CURRICULUM For DM – PAEDIATRIC AND NEONATAL ANAESTHESIA, LHMC

1. Preamble

The purpose of the DM programme (Paediatric and Neonatal Anaesthesia) is to create specialists who 5would provide high quality health care to paediatric and neonatal population and advance the cause of science through research & training. After having undergone the required training in paediatric and neonatal anesthesia, the competent superspecialist should be able to recognize the health needs of this particular community. He or she should be competent to handle effectively necessary medical problems, should acquire broad range of skills that will enable him to practice anaesthesiology independently and should be aware of the recent advances pertaining to the specialty. The PG student should also acquire the basic skill in teaching of medical/paramedical students.

2. Admission Requirement

For admission to DM (Paediatric and Neonatal Anaesthesia), a candidate is required to possess MD or an equivalent qualification in Anaesthesia of an Institute/University recognized by the Medical Council of India.

3. Duration of Course

Three full academic years

4. No. of Candidates

As per sanctioned Intake.

5. Aims and Objectives of the Course

The aim of the course is to impart thorough and comprehensive training to the candidate in the various aspects of this specialty to enable him/her:

(a) To recognize the anatomical, physiological and psychological differences in the sub-set of paediatric and neonatal patients.

(b) To train anaesthesiologists adequately to ensure the safe delivery of anaesthesia to this vulnerable group of patients.

(c) To carry out and help in conducting applied research in the field of paediatric and neonatal anaesthesia

(d) To acquire the basic skill in teaching of medical/paramedical students and to function as a faculty/consultant in the specialty

(e) To be able to plan, set-up and manage independent paediatric and neonatal anaesthesia unit catering to paediatric surgery and intensive care.

(f) Should be able to communicate appropriately with colleagues to function in a group in operating room and

intensive care unit.

6. Method of Selection

The selection of candidate for admission of DM in Paediatric and Neonatal Anaesthesia is to be made through nationwide Common Entrance Test (NEET-SS) conducted by National Medical Commission. The selection should be based on merit only.

7. Teaching Methods

During the period of training candidates follow in-service residency programme. She/he works as senior resident and is given gradually increasing responsibility – for independently managing the anaesthesia for simple paediatric and neonatal surgereies and decision making in intensive care management. The day to day work of the trainees will be supervised by the consultant of the department of Paediatric and neonatal Anaesthesiology. The posting is so designed that the trainee gets posted in various areas of the department like Operation Theatre, postoperative ICU, and Intensive Care Unit. Besides this, seminars, workshops, case discussions, journal club will also be organized.

8. Teaching Programme

Periodic rotations in various paediatric and neonatal Operation Theatres and Intensive Care Units would be made. The trainee would be posted in different specialities such as Paediatric surgery OT, Orthopaedic OT, Ophthalmology OT, Otorhinolaryngology OT, Dental and maxillofacial OT, Non operating room anaesthesia (CT/ MRI), Pre-anaesthesia checkup clinic, Paediatric ICU, Postoperative and Paediatric Surgery ICU, Neonatal ICU.

Along with everyday clinical teaching in operation theatres and ICU, the following teaching programme is prescribed for the course:

DM seminar/Case discussion/Tutorial

Journal Club

Teaching of MD Anaesthesia students by the DM student is part of the training.

9. Paediatric and neonatal Anaesthesia Curriculum

The student should have fair knowledge of basic sciences (Anatomy, Physiology, Biochemistry, Microbiology, Pathology, Pharmacology, Statistics and Physics) as applied to paediatric and neonatal anaesthesia. The student should acquire in-depth knowledge including recent advances. He/she should be fully conversant with the required diagnostic and therapeutic procedures. The training programme shall be updated as and when required. The trainees shall maintain a log book of the work assigned to them. The curriculum shall include:

I. Paediatric and Neonatal Developmental Principles

Knowledge

1. Define Preterm, Prematurity, Neonate, Infant, and Child.

2. Understand the terms Gestational Age and Post-Conceptual Age.
1. Understand the transition from foetal to neonatal circulation including the effect on vascular and cardiac structures (conversion from parallel to series circulation), foetal haemoglobin and blood gas values,arterial and pulmonary artery pressure changes, and ventricular function.
2. Understand normal airway and respiratory development, cardiac development, neurologic development, renal development and hematopoietic development including the conversion of foetal to adult haemoglobin.
3. Understand the effect of prematurity upon organ system development and the short and long-term risks of prematurity including respiratory distress syndrome, bronchopulmonary dysplasia, apnoea, anaemia, intraventricular haemorrhage, retinopathy of prematurity, and hypoglycaemia.
4. Understand the basis of pharmacokinetic and pharmacodynamic differences of anaesthetic agents between neonates, infants and children.

Skills

5. Appropriately administer anaesthesia to all age groups and account for differences in drug volume of distribution, MAC, protein binding, metabolism, and excretion.

II. Coexisting Paediatric and Neonatal Diseases

Knowledge

1. Understand the anatomy and pathophysiology of common cyanotic and acyanotic congenital heart lesions including ventricular septal defect, atrial septal defect, patent ductus arteriosus, critical aortic stenosis and coarctation, pulmonary stenosis, tetralogy of Fallot, and transposition of the great arteries.
2. Understand the anaesthetic implications for children with congenital heart disease including associated syndromes, preoperative assessment, SBE prophylaxis, anaesthetic cardiovascular effects, and the effects of an intracardiac shunt on intravenous and inhalation induction of general anaesthesia.
3. Understand the pathophysiology and anesthetic implications of obstructive sleep apnoea, asthma, and acute upper respiratory tract infection.
4. Learn the common congenital syndromes that include difficult airways, e.g., Pierre Robin, Treacher-Collins, Trisomy 21 etc.
5. Know the anesthetic implications of cerebral palsy, seizure disorders, hydrocephalus, neuromuscular diseases, muscular dystrophies, and diseases of the neuromuscular junction and neuromuscular transmission.
6. Understand the anesthetic implications for pyloric stenosis, gastro-esophageal reflux, renal disease and liver disease in the paediatric and neonatal patient.
7. Understand the anaesthetic implications and perioperative management of inherited disorders of coagulation (e.g. haemophilia) and hemoglobinopathies (e.g., sickle cell diseases). Know the anaesthetic considerations for children with oncologic disease and

who have had chemotherapy.

8. Know the anaesthetic implications of children with a mediastinal mass.
9. Understand the anaesthetic considerations for a child with a latex allergy.
10. Know the residual medical problems in children born premature (e.g., bronchopulmonary dysplasia) and the potential impact on anaesthetic care.
11. Know the essentials of Paediatric and Neonatal Advanced Life Support (PALS/ NALS).

Skills

12. Perform a preoperative evaluation and participate in an anaesthetic for a paediatric and neonatal patient with congenital heart disease.
13. Perform a preoperative evaluation and present an anaesthetic plant for a paediatric and neonatal patient with an upper respiratory tract infection (URI). Develop a decision process for proceeding with elective surgery in a child with an acute or recovering URI.
14. Identify and evaluate the child with a difficult airway.
15. Be able to evaluate and institute appropriate therapy for a child with respiratory failure.
16. Plan an anaesthetic for a child with a neuromuscular disease.
17. Develop a plan for the perioperative management of a child with sickle cell disease.
18. Develop a plan for the perioperative management of a child with a congenital bleeding disorder.
19. Describe a plan for the induction of anaesthesia in a paediatric/ neonatal patient with gastroesophageal reflux.
20. Plan an anaesthetic for the prematurely born child.
21. Using PALS/ NALS, be able to preside over the resuscitation of a child in cardiac arrest, or with a life-threatening hemodynamic disturbance or arrhythmia.

III. Anaesthetic Techniques

Knowledge

1. Understand the pre-operative issues relevant to the anaesthetic care of neonates, infants and children including: coexisting morbidities, medications, allergic reactions, labour and delivery history, maternal history, family history, the normal paediatric and neonatal physical examintaion and the evaluation of abnormal findings.
2. Know the ASA guidelines for preoperative fasting including clear fluids, breast milk and formula based upon patient age. Understand the appropriate ordering of preoperative laboratory testing and evaluation.
3. Know the options available for premedication including agents, routes and side-effects.
4. Understand the differences between the various paediatric breathing circuits to provide

oxygen and anaesthesia.

5. Understand the factors determining the speed of inhalation induction in paediatric/ neonatal patients and the various agents currently available for inhalation induction including the benefits and side-effects of each.
6. Understand the regulation of temperature in neonates, infants and children and compensatory mechanisms, effects of anaesthesia on temperature and the consequences of hypothermia.
7. Know the differential diagnosis and management of perioperative hyperthermia.
8. Know the age-related fluid and electrolyte requirements for neonates, infants and children including calculation of deficit, intra-operative fluid requirements, glucose requirements and the guidelines, indications and side effects for blood and blood product administration in the neonatal/ paediatric patient.
9. Understand the differences between the paediatric/ neonatal airway and the adult airway and the effects on airway management.
10. Know the various sizes of oral/nasal airways, facemasks, LMAs, blades for laryngoscopy and endotracheal tube sizes (cuffed and uncuffed) and their appropriate use in children of all ages including neonates.
11. Know the prevention, management and consequences of laryngospasm.
12. Know the paediatric/ neonatal doses of intravenous anaesthetic medications including induction agents, opiates, muscle relaxants, reversal agents and emergency medications including side-effects and contraindications.
13. Know the criteria for tracheal extubation and how to perform a deep extubation safely.
14. Know the therapeutic and toxic doses of local anaesthetics in children.
15. Understand the indications and contraindications for spinal and epidural anaesthesia and peripheral blocks in children plus side effects and complications.
16. Understand the post-operative anaesthetic complications for paediatric/ neonatal patients including stridor, croup, nausea/vomiting and emergence delirium and their management.

Skills

17. Perform appropriate preoperative evaluation of neonates, infants and children
18. Obtain informed consent from a parent and assent from an appropriately aged child.
19. Administer premedication to a child.
20. Perform inhalation inductions on paediatric patients of all ages.
21. Monitor patient temperature and institute warming methods on neonates, infants and children.
22. Appropriately choose and administer fluids to paediatric/ neonatal patients of all ages.
23. Secure venous access, both peripheral and central in indicated patients.
24. Calculate allowable blood loss for children of all ages including neonates.
25. Demonstrate the ability to estimate blood loss in paediatric/ neonatal patients.
26. Perform mask ventilation, LMA placement and intubation on paediatric patients of all ages including neonates.

27. Appropriately manage upper airway obstruction,laryngospasm,and broncospam in paeddiatric patients including neonates.
28. Perform commonly used regional analgesic techniques in paediatric patients including neonates.
29. Learn procedures like cricothyroidotomy, fibreoptic intubation, venesections, umbilical artery catheterisation, fluid resuscitation.
30. Learn the basics of Echocardiography and Ultrasound.

IV. Anaesthesia for Paediatric and Neonatal Surgical Procedures

Knowledge

1. Know the pathophysiology, indications for surgical intervention, and anaesthetic implications for the following common paediatric and neonatal surgical conditions:
   a. congenital diaphragmatic hernia (CDH)
   b. tracheoesophageal fistula
   c. inguinal hernia
   d. intussusception
   e. necrotizing enterocolitis (NEC)
   f. omphalocele and gastroschisis
   g. pyloric stenosis
   h. intestinal obstruction
   i. intra-abdominal tumors, cysts
   j. congenital lobar emphysema
   k. empyema, lung abscess
   l. posterior urethral valves, hydronephrosis
   m. undescended testis
   n. otitis media requiring myringotomy and tube placement
   o. obstructive sleep apnoea or recurrent tonsillitis requiring adenotonsillectomy
   p. acutely bleeding tonsil
   q. oesophageal foreign body
   r. tracheal or bronchial foreign body
   s. retropharyngeal abscess
   t. choanal atresia
   u. hydrocephalus requiring ventriculo-peritoneal (VP) shunt insertion or revision
   v. myelomeningocele
   w. intracranial tumors
   x. blocked tear ducts requiring lacrimal duct probing and irrigation
   y. open globe injury
   z. strabismus

aa. congenital cataract

bb. scoliosis

cc. congenital talipes equinovarus

dd. craniosynostosis

ee. cleft lip and palate

ff. paediatric trauma

gg. paediatric burns

2. Understand the age-related changes and pathophysiology of intracranial pressure (ICP) in children.
3. Understand the implications of pneumoperitoneum in the neonate and child and the physiologic changes due to carbondioxide insufflation.
4. Understand the haemodynamic changes in thoracoscopy and the physiology of one lung ventilation in children.
5. Know the pathophysiology and treatment of the oculocardiac reflex.
6. Understand the implications of providing paediatric/ neonatal anaesthesia for radiation therapy, CT scan, MRI and additional procedures outside of the traditional OR environment.

Skills

7. Develop the ability to choose appropriately between endotracheal intubation, laryngeal mask airway, or facemask ventilation for any paediatric/ neonatal surgical procedures.
8. Conduct of Minimal access surgery (laparoscopy and thoracoscopy) in neonates, infants and children.
9. Lung isolation techniques in thoracic surgery and the devices available in the appropriate age group.
10. Be able to place an intravenous catheter in a paediatric/ neonatal patient.
11. Develop a plan when intravenous catheter placement fails.
12. Develop the ability to appropriately manage intraoperative hypoxemia.
13. Develop the ability to appropriately manage intraoperative hypocarbia or hypercarbia.
14. Develop the ability to appropriately manage intraoperative hypotension or hypertension.
15. Develop the ability to appropriately manage intraoperative bradycardia or tachycardia.
16. Develop the ability to appropriately manage intraoperative increased ICP.

V. Paediatric and Neonatal Pain Management

Knowledge

1. Understand methods for recognition and assessment of pain in different paediatric age groups including neonates.
2. Know methods for treatment of acute postoperative pain in children.
3. Understand the age-related differences in use of opioid analgesics in children.

4. Know different regimens for postoperative epidural analgesia in children.
5. Understand the pathophysiology and treatment of common chronic painful conditions in children (e.g., sickle cell disease, oncologic disease, reflex sympathetic dystrophy, etc.)

Skills

6. Demonstrate the ability to develop and carry out a plan to manage and treat postoperative pain in children across all age groups including neonates.
7. Learn and perform epidural catheterisation in neonates and infants.
8. Learn the use of Patient Controlled Analgesia pumps.
9. Demonstrate the ability to treat refractory postoperative pain in children of all ages.
10. Be able to evaluate and treat common complications of analgesic therapy in children (e.g., nausea, vomiting, pruritus, and ventilatory depression).
11. Be able to evaluate and manage children with epidural analgesic therapy and break-through pain.
12. Learn the diagnosis and treatment of chronic pain in children.

VI. Paediatric/ Neonatal Post anaesthesia care unit (PACU) and Intensive care

Knowledge

1. Understand and assess patient's recovery and the parameters used for safe discharge or transfer
2. Observe and recognize commonly occurring problems in PACU such as hypothermia, arrhythmias, shivering, pulmonary oedema.
3. Understand the principles of mechanical ventilation and modes of ventilatory support in children.
4. Understand the principles and application of Oxygen Therapy
5. Understand proper use of sedative/hypnotic drugs in the ICU.
6. Know appropriate nutritional support - enteral and parenteral.
7. Know ethical and legal aspects of critical care
8. Understand Sterilization and disinfection of ICU equipment.
9. Knowledge of newer ventilator strategies e.g. High frequency oscillatory ventilation, ECMO, use of Nitric oxide.

Skills

1. Assess patient recovery and the parameters for transfer from the PACU to the ward, ICU or home.
2. Be able to recognize and manage commonly occurring problems in PACU such as hypothermia, arrhythmias, shivering, pulmonary oedema, nausea and vomiting, emergence delirium.

3. Management of paediatric/ neonatal mechanical ventilation and ICU care.
4. Learn good communication skills with patient and relatives.

VII Recommended Reading

1. **A Practice of Anesthesia for Infants and Children**
   Charles J. Cote, Jerrold Lerman, I. David Todres
2. **Smith's Anesthesia for Infants and Children**
   Peter J. Davis, Etsuro K. Motoyama
3. **Pediatric Anesthesia**
   George A. Gregory
4. **Pediatric Cardiac Anesthesia**
   Carol L. Lake
5. **Pediatric and Obstetrical Anesthesia**
   Theodore H. Stanley, P.G. Schafer
6. **Anesthesia for Genetic, Metabolic, and Dysmorphic Syndromes of Childhood**
   Victor C. Baum, Jennifer E. O'Flaherty
7. **Manual of Pediatric Anesthesia: With an Index of Pediatric Syndromes**
   David J. Steward, Charles J. Cote, Jerrold Lerman
8. **Anaesthetic management of difficult and routine paediatric patients**
   Frederic A. Berry
9. **Regional Anaesthesia in Infants, Children and Adolescents**
   Bernard Dalens
10. **Clinical Anaesthesia for the Newborn and the Neonate**
    Usha Saha

11. Recommended Journals

Paediatric Anaesthesia, Journal of Neonatal Critical Care and Anaesthesia

12. Logbook

The candidate should maintain a log book where they would enter the data of paediatric and neonatal anaesthesia cases done during their tenure.

13. Research

The trainee shall be required to undertake research on the assigned project and write papers under the guidance of the recognized postgraduate teacher, the result of which shall be written up and submitted in the form of

thesis. The candidate will have to submit a proposal/topic for the project work within three months of the joining of the course. The work period for the project will be 1½ years to 2 years. Papers from the project should be sent for publication in an indexed journal. Another article as first author should also be submitted for publication in an indexed journal before the candidate appears in the final

14. Detailed Syllabus

I. BASIC SCIENCES

ANATOMY

Definition of Preterm, Prematurity, Neonate, Infant, and Child.

Definition of the terms Gestational Age and Post-Conceptual Age.

Normal growth and development.

Normal airway and respiratory development. Differences between neonatal, paediatric and adult airway.

Cardiac development, neurologic development, renal development and hematopoietic development including the conversion of foetal to adult haemoglobin.

Anatomy of common cyanotic and acyanotic congenital heart lesions including ventricular septal defect, atrial septal defect, patent ductus arteriosus, critical aortic stenosis and coarctation, pulmonary stenosis, tetralogy of Fallot, and transposition of the great arteries.

PHYSIOLOGY

Transition from foetal to neonatal circulation including the effect on vascular and cardiac structures (conversion from parallel to series circulation), foetal haemoglobin and blood gas values, arterial and pulmonary artery pressure changes, and ventricular function.

Effect of prematurity upon organ system development and the short and long-term risks of prematurity including respiratory distress syndrome, bronchopulmonary dysplasia, apnoea, anaemia, intraventricular haemorrhage, retinopathy of prematurity, and hypoglycaemia.

Understand the pathophysiology and anaesthetic implications of obstructive sleep apnoea, asthma, and acute upper respiratory tract infection.

PHARMACOLOGY

Pharmacokinetic and pharmacodynamic differences of anesthetic agents between neonates, infants and children.

Differences in drug volume of distribution, MAC, protein binding, metabolism, and excretion. Therapeutic and toxic doses of local anaesthetics in neonates, infants and children. Additives in regional blocks. Neurotoxicity of anaesthetic agents in children including neonates. Drugs used for premedication including agents,routes and side effects.
Paediatric and neonatal doses of intravenous anaesthetic medications including induction agents, opiates, muscle relaxants, reversal agents and emergency medications including side-effects and contraindications.

PHYSICS

Laws of physics as applied to anaesthesia. Principles of monitoring equipment and equipment used for conduct of anaesthesia including ultrasound.

PSYCHOLOGICAL AND ETHICAL ISSUES

Consent, assent, issues related to ethics of research in paediatric and neonatal anaesthesia. Psychological differences, perioperative anxiety, issues in children with special needs.

II. CLINICAL SCIENCES AS RELATED TO PAEDIATRIC AND NEONATAL ANAESTHESIA

Perform appropriate preoperative evaluation of neonates, infants and children. Understand the pre- operative issues relevant to the anaesthetic care of neonates, infants and children including: coexisting morbidities, medications, allergic reactions, labour and delivery history, maternal history, family history, the normal neonatal and paediatric physical examinataion and the evaluation of abnormal findings.

Know the ASA guidelines for preoperative fasting including clear fluids, breast milk and formula based upon patient age. Understand the appropriate ordering of preoperative laboratory testing and evaluation.

Understand the regulation of temperature in neonates, infants and children and compensatory mechanisms, effects of anaesthesia on temperature and the consequences of hypothermia.
Know the differential diagnosis and management of perioperative hyperthermia.

Know the age-related fluid and electrolyte requirements for neonates, infants and children including calculation of deficit, intra-operative fluid requirements, glucose requirements and the guidelines, indications and side effects for blood and blood product administration in the patient.

Plan an anaesthetic for the prematurely born child. Know the residual medical problems in children born premature (e.g., bronchopulmonary dysplasia) and the potential impact on anaesthetic care.

Learn the common congenital syndromes that include difficult airways, e.g., Pierre Robin, Treacher-Collins,Trisomyy 21 etc.Identify and evaluate the child with a difficult airway. Preoperative evaluation and an anaesthetic plan for a paediatric patient with an upper respiratory tract infection (URI). Develop a decision process for proceeding with elective surgery in a child with an acute or recovering URI.

Evaluate and institute appropriate therapy for a child with respiratory failure.

Understand the anesthetic implications for pyloric stenosis, gastro-esophageal reflux, renal disease and liver disease in the paediatric patient.

Know the anaesthetic implications of children with a mediastinal mass.
Understand the anaesthetic considerations for a child with a latex allergy. Plan
an anaesthetic for a child with a neuromuscular disease.
Develop a plan for the perioperative management of a child with haemoglobinopathies. Develop a
plan for the perioperative management of a child with a congenital bleeding disorder.
Understand the indications and contraindications for spinal and epidural anaesthesia and peripheral blocks in infants and children including side effects and complications.

Know the prevention, management and consequences of laryngospasm.

Know the criteria for tracheal extubation and how to perform a deep extubation safely.

Understand the post-operative anaesthetic complications for paediatric patients including stridor, croup, nausea/vomiting and emergence delirium and their management.

Know the pathophysiology, indications for surgical intervention, and anaesthetic implications for the following common paediatric and neonatal surgical conditions:

a. congenital diaphragmatic hernia (CDH)
b. tracheoesophageal fistula
c. inguinal hernia
d. intussusception
e. necrotizing enterocolitis (NEC)
f. omphalocele and gastroschisis
g. pyloric stenosis
h. intestinal obstruction
i. intra-abdominal tumors, cysts
j. congenital lobar emphysema
k. empyema, lung abscess
l. posterior urethral valves, hydronephrosis
m. undescended testis

Understand the implications of pneumoperitoneum in the neonate and child and the physiologic changes due to carbon di oxide insufflation.

Understand the haemodynamic changes in thoracoscopy and the physiology of one lung ventilation in children.

III. ALLIED SCIENCES

Common cyanotic and acyanotic congenital heart lesions including ventricular septal defect, atrial septal defect, patent ductus arteriosus, critical aortic stenosis and coarctation, pulmonary stenosis, tetralogy of Fallot, and transposition of the great arteries.

Understand the anesthetic implications for children with congenital heart disease including associated syndromes, preoperative assessment, SBE prophylaxis, anesthetic cardiovascular effects, and theeffects of an intracardiac shunt on intravenous and inhalation induction of general anaesthesia. Perform a preoperative evaluation and participate in an anaesthetic for a paediatric patient with congenital heart disease.

Understand the principles of cardiopulmonary bypass in pediatric patients.

Know the anesthetic implications of cerebral palsy, seizure disorders, hydrocephalus, intracranial tumors, neuromuscular diseases, muscular dystrophies, and diseases of the neuromuscular junction and neuromuscular transmission.

Understand the anesthetic implications and perioperative management of inherited disorders of coagulation (e.g. haemophilia) and hemoglobinopathies (e.g., sickle cell disease). Develop a plan for the perioperative management of a child with a congenital bleeding disorder.

Know the anaesthetic considerations for children with oncologic disease and who have had chemotherapy.

Understand the anaesthetic considerations in children with endocrine abnormalities including pheochromocytoma, thyroid disorders, etc.

Principles and conduct of solid organ transplantation in children.

Know the pathophysiology, indications for surgical intervention, and anaesthetic implications for the following common paediatric and neonatal surgical conditions

a. otitis media requiring myringotomy and tube placement
b. obstructive sleep apnoea or recurrent tonsillitis requiring adenotonsillectomy
c. acutely bleeding tonsil
d. Oesophageal foreign body

e. tracheal or bronchial foreign body
f. retropharyngeal abscess
g. choanal atresia
h. hydrocephalus requiring ventriculo-peritoneal (VP) shunt insertion or revision
i. myelomeningocele
j. intracranial tumors
k. blocked tear ducts requiring lacrimal duct probing and irrigation
l. open globe injury
m. strabismus
n. congenital cataract
o. scoliosis
p. congenital talipes equinovarus
q. craniosynostosis
r. cleft lip and palate
s. paediatric trauma
t. paediatric burns

Understand the age-related changes and pathophysiology of intracranial pressure (ICP) in children. Know the pathophysiology and treatment of the oculocardiac reflex.
Understand the implications of providing paediatric anaesthesia for radiation therapy, CT scan, MRI and additional procedures outside of the traditional OR environment including dental anaesthesia and endoscopic procedures.

Anaesthesia for day care surgery and office-based procedures.

Paediatric Pain Management and Intensive care

Understand methods for recognition and assessment of pain in different paediatric age groups including neonates.

Know methods for treatment of acute postoperative pain in children. Demonstrate the ability to develop and carry out a plan to manage and treat postoperative pain in children across all age groups including neonates.

Demonstrate the ability to treat refractory postoperative pain in children of all ages including neonates. Understand the age-related differences in use of opioid analgesics in children.
Learn and perform epidural catheterisation in neonates and infants.
Know different regimens for postoperative epidural analgesia in children. Be able to evaluate and manage children with epidural analgesic therapy and break-through pain.

Learn the diagnosis and treatment of chronic pain in children.

Understand the pathophysiology and treatment of common chronic painful conditions in children (e.g., sickle cell disease, oncologic disease, reflex sympathetic dystrophy, etc.)

Understand the concepts of Patient Controlled Analgesia.

Be able to evaluate and treat common complications of analgesic therapy in children (e.g., nausea, vomiting, pruritus, and ventilatory depression).

Understand the principles of mechanical ventilation and modes of ventilatory support in neonates and children.

Management of paediatric mechanical ventilation and ICU care.

IV. RECENT ADVANCES

Recent advances in the field of paediatric surgery, paediatrics, neonatology, paediatric and neonatal critical care.

Advances in Pulmonary support - ECMO, Nitric oxide, High frequency oscillatory Ventilation
Blood substitutes
Current advances and concepts in drugs, equipments, and monitoring methods

V. OTHERS

Hospital Administration:
Sterilization/Gas supply, equipment maintenance, ambient air control and infection control techniques in OT

Microbiology: Infection control, prevention, diagnosis and management.

Ethics in Medicine

Bio Statistics and Research Methodology

ASSESSMENT & EXAMINATION

Regular three internal assessments, both in theory and practicals, shall be made for every candidate. Internal assessment will be made in day to day work of trainee, which involves patient care, teaching and anaesthesia in the operating room,emergency services,bedside presentation and research.

Learn the diagnosis and treatment of chronic pain in children.

Understand the pathophysiology and treatment of common chronic painful conditions in children (e.g., sickle cell disease, oncologic disease, reflex sympathetic dystrophy, etc.)

Understand the concepts of Patient Controlled Analgesia.

Be able to evaluate and treat common complications of analgesic therapy in children (e.g., nausea, vomiting, pruritus, and ventilatory depression).

Understand the principles of mechanical ventilation and modes of ventilatory support in neonates and children.

Management of paediatric mechanical ventilation and ICU care.

VI. RECENT ADVANCES

Recent advances in the field of paediatric surgery, paediatrics, neonatology, paediatric and neonatal critical care.

Advances in Pulmonary support - ECMO, Nitric oxide, High frequency oscillatory Ventilation
Blood substitutes
Current advances and concepts in drugs, equipments, and monitoring methods

VII. OTHERS

Hospital Administration:
Sterilization/Gas supply, equipment maintenance, ambient air control and infection control techniques in OT

Microbiology: Infection control, prevention, diagnosis and management.

Ethics in Medicine

Bio Statistics and Research Methodology

ASSESSMENT & EXAMINATION

Regular three internal assessments, both in theory and practicals, shall be made for every candidate.

Final Examination

Eligibility

Candidate will be allowed to appear after three years of training and after completion of his / her Research Project and as per University rules.

Board of Examiners

Paediatric anaesthesiologists with minimum 3 years of teaching experience in the speciality.

Theory Papers

04 Paper (Paper I to Paper IV, 100 Marks each) This system is followed in other subjects of D.M. Courses.

There shall be four theory papers with the following titles

- Basic sciences as related to paediatric and neonatal anaesthesia
- Clinical Sciences aspects of paediatric and neonatal anaesthesia
- Anaestheia in relation to Allied Sciences, Research Methodology
- Pain, intensive care and Recent advances

Clinical Practical and Viva Voce

One long case and two short cases will be given to the candidates and the discussion thereon would last 30-40minutes in each case. The candidates will also be given ECG, X-rays, and ABG to be interpreted. Various equipment used in OT, intensive care, drugs, fluids, catheters for invasive monitoring will also be discussed. Viva will also be held.

Passing Criteria

As per existing system of passing criteria, it is mandatory for the candidate to obtain minimum 40% of passing marks in each Theory Paper and 50% of marks in overall aggregate in all papers. For Clinical practical & viva minimum 50% of marks in overall aggregate are required.