



PDCC IN NEUROANAESTHESIA CURRICULUM

AIIMS KALYANI



JANUARY 8, 2024

ACADEMIC SECTION
AIIMS Kalyani

PDCC Neuroanaesthesia

Overview

The principal objectives of this institute is to provide highest standards of patient care and to develop of teaching in under graduate, post graduate and Post-doctoral students in all its branches so as to demonstrate a high standard of medical education. Currently our Department of Anaesthesiology is running elective and emergency anaesthesia services to General Surgery, Obstetrics and Gynaecology, Orthopaedics, ENT, Ophthalmology, Urology, Neurosurgery, Plastic surgery, Oral and Maxillofacial surgery, and paediatric surgery. We are also running a thirteen-bedded ICU where we are catering to the patients of surgical and medical diseases needing intensive life support.

At present, the Department of Anaesthesiology has four faculties (One additional Professor and 3 Assistant Professors) and five senior residents. The faculty members are trained from reputed institutions of the country and have experience in a variety of fields. One additional professor is a trained neuroanaesthesiologist from the reputed SGPGI, Lucknow. We are involved in teaching and training of MBBS, postgraduate and BSc OTT students. We have started research activities in the department and the faculties are involved in multicentre /interdisciplinary research projects. All the faculties are well experienced and are very dynamic and passionate about patient care, academics and research.

Neuroanaesthesia is a separate speciality of anaesthesia which plays a pivotal role in improving the outcome of treatment of neurological and neurosurgical patients. AIIMS Kalyani is catering to elective and emergency neurosurgical patients including brain, spine and neurovascular surgeries. The average number of Neurosurgical cases per month are 19-20 and the census is on a constant rise. A 13-bedded neurosurgical ICU is going to start soon.

Taking into consideration the various credentials, the department of Anaesthesiology finds itself self-sufficient in starting Post-Doctoral Certificate Course (PDCC) in Neuroanaesthesia in AIIMS Kalyani.

Eligibility: MD/ DNB Anaesthesiology from a MCI recognised university/College. Two years of senior residency in a teaching institute.

Selection Criteria: Interview

Duration of course: 1 year.

Number of seats: 02

Syllabus:

Basic Neuroanatomy and Neurophysiology

1. Anatomy of the brain and spinal cord
2. Physiology of the brain and spinal cord

3. The cerebrospinal fluid circulation
4. Cerebral and spinal circulation, metabolism and effects of various anaesthetics (inhalational and intravenous agents)
5. Intracranial pressure and various herniation syndromes
6. Determinants of brain elastance, cerebral perfusion pressure, cerebral autoregulation, and metabolic coupling
7. Mechanism of neuronal injury and brain protection

Respiratory physiology

1. Physiology of spontaneous respiration and mechanical ventilation
2. Indications for mechanical ventilation
3. Modes of ventilation
4. Weaning from ventilatory support
5. Complications of mechanical ventilation – recognition and management

Cardiovascular physiology:

1. Recognition and management of arrhythmias
2. Management of hemodynamic disturbances – hypotension, hypertension, myocardial ischemia, pulmonary edema and heart failure
3. Knowledge of commonly employed vasoactive and anti-arrhythmic drugs

Renal physiology:

1. Fluid and electrolytes physiology and pathophysiology
2. Prevention, diagnosis and management protocol for acute kidney disease
3. Basic knowledge of dialysis

Metabolic disorders

1. Pathophysiology and management of the Electrolyte disturbances in neurosurgical patients
2. Acid-base disorders
3. Understanding of endocrine disorders

Pharmacology

1. Basic idea on pharmacodynamics and pharmacokinetics of drugs, drug interactions, complications of various drugs used in neurological patients
2. Sedatives and anaesthetic agents
3. Analgesics - Narcotics and non-narcotic agents
4. Muscle relaxants
5. Anticonvulsants
6. Vasopressors and inotropes
7. Antibiotics
8. Steroids

Brain Death:

1. Criteria, determination and certification of Brain death
2. Differential diagnosis e.g. drug induced, locked-in syndrome, etc

3. Organ donation: metabolic and hemodynamic management pending organ harvesting

Subarachnoid Hemorrhage:

1. Various types of cerebral aneurysms
2. Describe the common aneurysm locations leading to SAH
3. Understand the clinical and radiographic grades of SAH 12
4. Methods used to detect cerebral vasospasm & strategies to treat cerebral vasospasm to prevent secondary ischemic stroke
5. Indications for temporary external ventricular drains / permanent Shunts
6. Non-neurological complications of SAH and their management
7. Surgical clipping and coiling of cerebral aneurysm
8. Giant intracranial aneurysms and their implications

Monitoring in Neuro Critical Care

1. Neurological monitoring at the bedside
2. EEG- understanding basic EEG, role of continuous EEG monitoring in ICU
3. Monitoring cerebral oxygenation
4. Monitoring cerebral blood flow
5. Monitoring biomarkers
6. Hemodynamic monitoring
7. Respiratory monitoring
8. Intracranial pressure monitoring

Neuroimaging

1. Basics of neuroradiology
2. CT, MRI, TCD (Trans cranial Doppler), USG (Ultrasound)
3. Interventional Neuroradiologic procedures
4. Identify the basic structures in the central nervous system (Ventricles, cisterns, sinuses, major anatomic landmarks)
5. List the imaging techniques/signs used to identify acute intracranial hemorrhages, mass lesions, arterial and venous lesions, and ischemic penumbras / infarcts

Procedures in the OT and ICU

1. Arterial line placement
2. Central venous line placement
3. Airway related issues in Neuroanaesthesia
3. Anaesthetic management of
 - Supratentorial, Posterior Fossa, CP angle and other brain tumours.
 - Spine surgery
 - Head injury
 - Hydrocephalus
 - Awake craniotomy
 - Neuroendoscopy
 - Epilepsy surgery
 - Neuroradiological procedures
 - DBS and other neurofunctional surgeries
4. Tracheostomy – surgical and percutaneous dilatational tracheostomy
5. Care of patients with invasive equipment e.g ICP monitor, EVD

- Deep epilepsy electrode, grid, etc.
- 6. Patient controlled analgesia pump
- 7. Application of transcranial Doppler

Traumatic Brain/Spinal Cord Injury

Management of TBI (Traumatic Brain Injury)

- 1. Assessment and resuscitation
- 2. Airway management
- 3. Laboratory and radiological investigations
- 4. Pathophysiology of head injury
- 5. Factors causing secondary injury
- 6. ICP (Intracranial pressure) - physiology and pathophysiology, and principles of management. Controversies of ICP monitoring in TBI
- 7. CPP (Cerebral perfusion pressure); its role in TBI management, concept of individualized CPP
- 8. ICP-CPP targeted management of TBI
- 9. Biochemical markers of brain injury, molecular and cellular mechanisms of injury
- 10. Brain Trauma Foundation Guidelines in the management of TBI / spinal cord Injury
- 11. Role of hyperventilation in traumatic brain injury

Management of Spinal cord injury

- 1. Resuscitation and care of the affected area
- 2. Airway management of C-spine injury
- 3. Pathophysiology of spinal cord injury
- 4. Conservative management of spine injury
- 5. Role of steroids administration in spinal cord trauma
- 6. Spinal shock and autonomic hyperreflexia
- 7. Care of the cardiovascular and pulmonary complications

Miscellaneous

- 1. Sepsis - Pathophysiology and management
- 2. Haemodynamic management
- 3. Pregnancy and Neurosurgery
- 4. Cyanotic heart disease and neurosurgery
- 5. Multiple Organ Dysfunction Syndromes
- 6. Nosocomial infections
- 7. Antibiotics and immunotherapy
- 8. Reperfusion injury and antioxidants
- 9. Shock-types and management
- 10. Deep vein thrombosis prophylaxis, management and Pulmonary Embolism
- 11. Coagulopathies and their management
- 12. Infection Control in the ICU

Teaching and Training Methods:

1. **Journal Club:** The trainee will present a journal article relevant to neuroanaesthesia.
2. **Lectures:** Attend didactic lectures by internal and external faculty
3. **Subject Seminar:** The trainee will present a subject topic allocated after doing a comprehensive preparation, relevant literature search
4. **Clinical Case Presentation**
5. **Clinical audits and departmental reviews**
6. **Teaching and training of Undergraduates and post graduate students**
7. **Student will be encouraged to deliver lectures/ present papers at the CME programmes/ conferences conducted at the National, State and Local Levels**
8. **Bedside teaching**
9. **Logbook**
10. **Research: Student will be encouraged to take active participation in the research work and publications.**

Assessment:

Formative assessment: Continual assessment during training to assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system.

Summative Assessment: At the end of course.

The summative assessment examination shall include two heads:

- A. Theory examination.
- B. Practical, Clinical examination and Viva-voce

There shall be three theory papers of 3 hours each.

Paper I: Basic Sciences as applied to the subject

Paper II: Clinical Neuroanaesthesia Neuroanaesthesia, interventional neuroradiology, and

Paper III: Neurointensive care and Recent advances in the subject

Clinical / Practical and Oral Examination:

(i) Clinical presentation

Students shall examine a minimum one long case and 02 short cases.

(ii) Oral Examination shall be thorough and shall aim at assessing the student's knowledge and competence about the subject, investigative procedures, therapeutic techniques and other aspects of the specialty, which form a part of the examination.

Study Material:

Books (latest edition)

- Text Book of Neuroanaesthesia by JE Cottrell and Young

- Core Topics in Neuroanaesthesia by Matta, Menon and Smith
- Text Book of Neuroanesthesia by Albin
- Neurological and Neurosurgical Critical care by Ropper and Diringer
- Case studies in Neuroanaesthesia and Neurocritical care –by J Andrzejowski and Sambamurthy
- Other anaesthesia books for postgraduates

Journals:

3-5 International and 02 national journals (indexed)