Guidelines for Resident Training in Critical Care Medicine

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Guidelines for Resident Training in Critical Care Medicine

Guidelines/Practice Parameters Committee
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The Society of Critical Care Medicine has become increasingly concerned that residency training programs be consistent with regard to the management of critical illness. Variations in training may be related to the explosion of knowledge and technology in critical care, and to the fact that most training programs limit the resident physician's intensive care unit experience to managing patients within that program's specialty. Training and management of patients with critical illness may become more fragmented as a result of current emphasis on primary care and de-emphasis on specialty training.

This document intends to define cognitive and procedural skills that residents should possess on completion of graduate training in order to be able to formulate and initiate a treatment plan for the critically ill patient.

To accomplish this goal, the American College of Critical Care Medicine formed a multidisciplinary task force to review current requirements for residency programs in Internal Medicine, Surgery, Anesthesiology, Pediatrics, and Emergency Medicine (1). The task force utilized recognized principles (2) to promulgate a consensus core curriculum of cognitive knowledge and procedural skills that the American College of Critical Care Medicine and the Society of Critical Care Medicine believe to be necessary for physicians to effectively approach the complex problems encountered in the critically ill patient.

Each of the following recommendations has been assigned a Level 3 "rating" that reflects the weight of scientific evidence, expert opinion, and clinical practice experience which the recommendation is based, according to the following scale:

Level 1. Convincingly justifiable on scientific evidence alone;
Level 2. Reasonably justifiable by available scientific evidence and strongly supported by expert critical care opinion;
Level 3. Adequate scientific evidence is lacking but widely supported by available data and expert critical care opinion.

RECOMMENDATION 1

Upon completion of residency training, the physician should have achieved proficiency in the recognition and initial management of problems commonly encountered in the intensive care unit. This proficiency includes, but is not limited to, sepsis, acute respiratory failure, acute renal failure, hemodynamic instability, overdoses and poisonings, acute neurologic insults, acute electrolyte and endocrine emergencies, and coagulation disorders. For less common problems, the trainees gain a knowledge base that allows them to formulate a differential diagnosis, initiate a management plan, and request appropriate consultations.

RECOMMENDATION 2

Methods of teaching critical care should be left to the discretion of individual program directors. Approaches to resident teaching depend greatly on available facilities, patient population base, and faculty. It is likely that the majority of cognitive skills will be conveyed through didactic lectures and patient care rounds. Procedural skills must be taught both in didactic sessions and in demonstrations at the bedside. Distribution of pertinent medical literature and a curriculum summary is encouraged.
RECOMMENDATION 3

The following core curriculum is recommended. These curriculum guidelines are not intended to constrain training programs nor to mandate instruction in all topics included. Rather, they should serve as a goal toward which training programs should strive.

I. Specific Credentials

A. All housestaff should achieve Advanced Cardiac Life Support (ACLS), Pediatric Advanced Life Support (PALS), Advanced Trauma Life Support (ATLS) provider status, as appropriate, and maintain this throughout their training.

II. Cognitive Skills

A. Cardiovascular

1. Recognition and Acute Management of
   a. Shock (all forms)
   b. Cardiac arrhythmias
   c. Cardiogenic pulmonary edema
   d. Acute cardiomyopathies
   e. Hypertensive emergencies

2. Principles of
   a. Vasoactive and inotropic therapy
   b. Arterial, central venous, and pulmonary artery catheterization and monitoring
   c. Cardiovascular physiology in the critically ill patient

B. Respiratory

1. Recognition and Acute Management of
   a. Acute and chronic respiratory failure
   b. Status asthmaticus
   c. Smoke inhalation and airway burns
   d. Upper airway obstruction, including foreign bodies and infection
   e. Near drowning
   f. Adult respiratory distress syndrome (noncardiogenic/capillary leak pulmonary edema)

2. Use of
   a. Pulmonary function tests including bedside spirometry
   b. Arterial blood gas analysis

3. Principles and Application of
   a. Oxygen therapy
   b. Mechanical ventilation (invasive and noninvasive) including indications, modes, complications, and weaning
C. **Renal**

1. **Recognition and Acute Management of**
   a. Fluid and electrolyte disturbances
   b. Renal failure
   c. Acid-base disorders

2. **Principles of:**
   a. Drug dosing in renal failure
   b. Fluid and electrolyte therapy in the critically ill patient
   c. Dialysis

D. **Central Nervous System (CNS)**

1. **Recognition and Acute Management of**
   a. Coma
   b. Drug overdose
   c. Acute hydrocephalus
   d. Brain death evaluation
   e. Persistent vegetative state
   f. Intracranial vascular accidents
   g. Status epilepticus
   h. Intracranial infection
   i. Intracranial hypertension
   j. Spinal cord injury

E. **Metabolic and Endocrine**

1. **Recognition and Acute Management of**
   a. Hypoadrenal crisis
   b. Diabetes insipidus
   c. Diabetic ketoacidosis

2. **Principles of Alimentation**
   a. Enteral
   b. Parenteral

F. **Infectious Disease**

1. **Recognition and Acute Management of**
   a. Sepsis
   b. Hospital-acquired and opportunistic infections, including Acquired Immunodeficiency Syndrome

2. **Principles of**
   a. Antibiotic selections and dosage schedules for the critically ill patient
   b. Infection risks to healthcare workers
G. Hematologic Disorders

1. Recognition and Acute Management of
   a. Defects in hemostasis
   b. Hemolytic disorders
   c. Hematologic dysplasias and their complications
   d. Sickle cell crisis
   e. Thrombotic disorders

2. Principles of
   a. Anticoagulation and fibrinolytic therapy
   b. Blood component therapy
   c. Plasmapheresis for acute disorders including neurologic and hematologic diseases

H. Gastrointestinal Disorders

1. Recognition and Acute Management of
   a. Gastrointestinal bleeding
   b. Hepatic failure
   c. Perforation of viscus

2. Principles of prophylaxis against stress ulcer bleeding

I. Principles of Transplantation

1. Immunosuppression

2. Infections in the immunocompromised patient

3. Organ rejection

4. Organ donation

J. Principles of Sedation, Analgesia, and Neuromuscular Blockade in the Critically Ill Patient

K. Monitoring & Biostatistics

1. Prognostic indices such as Acute Physiology and Chronic health Evaluation (APACHE), Therapeutic Intervention Scoring System (TISS), and Pediatric Risk of Mortality (PRISM) as indicated

2. Respiratory monitoring (pulse oximetry, transcutaneous $P_O_2$, $P_C_O_2$, and end-tidal CO$_2$

3. Indirect calorimetry

L. Ethical and Legal Aspects of Critical Care

1. Do-not-resuscitate orders

2. Principles of informed consent

3. Rights of patients
4. Withholding and withdrawing life support
5. Advance directives (Patient Self-Determination Amendment of 1991)

M. Psychosocial Issues
1. Understanding the effect of life-threatening illness on patients and their families
2. Death and dying

N. Transport of the Critically Ill Patient
1. Stabilization
2. Equipment and monitoring

O. Principles of Resuscitation and Postoperative Management of the Patient With Acute Injury

III. Supplemental Cognitive Skills

In addition to the core curriculum for all residents, the following list represents entities that are unique to either the adult or pediatric population.

A. Adult Critical Care Training
1. Recognition and Acute Management of
   a. Myocardial infarction
   b. Aortic dissection
   c. Hyperosmolar coma
   d. Pheochromocytoma
   e. Critical illness in the pregnant patient
   f. Thyroid storm and myxedema coma
   g. Pancreatitis
   h. Mesenteric infarction
   i. Pulmonary embolism
   j. Cardiac tamponade
   k. Acute valvular insufficiency
2. Living wills, advance directives, durable powers of attorney

B. Pediatric Training
1. Recognition and Acute Management of
   a. Common forms of congenital heart disease (cyanotic and acyanotic)
   b. Bronchiolitis
   c. Inborn errors of metabolism
2. Perioperative management of the critically ill child
3. Evaluation and acute management of the critically ill neonate
4. Legal Issues
   a. Child abuse and neglect statutes
   b. Baby Doe legislation

IV. Core Procedural Skills for Residents

In addition to practical training in the following procedural skills, the resident must have an understanding of the indications, contraindications, complications, and pitfalls of these interventions. Due to the variability of individual training programs, practical experience may be limited for some procedures.

A. Airway Management
   1. Maintenance of an open airway in the nonintubated patient
   2. Ventilation by bag-mask systems
   3. Tracheal intubation
   4. Management of pneumothorax

B. Circulation
   1. Arterial puncture and cannulation
   2. Insertion of central venous catheters
   3. Pericardiocentesis in acute tamponade
   4. Dynamic electrocardiogram interpretation
   5. Cardioversion
   6. Pulmonary artery catheterization
   7. Transcutaneous pacing
REFERENCES

1. American Medical Association/Accreditation Council for Graduate Medical Education: Essentials and Information Items, 1993-1994


These guidelines have been developed by the Guidelines Committee of the Society of Critical Care Medicine (SCCM), and thereafter reviewed and revised by the Society's Council. These guidelines reflect the official opinion of the Society of Critical Care Medicine and do not necessarily reflect, and should not be construed to reflect, the view of certification bodies, regulatory agencies or other medical review organizations.

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