

Vanderbilt University Medical Center
Emergency General Surgery Service
Surgical Residency Rotation and Curriculum

UNIT 10 SHOCK, RESUSCITATION, AND SURGICAL CRITICAL CARE

PART A: SHOCK AND RESUSCITATION

UNIT OBJECTIVES:

1. Demonstrate an understanding of the pathophysiology of shock and its categories.
2. Demonstrate an understanding of the mechanisms and pathophysiology of cardiopulmonary arrest.
3. Demonstrate the ability to manage the treatment of shock and cardiopulmonary arrest.

COMPETENCY-BASED KNOWLEDGE OBJECTIVES:

1. Define the categories of shock based upon type, and explain the etiology and pathophysiology of each type of shock:
 - a. Cardiogenic
 - b. Hypovolemic
 - c. Distributive (septic, anaphylactic, neurogenic, and adrenal insufficiency mediated)
 - d. Obstructive (cardiac tamponade, tension pneumothorax, pulmonary embolus)
2. Summarize the clinical presentation and hemodynamic parameters associated with each type of shock.
3. Propose an algorithm for diagnosing and initiating treatment for each shock type.
4. Discuss the pathophysiology, including the mechanism of arrest, for each of the following situations:
 - a. Acute myocardial infarction
 - b. Acute dysrhythmia
 - c. Congestive heart failure
 - d. Pulmonary embolus
 - e. Tension pneumothorax
 - f. Substance abuse
 - g. Hypothermia
 - h. Acute stroke
 - i. Hemorrhagic shock
5. Explain the indications for and the pharmacokinetics of each of the following drugs:
 - a. Lidocaine
 - b. Bretylium
 - c. Digoxin
 - d. Propranolol
 - e. Verapamil
 - f. Pronestyl
 - g. Quinidine
 - h. Isoproterenol
 - i. Amiodarone
 - j. Dopamine
 - k. Dobutamine
 - l. Adenosine (Adenocard®)
6. Summarize the indications and the appropriate techniques for cardioversion and defibrillation.

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7. Outline the signs and symptoms of acute airway obstruction and define the appropriate intervention in adult and pediatric patients.
8. Explain the physiological impact of mechanically assisted ventilation on the cardiovascular / respiratory system.
9. Analyze methods for initiating and maintaining ventilatory support.
10. Describe the indications and potential complications for the following surgical interventions:
 - a. Central venous catheter
 - b. Swan Ganz catheter
 - c. Arterial line
 - d. Thoracostomy tube
 - e. Peripheral vein cutdown
 - f. Thoracentesis
 - g. Endotracheal intubation (oral and nasal)
 - h. Cricothyrotomy

11. Review the importance of serial physical examinations, hemodynamic monitoring, and serial laboratory evaluations in assessing patient response to specific resuscitation treatment.
12. Outline the clinical and laboratory indications for transfusion of the following blood products:
 - a. Packed red cells
 - b. Fresh frozen plasma
 - c. Platelets
 - d. Cryoprecipitate
 - e. Whole blood
 - f. Specific clotting factor concentrates (VIII, IX, XII)

13. Analyze the potential complications from use of the above products.
14. Elderly patients represent a special population, presenting key differences in emergency situations.
Analyze and use examples to describe the significance of the following characteristics that are more frequent in the elderly:
 - a. Vague, imprecise symptoms
 - b. Atypical disease presentation
 - c. Co-morbidity
 - d. Polypharmacy
 - e. Possibility of cognitive impairment
 - f. Diagnostic tests with different normal values
 - g. Likelihood of decreased functional reserve
 - h. Inadequate social support systems

15. Describe the role and indications (if any) for the following products in acute resuscitation:
 - a. Desmopressin acetate (DDAVP)
 - b. Hespan and similar products
 - c. Albumin

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16. Assess the indications, guidelines, and potential complications of the following cardiovascular drugs:

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| a. Dopamine | d. Epinephrine |
| b. Dobutamine | e. Norepinephrine |
| c. Phenylephrine | f. Amrinone |

17. Analyze and explain factors involved in blood pressure overestimation in elderly patients (pseudohypertension).

COMPETENCY-BASED PERFORMANCE OBJECTIVES:

1. Complete and pass Advanced Cardiac Life Support (ACLS) training.
2. Perform venous access procedures, including subclavian and jugular vein catheterizations and saphenous vein cutdown.
3. Diagnose cardiac arrest and rhythm disturbances.
4. Determine the indication, dosage, contraindications, and method of administration of the following medications:
 - a. Morphine
 - b. Lidocaine and Procainamide
 - c. Bretylium
 - d. Propranolol
 - e. Atropine
 - f. Isoproterenol
 - g. Verapamil
 - h. Epinephrine and norepinephrine
 - i. Dopamine and dobutamine
 - j. Amrinone
 - k. Calcium
 - l. Cardiac glycosides
 - m. Nitroglycerin and nitroprusside
 - n. Furosemide
 - o. Sodium bicarbonate
 - p. Adenosine (Adenocard ®)
5. Estimate volume requirements in acute hemorrhage; and institute replacement therapy.
6. Recognize and manage airway obstruction.
7. Perform closed chest defibrillation.
8. Use disposable airway equipment, (e.g., bags, gloves) as transmissible infection precautions.
9. Perform endotracheal and nasotracheal intubation.
10. Perform cricothyrotomy and tracheostomy.
11. Manage mechanical ventilatory equipment.
12. Perform pulmonary artery catheterization, including determining catheter position by pressure wave recording and electrocardiogram (EKG).
13. Manage cardiogenic and septic shock.