. Aksamit Jr, MD

91. Acute Bacterial Meningitis

Eelco F. M. Wijdicks, MD, PhD

92. Brain Abscess and Spinal Epidural Abscess

Cristina G. Corsini Campioli, MD, and John C. O'Horo, MD, MPH

Acute Neuromuscular Disorders

93. Myasthenia Gravis

Maximiliano A. Hawkes, MD, and Eelco F. M. Wijdicks, MD, PhD

94. Guillain-Barré Syndrome

Eelco F. M. Wijdicks, MD, PhD

95. Amyotrophic Lateral Sclerosis

Jennifer M. Martinez-Thompson, MD, and Nathan P. Staff, MD, PhD

96. Rhabdomyolysis, Myopathies in Intensive Care, and Toxic Myopathies

Margherita Milone, MD, PhD, and Justin C. Kao, MB, ChB

97. Myopathy and Neuropathy Acquired in the Intensive Care Unit

Priya S. Dhawan, MD, and Jennifer A. Tracy, MD†

Miscellaneous Disorders of Acute Brain Injury

98. Status Epilepticus

Pouya A. Ameli, MD, MS, Christopher Robinson, DO, MS, and Sara E. Hocker, MD
99. Posterior Reversible Encephalopathy Syndrome

Jennifer E. Fugate, DO

100. Demyelinating Disorders of the Central Nervous System

Caitlin S. Jackson-Tarlton, MD, and W. Oliver Tobin, MB, BCh, BAO, PhD

101. Prion Disease and Evaluation of Rapidly Progressive Dementia

J. Brent Peel, MD, Levi W. Howard, DO, and Dennis W. Dickson, MD

Neuro-oncology

102. Brain and Spine Tumors

Mithun G. Sattur, MD, Devi P. Patra, MBBS, Maciej M. Mrugala, MD, PhD, Ayan Sen, MD, and Bernard R. Bendok, MD

103. Leptomeningeal Metastasis

David N. Abarbanel, MD, and Alyx B. Porter, MD

104. Autoimmune Encephalitis in Critical Care

Eslam Shosha, MB, BCh, and Sean J. Pittock, MD

105. Radiotherapy and Chemotherapy for Central Nervous System Tumors

Ugur T. Sener, MD, Sameer R. Keole, MD, and Sani H. Kizilbash, MD, MPH
Postoperative Neurosurgery

106. Intensive Care After Spinal Surgery

Anthony L. Mikula, MD, and Benjamin D. Elder, MD, PhD

107. Intensive Care After Craniotomy

Lina Marengo Hillebrand, MD, and Kaisorn L. Chaichana, MD

108. Intensive Care After Neuroendovascular Procedures

Brian W. Chong, MD, Chandan Krishna, MD, and Bernard R. Bendok, MD

Section IV: Questions and Answers

Section V: Imaging in Critical Illness

109. Chest Imaging

Carlos A. Rojas, MD, and Barbara L. McComb, MD

110. Abdominal Radiographs

Frank K. Chen, MD, David J. DiSantis, MD, and Joseph G. Cernigliaro, MD

111. Ultrasonography

Christopher M. Kyper, MD, and Lauren K. Ng, MD

112. Transesophageal Echocardiography

Joshua M. Hauser, MD, MPH, Scott J. Heller, MD, and Harish Ramakrishna, MD

Section V: Questions and Answers

Section VI: Procedures

Airway Procedures and Modes of Ventilation

113. Basics of Airway and Oxygen Delivery Devices

Andrew W. Murray, MD

114. Endotracheal Intubation Procedures

Juan G. Ripoll Sanz, MD, and Matthew J. Ritter, MD

115. Noninvasive Positive Pressure Ventilation

Arvind Balavenkataraman, MBBS, and John E. Moss, MD

116. Tracheostomy

Cody J. Smith, MD, Saba Ghorab, MD, and David G. Lott, MD

117. Diagnostic and Therapeutic Bronchoscopy in the Intensive Care Unit

John A. Fanous, MBBS, and Kenneth K. Sakata, MD

Cardiovascular and Cardiopulmonary Monitoring and Access

118. Electrocardiographic Monitoring

Sumedh K. Iyengar, MBBS, Shruti K. Iyengar, MBBS, and Komandoor Srivathsan, MD

119. Hemodynamic Monitoring

Hannelisa E. Callisen, PA-C, and Ayan Sen, MD

120. Pulmonary Artery Catheterization

Philip E. Lowman, MD, and Christan D. Santos, APRN, DNP

121. Thoracentesis and Chest Tubes

Staci E. Beamer, MD

122. Central Line Placement

Luke J. Matzek, MD, and W. Brian B. Beam, MD

123. Interventional Radiology Procedures

Rahmi Oklu, MD, PhD, and Harish Narayanan, MD

Neuromonitoring and Procedures

124. Intracranial Pressure Monitoring and External Ventricular Drainage

Amanda D. Tomlinson, APRN, DNP, and William D. Freeman, MD

125. Lumbar Puncture

Christina I. Collins, APRN, DNP, and Karen A. Pratt, APRN

126. Lumbar Drain

Jamie J. Van Gompel, MD

127. Intraventricular Drug Administration

William W. Horn Jr, APRN, and Benjamin L. Brown, MD

128. Transcranial Doppler Ultrasonography

Michelle P. Lin, MD, MPH, and Josephine F. Huang, MD

129. Electroencephalography

Amy Z. Crepeau, MD

130. Essentials of Multimodal Brain Monitoring

Jennifer E. Fugate, DO

131. Essentials of Cranial Neuroimaging

Vishal N. Patel, MD, PhD, and Sukhwinder S. Sandhu, MD

Section VI: Questions and Answers

Section VII: Pharmacotherapeutics

132. Sedation and Analgesia

Kevin H. Luk, MD

133. Inotropes, Vasopressors, and Antihypertensive Agents

Juan N. Pulido Sierra, MD

134. Antibiotics, Antivirals, and Antifungals

Christopher F. Saling, MD

Section VII: Questions and Answers

Section VIII: End-of-Life Considerations

135. Palliative and End-of-Life Care in the Intensive Care Unit

Maisha T. Robinson, MD

136. Assessing Decisional Capacity

Ahmed A. Alhassan, MBBS, David C. Fipps, DO, and Christopher L. Sola, DO

137. Brain Death

Eelco F. M. Wijdicks, MD, PhD

138. Disorders of Consciousness

Amanda L. Porter, MD, and Gregory S. Day, MD

139. Concerns and Care Before Organ Donation

Diane C. McLaughlin, APRN, and Lauren K. Ng, MD

140. Medical Professionalism

Thomas Gossard, BA, and Erik K. St. Louis, MD

141. Informed Consent for Treatment or Research

Thomas Gossard, BA, and Erik K. St. Louis, MD

Section VIII: Questions and Answers