Curriculum

WFSA

Paediatric Anaesthesia

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I. INTRODUCTION

Paediatric anaesthesia is an important super-specialty of anaesthesia required to train anaesthesiologists to function as a faculty/consultant/specialist, to carry out and help in conducting applied research in the field of paediatric anaesthesia and to plan and set-up an independent paediatric anaesthesia unit which can cater to paediatric surgery and intensive care. This specialty education in the field of paediatric anaesthesia and intensive care is necessary for the development of the concerned skills, knowledge, and attitudes. It leads to proficiency in clinical competency and makes one assume responsibility for the care of individual patients independently.
Paediatric anaesthesia deals with the anaesthetic and perioperative management of children from new born to 18 years of age. The anaesthetic management of children is very different from that of adults due to the anatomical, physiological, pharmacological and psychological differences between the two.

The primary aim is to standardize the training of an anaesthetist in the specialty of Paediatric Anaesthesia to improve standards of care and reduce mortality and morbidity rates of paediatric anaesthesia in Globally.

To train anaesthetists in the safe practices and latest advances of Paediatric Anaesthesia so that they are able to provide safe anesthesia to children in the perioperative period.

The specialty program in paediatric anaesthesia will ensure optimal patient care and an opportunity to develop skills in clinical care & judgment, teaching, administration & research. Paediatric anaesthesia specialist will be proficient not only in providing anaesthesia care for neonates, infants, children and adolescents undergoing a wide variety of surgical, diagnostic, and therapeutic procedures, but also in pain management, intensive care & advanced life support. After completion of the course, the specialist will be able to perform the following:

a) Provide perioperative anaesthesia & intensive care for neonates, infants, children & adolescents undergoing a wide variety of surgical, diagnostic & therapeutic procedures.
b) Provide perioperative pain relief to children of all ages.
c) Have proficiency in paediatric advanced life support.
d) Teach, train and mentor postgraduate students in paediatric anaesthesia.
e) Plan, conduct and publish research in the field of paediatric anaesthesia

II. TEACHING AND TRAINING ACTIVITIES

1. Training

Area of rotation	Total duration of rotation (months)
Elective and emergency Paediatric Surgery (Urogenital/ Thoracic/ Orthopaedics/ Eye OTs)	3 months
Plastic/ ENT/ Neurosurgery/ Cardiac OTs	1 month
NORA (Dental sedation, CT scan, MRI, Radiotherapy, GE	15 days
NICU	15 days
PICU	15 days
Emergency Room	15 days
Total	6 months

***Rotation in the above OTs will include duties in PAC clinic and pain services**

2. Teaching/Academic Activities (moderated by core faculty)

The Fellow will be directly mentored by course director and the responsibility of the course exposure lies entirely with the hospital and the course director.

The academic program should include the following:

a. Journal Club & critical appraisal: This would be a weekly academic exercise. Candidate will be expected to select articles for presentation from reputed paediatric anaesthesia journals and discuss their suitability for presentation with the moderator.
b. Faculty Lecture
c. Case presentations (List of suggested cases)
d. Audit of the surgical cases which were provided anaesthesia will be presented per month and critical events during this period discussed.
e. PALS course certification is mandatory during the course. Any other course like NALS would be desirable but not compulsory.
f. Poster/Paper presentation in national/international conference – at least one during the course.

g. Attendance in one National/ International Paediatric Conference per year is mandatory. Representation in more than 1 educational activity will be encouraged.

Direct Observed Procedures
Communication Establish an effective relationship with both paediatric patients and parents emphasizing understanding, trust, empathy, and confidentiality Communicate a concise assessment and perioperative anaesthetic management plan with the parents and attending staff
Preoperative Assessment of child for gestational age, URI, fasting duration, medical co-morbidities and premedication plan Knowledge of fasting guidelines
Airway Airway assessment of child Bag and Mask Ventilation technique Technique of endotracheal intubation of all ages including infants and neonates Supraglottic airway device placement One lung ventilation technique based on age of child
Management of Difficult airway
Regional anaesthesia techniques
Fluid management
Ultrasound
Routine and advanced monitoring
Postoperative management in PACU Discharge criteria Pain assessment and treatment
Oxygen therapy
Resuscitation • Paediatric advanced life support (PALS)

III. SYLLABUS

1. Developmental aspects
   a) Transition from intrauterine to extrauterine life
   b) Neonatal physiology
   c) Transition from neonatal period to infancy

2. Anatomical and physiological differences between small children and adults
   a) The airway and respiratory system
   b) The cardiovascular system
   c) Water, electrolytes and the kidney
   d) The liver and gastrointestinal tract
   e) The central nervous system
   f) Hematology

3. Pharmacological differences in drug kinetics and dynamics
   a) Inhalational agents
   b) Intravenous induction and maintenance agents
   c) Opioids and non-opioid analgesics
   d) Local anaesthetic agents

4. Preoperative assessment and preparation
   a) History taking and clinical examination – Interaction with children
   b) Criteria for investigations
   c) Blood group and cross match
   d) Preoperative management of
      - URTI
      - Bronchial asthma, cystic fibrosis, OSA
      - Seizures, cerebral palsy, muscular dystrophy
      - GE reflux
      - Thalassemia, sickle cell disease
   e) Selection for day care and discharge criteria
   f) Fasting guidelines
   g) Communication with child and family

5. Equipment, techniques and monitoring
   a) Equipment
      - Face masks – anatomical, Randel Baker mask, other types
      - Oro- and naso-pharyngeal airways
      - Supraglottic airway devices – CLMA, PLMA, Igel etc.
      - Tracheal and tracheostomy tubes (plain, cuffed, preformed,

armoured, Cole, laser)
    - Laryngoscopes (curved and straight blades, videolaryngoscope)
    - Fiberoptic bronchoscope
    - Breathing circuits
        - Jackson Rees modification of Ayre's t-piece
        - Circle absorption breathing system
    - Anaesthesia machine
    - Ventilators
- b) Techniques
    - Anaesthesia for a term and preterm neonate – tracheoesophageal fistula, congenital diaphragmatic hernia, atresia, omphalocele and gastrochisis, necrotizing enterocolitis
    - IV access skills
        - Routine sizes, sites and fixation for peripheral cannulae
        - Central venous lines: indications, devices, techniques and complication
        - PICC line
        - Ultrasound guidance for vascular access
        - Intraosseous access
        - Care of long term central venous lines
    - Inhalational induction
    - Maintenance of anaesthesia
    - Management of laryngospasm
    - RSI and Modified RSI
    - Maintenance of body temperature
    - Common problems in recovery (including criteria for discharge)
- c) Monitoring
    - Cardiovascular, respiratory, CNS, neuromuscular, temperature
    - Indications for invasive monitoring

6. Management of the airway
    - a) Assessment of the paediatric airway
    - b) Identification of the child with a difficult airway
        - Congenital syndromes
        - Airway obstruction, congenital and acquired
    - c) Equipment used in management of the paediatric airway
    - d) Basic and advanced paediatric airway skills
    - e) Techniques for management of difficult airway
    - f) Complications associated with difficult airway management

7. Pain management including regional techniques
    - a) Pain neurophysiology

b) Nociception and the response to injury
c) Analgesic pharmacology
d) Multimodal analgesia

8. General surgery
   a) Common problems of neonatal and small infant anaesthesia
   b) Acute Abdomen and RSI
   c) Laparoscopic surgery techniques and implications
   d) Hernia Repair, Orchidopexy, Appendicectomy, Exploratory Laparotomy for tumors/cyst removal/excisions/resection anastomosis etc.
   e) Brachial sinus/ fistula excision, cystic hygroma, tongue tie release etc.
9. Urology and renal transplantation:
   a) Cystoscopy, PUV Fulguration
   b) Nephrectomy
   c) D J Stent insertion and removal
   d) Pyeloplasty
   e) Hypospadiasis repair
   f) Orchidectomy
10. Ear, nose and throat surgery
   a) General anaesthetic considerations – laryngeal papilloma, bronchoscopy
   b) The shared airway
   c) Post anaesthetic care
   d) Obstructive sleep apnoea – adenotonsillectomy
11. Ophthalmic surgery
   a) Glaucoma
   b) Vitreoretinal surgery
   c) Squint
12. Dental, maxillofacial and plastic surgery
   a) Cleft lip and palate
   b) Trauma
13. Orthopaedic surgery
   a) Cerebral palsy
   b) Scoliosis surgery
   c) CTEV Correction
   d) Hip Spica
14. Neurosurgery
   a) Hydrocephalus
   b) Meningomylocele
   c) VP Shunt insertion/revision
15. Cardiac and thoracic surgery
   a) VSD/ASD/AVSD/PDA,
   b) Preoperative assessment and investigations including the implications of Cyanotic heart disease, Re-do surgery, Pulmonary hypertension

c) Blood gas analysis
d) Principles of cardiopulmonary bypass and cardioplegia
e) Pharmacology of ionotropes – types, uses & doses, antifibrinolytics, heparin, haemostasis and blood product use

f) Thoracic surgery – one lung ventilation, VATS, thoracotomy

16. Anaesthesia/sedation in remote location
    a) CT, MRI
    b) Interventional radiology – DSA
    c) Cardiac catheterization
    d) Dental sedation
    e) Radiotherapy
    f) GE endoscopy

VI. LOG BOOK

The student will maintain a "log book" of all the cases and procedures done. The student will also keep a record of seminars, journal clubs, and clinical meetings performed by him in the logbook.

V. RECOMMENDED TEXT BOOKS AND JOURNALS:

1. Books
    a. Gregory's Pediatric Anesthesia. Edited by George. E. Gregory, Dean. B. Andropoulas. Sixth edition 2020, Publisher Wiley - Blackwell Publishing Ltd.

    b. Smith's Anesthesia for infants and children. Peter J. Davis, Franklyn P. Cladis, Etsuro K. Motoyama. Tenth Edition 2021, Publisher Elsevier Mosby.

    c. A Practice of Anesthesia for Infants and Children. Charles J. Cote, Jerrold Lerman, I. David Todres. Sixth edition 2018, Elsevier.

2. Journal

    a) Pediatric Anesthesia

    b) Anesthesiology

    c) British Journal of Anaesthesia

    d) Canadian Journal of Anesthesia

    e) Indian Journal of Anaesthesia

    f) Journal of Anaesthesiology and Clinical Pharmacology