

Guidelines for training in intensive care medicine

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Preamble

The present guidelines are presented with the aim of unifying the minimal requirements for training in intensive care medicine in Europe. These guidelines will serve as a basis to obtain the European Diploma of Intensive Care Medicine (by the ESICM). To be recognized as a specialist in intensive care medicine ("intensivist"), the candidate must present evidence of:

a) a primary specialty in anaesthesiology, internal medicine (or specialty thereof), surgery, paediatrics (or in intensive care medicine), and

b) a period of 2 years full-time training and experience in intensive care medicine. This 2 year period cannot be entirely included in the primary specialty, except in countries where a primary specialty in intensive care medicine (at least 5 years) has been formally recognized.

During this latter training period, the candidate must have gained experience in the diagnosis and treatment of patients with:

- serious medical and surgical diseases,
- polytrauma,
- coronary artery disease,
- neurosurgical diseases,
- paediatric emergencies.

For all candidates, experience is desirable but not mandatory in the following areas:

- operating theatre (anesthetic procedures),
- burns unit,
- emergency room,
- medicalized ambulance systems,
- paediatric intensive care,
- neonatology unit.

The present document defines the *minimum* content of these 2 years of training in intensive care medicine, and

is dealing with two aspects: the knowledge about pathophysiology, diagnosis and treatment of a series of disease processes, and a list of specific procedures and interventions that the candidate must be able to perform.

Theoretical knowledge

The intensive care specialist must understand the pathophysiology, construct a differential diagnosis and apply the appropriate prophylactic and therapeutic interventions in the following disorders. This list is not comprehensive.

Respiratory

Management of airways (including respiratory arrest, upper airway obstruction, smoke or burns airway damage), pulmonary edema (adult respiratory distress syndrome and hemodynamic type), hypercapnic respiratory failure, severe asthma, chest trauma, respiratory muscle disorders, thoracic surgery.

Cardiovascular

Hemodynamic instability and shock, cardiac arrest, acute myocardial infarction and unstable angina, severe heart failure, common arrhythmias and conduction disturbances, specific cardiac disorders (cardiomyopathies, valvular heart disease, atrial or ventricular septal defects, myocarditis, ...), tamponade, pulmonary embolism, aortic dissection, hypertensive crisis, peripheral vascular diseases, cardiovascular surgery.

Neuropsychiatric

Coma, head trauma, intracranial hypertension, cerebrovascular accidents, cerebral vasospasm, meningo-encephalitis, acute neuromuscular diseases (including myasthenia & Guillain Barré syndrome), postanoxic brain damage, acute confusional states, spinal cord injury, neurosurgery, brain death.

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Renal

Acute renal failure.

Metabolic and Nutritional

Electrolyte and acid-base disorders, endocrine disorders (including diabetes), nutritional requirements, monitoring of nutrition.

Haematologic

Disseminated intravascular coagulation and other coagulation disorders, hemolytic syndromes, acute and chronic anemia, blood component therapy, immune disorders.

Infectious

Severe infections due to aerobic and anaerobic bacteria, viruses, fungi and parasites, nosocomial infections, infections in the immunocompromised, tropical diseases, antimicrobial therapy, immunotherapy.

Gastro-intestinal

Inflammatory bowel diseases, pancreatitis, acute and chronic liver failure, prevention and treatment of acute GI bleeding (including variceal bleeding), peritonitis, mesenteric infarction, perforated viscus, bowel obstruction, abdominal trauma, abdominal surgery.

Obstetric

Toxemia (including in HELLP syndrome), amniotic fluid embolism, eclampsia, and hemorrhage.

Paediatric

Resuscitation, acute respiratory failure, cardiac failure, trauma, severe infections, intoxications, metabolic disorders, seizures.

Environmental hazards

Burns, hypo- and hyperthermia, near-drowning, electrocution, radiations, chemical injuries, animal bites.

Toxicology, poisoning

Acute intoxications, drug overdose, serious adverse reactions, anaphylaxis.

General

Pharmacology, pharmacokinetics and drug interactions
 Analgesia and sedation
 Inflammation and anti-inflammatory agents
 Multiple trauma
 Transport of the critically ill
 Multisystems disorders
 Management of the organ donor.

Interventions and procedures

The intensivist must be able to perform a number of specific procedures:

Respiratory

Maintenance of open airway, including endotracheal intubation (oral and nasal) and emergency cricothyrotomy,

use of laryngeal mask, suctioning of the airway, setting and tuning of the respirator with different modes of ventilation, titration of oxygen therapy, use of positive end-expiratory pressure, use of mask ventilation and continuous positive airway pressure, techniques of weaning from mechanical ventilation, placement of a thoracostomy tube, implementation of respiratory pharmacological support, bronchofibroscopy, interpretation of arterial and mixed venous blood gases, assessment of gas exchange and respiratory mechanics.

Cardiovascular

Placement of a central venous catheter (by different routes), a pulmonary artery catheter and an arterial catheter (by different routes); measurement and interpretation of the hemodynamic variables (including the derived variables); implementation of cardiovascular support, antiarrhythmic therapy and thrombolysis; pericardiocentesis, placement of temporary pacing, basic and advanced cardiopulmonary resuscitation (CPR), cardioversion. Advisable: circulatory assist devices, cardiovascular echo-Doppler techniques.

Neurologic

Basic interpretation of a brain CT-scan, intracranial pressure monitoring.

Advisable: measurements of jugular venous saturation, cerebral Doppler velocities and cerebral blood flow.

Metabolic

Implementation of intravenous fluid therapy, enteral and parenteral nutrition.

Haematologic

Correction of haemostatic and coagulation disorders, interpretation of a coagulation profile, implementation of thrombolysis.

Advisable: plasma exchange.

Renal

Advisable: intermittent or continuous extracorporeal renal support techniques.

Gastro-intestinal

Placement of an esophageal and/or gastric tamponade balloon.

Advisable: placement of a duodenal tube feeding.

Toxicologic

Advisable: blood purification techniques, hyperbaric oxygenation.

General

Administration and budgetting

Total quality assessment: measurement of severity of illness and outcome assessment

Exposure to clinical research

Ethical and legal aspects