

Government of Karnataka



PARA MEDICAL BOARD

**Revised Syllabus
of
III Year Diploma in Operation Theater
& Anaesthesia Technology**

2017

III Year DIPLOMA IN OPERATION THEATRE & ANAESTHESIA TECHNOLOGY

COURSE CONTENT:(Anaesthesia Technician)

In general, it aims to impart: -

A knowledge of anesthetic drugs and adjuncts.

- Knowledge of cardiovascular, respiratory, neurological, hepatobiliary, renal physiology and endocrine homeostasis and related drugs as relevant to patients undergoing anesthesia. Relevant anatomy, physiology, biochemistry, pharmacology and physics.
- A basic idea of the relevant physical principles involved in the construction and functioning of equipment used in anesthesia and monitoring.
- Knowledge to assist in the commonly used techniques in general,
- Regional and local anesthesia, and their applications for routine and emergency anesthesia.
- Relevant knowledge to manage patients in intensive care unit.
- Relevant knowledge of record maintenance.
- Knowledge of cardiopulmonary resuscitation i.e. both BLS & ACLS.

DRUGS, EQUIPMENTS AND CLINICAL ANAESTHESIA
(including CPR) **DRUGS-30 Hours**

ANAESTHETIC DRUGS:**Induction agents-**

Intravenous (Thiopentone, Propofol, Ketamine, Etomidate)

Inhalational (Halothane, Isoflurane, Sevoflurane, Desflurane)

Benzodiazepines (Diazepam, Lorazepam, Midazolam)

Opioids (Morphine, Pethidine, Fentanyl)

Dexmedetomidine

Muscle Relaxants: Depolarising (Succinylcholine) Nondepolarizing (Vecuronium, Atracurium, Rocuronium) Reversal agents (Neostigmine)

Local Anaesthetics: Lidocaine, Bupivacaine, Ropivacaine, Levo Bupivacaine

Premedicants and adjuncts:

Antisialagogues (Atropine, Glycopyrolate), Antiemetics (Metoclopramide, Ondansetron), Steroids, Bronchodilators, Antihistamines, Vasopressors, Vasodilators

Fluids: Crystalloids, Colloids, Blood transfusion

DETAILED SYLLABUS OF DRUGS:**ANAESTHETIC DRUGS****IV Agents**

1. THIOPENONE (Physical form, Dilution dosage, actions, side effects)
2. PROPOFOL (Physical form, contents, dosage, actions, adverse effects, uses)
3. KETAMINE (Physical form, dosage, actions, adverse effects, uses)
4. ETOMIDATE (Physical form, dosage, actions, adverse effects & uses)

Inhalational Agents – Classification

1. Halothane – MAC, Color coding, actions, uses, side effect
2. ISOFLURANE - MAC, Color coding, actions, uses, side effect
3. SEVOFLURANE - MAC, Color coding, actions, uses, side effect
4. DESFLURANE - MAC, Color coding, actions, uses, side effect

BENZODIAZEPINES

1. DIAZEPAM – MOA, formulation & dosage, uses, side effects
2. LORAZEPAM - MOA, formulation & dosage, uses, side effects
3. MIDAZOLAM - MOA, formulation & dosage, uses, side effects

OPIOIDS – Classification

1. MORPHINE – MOA, Formulation & dosage, uses, adverse effects & antagonists
2. PETHIDINE - MOA, Formulation & dosage, uses, adverse effects & antagonists
3. FENTANYL - MOA, Formulation & dosage, uses, adverse effects & antagonists

Alfa2 agonists :

DEXMEDETOMIDINE

- MOA, Formulation & dosage, dilution, actions, uses, adverse effects.

MUSCLE RELAXANTS – Classification

DEPOLARISING

- Succinyl choline – formulation & dosage, action, uses, adverse effects

NON – DEPOLARISING

- Vecuronium – formulation & dosage, metabolism, action, uses, reversal, adverse effects.
- Atracurium - formulation & dosage, metabolism, action, uses, reversal, adverse effects
- Rocuronium - formulation & dosage, metabolism, action, uses, reversal, adverse effects

REVERSAL AGENTS

- NEOSTIGMINE - formulation & dosage, metabolism, action, uses, reversal, adverse effects

VASODILATORS – Preparations

NITROGLYCERENE – formulation & dosage dilution & infusion dose, uses, Adverse effects, monitoring

SODIUM NITROPRUSSIDE – formulation & dosage dilution & infusion dose, uses, adverse effects, monitoring.

FLUIDS

CRYSTALLOIDS – Types available. Contents

(DNS, NS, RL, EP) – uses

COLLOIDS

- Types, Specific indication, adverse effects

BLOOD TRANSFUSION

Types of blood products available, storage, indications & dosage, checking of blood, complications, monitoring & treatment.

LOCAL ANAESTHETICS – Classification

LIDOCAINE – Formulation & dosage, available forms & percentages, uses, adverse effects (spinal, epidural & blocks dosages) infusion dose.

BUPIVACAINE - Formulation & dosage, available forms & percentages, uses, adverse effects (spinal, epidural & blocks dosages) infusion dose.

ROPIVACAINE - Formulation & dosage, available forms & percentages, uses, adverse effects (spinal, epidural & blocks dosages) infusion dose.

LEVO BUPIVACAINE - Formulation & dosage, available forms & percentages, uses, adverse effects (spinal, epidural & blocks dosages) infusion dose.

PREMEDICANTS AND ADJUNCTS

ANTI SIALOGUES

ATROPINE – formulation & dosage, actions, uses, adverse effects

GLYCOPYROLATE - formulation & dosage, actions, uses, adverse effects

ANTEMETICS

METOCLORRAMIPE - formulation & dosage, actions, uses, adverse effects

ONDANSETRON - formulation & dosage, actions, uses, adverse effects

STEROIDS – Preparations, formulation & dosage, actions, uses, adverse effects

BRONCHO DILATORS – Contents, formulation & dosage, actions, uses, adverse effects

ANTIHISTAMINES – Types, formulation & dosage, actions, uses, adverse effects

VASOPRESSORS – commonly used drugs:

DOPAMINE, DOBUTAMINE, NORADRENALIN,

ADRENALIN

Formulation, dosage, dilution, infusion dose, uses, actions, and adverse effects.

Anaesthesia Work Station: Oxygen delivery systems, Principles of Anaesthesia machine, Cylinders, Piped Medical Gases, Flow meters, Vaporisers, Checklist for Anaesthesia Machine, O₂ flush, Safety features of Anaesthesia machine, Alarms Pre operative preparation of equipment (Cockpit Drill)-Check List

Breathing Systems- Open and Closed, Mapleson's, Uses, Daily checking
Carbon Dioxide absorbers
Face masks, Airways, Supraglottic airway devices, Combitube, Laryngoscopes and blades, Endotracheal tubes
Airway adjuncts-Stylets, Bougie, Light wand, Tube exchanger etc
Care and sterilization of Anaesthetic equipment
Spinal and Epidural needles, epidural catheters, Peripheral Nerve Locator, Pneumatic tourniquets
Other equipments: Suction apparatus, Suction catheters
Electrical hazards in the Operating Room
Occupational hazards to OT personnel-Universal Precautions
Inventory management

O₂ delivery systems – Types : venti-mask, nasal prongs, ambu bag, O₂ HOOD, Mechanical ventilation, O₂ flow for each & indications.

DETAILED SYLLABUS OF EQUIPMENT;

ANAESTHESIA: A WORK STATION:

PRINCIPLES OF ANAESTHESIA MACHINE

Components, assembly arrangements, uses, advantages, disadvantages, safety features

CYLINDERS – Types, sizes, color coding, safety features, pin index.

FLOW METRES – components, description, color coding, safety features.

PIPED MEDICAL GASES – pressure regulators, color coding safety features.

VAPOTISERS – Types, safety features with color coding, MAC, filling mechanism with color coding of fillers

CHECK LIST FOR ANAESTHESIA MACHINE

O₂ flush – why, when and how to use

O₂ delivery

SAFETY FEATURES OF ANAESTHESIA MACHINE and ALARMS

PRE OPERATIVE PRE PARATION OF EQUIPMENT (COCKPIT DRILL) – CHECK LIST

BREATHING SYSTEMS OPEN & CLOSED – types & assembly, components,

advantages & disadvantages

MAPLESON'S – Types (A, B, C, D, E, F)

Details of Bain's & J R circuit with functional analysis

Assembly, functions of each components (outer tube, uses of inner tube, APL valve, reservoir bag)

Uses

Checking of circuit with pathik's test.

CO₂ ABSORBERS

FACE MASKS – Sizes, triple manure

AIR WAYS – Sizes, types, uses

SUPRAGLOTTIC AIRWAY – types, sizes, placement, amount of air to be injected, depending on size

- uses

- complications

COMBITUBE – Uses, sizes, advantages & disadvantages

LARYNGOSCOPES & BLADES – types of laryngoscopes, identification and uses

ENDOTRACHEAL TUBE – Sizes, types, volume of air to inflated, fixing of ETT

AIRWAY ADJUNCTS

Styllets, bougie, light wand, tube exchanger – identification, uses

Care & sterilization of anaesthetic equipment – identification, uses

Spinal & epidural needles, epidural catheters – identification, uses

PERIPHERAL NERVE LOCATOR – Uses, working principles

PNEUMATIC TOURNIQUETS – Uses, tourniquet time mechanism of use

SUCTION APPARATUS, SUCTION CATHETERS – Principle and uses

Electrical hazards in the OT

Occupational hazards to OT personnel

Clinical Anaesthesia-

General and regional anaesthesia-Choice of anaesthesia technique-(General Anaesthesia, Monitored Anaesthesia Care, Local Anaesthesia)Preparation of patient, drugs, equipment, emergency drugs(Check list/Protocols)

Patient:

Pre Anaesthetic evaluation,investigations,ASA grading,airway assessment(ASA Difficult Airway Algorithm)

Pre operative preparation-fasting,IVaccess,premedication,preloading,Informed written consent, pre oxygenation

Monitoring-Basic standards(P,BP,R,SpO₂,T,ETCO₂)-non invasive/invasive

Fluid and electrolyte management during pre operative period

Drugs-availability and choice of drugs,dosage,dilutions and labeling

Concept OF Induction,Neuro muscular paralysis,Intubation,Ventilation,Reversal and Recovery during GA

Central Neuraxial Blockade –Spinal,Epidural and Caudal

Effects of regional anaesthesia including Central Neuraxial Blockade on various systems

Tourniquets

Patient positioning,hazards and care of the patient during regional anaesthesia and positioning

Post operative care of high risk patients

Latest CPR guidelines

Medico Legal liabilities

Record keeping

DETAILED SYLLABUS OF CLINICAL ANAESTHESIA

Central neuraxial blockade

- Spinal
- Epidural
- Caudal
- Indications and contra indications
- Additives
- Effects / complications

- Effects of regional anaesthesia including central neuraxial blockade on various systems

- Tourniquets – importance of cuff pressure and tourniquet time in upper and lower limb

- Patient positioning hazards and care of the patient during regional anaesthesia and positioning

- Latest CPR guidelines
 - a. BLS
 - b. ACLS
 - c. Drugs used in CPR
 - d. Defibrillator

- Medico legal liabilities: Dereliction of duty, what to do when faced with adverse situation

- Record keeping: Writing Method and importance.

- Preoperative preparation

- Informed written consent: Different types of consents and the process.

- Pre oxygenation

Monitoring – invasive / non invasive

Basic standards

PR, BP, RR, SPO₂, Temperature, Etco₂

Fluid & Electrolyte management during pre operative period

- Ringer lactate (RL)
- Dextrose normal saline (DNS)
- Normal saline (NS)
- Hydroxy ethyl starch (HES)
- Blood transfusion
- ABG and correction of acidosis and electrolytes

Drugs

- Availability and choice of drugs
- Dosage
- Dilutions and preparing infusions, pumps
- Labeling

Concept of – induction and analgesia

- Neuro muscular paralysis
- Ventilation
- Intubation
- Reversal
- Recovery during GA

General anaesthesia – indications, drugs used, preparation, monitoring, reversal

Regional anaesthesia – types, drugs used indications, complications

GMAC – drugs used, indications, monitoring

LA – drugs used, complications, indications

Preparation of patient drugs, equipment, emergency drugs

Pre Anaesthetic evaluation

- Investigations
- ASA grading
- Airway assessment

Pre operative preparations

- Fasting
- IV access
- Premedication

PRACTICAL SYLLABUS FOR ANAESTHESIOLOGY DRUGS (8HOURS)

IDENTIFICATION OF THE DRUG

CHEMICAL COMPOSITION, FORMULATION, PRESERVATIVE

USED, PHARMACODYNAMICS, USES, ROUTES OF ADMINISTRATION, SIDE

EFFECTS, CONTRA INDICATIONS

1. Intravenous Anaesthetic agents

: Thiopentone, Propofol, Ketamine, Etomidate (1 HOUR)

2. Inhalational Anaesthetic agents : Oxygen, Nitrous

Oxide, Halothane, Isoflurane, Sevoflurane, Desflurane (1 HOUR)

3. Benzodiazepines: (Diazepam, Lorazepam, Midazolam) and

Opioids (Morphine, Pethidine, Fentanyl, Buprenorphine) (1 HOUR)

4. Muscle Relaxants: Depolarising (Succinylcholine) Nondepolarizing (Vecuronium,

Atracurium, Rocuronium) Reversal agents (Neostigmine) (1 HOUR)

5. Local Anaesthetics: Lidocaine, Bupivacaine (1 HOUR)

6. Premedicants and adjuncts:

Anticholinergics (Atropine, Glycopyrrolate), Antiemetics (Metoclopramide, Ondansetron), Steroids (Hydrocortisone, Dexamethasone), Bronchodilators (Aminophylline), Antihistamines (Pheniramine

maleate), Vasopressors (Ephedrine, Mephenteramine, Phenylephrine, Adrenaline, Noradrenaline, Dopamine, Dobutamine), Vasodilators (SNP, NTG)

(1 HOUR)

7. Fluids:Crystalloids(NaCl,5%D,DNS,RL,Isolye P,Isolyte M),Colloids(Hetastarch,Albumin,Polygelatin) (1HOUR)
8. IV Cannulation and blood sampling (1HOUR)

EQUIPMENTS (12 HOURS)

1. Gas Cylinders-O₂,N₂O-Basic principles(colour coding,PINindex,filling ratio,Pressure and volume of gas available).Fixing of cylinders to anaesthesia work station (1HOUR)
2. Piped medical gases(O₂,N₂O,compressed air,suction)-colour coding,valves,quick couplers,hoses, Fixing of PMGs to anaesthesia work station (1HOUR)
3. Check list for anaesthesia work station (1HOUR)
4. Breathing systems-Mapleson's A,D and F,Closed system(low flow-CO₂ absorber(sodalyme baralime)
5. Airway-Face masks-types sizes available,Airways -types sizes available (1HOUR)
6. Airway- Supra glottis airway devices-LMA Classic,Proseal LMA,ILMA,IGEL,AMBU Aura,Combitube (1HOUR)
7. Airway- Endotracheal tubes-PVC,cuffed,uncuffed-all sizes available,Calculation of Internal Diameter and Length for age and weight (1HOUR)
8. Laryngoscopes-types available,parts blades, uses (1HOUR)
9. Airway adjuncts- stylets,light wand,bougies,tube exchangers,Magill's forceps (1HOUR)
10. Spinal and Epidural needles,epidural catheters,Peripheral Nerve Locator, tourniquets Miscellaneous:i)suction catheter,and apparatus,ii)nebulisers (1HOUR)

11. Perioperative fluid requirement calculation(1HOUR)
12. Bio medical waste management- segregation at source(colour coding of baskets),Cleaning and sterilisation of anaesthetic equipment (1HOUR)

LOG BOOK : TO BE MAINTAINED IN A COMMON FORMAT

II. THE DEVELOPMENT OF SKILLS IN AN ANAESTHESIA TECHNICIAN

A)GENERAL SKILLS TO BE DEVELOPED:

1. Writing skills:

- a)writing error free medical terms in english language
- b)record keeping

2. Reading skills:

to read instructions for operating equipments,names of the drugs including expiry date

3..Communication skills:

- a)communicate with patients and their relatives in taking informed written consent
- b) communicate in a comprehensible way with operating team members about technical matters.

B) SPECIFIC SKILLS TO BE DEVELOPED:

PRE ANAESTHETIC:

1. Checking and setting up of anaesthesia machine
2. Preparing intravenous fluids,drugs and administration equipment
- 3.Preparing airway devices(LMA, ET tube etc)
- 4.Communicating with patients on arrival in the OT.
- 5.Establishing peripheral venous access
- 6.Applying anaesthetic monitoring(ECG,BP,SpO2,ETCO2,EEG,BIS)

DURING ANAESTHETIC:

Assists in :

- induction and maintenance oo Anaesthesia
- Helps in treating Anaphylaxis to Drugs
- securing an airway
- safe positionig
- monitoring
- collecting and analysis of blood samples
- acquiring and administering drugs, fluids and equipment

post anaesthetic:

Assists in :

- reversal and recovery
- transfer to Recovery/PACU

General Surgery

Introduction, special features of general surgery, neck procedures, like thyroidectomy, lymph node biopsies . Breast procedures like Excision of benign breast lump like fibroadenoma, mastectomy / lumpectomy for carcinoma breast.

Abdominal Incisions

Biliary tract procedures like Cholecystectomy open / Laparoscopic

Liver procedures like Hydatid cyst surgeries, Liver Resections, Treatment of liver Abscess

Splenic Procedures like Splenectomy

Pancreatic procedures like whipples Pancreatico duodenectomy, Triple Bypass, Puestow`s pancreatico Jejunostomy

Esophageal procedures like : Heller`s Cardiomyotomy

: Fundoplication

: Esophagectomy

Gastric procedures like : G J & Vagotomy

: Gastrectomy

Intestinal procedures like : ® and (L) Hemicolectomies

: Anterior resection

: Abdominoperineal resection (APR)

Anorectic procedures like : Colostomy

: Haemorrhoids

: Fissures

: Fistula

: Pilonidal sinus

Hernia : Amputation of Extremities

3 hours classes in Each allied surgical subjects and superspecialities (40 classes)

Gynecology & obstetrics:

Introduction

Gynecology

Diagnostic Technically

Episiotomy

Caessaerian section

Vaginal & Abdominal Hysterectomy

Introduction, gynecology, diagnostic technique, vulvar procedures, vaginal, procedures, abdominal procedures, obsteries.

Orthopedics

Development of orthopedics, special features of orthopaedic surgery, extremities, fractures, Joint reconstruction, replacement, repairs of tendons and ligaments, vertebral column, cast application.

Ophthalmology

Introduction. The eye, ocular, operative procedures, eyelid and adnexal procedures trauma to the eye, general considerations.

Otolaryngology

Introduction, the ear, otologic operative procedures, microscopic surgeries, the nose, nasal operative procedures, oral cavity and throat operative procedures, The needle operative procedures on the larynx, trachea, bronchus, esophagus, gen consideration in ENT procedures.

Internal assessment (valued papers) to be kept for 1 year

Teachers dairy to be maintained

Log book to be maintained

Shown during Inspection

Paper	Subject	Q P Code	Marks	No. of Teaching hours
Paper 1	Anesthesiology	6131	100	80
Paper 2	Operative Surgery	6133	100	80
Practical			100	80