Questions to prepare for practical classes in anesthesiology and critical care for 4th year students

Fall Semester

Lesson 1. Physiology of pain. Methods of objective control in anesthesiology and resuscitation

1. Pain definition. Central and peripheral mechanisms of pain. Antinociceptive system
2. Assessment of pain. The concept of anesthesia. Current opportunities and approaches to pain relief
3. Opioid analgesics in anesthesiology and intensive care. Main pharmacological effects. The main representatives of opioid analgesics. Opioid receptor antagonists
4. Patient-controlled analgesia. Field of application
5. Non-opioid analgesics in anesthesiology and intensive care. Main pharmacological effects. The main representatives of NSAIDs. Paracetamol in intensive care
6. Monitoring during anesthesia
7. Gas monitoring during anesthesia
8. Monitoring of muscle relaxation during anesthesia. Features of invasive hemodynamic monitoring

Lesson 2. Inhaled anesthetics

1. Inhaled anesthetics in anesthesiology (nitrous oxide, fluorotane, isoflurane, sevoflurane)
2. Applied pharmacokinetics of inhaled anesthetics: partition coefficients, minimal alveolar concentration and their effect on the course of anesthesia
3. Inhalation mask anesthesia. Field of application. Technique
4. Endotracheal combined anesthesia. Field of application. Technique
5. Features of anesthetic management in children. Dosis factor

Lesson 3: Non-inhalation anesthetics

1. Short-acting opioid analgesics in anesthesiology (fentanyl, sufentanil, remifentanil)
2. Intravenous anesthetics in anesthesiology (midazolam, propofol, ketamine, thiopental)
3. Muscle relaxants in anesthesiology. Features of depolarizing muscle relaxants
4. Muscle relaxants in anesthesiology. Features of non-depolarizing muscle relaxants
5. Total intravenous anesthesia. Field of application. Technique
6. Vascular access for infusion and transfusion therapy

Lesson 4: General Anesthesia

1. Preparing patients for elective surgery
2. Preparing patients for emergency surgeries.
3. Anesthetic risk assessment (ASA scale)
4. Preoperative prevention of thromboembolic complications.
5. Preoperative antibiotic prophylaxis. Goals
6. Prevention of aspiration complications before surgery
7. Premedication
8. Components and stages of general anesthesia
9. Intubation of the trachea. Equipment. Laryngeal mask airway in anesthesiology
10. Complications of tracheal intubation. The concept of "difficult intubation." Prediction of "difficult intubation"
11. Intraoperative period: induction of anesthesia, formation of anesthesia, maintenance of anesthesia, recovery from anesthesia

Lesson 5: Local Anesthesia

1. Local anesthetics in anesthesiology. Classes. Pharmacology
2. Spinal anesthesia. Methodology. Indications
3. Spinal anesthesia. Contraindications to conduct. Complications
4. Epidural anesthesia. Methodology. Indications
5. Epidural anesthesia. Contraindications to conduct. Complications
6. Sacral (caudal) anesthesia
7. Conductive anesthesia

Lesson 6. Complications of the early postoperative period. Prevention and therapy. Correction of water and electrolyte disorders

1. Recovery from anesthesia (awakening). Extubation. Recovery stage complications
2. Life-threatening intraoperative complications
3. Infusion therapy during surgery. Crystalloid and colloid blood substitutes
4. The use of blood products during surgery. Blood saving technologies in surgery
5. Early postoperative period. Monitoring Complications. Recovery Ward
6. Anesthesia in the postoperative period
7. Concepts of expedited surgical rehabilitation after “high-risk” operations (fast-track / ERAS concept)
8. Violations of acid-base balance (metabolic and respiratory acidosis, metabolic and respiratory alkalosis). The reasons. Correction methods
9. Violations of water and electrolyte balance. Hyper - and dehydration. Hypo- and hyper-Na + -emia. Hypo- and hyper-K + -emia. The reasons. Correction methods

Spring semester

Lesson 1. Terminal conditions. Cardiopulmanary and cerebral resuscitation

1. Pathogenesis and mechanisms of cardiac arrest. Clinical presentation and diagnosis
2. The initial (basic) level of adult resuscitation
3. A qualified level of adult resuscitation
4. Resuscitation of children and newborns
5. Drug therapy for resuscitation of adults and children
6. Electrical impulse therapy (electrical cardioversion and cardiac pacing)
7. Post-resuscitation therapy (cerebral resuscitation)
8. Brain death. Diagnostics. Tactics
9. Electrical injury. Heatstroke. Clinic, intensive care
10. Drowning. Clinic, intensive care. Drowning in fresh and salt water
11. Overcooling. Clinic, intensive care

Lesson 2. Shock

1. Acute coronary syndromes. Modern intensive care tactics
2. Shock. Classification. Pathophysiology, clinical presentation. Tactics of treatment
3. Diagnosis and intensive care of cardiogenic shock
4. Diagnosis and intensive care of hemorrhagic shock
5. Diagnosis and intensive care of burn shock
6. Diagnosis and intensive care of anaphylactic shock
7. Pathogenesis, diagnosis and treatment of DIC
8. Enteral and parenteral nutrition in critical care. Calculation of calories. Methodology

Lesson 3. Acute respiratory failure

1. Clinical and laboratory signs of respiratory failure. Etiology
2. Intensive therapy of respiratory failure (restoration of airway clearance, oxygen therapy, mechanical ventilation)
3. Pulmonary thromboembolism. Clinic, diagnosis, intensive care
4. Pulmonary edema. Clinic, diagnosis, intensive care
5. Acute Respiratory Distress Syndrome
6. Intensive therapy of severe pneumonia. Community and hospital acquired pneumonia. Prevention of nosocomial pneumonia
7. Cricothyrotomy and tracheostomy in critical conditions. Indications. Methodology. Complications

Lesson 4. Sepsis

1. Sepsis. Clinic, diagnosis and intensive care
2. Diagnosis and intensive care of septic shock
3. Antibacterial therapy of severe infections. De-escalation therapy
4. Acute renal damage. Etiology, diagnosis, treatment
5. Hemodialysis. The principle of the method. Use in acute renal damage and chronic renal disease
6. Peritoneal dialysis. The principle of the method
7. Extracorporeal blood purification in intensive care (hemosorbtion, plasma exchange, hemofiltration, hemodiafiltration)
8. Acute hepatic failure. Etiology, diagnosis, treatment

Lesson 5. Acute cerebral disorders

1. Coma. Glasgow score. The dangers of coma. Examination of the patient in a coma
2. Ischemic and hemorrhagic stroke. Diagnostics. Differences in intensive care tactics
3. Comatose states in diabetes mellitus (hypoglycemic and hyperglycemic ketoacidotic coma). Diagnosis, intensive care
4. Cerebral edema. The reasons. Diagnostics. Intensive therapy
5. Traumatic brain injury. Clinic and intensive care

Lesson 6: Resuscitation and Intensive Therapy in Toxicology

1. Acute poisoning. The reasons. Toxicokinetics and toxicodynamics of poison. Clinical stages of poisoning. Clinical syndromes. Diagnostics
2. Acute poisoning. General principles of treatment
3. Acute alcohol poisoning. Diagnostics, intensive care
4. Acute poisoning with alcohol substitutes (ethylene glycol, methanol). Diagnosis, intensive care
5. Acute poisoning with acetic acid. Diagnosis, intensive care
6. Acute carbon monoxide poisoning (carbon monoxide). Diagnosis, intensive care
7. Acute poisoning with methemoglobin formers. Diagnosis, intensive care
8. Acute poisoning with psychotropic drugs. Diagnosis, intensive care
9. Acute mushroom poisoning. Diagnosis, intensive care
10. Poisoning with biological poisons (snake venom, jellyfish)