ANAESTHESIOLOGY — M D

The course content should include a fund of acquired information and the strategy evolved for acquiring the information. Most useful information should be included taking into account the limits of the time available. The contents should ensure that the candidate acquires basic skills and attitudes in the subject. It should discipline the thinking habit for problem solving and discovery of new knowledge in the field.

To this Extent the Course Content should Include Certain Facts

a) A thorough knowledge of the pharmacokinetics and pharmacodynamics of anaesthetic drugs and adjuncts.

b) Knowledge of cardiovascular, respiratory neurological, hepatobiliary, renal and endocrine homeostasis and related drugs as relevant to patients undergoing anaesthesia.

c) Relevant anatomy, physiology and biochemistry.

d) A basic idea of the relevant physical principles involved in the construction and functioning of equipment used in anaesthesia and monitoring.

e) Knowledge to attain expertise of the commonly used techniques in general, regional and local anaesthesia.

f) A clear-cut concept of unconsciousness and its implications.

g) Relevant knowledge about chronic intractable pain and its management.

h) Relevant knowledge to manage patients in intensive therapy unit.

i) Relevant knowledge of medical Statistics

j) Knowledge & Expertise in Cardiopulmonary resuscitation.

The Course content should also include ways and means of stimulating the thought processes of the candidate and ensure that the candidate can critically acquire new information from books, journals, lectures, seminars and discussions. It should include ways and means of developing reflective thinking and problem solving by critically analysing events during anaesthesia. Interpretation of these data and logical reasoning should lead to application of facts and principles in practice.

It is needless to emphasise that the course content should ensure that the candidate acquires the necessary aptitude and motor skills to become a competent anaesthesiologist, learn the art of teaching

students,nurses and paramedical staff and carry out a simple research project.

1st Year Theory

Should cover the following:

a) Anatomy – Diaphragm, larynx and upper and lower airway, learn relevant, anatomy for regional anaesthesia and venous cannulations. Some Anatomical areas of interest to the anaesthetist are Orbit of the Eye, Base of skull, Vertebral Column, spinal cord, and meninges, axilla, 1st rib, Intercostal space.

b) Principles of physics and use of equipment in anaesthesia

   i) Anaesthesia machine - checking the machine and assembly of necessary items.

   ii) Airway equipment including Tracheostomy./ Equipments for airway management - mask, LMA, fibreoptic laryngoscopes; other devices like Combi tube etc.

   iii) Breathing systems continuous flow systems, draw over system - Assembly and checking.

   iv) Monitoring in Anaesthesia with concepts of minimal monitoring.

   v) Safety in Anaesthesia Equipments.

   vi) Medical gases - storage and central pipeline system.

c) Physiology

   i) Theories of mechanism of production of Anaesthesia.

   Respiratory, cardiovascular, hepatobiliary, renal and endocrine system. Pregnancy, Blood Groups, Muscle & N M Junction, ECG, Regulation of temperature & Metabolism, Stress response.cerebral blood flow and ICP.

d) Pharmacology

   i) General pharmacological principles.

   ii) Concepts of pharmacokinetics and pharmacodynamics.

   Uptake and distribution of inhaled anaesthesia agents.

   Drug interaction in Anaesthesiology.

   Drugs used in Anaesthesia, Drugs used for treatment of diseases and interaction of these .

e) Theoretical background of the commonly used anaesthetic techniques of general and regional anaesthesia viz.

   i) GA - Intravenous, Inhalational, Endotracheal etc. using spontaneous and controlled mode of ventilation.

   ii) RA - Spinal, epidural and local.

f) Biochemistry relevant to fluid balance & Blood Transfusions, Artificial Blood. & Perioperative fluid therapy.

   Acid base homeostasis in health and diseases.

g) Documentation and medico-legal aspects of anaesthesia.

   Stress the importance of accurate documentation.

h) Theoretical background on disorders of:
   i) Cardiovascular system.
   ii) Respiratory system
   iii) Hepatobiliary system.
   iv) Urinary system.
   v) Endocrine system, Pregnancy.

i) Cardiopulmonary Resuscitation; Theories of cardiac pump, thoracic pump

   Thoracic pump and defibrillation.

   Resuscitation of a patient with overdose of drug/poisons. Management of unconscious patients. Resuscitation of a severely injured patient.

j) Neonatal resuscitation.

k) Introduction to Research methodology, Random clinical trials etc. Basics of biostatistics.

l) Preoperative assessments and medication - general principals.

m) Introduction to anatomical, physiological, pharmacological and biochemical aspects of pain and pain management.

n) Introduction to artificial ventilation.

o) Oxygen therapy

p) Introduction to the operation theatre, recovery rooms (concepts of PACU), ICU.

q) Recovery from anaesthesia.

r) Shock - pathophysiology, clinical diagnosis and management.

s) Pulmonary function tests - principles and applications.

t) Effect of positioning.

2nd Year Theory

a) Relevant anatomy o f each system

b) Physics of equipment used in anaesthesia

   Medical gases - gas plant, central pipeline Scavenging system.

   Reducing valves

   Anaesthesia machine, Humidifiers

   Flow meters

   Vaporizers - Characteristics and functional specifications.

   Breathing systems - Assembly, functional analysis, flow, Minimum monitoring standards requirements, APL and flow directional valves.

c) Sterlization of equipment.

d) Computers, Utility, computer assisted learning and data storage. Computerised anaesthesia records.

e) Pharmacology of drugs used in cardiovascular, respiratory endocrine, renal diseases and CNS disorders.

f) Acid-base and electrolyte balance and.

g) Interpretation of blood gases and other relevant biochemical values, various function tests and basics of measurement techniques, ECG

Paediatrics – Prematurity, Physiology,anatomy of neonate NS adult

h) Principles of monitoring equipment used for assessment of

i) Cardiac function viz. Rhythm, pulse, venous and arterial pressures, cardiac output,

ii) Temperature

iii) Respiratory function viz., Rate volumes, compliance, resistance, blood gases.

iv) Intracranial pressure, depth of anaesthesia and

v) Neuromuscular block.

i) Working principles of ventilators.

j) Special anaesthetic techniques as relevant to outpatient anaesthesia, hypotensive anaesthesia, anaesthesia in abnormal environments and calamitous situations.

k) Anaesthetic management in special situations - Emergency, ENT, Ophthalmology, Obstetrics, Obstetric analgesia, Plastic, Dental, Radio-diagnosis and Radiotherapeutic procedures and patients with systemic diseases.

l) Medical statistics relevant to data collection, analysis, comparison and estimation of significance.

m) Journal clubs.

SECOND YEAR

1. Principles of paediatric anaesthesia. management of neonatal surgical emergencies, RA in infants.
2. Associated medical disorders in surgical patients - anaesthesia implications and management.
3. Basics of orthopaedic anaesthesia.
4. Day care anaesthesia.
5. Rural anaesthesia - anaesthesia for camp surgery.
6. Anaesthesia for otorhinolaryngology with special emphasis on difficult airway management.
7. Blood and blood component therapy. Anaesthetic implications in coagulation disorders.
8. Monitored anaesthesia care.
9. Anaesthetic implication in Diabetic mellitus, thyroid and parathyroid disorders, phaeochromocytoma, cushings disease etc.
10. Management of acid-base disorders
11. Principles of geriatric anaesthesia
12. Anaesthesia outside the OR and in special situation

Principle of management in Trauma, disorders and mass casualties

3rd Year Theory

a) Anaesthesia for patients with severe cardiac, respiratory, renal and hepatobiliary disorders posted for unrelated surgery.

b) Management of patients in shock, renal failure, critically ill and/or on ventilator.

c) Chronic pain therapy and therapeutic nerve blocks.

d) Selection, purchase, maintenance and sterilization of anaesthesia and related equipment.

1. Principles of anaesthetic management of neuro/ cardiac/ thoracic / vascular/ Transplantation/ burn and plastic surgery.
2. Principles of neonatal ventilation and critical care.
3. Principles of human resources and material management.
4. General principles of medical audit
5. Principles of one lung anaesthesia

ATTITUDE DEVELOPMENT

The student should develop attitudes that lead to:

1. Life long learning and updating
2. Sympathetic Communication with relatives
3. Sympathetic Communication with patients
4. Appropriate communication with colleagues to function in a group in OR/ICU
5. Become a teacher for Technicians, Nurses, and paramedical staff. And teach undergraduates.
6. Ability to discuss. Participate in case discussion and scientific presentations

Ability to function as a leader in the Operating room

SKILL DEVELOPMENT

Requirement of Practical Training by Junior Resident

It is felt that at the end of a 3-year training course a candidate should have the knowledge and ability to:

1. Plan and conduct anaesthesia, recovery, and postoperative pain relief for elective and emergency surgery related to all surgical specialties.
2. Carry out basic life support (BLS) and advanced life support (ALS) and train medical and paramedical staff in BLS and ALS.
3. Manage unconscious patients : Airway management and long term management of unconscious patient.
4. Manage patients admitted to an intensive care unit.
5. Manage patients suffering from chronic intractable pain.
6. Organize the Hospital environment to manage mass casualty situation
7. Critically review and acquire relevant knowledge from the journals about the new development in the speciality.
8. Should be able to participate in anesthesia audit.

Major stress will be on practical training. The Goals of postings both the general goals and of specific sub speciality postings will be fulfilled by rotating the junior resident in various operating theatres,

Intensive Care, Pain Clinic, Emergency Room (Casualty) Out Patient Department and Peripheral anaesthesia Facilities. The recommended period of stay in each area is as follows:

Speciality	*Months*
General Surgery	4
Urology	1
Eye	2
ENT	2
Dental	1
Orthopedics/Trauma	3
Gynecology	2
Obstetrics	2
Pediatrics	2
Burns/Plastic	1
CTVS	2
Neurosurgery	2
ICU	3
Pain	2
Recovery	1
Organ Transplant	1
Peripheral Theatre (Radiology, Radiotherapy ECT Cardiac Cath.)	1
Elective	1

The student will be instructed in preoperative preparation of the patients and discussion of the intraoperative problems of cases being conducted on the day. During these postings the students will initially observe and then perform various procedures and conduct the anesthestic procedure as listed. Each procedure observed and performed will be listed in the logbook. Which will be signed by attending faculty.

The trainee will undergo a graded training in the following manner:

Orientation: At the beginning of 3 Years each student should be given an orientation to the hospital operation theatre and subject of anaesthesia. The candidate shall be assigned thesis guides so as to help them prepare protocols.

Introductory lectures should be aimed to familiarize the student with the a) basic anaesthesia delivery equipment and Monitors and important principles of physics that govern the functions of these equipments. b) Intravenous Anaesthetic drugs and Inhalation agents. c) Patient evaluation, interpretation of laboratory investigation as applied to the care of the patients planning and conduct of general anaesthesia, and postoperative care. The faculty should do the teaching. Students should be taught basic and advanced cardiac life support. The student should be familiarized about the principle of the sterilization and universal precautions. They should be able to ask for consultation when necessary.

The students are encouraged and taught to search literature to be able to write a thesis protocol.

1st Year Objectives

The first year resident should be taught expertise in the management of ASA I and II cases. To start with they will observe and slowly become independent in giving general anaesthesia and spinal anaesthesia to ASA I & II cases for minor and major surgery, under graded supervision. They should be posted to the following specialties doing the first year gynecology, General Surgery, Orthopedic, ENT, Recovery Room, Urology.

2nd Year Objectives

The student should be taught to give general anaesthesia regional anesthesia to ASA I, II, III & IV under supervision they should be able to give extradural block (EDB), Spinal Block, and Peripheral Nerve Blocks under supervision. Should learn pediatric and trauma life supports and maintain skills for basic and advanced cardiac life support.

It is advised that they may be posted in the following specialties Obstetrics, Dental Surgery, Eye, ICU, Pain Clinic and Peripheral Theatres.

The student should be able to be able to analyze data and write a thesis. Should be able to present scientific data.

3rd Year Objectives

The student should be able to plan and administer anaesthesia to all patients under graded supervision including patients for cardiac, Neurosurgery, Pediatric surgery and for all major surgery. The aim at the end is to be competent and independent soon after the third year of junior residency in providing anaesthesia to elective and emergency cases. The junior resident should be able to manage critically ill patient treat intractable pain. They should also know how to organize mass casualty. The curriculum should be able to provide 1 month of elective posting.

Minimum Procedures/Cases to entered in the log book.

Regional

SAB	=	30 SAB
EDB	=	30 including continuous EDB
Caudal	=	10
Sciatic/Femoral	=	5 + 5
Bier Block	=	5
Ankle Block	=	5
Stellate Ganglion	=	3 (observe)
Brachial Plexus	=	5 observe 10 do
Sympathetic Block	=	5 (Observe)
Trigger Point injection	=	5
Other peripheral N. Block	=	10
Ophthalmic Blocks	=	5 (observe)
Field Block	=	5

Anaesthesia for:

Open Heart	=	3 – 5 observe
Closed Heart	=	5 observe
Craniotomy	=	5 observe
Spinal Surgery	=	5 observe
Joint Replacement	=	5 observe
Anesthesia for organ transplant	=	5 observe (desirable)

Procedures

Internal Jugular Cannulation	=	5 + 5 do/observe
External Jugular Cannulation	=	5
Subclavian Vein Cannulation	=	5 + 5 do/observe
Peripheral Central Line	=	15
Arterial Line Cannulation	=	10

Conduct of Cases

ASA I	=	100
ASA II	=	50
ASA III	=	30
ASA IV	=	10
Labour Analgesia	=	5
Organ Transplant	=	5 observe

DETAILED CURRICULUM FOR POSTINGS

I. GENERAL GOALS OF ALL POSTINGS

II. Objectives:

A. Learn to perform preoperative evaluation

1. Learn to collect and synthesize preoperative data and to develop a rational strategy for the perioperative care of the patient. Outpatients: Develop skills in obtaining medical information from sources outside our institution, that is, other hospital and private physicians.
2. Learn a thorough and systematic approach to preoperative evaluation of patients with systemic diseases. Perform preoperative medical evaluations of patients undergoing many different types of operations, both of inpatients and outpatients but especially elderly patients with complex medical illnesses such as alcoholism, chronic obstructive pulmonary diseases, congestive heart failure, coronary artery disease, hepatic failure, hypertension, myocardial infarction, renal failure, and stroke etc.
3. Learn to prioritize problems and to present cases clearly and systematically to attending consultants.
4. Develop working relationships with consultants in other specialities to assist in preoperative evaluation.

Learn to get a good consultation.

5. Learn to interact with preopertive patients and develop effective counseling techniques for different anesthetic techniques and perioperative procedures. Learn to assess and explain risk of procedure and take informed consent.

B. Learn anesthetic techniques and skills and understant operate different equipment used by anaesthetist, develop optimum plans depending on patients condition Know the special considerations and techniques required to anesthetize patient in locations inside and outside of the operating room, for example, the Cardiac Catheteriza-tion Laboratory, Electroconvulsive Therapy, Genitourinary Clinic, Magnetic Resonance Imager, Radiology & Radiotherapy.

1. Perform the anesthesia machine check and prepare basic equipment necessary for all anesthetic cases.
2. Prepare drug table: select appropriate drugs for a case and develop a good system for arranging the drug and work tables.
3. Place standard monitors, for example, electrocardiogram, noninvasive blood pressure device, precordial stethoscope, neuromusclar blockade monitor, pulse oximeter, and capnograph.
4. Learn proper techniques of preoxygenation.
5. Learn how to induce anesthesia, both routine induction and rapid sequence induction, and the pertinent mechanical skills and choice of drugs
6. Perform airway management by knowing various procedures and equipment:

   They should know how to use/do

   i) Direct laryngscopy using curve and straight blade

   ii) Laryngeal mask airway

   They should be familiar with

   a. Fiberoptic techniques

   b. Light wand techniques

   c. Blind techniques

   d. Combitube
7. Failed Intubation or difficult airway algorithms
   a. All techniques for endotracheal intubation
   b. Additional techniques such as retrograde wire intubation and surgical cricothyroidotomy both of which will be learned on a mannequin.
8. Awake intubation
   a. Topical/Local anaesthesia for airway
   b. Airway nerve block, for example, superior laryngeal nerve and glossopharyngeal nerve block
9. Learn anesthetic maintenance: appropriate choice and use of anesthetic drugs and adjuvant drugs such as muscle relaxants and how to monitor their effects
   a. Assessment of Anesthetic depth.
   b. Assessment of volume status

c. Replacement of intraoperative fluid losses
d. Appropriate use of blood and blood products
e. Effect of different types of surgical procedures on anesthetic management, for example, effects of aortic cross-clamping
f. Appropriate use of intraoperative laboratory tests blood gas coagulation tests etc.

10. Become skilled in catheterizing or cannulating the following vessels for sampling blood, measuring concentrations or pressures, or administering drugs of fluids:
    a. Veins: all ages and all sizes
    b. Arteries: radial and other sites
    c. Central vessels: internal jugular, subclavian, and "long-arm" routes
11. Become skilled in using and interpeting the following routine noninvasive and invasive monitors intraoperatively and others:
    a. Electrocardiogram with ST-segment analysis
    b. Noninvasive blood pressure
    c. Capnograph: values and changes in values and waveform.
    d. Pulse oximetry: values and changes in values
    e. Neuromuscular blockade monitor
    f. Invasive arterial pressure: waveform and changes in the waveform
    g. Central venous pressure: values and waveform
    h. Pulmonary artery pressure: Values and waveforms, pulmonary capillary wedge tracing
        i. Cardiac output
        ii. Mixed venous oxygen saturation
        iii. Evoked potential
        iv. transesophageal echocardiography: basic understanding
12. Become skilled in techniques for regional anesthesia
    a. Brachial plexus blockade: interscalene, supraclavicular, axillary techniques with and without nerve stimulator for localization
    b. Spinal anesthesia (including continuous spinal where appropriate)
    c. Epidural anesthesia: lumbar, caudal, and thoracic.
    d. Lower extremity blockade: femoral, sciatic, and lateral femoral cutaneous nerves
    e. Upper extremity blockade: ulnar, median, and radial nerves
    f. Bier block
    g. Cervical plexus block
13. Become skilled in discontinuing anesthesia and monitoring emergence from anaesthesia
    a. Reversal of neuromuscular blockade

b. Determination of appropriate time for extubation
c. Monitoring of airway function during and after emergence

14. Become familiar with/skilled in perioperative pain management
    a. Postoperative epidural infusion (opiates, local anesthetics)
    b. Patient-controlled analgesia
    c. Adjunctive nerve blockade

15. Become skilled in use of techniques for conscious sedation and monitored anaesthesia care
    a. Selection of patients for conscious sedation
    b. Selection of drugs for use in conscious sedation
    c. Monitoring techniques helpful in controlling depth of sedation
    d. Recognition of when conscious sedation has become unconscious sedation
16. Know how to successfully resuscitate, and develop skill of Basic Life support and Advance Cardiac Life support.
17. Work with other members of the OR team, including surgeons and nurses, to optimally care for surgical patients, especially develop communications skill.

ANAESTHESIA OUT SIDE OPERATING ROOM

1. Radiology and interventional neuroradiology: Know special anaesthetic considerations in these settings:

a. Dye allergies
b. Embolization
c. Examination for magnetic resonance imaging (MRI)
    i. Monitoring
    ii. Equipment options in the MRI suite
    iii. General anesthetic/sedation techniques

2. Electroconvulsive shock therapy (ECT)

a. Preoperative
b. Anesthetic techniques and drug effects on seizure duration
c. Hemodynamic responses and appropriate treatment

3. Cardiac catheterization

a. Preoperative evaluation of children
b. Anesthetic consideration
    i. Children
    ii. Electrophysiologic tests/radiofrequency ablation Cardioversion

4. UROLOGY SERVICE (This service may be in OPD or OT)

Become skilled in anesthetic techniques applicable to the Genitourinary Clinic

a. Transurethral resection of the prostate: recognize and treat hyponatermia; know different anesthetic options and advantages and disadvantages of each

b. Irrigation fluid options: know advantages and disadvantages of each

c. Anesthetic techniques for extracorporeal shock wave lithotropsy

d. Anesthetic considerations for percutaneous placement of nephrostomy

III. Evaluation to Determine Goal Achievment

a. The resident will be evaluated every 3 months end posting by all attending consultants who worked with them.The attending physicians complete a Departmental Resident Evaluation Form, which is reviewed by the Clinical Competence Committee. informs them of any problems identified. and serious problems will be discussed with them immediately after they occur.

b. Residents will complete a log book. After each posting it will be checked and signed by the faculty concerned.

Trauma & Resuscitation

All residents must achieve basic and advanced cardiac life support, advanced trauma life support, and pediatric life support training. They should start with the training of Airway breathing circulation (ABC) training and master the skills repeatedly and then procedure to advanced life support.

I. GOALS OF TRAUMA/TRAUMATISED PATIENT AND DISASTER MAAGEMENT

a. Acquire Improve ability to evaluate & triage the patient and formulate anesthetic plans, especially in the trauma patient.

b. Acquire ability to administer operative anesthesia safely and rapidly.

c. Acquire ability to identify, prevent and care for postoperative complications.

A. Manage anesthesia for severely traumatized patients by doing the following as rapidly as possible:

1. Evaluation/documentation

2. Placement of intravascular catheters

3. Airway intubation

4. Choose among anesthetic options and induce and maintain anesthesia safely

POST ANESTHESIA CARE UNIT (PACU)

1. Goals

Understand the importance, purpose, and components of the anesthesia record and the report from the anaesthetizing anesthesiologist.

Use information about the patient that is received and observed on admission to the PACU and during care there for the following purposes:

1. To create a care plan
2. To score the patient's condition according to the Aldrete system
3. To assess the patient's recovery and condition for a safe discharge or transfer

Observe, recognize, and learn to treat the most commonly occurring problems likely to arise in the Postaanesthesia Care Unit (PACU). Understand the parameters patients must meet for safe discharge from the PACU to the following:

1. home
2. inpatient ward
3. intensive care unit

Detection of Hypoxemia and Oxygen therapy should be learned in this posting Should be recognize.

1. Airway integrity and compromise.
2. Arrhythmia
3. Hypertension
4. Hypotension
5. Pain prevention and relief.
6. Nausea and vomiting
7. Decreased urine output
8. Emergence delirium
9. Delayed emergence from anesthesia
10. Shivering
11. Post obstructive pulmonary oedema

III. Evaluation to Determine Goal Achievement (End posting summative)

INTENSIVE CARE UNIT

I. Goals

Understand the spectrum of critical illnesses requiring admission to ICU recognize the critically ill patient who needs intensive postoperative care from the patient who does not require such care.

PRINCIPLES OF MANAGING A CRITICALLY ILL MEDICAL PATIENT

Cardiovascular

Recognition and acute management of Shock (all forms) Cardiac arrythmiasCardiogenic pulmonary edema Acute cardiomyopathies Hypertensive emergencies,myocardial infarction.

Respiratory

Recognition and acute management of Acute and chronic respiratory failure Status asthmaticus Smoke inhalation and airway burns Upper airway obstruction, including foreign bodies and infection Near drowning Adult respiratory distress syndrome. Use of Pulmonary function tests including bedside spirometer.

Renal

Recognition and acute management of Fluid and electrolyte disturbances.

Should be able to prescribe fluids in Renal failureAcid-basis disorders. Should be able to prescribe drugs based on Principles of Drug dosing in renal failure Should know when to use Dialysis/hemofiltration.

Central Nervous System

Recognition and Acute management of Coma, Drug overdose know Glasgow Coma Scale Metabolic and Endocrine,emergencies like Diabetic ketoacidosis Hypoadrenal crisis, pheochromocytoma.

Infectious disease

Recognition and acute management of hospital acquired and opportunistic infections, including acquired immunodeficiency syndrome. Should know how to protect against cross infection Infection risks to healthcare workers.

Hematologic disorders

Recognition and acute management of Defects in hemostasis Hemolytic disorders should be able to prescribe component therapy based on the results of Coagulation profile.

Thrombotic disorders sould be able to diagnose Deep Vein thrombosis and know Principles of Anticoagulation and fibrinolytic therapy.

Know the indications of Plasmapheresis for acute disorders, including neurologic and hematologic. diseases.

Gastrointestinal disorders

Sould be able to recognize and manage Gastrointestinal bleeding hepatic failure should be able to prescribe prophylaxis against stress ulcer bleeding.

A. Should be able to do the following (ideally) at the end of the posting:
    1. Radial arterial catheters and other sites as necessary
    2. Central venous catheters
        a. Subclavian route
        b. Internal or external jugular route
    3. Pulmonary artery (PA) catheters (Observe only)

B. Understand and interpret the following PA catheter variables, initiate appropriate therapy in response to changes in them:
    1. PA waveform
        a. Normal
        b. Pathologic
        c. PA wedge
    2. Mixed venous oxygen saturation
    3. Right ventricular ejection fraction
    4. Thermodilution cardiac output
        a. Technological basis for cardiac output measurements
        b. Factors producing errors in cardiac output measurements

C. Manage cardiovascular instability
   1. Know different fluid therapy options and when to use them
   2. Know the different inotropic drugs and when to use them
   3. Know how to use invasive monitoring devices to guide therapeutic use of fluids and inotropic drugs

D. Manage respiratory failure and postoperative pulmonary complications
   1. Know how to use arterial blood gas and ventilatory variables to evaluate postoperative patients with respiratory failure
   2. Understand the operation of mechanical ventilators including different ventilatory modalities and how each is best used for management of respiratory failure and noninvasive) including modes complications and modes of weaning

      Principles & application of Oxygen therapy.

E. Pathophysiology and Clinical manifestation of septicemia and its treatment
   1. Recognize sepsis in the postoperative patient including all the typical hemodynamic findings
   2. Know the appropriate tests to diagnose sepsis, including diagnostic tests
   3. Use various monitoring devices to assist in managing sepsis; specifically understand the optimization of oxygen delivery to tissues in the septic patient and the appropriate management of fluids and vasopressors to accomplish these goals.
   4. Know the different classes of antibiotics and antifungal agents and their use in treating sepsis

F. Deliver appropriate nutritional support
   1. Learn about the use of enteral nutrition in the patient who cannot tolerate input per os
   2. Learn about the use of parenteral nutrition in the critically ill surgical patient
   3. Interact with nutrition support services in planning nutrition for the critically ill patient

G. Provide effective pain management and sedation postoperatively
   1. Learn the appropriate use of pain management modalities in the ICU including:
      a. Patient-controlled analgesia
      b. Epidural and subarachnoid narcotics
   2. Learn the use of sedative/hypnotic drugs in the ICU for:
      a. For Patient on Ventilator

Principles of Transplantation

Care of Immunosuppression Infections in the immunocompromised patient Should know Organ rejection.

Monitoring and Biostatistics

Should be able to use Prognostic indices such as acute physiology and chronic health evaluation, therapeutic intervention scoring system and know the concept of audit

Ethical and legal aspects of critical care

Know the legal importance of

Should be able to take informed consents not resuscitate orders; (DNR) withdrawing of therapy

Psychosocial Issues

Should be able to communicate with distressed relatives

Should be able to give the correct picture of a critical patient, but with compassion in view of critical nature of the illness

Should be able to Transport a critically ill patient/ resuscitate patient with acute traumatic injury

PEDIATRIC TRAINING

Sould be able to

Recognize and manage cardiovascular and respiratory failure in a critically ill child

Evaluate manage the critically ill neonate

Prescribe appropriate dose of all drugs and fluid and electrolytes in a child

Core procedural skills for residents. In addition to practical training in the following procedural skills, the resident must have an understanding of the indications, contraindications, complications & pitfalls of these interventions. Due to the variability of individual training programs, practical experience may be limited for some procedures

Cardioversion

Pulmonary artery catheterization

Trancutaneous pacing

Draining of tension Pneumothorax

Insertion of chest drain

Conventional and Percutaneous Tracheostomies

CARDIOVASCULAR ANESTHESIA

I. Goals

A. Understand cardiac physiology Develop knowledge of cardiovascular anesthesia (anesthesia for the patient with cardiovascular disease). Choose appropriate anesthetic techniques for patients with different types of cardiovascular disease and the skills for lifelong continuing education.

B. Develop technical and monitoring skills necessary for cardiovascular anesthesia

C. Administer anesthesia for a wide variety of cardiothoracic Cases and develop interest in further learning

D. Perform a thorough preoperative assessment of the patient undergoing cardiovascular surgery

E. Know intraoperative anesthetic management for the patient undergoing cardiopulmonary bypass. Know how cardiopulmonary bypass is instituted and discontinued Understand cardiopulmonary bypass and discuss the mechanical aspects of it as follows:

   1. Different types of pumps - pulsatile and nonpulsatile
   2. Physiology of hypothermia and cardiac and cerebral protection
   3. Effects of bypass on volumes of distribution and clearance of anesthetic drugs and anesthetic maintenance, including amnesia

D. Know how and why to use of inotropic support, vasodilators, and antiarrhythmic drugs that may be

necessary before but are especially necessary after cardiopulmonary bypass

E. Develop and understanding of the major issues involved in the perioperative care of the child with congenital heart disease

B. Insert vascular catheters or cannulas for adult and pediatric patients and obtain measurements from them as follows:

1. Arteries

Internal jugular vein and the subclavian vein

Pulmonary artery (Swan-Ganz) catheters and initiate appropriate therapy in response to changes in the following pulmonary artery (PA) variables:

a. Waveform

b. Normal tracing

c. Pathologic tracing

c. Pulmonary artery wedge tracings

2. Mixed venous oxygen saturation

3. Theromodilution cardiac output

observe/know about a Transesophageal echocardiograpy (TEE) probe and interpret TEE images

F. Manage care during cardiac surgery as follows:

1. Blood replalcement

2. Monitoring the effect of heparin

3. Postcardio;ulmonary bypass coagulopathy

Rationale for various therapies such as aprotinin designed to prevent

Coagulopathy

G. Know following procedures and anesthetic implications:

1. Aortic repairs

2. Congenital repairs - pediatric

3. Coronary artery bypass grafting and valves - adults

4. Electrophysiology

5. Thoracic surgery

6. Transplantation - heart and lungs

H. Work as a team member with fellow anesthesiologists, surgeons, perfusionists, and nurses

I. Maintain good clinical judgment under stress and act quickly and accurately in diagnosis, interpretation, and treatment of intraoperative problems

Evaluation to Determine Goal Achievement.

NEUROANESTHESIA

I. Goals

A. Administer anesthesia safely to patients with neurologic disease who are undergoing neurologic or

non-neurologic surgery, diagnostic procedures requiring anesthesia, or nonsurgical interventions requiring anesthesia.

B. Understand the basic concepts of central nervous system (CNS) physiology as they relate to neuroanesthesia, specifically, mastery of autoregulation of blood flow, blood flow response to CO2, blood flow response to cerebral oxygen ($CMRO_2$) and glucose (CMRglu) metabolic rates, and cerebrospinal fluid physiology.

C. Know the effect(s) of commonly used anesthetic agents and adjuvant agents, for example antihypertensives, on cerebral physiology.

D. Understand the anesthetic implications of the most common neurosurgical procedures, that is, what is likely to happen during neurosurgery that will affect anesthetic management.

E. Understand the basic concepts behind electrophysiologic monitoring of the brain and spinal cord.

F. Understand how concurrent medical illnesses affect anesthesia during neurologic surgery.

II. Objectives

A. Review the medical history and physical examination of patients; assess their major neurosurgical problem. Evaluate the patients Glasgow Coma Scale as well as other medical problems that may affect anesthetic care; and know what information about nervous system function and pathology as important to the anesthesiologist.

1. Recognize both the adult and pediatric patient with poor elastance of increased intracranial pressure (ICP).
2. Evaluate the patient with subarachnoid hemorrhage and intracranial aneurysm by means of the Hunt-Hess and Fischer gradings systems; recognize preoperative vasospasm; and anticipate which patients are likely to require special techniques such as barbiturate protection, hypotension, induced hypertension, or temporary vessel occlusion.
3. Differentiate between radiculopathy and myelopathy and understand the anesthetic implications of each, that is, which patients require awake intubation and positioning.
4. Know the basic differences between the following types of brain, spinal cord, and metastatic tumors of the CNS and their association with edema and intraoperative blood loss. Know the anesthetic implications of:
   a. Acoustic neuroma, Ependymoma, Gliomas, Meningioma, Pituitary tumours

      Understand the following different types of spinal operations as well as their anesthetic implications:

      a. Anterior cervican discectomy and fusions, anterior cervial corpectomies, posterior cervical fusions, laminectomies, and foramenotomy, Laminectomies for excision of spinal cord tumors, both intrameullary and extramedullar, Lumbar laminectomies, microdiscectomies, corpectomies, and fusions with instrumentatio, Thoracic laminectomies and discectomies.
6. Anticipate premedication for and anesthetic considerations during electrocorticography
7. Anticipate airway and sedation requirements for stereotactic neurosurgical procedures conducted with either general anesthesia or monitored anesthesia care

Perform the following specific procedures and monitoring techniques necessary to care for the neurosurgical patient.

1. Choose appropriate premedication and agents for anesthetic induction and maintenance based on a knowledge of their effects on cerebral physiology and on neuropathology
2. Choose and place the following monitors and monitoring devices for use during spinal and intracranial surgery:
   a. Arterial line, central venous (CVP) or pulmonary artery (PA) pressure catheters by all approaches, especially the basilic or cephalic veins
   b. observe/know about Precordial Doppler and interpretation of sounds
3. Perform techniques for awake intubation and positioning of the neurosurgical patient with either an unstable neck or myelopathic signs and symptoms
   a. Assess when awake intubation and positioning are needed
   b. Intubate an awake patient such that coughing or movement are minimal
   c. Master anesthesia for awake intubation, including but not limited to, superior laryngeal and glossopharyngeal nerve blocks and transtracheal injection of lidocaine
4. Detect and treat air embolism during neurosurgery:
   a. Know use of monitors to detect air embolism and what monitoring patterns are associated with air embolism.
   b. Recognize the relative risks of different procedures and positions for air embolism.
5. Know general priniciples of positioning the patient for neurologic surgery and the advantages and disadvantages of each position:
   a. Lateral
   b. Prone
   c. 3/4 prone
   d. Supine-head turned
   e. Sitting - theoretical knowledge only because this position is no longer used at our institution
6. Know anesthetic effects on the electroencephalogram (EEG) and evoked potentials and basic implications of and appropriate responses to changes in each.
7. Understand the basic indications and techniques, and, if possible, perform the following special procedures used during neuroanesthesia:
   a. Induced hypotension
   b. Induced hypertension
   c. Moderate Hypothermia

      Barbiturate cerebral protection, Cardiopulmonary bypass and circulatory arrest — theoretical knowledge only in most instances.
8. Know the differential diagnoses and treatment alternatives of intraoperative intracranial hypertension ("tight brain").
9. Reverse general anesthesia rapidly with a minimum of hemodynamic change to allow early postoperative assessment of the patient and recognize when failure to emerge from anesthesia is not likely an anesthetic effect.
10. Know the management of Head Trauma, and its anesthetic management

III. Evaluation to Determine Goal Achievement

A Preparation for case and ability to carry out plan discussed the night before:

1. Recognition of intraoperative problems and communication with the attending; ability to appropriately respond to changing clinical situation; clinical judgment
2. Mechanical skills of placing lines and positioning the patient
3. Application of basic and clinical science knowledge and skills to the neurosurgical patient

B. The neuroanesthesia group will meet at the conclusion of each rotation and an overall performance evaluation will be made based on the above criteria ED.

PAIN MANAGEMENT

I. Goals

A. Differentiate among the different chronic pain states, for example, reflex sympathetic dtystrophy and neuropathic or myofascial pain, and know what treatments are effective for each.

B. Know the types of drugs that relieve pain and their efficacy, indications, side effects and contraindications and use.

C. Know the laboratory tests, radiologic studies, and psychological tests used to help differentiate chronic pain syndromes.

D. Learn to perform a thorough, directed history and physical examination, which will emphasize and facilitate the diagnosis of different pain states.

E. Know the multidisciplinary approach to pain management.

F. Know when it is appropriate to refer patients to different specialists for definitive or adjunctive therapy, for example, neurosurgery, orthopedic surgery, neurology.

G. Manage acute and perioperative pain syndromes proficiently.

II. Objectives

A. Learn the anatomy of the sympathetic nervous systems, specifically, the anatomy of the epidural and subarachnoid spaces and the location of sympathetic and parasympathetic ganglia

B. Perform blocks and techniques in administering them that are commonly used to manage acute and chronic pain as follows (Please note: Some of these blocks may not be performed in a given month because of the patient population available during that month):

1. Epidural steroid injuction (all levels)
2. Long-term epidural catheterization
3. Blocks Should observe and know about the following blocks:
   a. Celiac plexus
   b. Infraorbital nerve
   c. Intercostal nerve
   d. Lumbar sympathetic
   e. Stellate ganglion
   f. Facet blocks

4. Complications associated with each blocks and appropriate treatment of each

C. Know the cutaneous dermatomal mappings

D. Diagnose myofascial pain syndromes and perform trigger point injections

E. Know the different modalities of physical therapy that may relieve both acute and chronic pain and learn how to obtain such therapy

F. Know the indications for stimulation techniques such as transcutaneous electrical nerve stimulation (TENS), dorsal column stimulation, and deep brain stimulation

G. Know the acute pain and cancer pain guidelines:

1. Treatments the WHO Treatment Ladder
   a. Drugs: analgesics, opiates, sedatives, and stimulants
   b. Nerve blocks
   c. Neruolysis, surgical and chemical
2. Routes of administration and risk and benefits of each epidural
   a. Intramuscular
   b. Intrapleural
   c. Intravenous
   d. Oral
   e. Patient controlled
   f. Subcutaneous

H. Diagnose and know how to treat the following pain syndromes:

a. Diabetic neuropathy
b. Inflammatory states such as bursitis, carpal tunnel syndrome, skeletal pain, and tendonitis
c. Phantom limb pain
d. Post-herpetic neuralgia
e. Reflex sympathetic dystrophy
f. Trigeminal neuralgia
g. Low back pain

III. Evaluation to Determine Goal Achievement

PEDIATRIC

I. Goals

A. Administer anesthesia safely for routine surgical, diagnostic, and therapeutic procedures.

B. Recognize and treat postanesthesia problems

C. Recognize when you or your institution cannot provide adequate care for a particular problem

II. Objectives

A. Preoperative

Neonatal anatomy and physiology applied to conduct of anesthesia.

1. Review the chart, take an adequate history, assess the major systemic problems, identify special problems such as latex allergy or apnea related to prematurity, and develop a plan of care.
2. Recognize and cope with the emotional problems of parents and child, and attempt to alleviate them.
3. Know the priniciples of and medications used for preoperative sedation.
4. Induce anesthesia in an distraught or uncooperative child.
5. Recall and state the anatomic, physiologic, and pharmacologic differences and similarities in the major organ systems between children and adults.
6. Transport safely a sick pediatric patient to the operating room and be able to state and perform the solutions to any problems which may arise in the following areas:
   a. Heat maintenance
   b. Cardiovascular stability
   c. Ventilation
   d. Oxygenation
7. Record and estimate preoperatively blood volume, hourly fluid requirements, estimated fluid deficit, third space loss, red cell mass at the patient's hematocrit, acceptable red cell mass loss, and acceptable blood loss.

B. Intraoperative

1. Know appropriate endoracheal tube sizes - cuffed and uncuffed.
2. Induce and maintain anesthesia by inhalation, intravenous, intramuscular, and rectal routes and know the differences in effects of various anesthetics between adults and pediatric patients.
3. Administer mask or laryngeal mask airway anesthesia when appropriate.
4. Maintain the airway of an anesthetized pediatric patient and intubate the trachea without trauma in 98% of cases within 1 minute.
5. Perform awake intubation.
6. Recognize abnormal airways and maintain them during anesthesia.
7. Describe the appropriate management of laryngospasm.
8. Recognize the following signs of hypoxias: bradycardia, poor color, poor venous filling, distant heart tones, and abnormal elctrocardiogram.
9. Understand the various forms of breathing circuits used in pediatric anesthesia and them appropriately.
10. Apply consistently and interpret data from a blood pressure cuff, electrocardiogram, oximeter, capnograph or mass spectrometer, and a thermistor.
11. Know the indications of use of a heat lamp and heated humidifier when appropriate Answer questions concerning the importance of thermoneutrality in pediatric by demonstrating the use and abuse of the followi,ng, Heat lamp,b. Heat blanket, Heat humidifier, Room temperature.
13. Master the techniques of halothane and isoflurane/nitrous oxide/oxygen/muscle relaxant anesthesia.
14. Determine and discuss when deep or awake extubation is appropriate and apply the proper approach.
15. Understand and apply the basic concepts of neuromuscular blockade in children, know when anesthesia is adequately reversed, and know the differences between dose/effect in infants and children as compared to adult patients.

16. Apply the priniciples of fluid and blood replacement during anesthesia.
17. Understand the benefits and risks of regional anesthesia, including spinal anesthesia and regional analgesia for postoperative pain.

C. Postoperative

1. Transport safely and manage immediate postoperative care in the following areas: ventilation, oxygen administration, temperature control, cardiovascular monitoring, fluid balance, and pain relief.
2. Recognize postoperative croup and treat it.
3. Understand postanesthesia apnea, factors associated with it, the appropriate duration of monitoring, and treatment.

D. Special problems

1. Manage the following in pediatric patients undergoing anesthesia and surgery:
   a. Blood replacement
   b. Drug administration and anesthetic requirement (minimum anesthetic concentration)
   c. Fluid and electrolyte balance, glucose requirement, and renal maturation
   d. Hypocalcemia
   e. Hypoglycemia
   f. Metabolism
   g. Temperature control
   h. Vitamin K administration
2. Care of patients in the following special circumstances:
   a. Special problems
      i. Congenital heart disease
      ii. Epiglottitis
      iii. Malignant hyperyrexia
      iv. The child with the anatomically difficult airway (e.g. Pierre Robin syndrome)
   b. Special procedures
      i. Bronchoscopy (in particular for foreign body aspsiration)
      ii. Tonsillectomy (in particular for the rebleeding tonsil)
      iii. Computerized axial tomographic scan and magnetic resonance imaging
3. Know and experience management of a pediatric patient with a full stomach
4. Identify the following various problems in pediatric patients and handle them:
   a. Diaphragmatic hernia
   b. Omphalocele and gastroschisis
   c. Pierre-Robin syndrome
   d. Pyloric stenosis
   e. Tracheoesophageal fistula
5. Understand pediatric resucitation, drugs and doses used for it, and defibrillation

III. Evaulation to Determine Goal Achievment

OBSTETRIC

I. Goals

A. Learn how the physiology of normal pregnancy alters the response to anesthesia

B. Learn pertinent aspects of fetal and placental physiology

C. Learn what obstetricians may require from anesthesiologists

D. Learn how pregnancy creates special problems for the anesthesiologist learn the nature of high-risk obstetrics and how special medical problems alter the approach to obstetric anesthesia

E. Participate in morbidity mortality conference and ongoing research

II. Objectives

F. Learn how to evaluate the neonate and principles of neonatal resuscitation

G. Learn how drugs affect the neonate

H. Learn how to communicate effectively with obstetricians and with labor and deliver nurses.

A. Obtain pertinent information from the history and physical examination of the obstetric patient to assess major systemic problems

B. Understand obstetric physiology and pharmacology as follows:

1. Alteration of maternal physiology during pregnancy
2. Effects fo anesthesia, both general and regional, on human uteroplacental blood flow and of adjunctive medications such as vasopressors and vasodilators on uterine blood flow
3. Perinatal pharmacology and placental transfer of drugs
4. Effects of epidural and systemic medications on labor and delivery
5. Learn all anesthetic techniques suitable for managing normal labor pain including:
   a. Epidural local anesthesia
   b. Epidural opiate anesthesia
   c. Inhalation analgesia
   d. Intravenous analgesia

C. Understand epidural and spinal analgesia and anesthesia as follows:

1. Anatomy and physiology of the epidural space and spine
2. Techniques of needle placement including midline and paramedian approaches
3. Pharmacology of local anesthetics
4. Complications and side effects

D. Know common problems encountered in continuous epidural infusion and how to prevent and treat them

E. Know how to use of intraspinal opiates in obstetrics:

1. Physiology and pharmacology

2. Benefits for labor, deliver and postoperative pain
3. Side effects

F. Understand the advantages of regional and general anesthesia for cesarean section

G. Know the risk factors, prevention, and treatment of maternal aspiration

H. Evaluate difficult airways and know how to prevent the problems associated with them and to manage failed intubation

I. Be familiar with recent advances in obstetric anesthesia
1. The effect of epidural anesthesia on labor and deliver
2. Drug interaction
3. The epidural test dose
4. Anesthesia for pre-term delivery

J. Recognize high-risk factors in obstetric patients and how they affect anesthetic management as follows:
1. Morbid obesity and anesthesia: Problems and management
2. Preeclampsia: Basic considerations and controversy in management
3. Neurologic disease and pregnancy

K. Understand anesthetic choices for the pregnant patient with heart disease

L. Identify and manage common medical emergencies in the post-parturient

M. Know how the late 20th century social problems affect anesthetic care, such as perinatal human immunodeficiency virus infection and maternal substance abuse

N. Manage maternal anesthesia and the stressed fetus

O. Know current fetal monitoring techniques and how to interpret the information they provide

III. Evaluation to Determine Goal Achievement

REGIONAL ANESTHESIA

I. GOALS

A. To teach anesthesia residents the art and sciences of regional anesthesia understand the anatomy, pathophysiology, and appropriate management of complications and side effects of regional anesthetic techniques, - the test doses; total spinal, subdural blocks - assessment and treatment; Risks of spinal, epidural hematoma and abscess - assessment and treatment; Postdural puncture headache - assessment and treatment; Pneumothorax- assessment and treatment; Physiologic side effects: sympathectomy, phrenic nerve block, intercostal nerve block - assessment and treatment; Peripheral nerve injury - assessment and follow up.

B. To understand general priniciples of local anesthetic pharmacology, including the pharmacodynamics and pharmacokinetics of various local anesthetics. This includes onset duration, motor/sensory differentiation, and toxicity profile of various local anesthetics and allergy its treatment:

C. To understand the principles and indications for various local anesthetic adjuvants including:

Epinephrine, phenylephrine, narcotics, sodium bicarbonate, carbonation, hyaluronidase, alpha agonists, anticholinesterases.

D. To be familar with the relevant anatomy for regional techniques, including: Spinal canal and its contents, neural plexuses of the limbs, major autonomic ganglia.

E. Be familiar with the physiologic changes associated with spinal and epidural anesthesia.

F. Understand the indications for and the contraindications to regional anesthetic techniques including central neuraxis blocks, peripheral nerve blocks, sympathetic nerve blocks.

B. COGNITIVE SKILLS

At the compleltion of this rotation residents should be able to demonstrate the following skills.

1. Rational selection of regional anesthesia technique and choice of local anesthetic for particular patient encounters.
2. Ability to assess adequacy of regional anesthesia before the start of surgery, and demonstrate appropriate plans for supplementation of inadequate blocks.
3. Provide effective anxiolysis and sedation of patients by both pharmacologic and interpersonal techniques.
4. Select appropriate monitors for specific patient encounters, and document performance of regional anesthetic adequately.

III. EVALUATION TO DETERMINE GOAL ACHIEVEMENT

SKILLS SHEET FOR RESIDENTS ON THE REGIONAL ANESTHESIA ROTATION

Demonstrate ability to perform/familiarity with the following regional anesthesia techniques:

- Brachial plexus blockade
- sciatic nerve block
- femoral nerve block, o or 3-in-1 block
- Caudal block – adult and peadiatric
- ankle block
- epidural block/Catheter
- spinal subarachnoid block
- Biers block
- others

OBJECTIVES OF DENTAL ANESTHESIA

Understand the principles of conscious sedation

Principles of anesthesia in a dental Chair

Local Blocks For Dental Surgery

OBJECTIVES OF TRANSPLANT ANESTHESIA

Know the basic Principles of anesthetizing An immunocompromised Patient Principles of anesthetising

patient with end stage renal/liver disease Warm/Cold ischemic Time

OBJECTIVES FOR OPHTHALMOLOGY POSTING

1. Give anesthesia for intra and extraocular surgery
2. To anesthetize premature babies for ROP surgery.
3. To give Monitored Anesthesia Care to learn to sedate patients for MAC
4. To give Ophthalmic nerve blocks.

OBJECTIVES FOR ENT POSTING

1. To give topical anesthesia for awake intubation.(nasal and oral)
2. To give local block for Tonsillectomy
3. Local anesthesia for tracheostomy..
4. Local block for thyroid surgery TO give anesthesia for MLS
5. To give anesthesia for Laser surgery of airway.
   To give anesthesia for vascular malformations /tumours of noses

APPENDIX — I

Text books:

1. Miller RD, ed. Anesthesia, 5th ed.
2. Wylie Churchill Davidson
3. Nunn and Utting
4. Stoelting RK, Miller RD, eds. Basics of Anesthesia

APPENDIX (CARDIAC)

Text books:

1. JA Kaplan: Cardiac Anesthesia J Benum of: Anesthesia for Thoracic Ssurgery
   C Lake: Pediatric Cardiac Anesthesia

APPENDIX (NEURO ANAESTHESIA)

Text books include:

1. Cucchiara and Michenfelder: Clinical Neuroanesthesia, Churchill-Livingstone
2. Cottrell and Smith: Anesthesia and Neurosurgery, 3rd ed, CV Mosbyd
3. Millelr: Aanesthesia, 4th ed, Churchill-Livingstone; chapters 21, 38, and 56
4. Kirby and Gravenstein: Clinical Anesthesia Practice, WB Saunders; chapters 22, 4, and 73
5. Russell and Rodichok: Primer of Intraoperative Neurophysiologic Monitoring, Butterworth and Heinemann

APPENDIX (PEADIATRIC ANAESTHESIA)

Text books:

1. Gregory GA: Pediatric Anesthesia, 2nd ed
2. Steward D: Handbook of Pediatric Anesthesia, MD

APPENDIX (ICU)

1. ICU Book Paul Marino
2. Critical Care by Joseph Civetta, Robert W Taylor and Robert Kirby publisher Lippincott

APPENDIX (PAIN)

1. Bonica: The Management of Pain
2. Cousins and Bridenbaugh: Neural Blockade in Pain Management
3. Raj: Practical Management of Pain

ASSESSMENT METHODS

Assessment is a vital part of any course and it is element where there is frequently considerable doubt. There are 2 major components:

A) Formative Assessment: Ongoing evaluation during the course – During each posting/ Module/ End Unit

B) Summative Assessment: Final assessment after 3 years and/at the end of each semester Assessment

FORMATIVE ASSESSMENT/(Ongoing Evaluation)

Formative assessment will be conducted during each posting/module/unit. This will include the following:

TECHNICAL SKILLS COMPETENCY EVALUATIONS:

Methods to be used
1) Performing anaesthetic management on real patients (check lists of each skill and competency including log book evaluation)
2) Simulators
3) Objective Structured Clinical Examination (OSCE)

This evaluation will be done either in the OT or ICU or PAC or Postoperative wards.

PROBLEM SOLVING CASES:

Method to be used
1) Case presentations (evaluation by Peers)
2) Simulated case cards

3) OT discussions
4) OSCE

ORAL SKILLS – Attitudinal Development:

Method to be used
1) Ability to present seminars, discussion in class room (evaluation by Peers)
2) Talking to patients in pre-anaesthesia rounds
3) Operation theatre Management

CARDIOPULMONARY RESUSCITATION:

Method to be used
1) Mannequins demonstration
2) Check lists for evaluation
3) OSCE

C P R evaluation will be repeated at the end of each semester

SUMMATIVE ASSESSMENT (FINAL ASSESSMENT) and End Semester assessment

1) THEORY (Subject contents already outlined in curriculum)

Should consist of

a) Structured Essay Questions (SEQs)
b) Short Answer questions (SAQs) minimum of 10 SAQs will be Mandatory (in all four papers taken together)
c) Problem Solving Questions
d) Multiple choice Questions (MCQs) MCQs of different types Shoule be included atleast in one of the 4 papers. The use of MCQs is recommended for formative/end semester evaluation.

Final Theory papers: 4 Papers

		Marks
Paper I	Basic Sciences as applied to Anaesthesiology, including ethics, statistics, Quality assurance, medicolegal Aspects.	100
Paper 2	Anaesthesia in relation Associated Systemic	100
Paper 3	Anaesthesia in relation to subspecialities such As cardiac, neuro, obstetrics and pediatrics etc.	100
Paper 4	Intensive care Medicine, Pain Medicine and Recent advances in Anaesthesiology	100

2) PRACTICAL

4 components: Marks

The practical examination should be structured and objective as possible

	1 long case	40 min	100
A) Clinical Cases			
	2 Short cases	15 min each	40 each

Structured Assessment (Long Case)

1.	Oral skills/presentation	10
2.	Diagnosis/investigations	10
3.	Preanaesthetic Preparation	20
4.	Anaesthetic management	40
5.	Post operative complications & management	20
B) OSCE:	At least 10 OSCE stations with checklists For objective assessment marks	20
C) VIVA-VOCE (Structured)		
		TOTAL MARKS: 200
1.	Problem solving situations	40
2.	Drugs/Anaesthetic	40
3.	Equipments for Anaesthesia/In. Care	40
4.	Investigations}ECG/Xrays/MRI Endoscopy etc.	40
D) 1.	**CPR** Assessment on Mannequins	40
		Total Marks
	Theory (Papers 1-4)	400
	Practical (Cases, OSCE, Viva Voce)	400
	Grand Total	**800**

The candidate will be required to secure minimum 50% marks in theory and 50% marks in clinicals and viva-voce separately, which is mandatory for passing the whole examination. Candidate failing in theory will not qualify to take practical examinations. There should be enough gap between theory and practical Exam. As recommended by MCI rules.

Final Assessment Marks Weightage

30% : Internal (Formative) Assessment & Thesis

70% : Summative Assessment

The committee recommends that three external and three internal examiners should conduct the clinical examination. A maximum of 4 candidates should be examined per day and if there are more than 4 candidates the examination should be conducted on 2 consecutive days.

THESIS

Objectives

1. The student would be able to demonstrate capability in research by planning and conducting systematic scientific inquiry & data analysis and deriving conclusion.
2. Communicate scientific information for health planning.

Guide for thesis

1. Chief guide will be from the department of Anaesthesiology
2. Co-guide(s) will be from the department or from other disciplines related to the thesis.

Submission of thesis protocol

It should be submitted at the end of six months after admission in the course.

1. Protocol in essence should consist of:
   a. Introduction and objectives of the research project.
   b. Brief review of literature.
   c. Suggested materials and methods, and (scheme of work)
   d. Statistician should be consulted at the time of selection of groups, number of cases and method of study. He should also be consulted during the study.
   e. Bibliography
2. The protocol must be presented in the department of Anaesthesiology before being forwarded to the Research Committee of the Institute.
3. Protocol will be approved by the research committee appointed by the Dean/Principal to scrutinise the thesis protocol in references to its feasibility, statistical validity, ethical aspects, etc.

Submission of thesis

1. The thesis shall relate to the candidate own work on a specific research problem or a series of clinical case studies in accordance with the approved plan.
2. The thesis shall be written in English, printed or typed on white bond paper 22 × 28 cms with a margin of 3.5 cm. bearing the matter on one side of paper only and bound with cloth/rexine, with the title, author's name and the name of the College printed on the front cover.
3. The thesis shall contain: Introduction, review of literature, material and methods, observations, discussions, conclusion and summary and reference as per index medicus.

Each candidate shall submit to the Dean four copies of thesis, through their respective Heads of the Departments, not later than six months prior to the date of commencement of theory examination in the subject.

Evaluation of thesis

1. The thesis shall be referred by the University evaluation to the Examiners appointed by the University. The examiners will report independently to the Controller of Examinations and recommend whether the thesis is-

a) approved

b) returned for improvements as suggested or

c) rejected

2. The thesis shall be deemed to have been accepted when it has been approved by atleast two external examiners and if the thesis is rejected by one of the external examiners it shall be referred to another external examiner (other than the one appointed for initial evaluation) whose judgement shall be final for purposes of acceptance or otherwise of the thesis.

3. Where improvements have been suggested by two or more of the examiners, the candidate shall be required to re-submit the thesis, after making the requisite improvements, for evaluation.

4. When a thesis is rejected by the examiners, it shall be returned to the candidate who shall have to write it again. The second thesis, as and when submitted shall be treated as a fresh thesis and processed.

5. Acceptance of thesis submitted by the candidate shall be a pre-condition for his/her admission to the written, oral and practical/clinical part of the examination.

   Provided that under special circumstances if the report from one or more examiners is not received by the time, the Post-graduate examination is due, the candidate may be permitted provisionally to sit for the examination but the result be kept with held till the receipt of the report subject to the condition that if the thesis is rejected then the candidate in addition to writing a fresh thesis, shall have to appear in the entire examination again.

6. A candidate whose thesis stands approved by the examiners but fails in the examination, shall not be required to submit a fresh one if he/she appears in the examination in the same branch on a subsequent occasion.