

Overall Educational Objectives for Residents in ICU

A. CaNMEs Role: MEDICAL EXPERT

General Objectives

1. To obtain a working knowledge of critical care medicine by actively participating in the management of critically ill patients.
2. To gain an understanding of the integrative nature of disease in the critically ill patient and the interdisciplinary approach to the management of such patients.
3. To understand the pathophysiology of commonly seen diseases in critically ill patients.
4. To become familiar with the principles of airway management and ventilator care.
5. To be able to identify the patient at risk, perform an appropriate physical examination, formulate a problem list and institute a course of therapy under the direction of senior personnel.
6. To gain proficiency in procedures commonly carried out in a critical care unit.
7. To become comfortable in the management of a cardiac arrest and the acute resuscitation of a traumatized or acutely ill patient.

Specific Objectives

A. Initial Assessment of the Critically Ill

1. Obtain an appropriate history from a patient, family or other medical personnel.
2. Perform a problem oriented physical examination.
3. Formulate a problem list from the information gathered.
4. Identify problems in order of priority.
- 5. Outline a plan of management, in conjunction with ICU fellow or Consultant.**
6. Institute appropriate investigations and treatment under the supervision of an ICU fellow or Consultant.

B. Appropriate Use of the Laboratory in the Management of Critically Ill Patients

C. Skills

1. Introduction to the management of the airway.
- 2. Interpretation of hemodynamic data.**
- 3. Techniques to obtain vascular access via central venous catheter.**
4. **ACLS** and introduction to ATLS.
5. Tube thoracostomy.
6. Lumbar puncture.

7. Other: nasogastric tube or feeding tube insertion.

D. Knowledge Base

Each candidate rotating through the intensive care unit should develop a fundamental understanding of the diagnosis, incidence, etiology, microbiology, pathophysiology, signs, symptoms, treatments, prognosis and complications of the following conditions. The candidate must be able to recognise the severity of illness in these conditions, provide emergency and life saving support where required and followed up by an appropriate diagnostic and management plan.

1. Coma and other Neurological problems
- 2. Respiratory Failure**
3. Cardiac crises
4. Renal Preservation and Support
5. The abdomen
- 6. Trauma**
7. Burns
8. Hematological abnormalities and Blood replacement
- 9. Sepsis**
10. Nutrition: enteral and parenteral
11. Toxicology
12. Endocrine disturbances of critical illness
13. Organ transplantation
- 14. End of life issues**
15. Ethical, legal and philosophical considerations

Coma and other neurological Problems

The trainee shall demonstrate knowledge of:

- 1. The pathophysiology of coma and raised intracranial pressure (ICP)**
2. The **investigation of coma**, raised ICP and the monitoring techniques involved.
3. The available treatment for cerebral resuscitation and **management of raised ICP.**
4. Metabolic, structural and infectious causes of altered level of consciousness.
5. Seizure abnormalities and systemic metabolic consequences of status epilepticus with emphasis on pharmacological management.
6. Brain death.
7. Polyneuropathies and myopathies of critical illness.
8. Environmental and drug related psychopathology including anxiety, sleep disturbances, pain, withdrawal, delirium.

Respiratory Failure

The trainee shall demonstrate knowledge of:

1. The normal anatomy of the respiratory system.
2. The physiology of the gas exchange unit, chest wall and lung mechanics, airway dynamics and control of respiration.
3. **The pathophysiology of disease states leading to respiratory failure, including hypoxemic and hypercarbic respiratory failure.**
4. **An approach to the management of the airway.**
5. Invasive and non-invasive ventilation techniques and modes.
6. **Timing of liberation and failure to liberate from mechanical ventilation.**
7. **Complications of mechanical ventilation including ventilator associated pneumonia.**

Cardiac Crises

(arrhythmias, myocardial infarction, hypertensive emergencies)

The trainee shall demonstrate knowledge of:

1. **Methods and application of Advanced Cardiac Life Support.**
2. **Principles of invasive and non-invasive monitoring.**
3. Pathophysiology and treatment of heart failure.
4. Management of ischemic heart disease and myocardial infarction.
5. An understanding of cardiac arrhythmias including etiology and therapy..
6. **An understanding of cardiopulmonary interactions with an emphasis on right heart syndromes.**
7. Hemodynamic consequences of acute and chronic valvular abnormalities.

Shock States

The trainee shall demonstrate knowledge of:

1. **Diagnosis and understanding of the pathophysiology and types of shock.**
2. **Understanding the in initial management of shock with emphasis on oxygen delivery and oxygen consumption.**
3. Practical knowledge of Early Goal Directed Therapy.
4. Use of mixed venous oxygen saturation (ScvO₂) or pulmonary artery catheter-derived measurements to direct resuscitation of shock patients.
5. **Understand the separate roles of vasopressors and inotropic agents. The approach and limits to titrating this therapy.**
6. Understanding of multiple organ dysfunction and failure.

Renal Preservation and Support

The trainee shall demonstrate knowledge of:

1. Ability to distinguish between prerenal, renal and postrenal failure.
2. **Pathophysiology, diagnosis, and treatment of serious acid-base disorders.**
3. **Pathophysiology, diagnosis and treatment of serious fluid and electrolyte disorders.**
4. Knowledge of the interaction between drugs, nephrotoxins and the kidneys in both normal and diseased states.
5. Indication and understanding of intermittent hemodialysis and CVVHDF.

The Abdomen

The trainee shall demonstrate knowledge of:

1. The causes, diagnostic techniques and management of the acute abdomen.
2. The diagnosis, medical, surgical and radiological management of upper and lower GI bleeding.
3. The diagnosis and management of hollow viscus dysfunction.
4. **The diagnosis and management of acute and chronic hepatic failure with an emphasis on acute fulminant hepatic failure** and indications and contraindications for liver transplantation. Knowledge of the liver's role in: the reticuloendothelial system, as a site for metabolism, the production of a variety of enzymes, detoxification of endogenous and exogenous substances and in hemostasis.
5. **The diagnosis, medical and surgical management of severe pancreatitis.**

Trauma

The trainee shall demonstrate knowledge of:

1. The need for continuing care of the traumatized patient with regard to all vital systems, whether or not these systems have received the primary trauma.
2. The secondary insults that enhance the primary pathogenicity of traumatized organs.
3. **The short and long term predictable sequelae and complications of traumatized patients.**

Burns

The trainee shall demonstrate knowledge of:

1. The pathophysiology of the phases of burn injury:
 - i. fluid and electrolyte imbalance
 - ii. nutrition depletion, the catabolic state and protein requirements
 - iii. sepsis
 - iv. reconstruction
 - v. rehabilitation

2. The knowledge and complications of the airway burn, smoke inhalation and impaired gas transport.
3. The importance of environmental control.

Hematological Abnormalities and Blood Replacement

The trainee shall demonstrate knowledge of:

1. **White blood cell abnormalities including the issues regarding neutropenia and the immunocompromised host admitted to the ICU.**
2. The immunocompromised host and the diseases and treatment unique to the immunodeficient state.
3. The pathogenesis and management of thrombocytopenia.
4. **Etiology and management of anemia in the ICU.**
5. The coagulation and fibrinolytic sequences and disorders of these pathways including hypercoagulable states and coagulopathies.
6. **Blood component therapy and indications for transfusion in the ICU.**

Sepsis

The trainee shall demonstrate knowledge of:

1. Available diagnostic techniques for infectious organisms.
2. Epidemiology of infectious disease.
3. **Techniques to control and limit infections, specifically and approach to the septic patient in terms of foci of infection and source control.**
4. **Approach to ICU nosocomial infections, specifically ventilator associated pneumonia (VAP) and central line infections.**
5. The understanding of the systemic inflammatory response syndrome and multiple organ dysfunction.
6. The pharmacology, indications, complications, interactions, monitoring and efficacy of antimicrobial agents including antibiotics, antifungals, antivirals and antiparasitics.

Nutrition: Enteral and Parenteral

The trainee shall demonstrate knowledge of:

1. **Methods of assessing energy requirements and monitoring the effectiveness of nutritional support.**
2. **The indications, limitations, methods and complications of enteral and parenteral nutrition.**
3. The indications, methods, limitations and complications of various access routes for both enteral and parenteral nutrition.

Toxicology

The trainee shall demonstrate knowledge of:

1. The importance of vital system support as the cornerstone of care in the intoxicated patient, together with specific antidotes or supportive therapy pertinent to individual intoxicants.
2. Understand concepts of absorption, distribution, detoxification and elimination of intoxicants.
3. **The available methods to decrease absorption and enhance excretion of intoxicants with emphasis on those agents requiring hemodialysis or hemoperfusion.**
4. **Understand the management of common lethal intoxications including ASA, Acetaminophen, Betablockers, Calcium Channel Blockers, Digoxin, Lithium, TCAs, organophosphates, opioids.**
5. The ongoing patient's needs for emotional and psychiatric support.

Endocrine Disturbances of Critical illness

The trainee shall demonstrate knowledge of:

1. The pathophysiology, diagnosis and management of common endocrine disturbances.
2. **Recognition and treatment of endocrinological emergencies including thyroid storm, myxedema coma, DKA, hyperosmolar syndromes, addisons disease and pheochromocytoma.**
3. Recognition and treatment of endocrine disturbances developing in the critically ill.
4. **Understand the concepts and controversies of relative adrenal insufficiency, tight glucose control and euthyroid sick syndrome in the ICU.**
5. Disorders of thermoregulation and normal body temperature regulation.
6. **Understand pathophysiology, diagnosis (including urin analysis) and management on DI, SIADH and cerebral salt wasting syndrome.**

Organ Transplantation

The trainee shall demonstrate knowledge of:

1. Indications and acute and chronic complications related to solid organ transplantation.
2. Postoperative management concerns of patients undergoing solid organ transplantation.
3. **Immunosuppressive therapy and its pharmacologic and infectious complications.**
4. Diagnosis and therapy towards organ rejection and organ failure.

5. Diagnosis and management of bone marrow transplantation complications, specifically a approach to respiratory failure in the post BMT patient.

Ethical, Legal and Philosophical Considerations (including End of Life care.)

The trainee shall demonstrate knowledge of these concerns as they relate specifically to the critically ill:

1. Including consent, power of attorney and alternate decision-makers.
2. Resuscitation statistics and outcome.
3. Recognition of the legal concerns with the critically ill including mechanism of injury and patient and societal interactions.
4. **Understand how decision are made regarding end of life care.**

B. CanMeds Role: COMMUNICATOR

1. Communicate with patient, family and admitting service about daily patient progress
2. Communicate with ICU team (nurses, residents, attending staff) about patient care issues
3. **Keep clear, concise, legible documentation of daily patient progress in the patients' hospital chart**
4. **Participate in end-of-life discussions with ICU team and family members**

C. CanMeds Role: COLLABORATOR

1. Enlist the help and advice of consultants when indicated
2. Work with members of the ICU team to provide optimal patient care (nurses, physicians, dieticians, physiotherapists, pharmacists)

D. CanMeds Role: MANAGER

1. Efficiently manage the daily care of several patients
2. Efficiently and effectively manage new admissions into the ICU
3. Manage appropriate discharge from the ICU
4. Effective time management

E. CanMeds Role: HEALTH ADVOCATE

1. Demonstrate attention to patient safety
2. Honour patient confidentiality
3. Obtain consent when required

F. CanMeds Role: SCHOLAR

1. Demonstrate commitment to ongoing personal education
2. Demonstrate ability to teach other members of the ICU team
3. Knowledge of relevant basic science (medical expert)
4. **Knowledge of applied physiology in critical illness**

G. CanMeds Role: PROFESSIONAL

1. Display compassion, empathy, caring, honesty and ethical behaviour
2. Punctuality
3. Recognizes and deals with ethical issues