

Syllabus For Licensing Examination of M.Sc. Anesthesia Technology 2023



Nepal Health Professional Council

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S.N.	Subect	Marks
1	Pre-operative preparation and assessment for Anesthesia	30%
2	Anesthetic agents	25%
3	Techniques in Anesthesia	10%
4	Safety measures in operation theatre	15%
5	Operation theatre procedures	20%
	Total	100%

1. Pre-operative preparation for Anesthesia

Pre-operative preparation

Medications.

- Drugs to be discontinued/ stopped.
- Drugs to be continued.

Pre medications goals.

- Anti-anxiety.
- Antibiotics.
- Anti-sialagogues.
- Antacids.
- Pro-kinetics.
- Anti-emetics.
- Sedatives & tranquillizers.

Prosthetics, jewellery.

History Taking

- Chief complaints & present illness.
- Past history.
- Personal history.
- Family history.
- Birth history, immunization and mile stones.
- Medications and therapies.
- Allergy.
- Occupation, social status.
- Previous Surgeries, anaesthesia

General Examination and its significance

- Facies.
 - Decubitus.
 - Pallor.
 - Built and nutrition.
 - Skin eruptions.
 - Jaundice.
 - Edema.
 - Cyanosis.
 - JVP.
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- Pulse, Respiration, Temperature and Blood pressure.

Systemic examination and its significance

- Cardiovascular system
 - Precordium, bulge, pulsations, apex beat, cyanosis, oedema.

- Apex beat thrill.
- Precordial size(cardiac dullness)
- Heart sounds, murmurs, rubs.
- Peripheral pulses.
- Respiratory system
 - Chest size, shape, deformities, asymmetries, jugular veins pulsations, chest expansion, color of skin, pallor, cyanosis, inspiratory indrawing use of accessory muscles.
 - Chest expansion, tracheal position.
 - Vocal fremitus, thrill , rub.
 - Vocal resonance, cardiac and hepatic dullness.
 - Breath sounds, type (vesicular/rhonchi).
 - Rales, rhonchi, respirations, pleural rub
- CNS
 - Integrity of higher centers.
 - Cranial nerves.
 - Sensory system.
 - Motor system.
 - Reflexes- superficial & deep.
 - Joint, position and posture.
- Abdomen
 - Size and shape of abdomen, swelling, ascitis, visible peristalsis, caput medusae, spider nevi, umbilicus, skin over abdomen, movements.
 - Swelling, pain, tenderness, shifting dullness, fluid thrill, organomegally, guarding rigidity.
 - Shifting dullness, hepatic dullness, and tympanic notes
 - Peristalsis, venous hum
 - Renal function and clearance

ASA grading, its interpretation and importance

Airway Assessment

Mallampatti, Wilson, IDL, Cormack and Lehane, thyromental, interincus gap, anterior mandibular protusion, cervical spine extension, sternomental distance

Pre operative investigations

Basic lab investigations

Relevant Radiological Investigation

Other investigations according to comorbidities

2. Anesthetic agents

Intravenous anesthetic agents

- Thiopentone,
- Propofol
- Ketamine
- Etomidate
- Droperidol,
- Benzodiazepines
- Opioids

Inhalational anesthetic agents

- N₂O
- Halothane
- Isoflurane
- Enflurane
- Methoxyflurane
- Di- ethyl-ether
- Desflurane,
- Trichloroethylene
- Ethyl chloride

Skeletal muscle relaxants

- Depolarizers & non depolarizers
- Succinylcholine
- Pancuronium
- Vecuronium
- Rocuronium,
- Pipecuronium, dtz,
- Metocurine
- Atracurium
- Mivacurium
- Gallamine

Reversal of NM block

Neostigmine & other anticholinesterases

Permedication agents

- Antisialagogues
- Anticholinergics & vagolytics
- Antacids
- Prokinetics
- Antiemetics
- Sedatives, Hypnotics, Tranquil
- Analgesics & antipyretics
- Antiinflammatory

Local analgesic agents

- Lignocaine
- Bupivacaine
- Mepivacaine
- Ropivacaine,
- Prilocaine
- Etidocaine
- Entactic mixture

Cardiac drugs

- Dopamine
- Dobut,
- Antiarrhythmics,
- Nordrin,
- NTG,
- Sod nitroprusside,
- Cardiac glycosides,
- Beta blockers
- Antihypertensives,
- calcium, potassium,
- isoprin,
- diuretics

Drugs acting on respiratory system

- Aminophylline,
- Steroids,
- Sodabcarb,
- Antibiotics,
- B2 agonist,
- Anticholinergic

Drugs used in association with anesthesia

- Insulin,
- Heparin,
- Protamine,
- Mannitol,
- Oxytocin,
- Dye

3. Techniques in Anesthesia

Local analgesia techniques, infiltration, regional field blocks

- Spinal analgesia
- Epidural analgesia
- CSE Technique
- General anesthesia techniques

- I/V sedation
- I/V alone
- I/V induction + inhaled mtz
- I/V + inhaled + relaxants
- Hypnosis, Cryo-analgesia
- Anesthesia records
- Pain relief therapy (Labour analgesia)
- Anesthesia outside operation theatres

4. Safety measures in operation theatre

- Importance & significance of safety measures
- Electronic equipment, checking, maintenance + service contracts, electrical safety
 - Fire safety
 - Preventive measures
 - Firefighting systems
 - Fire codes, training, drill
 - Fire audit
- Radiation exposure to OT staff
- Patient safety
 - OT clothes, metal objects, jewelry,
 - Pressure points
 - Positioning & shifting
- Operation theatre environment
 - Space
 - Air conditioning
 - Illumination
 - Ventilation
 - Rest rooms
 - Scavenging systems
- Drug safety
 - Identification, dilution
 - Contents, clarity
 - Expiry date
 - compatibility
- Infection Control in OT
 - OT Scheduling
 - OT design and zones, barriers, movements in OT
 - OT washing, cleaning, disinfection schedules and sterilization
 - Sterilization of equipment, sterilization techniques, central sterilization
 - OT clothes and footwear
 - Storage methodology, FIFO, expiry date
 - Waste management
 - Scrubbing, gowning for surgical procedures
 - Personal hygiene and sanitation
 - Preparation and scrubbing of operative areas (body parts)

- Evaluation of sterilization methods
- Air-conditioning and filters

5. Operation theatre procedures

1. Procedures in Abdomen, Obstetric, Gynaecology & Urology (OBGY & URO) OT

Type of patients & presentation

Pain, distension, bleeding, vomiting, GI disturbances, oliguria, anuria, oedema, respiratory insufficiency

Patient preparation

Bowel preparation, antibiotics

Hydration therapy, diuretic, prokinetics, RT feeds, TPNCorrect electrolyte imbalance

Investigations

Routine-Hb, CBC, sugar,electro

Specific- X-Ray, CT, MRI

Renal function tests

Bld grouping- X matching

Usg abdomen-ECG, X-Ray chest

Operative procedures

Exploratory laparotomy

Appendectomy, colectomy resections, nephrectomy, uretero-pyelolithotomy, renal transplant, Hysterectomy, Myomectomy, PCNL, gastroctomy, GJ vagotomy, nephrolithotomy, TURP, open prostatectomy

Anaesthesia Techniques

Sedations, spinal, epidural general

Anaesthesia Management

Premedicantsanesthetic Agents positioning, i/v fluids, Transfusions, MonitoringManagement of complications

Post-operative

Pain relief measures IV fluids

2. Procedures in Ear, Nose, Throat (ENT), Ophthalmic & Paediatric OT

A. ENT

Presentation

- Cough, URTI, LRTI, hearing loss, nasal discharge, ear discharge, airway obstruction, headache, cancer & its spread

Steps in patient preparation

- Optimize infections, optimize airway patency, antibiotics, bronchodilators, mucolytics

Investigations

- X-Ray, CT, MRI, coagulation profile, xeroradiograms, endoscopies

Anesthesia Management

- Premedicants, antisialogogues, antiemetic
- Induction agents, special ETTs, throat packs, positioning I/v fluids monitoring

B. Ophthalmology

Pt presentation

- Diminished acuity of vision, Blurred/Double vision
- Discharge, pain, swelling. Ptosis, squinting

Preparation

- Lowering of IOP, antibiotics, pupillary dilatation
- Correction of co-morbidities (IHD, DH, HT), investigations

Anesthetic Management

- Mostly local analgesia
- Peritubular/Tenon block

Technique & precautions for general anesthesia

- Agents causing rise in IOP
- Smooth induction
- Role of monitoring
- Smooth extubation

C. Paediatric

Patient presentation

Body physiology, vomiting, abdominal distension, Respiratory distress, convulsions, Hypothermia, dehydration, running nose, URTI

Patient preparation

Correction of dehydration, electrolyte imbalance, oxygenation, correction of anemia, correct hypothermia

Anesthesia Management

- Role of premedicants, role of oral, rectal, nasal routes
- Venipuncture-sizes of cannula
- Types of I/V fluids & calculations for fluid requirements
- Types of endotracheal tubes
- Types of breathing circuits

Special operative procedures -

- -Congenital defects
- -Diaphragmatic Hernia
- -Interstitial Obstruction
- -Tracheo-oesophageal Fistula
- -endoscopies
- -Thoracic & cardiac procedures

3. Procedures in Neuro OT

Principles of anesthesia services

- Raised intracranial pressure, take measures to lower ICP
- Avoid further increase in ICP
- Avoid secondary injuries
- Different positioning

Patient presentation

- Evidence of high ICP
- Headache, vomiting, blurred vision, diplopia, seizures, bradycardia, hypertension neurological deficit

Patient preparation

- Cerebral resuscitation, diuretics, mannitol, corticosteroids, I/V fluids, hyperventilation, anticonvulsants

Investigations.

- x- rays, CT, MRI, electrolytes, EKG, sugar, urea, coagulation profile, blood group and crossmatching

Surgical procedures

- Head injury, intracranial hematoma, pituitary, posterior fossa tumors , aneurysms , meningiomas.

Anesthesia management

- Premedicants, induction, special endotracheal tubes , positioning monitoring ,transfusion maintaining ICP postoperative care

4. Procedures in Orthopedic & Trauma Care

Patient presentation

- Pain, reduced mobility, pulmonary congestion, associated medical disorders (↑age. HD, HT, DM, obesity.)

Preoperative preparation

- Correct underlying anemia shock, infections.
 - Bone alignment methods
 - Investigations
 - Radiology, blood chemistry, ECG, Echo, PFTS.

Immediate care of trauma

- Resuscitation
- Transfusion
- I/V fluids

Types of procedure

- CRUGA, MUGAOPEN RIF
- INTERNAL fixators
- EXTERNAL fixators

Anesthesia techniques

- Regional blocks, spiral, epidural & GA.
- Monitoring transfusion.
- Ortho table positions.

Special scenarios

- Fat metabolism. Cement implantation, tourniquets

Joint replacement energies

- Asepsis, sterile techniques
- Restricted manpower
- Exhaustive monitoring
- Analgesia techniques.

5. Procedures in Thoracic & Cardiac OT

Patient presentation

- Abnormal lung functions
- Different positions on OT table
- Intraoperative hypoxemia

- Postoperative ventilation
- Pain relief
- Secondary cardiac failure is associated
- Symptoms & their severity signs, respiratory systems findings

Patient preparation

Smoking, chest infections, breathing exercises

Chest physiotherapy, postural drainage, Bronchodilators, steroids, stimulants, diuretics, correct anemia, electrolyte balance, hydration, psychological support

Surgical Procedures

Endoscopies, lobectomy, pneumonatomy, decortications, VAT, mediastrial

Anesthetic management

checklist of -drugs, oxygenation, induction, intubation(DLT), positioning, maintenance, monitoring ventilation techniques, transfusions

Postoperative care

after thoracic monitoring, ventilator modes, nebulizers, weaning

General principles of anesthesia for cardiac procedures

- Myocardium & valves are not normal
- Balance of oxygen demand & supply
- Avoid ↓CO₂, ↓BP, arrhythmias
- calculate the risk involved
- thorough knowledge about CP Bypass.
- Patient on multiple medications

Patient presentation

Symptoms & signs of diabetes, hypertension

Evidence of failure,

Vasodilators, diuretics, anti-arrhythmics, anti-hypertension, glycosides, hypoglycemic, anti-platelets, anticoagulants, correct electrolyte imbalance

I/V lines-14 G/16 G CUP arterial lines, PCWP (SG)PA catheter

(Investigation-12 Lead EKG, 3D ECHO, Angio, EXR, PFTs, ABGs, Risk assessment

Arrange for 5-6 blood) Checklist of drugs

Surgical procedures

- Coronary artery bypass graft, valvular surgery
- Aortic surgery Congenital cardiac lesions (ASD, VSD, PDA, Tetralogy)

Anesthesia Management

Induction-Agents & schedule

Maintenance-ETT, inhaled relax ventilation, monitoring, blood transfusion, I/V Fluids, CP
Bypass-anticoagulation, postop-ventilation, sedation